



Interfaces Feature Guide for the NFX250 Network Services Platform

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15.1X53
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About the Documentation

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- Using the Examples in This Manual on page xiii
- Documentation Conventions on page xv
- Documentation Feedback on page xvii
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Documentation and Release Notes

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

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

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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.xsl; }
```

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

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

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

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

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

Documentation Conventions

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

Table 1: Notice Icons







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

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

Table 2: Text and Syntax Conventions

| Convention | Description | Examples |
|----------------------------|--|--|
| Bold text like this | Represents text that you type. | To enter configuration mode, type the configure command: user@host> configure |
| Fixed-width text like this | Represents output that appears on the terminal screen. | user@host> show chassis alarms No alarms currently active |

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

| Convention | Description | Examples |
|--------------------------------|---|--|
| <i>Italic text like this</i> | <ul style="list-style-type: none">Introduces or emphasizes important new terms.Identifies guide names.Identifies RFC and Internet draft titles. | <ul style="list-style-type: none">A policy <i>term</i> is a named structure that defines match conditions and actions.<i>Junos OS CLI User Guide</i>RFC 1997, <i>BGP Communities Attribute</i> |
| <i>Italic text like this</i> | Represents variables (options for which you substitute a value) in commands or configuration statements. | Configure the machine's domain name: [edit] root@# set system domain-name <i>domain-name</i> |
| Text like this | Represents names of configuration statements, commands, files, and directories; configuration hierarchy levels; or labels on routing platform components. | <ul style="list-style-type: none">To configure a stub area, include the stub statement at the [edit protocols ospf area area-id] hierarchy level.The console port is labeled CONSOLE. |
| < > (angle brackets) | Encloses optional keywords or variables. | stub <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. | broadcast multicast (<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. | rsvp { # Required for dynamic MPLS only |
| [] (square brackets) | Encloses a variable for which you can substitute one or more values. | community name members [<i>community-ids</i>] |
| 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 | | |
| Bold text like this | Represents graphical user interface (GUI) items you click or select. | <ul style="list-style-type: none">In the Logical Interfaces box, select All Interfaces.To cancel the configuration, click Cancel. |
| > (bold right angle bracket) | Separates levels in a hierarchy of menu selections. | In the configuration editor hierarchy, select Protocols>Ospf . |

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We encourage you to provide feedback, comments, and suggestions so that we can improve the documentation. You can provide feedback by using either of the following methods:

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- E-mail—Send your comments to techpubs-comments@juniper.net. Include the document or topic name, URL or page number, and software version (if applicable).

Requesting Technical Support

Technical product support is available through the Juniper Networks Technical Assistance Center (JTAC). If you are a customer with an active J-Care or Partner Support Service support contract, or are covered under warranty, and need post-sales technical support, you can access our tools and resources online or open a case with JTAC.

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

Self-Help Online Tools and Resources

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

- Find CSC offerings: <http://www.juniper.net/customers/support/>
- Search for known bugs: <http://www2.juniper.net/kb/>
- Find product documentation: <http://www.juniper.net/techpubs/>
- Find solutions and answer questions using our Knowledge Base: <http://kb.juniper.net/>
- Download the latest versions of software and review release notes: <http://www.juniper.net/customers/csc/software/>
- Search technical bulletins for relevant hardware and software notifications: <http://kb.juniper.net/InfoCenter/>

- Join and participate in the Juniper Networks Community Forum:
<http://www.juniper.net/company/communities/>
- Open a case online in the CSC Case Management tool: <http://www.juniper.net/cm/>

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

Opening a Case with JTAC

You can open a case with JTAC on the Web or by telephone.

- Use the Case Management tool in the CSC at <http://www.juniper.net/cm/>.
- Call 1-888-314-JTAC (1-888-314-5822 toll-free in the USA, Canada, and Mexico).

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

PART 1

Ethernet OAM Link Fault Management

- [Understanding Ethernet OAM Link Fault Management on page 3](#)

CHAPTER 1

Understanding Ethernet OAM Link Fault Management

- [Understanding Ethernet OAM Link Fault Management for an EX Series Switch on page 3](#)
- [Configuring Ethernet OAM Link Fault Management \(CLI Procedure\) on page 4](#)

Understanding Ethernet OAM Link Fault Management for an EX Series Switch

Supported Platforms [EX Series](#)

Juniper Networks Junos operating system (Junos OS) for Juniper Networks EX Series Ethernet Switches allows the Ethernet interfaces on these switches to support the IEEE 802.3ah standard for the Operation, Administration, and Maintenance (OAM) of Ethernet in access networks. The standard defines OAM link fault management (LFM). You can configure IEEE 802.3ah OAM LFM on point-to-point Ethernet links that are connected either directly or through Ethernet repeaters. The IEEE 802.3ah standard meets the requirement for OAM capabilities even as Ethernet moves from being solely an enterprise technology to a WAN and access technology, and the standard remains backward-compatible with existing Ethernet technology.

Ethernet OAM provides the tools that network management software and network managers can use to determine how a network of Ethernet links is functioning. Ethernet OAM should:

- Rely only on the media access control (MAC) address or virtual LAN identifier for troubleshooting.
- Work independently of the actual Ethernet transport and function over physical Ethernet ports or a virtual service such as pseudowire.
- Isolate faults over a flat (or single operator) network architecture or nested or hierarchical (or multiprovider) networks.

The following OAM LFM features are supported on EX Series switches:

- Discovery and Link Monitoring

The discovery process is triggered automatically when OAM is enabled on the interface. The discovery process permits Ethernet interfaces to discover and monitor the peer

on the link if it also supports the IEEE 802.3ah standard. You can specify the discovery mode used for IEEE 802.3ah OAM support. In active mode, the interface discovers and monitors the peer on the link if the peer also supports IEEE 802.3ah OAM functionality. In passive mode, the peer initiates the discovery process. After the discovery process has been initiated, both sides participate in discovery. The switch performs link monitoring by sending periodic OAM protocol data units (PDUs) to advertise OAM mode, configuration, and capabilities.

You can specify the number of OAM PDUs that an interface can miss before the link between peers is considered down.

- Remote Fault Detection

Remote fault detection uses flags and events. Flags are used to convey the following: Link Fault means a loss of signal, Dying Gasp means an unrecoverable condition such as a power failure, and Critical Event means an unspecified vendor-specific critical event. You can specify the periodic OAM PDU sending interval for fault detection. The EX Series switch uses the Event Notification OAM PDU to notify the remote OAM device when a problem is detected. You can specify the action to be taken by the system when the configured link-fault event occurs.

- Remote Loopback Mode

Remote loopback mode ensures link quality between the switch and a remote peer during installation or troubleshooting. In this mode, when the interface receives a frame that is not an OAM PDU or a pause frame, it sends it back on the same interface on which it was received. The link appears to be in the active state. You can use the returned loopback acknowledgement to test delay, jitter, and throughput.

Junos OS can place a remote DTE into loopback mode (if remote loopback mode is supported by the remote DTE). When you place a remote DTE into loopback mode, the interface receives the remote loopback request and puts the interface into remote loopback mode. When the interface is in remote loopback mode, all frames except OAM PDUs are looped back without any changes made to the frames. OAM PDUs continue to be sent and processed.

**Related
Documentation**

- [Configuring Ethernet OAM Link Fault Management \(CLI Procedure\) on page 4](#)
- [Example: Configuring Ethernet OAM Link Fault Management on EX Series Switches](#)

Configuring Ethernet OAM Link Fault Management (CLI Procedure)

Supported Platforms [EX Series](#)

Ethernet OAM link fault management (LFM) can be used for physical link-level fault detection and management. The IEEE 802.3ah LFM works across point-to-point Ethernet links either directly or through repeaters.

To configure Ethernet OAM LFM using the CLI:

1. Enable IEEE 802.3ah OAM support on an interface:

```
[edit protocols oam ethernet link-fault-management]
user@switch# set interface interface-name
```



NOTE: You can configure Ethernet OAM LFM on aggregated interfaces.



NOTE: The remaining steps are optional. You can choose which of these features to configure for Ethernet OAM LFM on your switch.

2. Specify whether the interface or the peer initiates the discovery process by configuring the link discovery mode to **active** or **passive** (**active** = interface initiates; **passive** = peer initiates):

```
[edit protocols oam ethernet link-fault-management]
user@switch# set interface interface-name link-discovery active
```

3. Configure a periodic OAM PDU-sending interval (in milliseconds) for fault detection:

```
[edit protocols oam ethernet link-fault-management]
user@switch# set interface interface-name pdu-interval interval
```

4. Specify the number of OAM PDUs that an interface can miss before the link between peers is considered down:

```
[edit protocols oam ethernet link-fault-management]
user@switch# set interface interface-name pdu-threshold threshold-value
```

5. Configure event threshold values on an interface for the local errors that trigger the sending of link event TLVs:

- Set the threshold value (in seconds) for sending frame-error events or taking the action specified in the action profile:

```
[edit protocols oam ethernet link-fault-management]
user@switch# set interface interface-name event-thresholds frame-error count
```

- Set the threshold value (in seconds) for sending frame-period events or taking the action specified in the action profile:

```
[edit protocols oam ethernet link-fault-management]
user@switch# set interface interface-name event-thresholds frame-period count
```

- Set the threshold value (in seconds) for sending frame-period-summary events or taking the action specified in the action profile:

```
[edit protocols oam ethernet link-fault-management]
user@switch# set interface interface-name event-thresholds frame-period-summary count
```

- Set the threshold value (in seconds) for sending symbol-period events or taking the action specified in the action profile:

```
[edit protocols oam ethernet link-fault-management]
user@switch# set interface interface-name event-thresholds symbol-period count
```



NOTE: You can disable the sending of link event TLVs.

To disable the sending of link event TLVs:

```
[edit protocols oam ethernet link-fault-management]
user@switch# set interface interface-name negotiation-options no-allow-link-events
```

6. Create an action profile to define event fault flags and thresholds to be taken when the link fault event occurs. Then apply the action profile to one or more interfaces. (You can also apply multiple action profiles to a single interface.)

- a. Name the action profile:

```
[edit protocols oam ethernet link-fault-management]
user@switch# set action-profile profile-name
```

- b. Specify actions to be taken by the system when the link fault event occurs:

```
[edit protocols oam ethernet link-fault-management]
user@switch# set action-profile profile-name action syslog
user@switch# set action-profile profile-name action link-down
```

- c. Specify events for the action profile:

```
[edit protocols oam ethernet link-fault-management]
user@switch# set action-profile profile-name event link-adjacency-loss
```



NOTE: For each action profile, you must specify at least one link event and one action. The actions are taken only when all of the events in the action profile are true. If more than one action is specified, all actions are executed. You can set a low threshold for a specific action such as logging the error and set a high threshold for another action such as system logging.

7. Set a remote interface into loopback mode so that all frames except OAM PDUs are looped back without any changes made to the frames. Set the remote DTE in loopback mode (the remote DTE must support remote-loopback mode) and then enable remote loopback support for the local interface.

```
[edit protocols oam ethernet link-fault-management]
user@switch# set interface interface-name remote-loopback
user@switch# set interface interface-name negotiation-options allow-remote-loopback
```

Related Documentation

- [Example: Configuring Ethernet OAM Link Fault Management on EX Series Switches](#)
- [Understanding Ethernet OAM Link Fault Management for an EX Series Switch on page 3](#)

PART 2

Interfaces

- [Understanding Interfaces on page 9](#)

CHAPTER 2

Understanding Interfaces

- [Interfaces Overview on page 9](#)
- [Understanding Interface Naming Conventions on page 11](#)
- [Understanding Interface Ranges on page 17](#)
- [Understanding Management Interfaces on page 18](#)
- [Understanding Port Ranges and System Modes on page 19](#)
- [Configuring the Interface Address on page 45](#)
- [Configuring Gigabit and 10-Gigabit Ethernet Interfaces on page 48](#)
- [Configuring Ethernet Loopback Capability on page 53](#)
- [Monitoring Interface Status and Traffic on page 53](#)
- [Troubleshooting Network Interfaces on page 54](#)

Interfaces Overview

Supported Platforms [EX4600, QFabric System, QFX Series standalone switches](#)

Juniper Networks devices have two types of interfaces: network interfaces and special interfaces. This topic provides brief information about these interfaces. For additional information, see the *Junos OS Network Interfaces Library for Routing Devices*.

- [Network Interfaces on page 9](#)
- [Special Interfaces on page 10](#)

Network Interfaces

Network interfaces connect to the network and carry network traffic. [Table 3 on page 9](#) lists the types of network interfaces supported.

Table 3: Network Interface Types and Purposes

| Type | Purpose |
|--------------------------------|---|
| Aggregated Ethernet interfaces | You can group Ethernet interfaces at the physical layer to form a single link-layer interface, also known as a <i>link aggregation group (LAG)</i> or <i>bundle</i> . These aggregated Ethernet interfaces help to balance traffic and increase the uplink bandwidth. |

Table 3: Network Interface Types and Purposes (*continued*)

| Type | Purpose |
|---|--|
| Channelized Interfaces | <p>Depending on the device and software package, 40-Gbps QSFP+ ports can be configured to operate as the following types of interfaces:</p> <ul style="list-style-type: none"> 10-Gigabit Ethernet interfaces (<i>xe</i>) 40-Gigabit Ethernet interfaces (<i>et</i> and <i>xle</i>) 40-Gigabit data plane uplink interfaces (<i>fte</i>) <p>When an <i>et</i> port is channelized to four <i>xe</i> ports, a colon is used to signify the four separate channels. For example, on a QFX3500 standalone switch with port 2 on PIC 1 configured as four 10-Gigabit Ethernet ports, the interface names are <i>xe-0/1/2:0</i>, <i>xe-0/1/2:1</i>, <i>xe-0/1/2:2</i>, and <i>xe-0/1/2:3</i>.</p> <p>NOTE: You cannot configure channelized interfaces to operate as Virtual Chassis ports.</p> |
| Ethernet Interfaces | You can configure Gigabit Ethernet, 10-Gigabit Ethernet, 40-Gigabit Ethernet interfaces to connect to other servers, storage, and switches. You can configure 40-Gigabit data plane uplink ports to connect a Node device to an Interconnect devices as well as for Virtual Chassis ports (VCPs). |
| Fibre Channel interfaces | You can use Fibre Channel interfaces to connect the switch to a Fibre Channel over Ethernet (FCoE) forwarder or a Fibre Channel switch in a storage area network (SAN). You can configure Fibre Channel interfaces only on ports 0 through 5 and 42 through 47 on QFX3500 devices. Fibre Channel interfaces do not forward Ethernet traffic. |
| LAN access interfaces | You can use these interfaces to connect to other servers, storage, and switches. When you power on a QFX Series product and use the factory-default configuration, the software automatically configures interfaces in access mode for each of the network ports. |
| Multichassis aggregated Ethernet (MC-AE) interfaces | You can group a LAG on one standalone switch with a LAG on another standalone switch to create a MC-AE. The MC-AE provides load balancing and redundancy across the two standalone switches. |
| Tagged-access mode interfaces | You can use tagged-access interfaces to connect a switch to an access layer device. Tagged-access interfaces can accept VLAN-tagged packets from multiple VLANs. |
| Trunk interfaces | You can use trunk interfaces to connect to other switches or routers. To use a port for this type of connection, you must explicitly configure the port interface for trunk mode. The interfaces from the switches or routers must also be configured for trunk mode. In this mode, the interface can be in multiple VLANs and accept tagged packets from multiple devices. Trunk interfaces typically connect to other switches and to routers on the LAN. |
| Virtual Chassis ports (VCPs) | You can use Virtual Chassis ports to send and receive Virtual Chassis Control Protocol (VCCP) traffic, and to create, monitor, and maintain the Virtual Chassis. On QFX3500, QFX3600, QFX5100, and EX4600 standalone switches, you can configure 40-Gigabit Ethernet QSFP+ uplink ports (non-channelized) or fixed SFP+ 10-Gigabit Ethernet ports as VCPs by issuing the request virtual-chassis-vc-port-set CLI command. |

Special Interfaces

Table 4 on page 11 lists the types of special interfaces supported.

Table 4: Special Interface Types and Purposes

| Type | Purpose |
|---|---|
| Console port | Each device has a serial console port, labeled CON or CONSOLE , for connecting tty-type terminals to the switch. The console port does not have a physical address or IP address associated with it. However, it is an interface in the sense that it provides access to the switch. |
| Loopback interface | A software-only virtual interface that is always up. The loopback interface provides a stable and consistent interface and IP address on the switch. |
| Management interface | <p>The management Ethernet interface provides an out-of-band method for connecting to a standalone switch and QFabric system.</p> <p>NOTE: On OCX Series switches, the em0 management interface always has the status up in show command outputs, even if the physical port is empty. The me0 interface is a virtual interface between Junos and the host operating system, therefore its status is independent from the status of the physical port.</p> |
| Routed VLAN interfaces (RVI and IRB interfaces) | <p>Layer 3 routed VLAN interfaces (called RVI in the original CLI, and called IRB in Enhanced Layer 2 Software) route traffic from one broadcast domain to another and perform other Layer 3 functions such as traffic engineering. These functions are typically performed by a router interface in a traditional network.</p> <p>The RVI or IRB functions as a logical router, eliminating the need for having both a switch and a router. The RVI or IRB must be configured as part of a broadcast domain or virtual private LAN service (VPLS) routing instance for Layer 3 traffic to be routed out of it.</p> |

Related Documentation

- [Understanding Aggregated Ethernet Interfaces and LACP on page 63](#)
- [Understanding Interface Naming Conventions on page 11](#)
- [Understanding Layer 3 Logical Interfaces on page 57](#)
- [Understanding Management Interfaces on page 18](#)
- *Understanding Integrated Routing and Bridging*
- *Overview of Fibre Channel*

Understanding Interface Naming Conventions

Supported Platforms [EX4600, QFabric System, QFX Series standalone switches](#)

The QFX Series and the EX4600 device uses a naming convention for defining the interfaces that is similar to that of other platforms running under Juniper Networks Junos OS. This topic provides brief information about the naming conventions used for interfaces on the QFX Series and on EX4600 switches.

This topic describes:

- [Physical Part of an Interface Name on page 12](#)
- [Logical Part of an Interface Name on a Switch Running QFabric Software Package on page 16](#)

- [Logical Part of a Channelized Interface Name on a Switch Running Enhanced Layer 2 Software on page 16](#)
- [Wildcard Characters in Interface Names on page 16](#)

Physical Part of an Interface Name

Interfaces in Junos OS are specified as follows:

device-name:type-fpc/pic/port

The convention is as follows:

- *device-name*—(QFabric systems only) The *device-name* is either the serial number or the alias of the QFabric system component, such as a Node device, Interconnect device, or QFabric infrastructure. The name can contain a maximum of 128 characters and cannot contain any colons.
- *type*—The QFX Series and EX4600 device interfaces use the following media types:
 - **fc**—Fibre Channel interface
 - **ge**—Gigabit Ethernet interface
 - **xe**—10-Gigabit Ethernet interface
 - **xle**—40-Gigabit Ethernet interface (QFX3500, QFX3600, and QFX5100 switches running a QFabric software package)
 - **et**—40-Gigabit Ethernet interface (QFX3500, QFX3600, QFX5100, and EX4600 switches running Enhanced Layer 2 Software)
 - **fte**—40-Gigabit data plane uplink interface (QFX3500, QFX3600, and QFX5100 switches running a QFabric software package)
 - **me**—Management interface
 - **em**—Management interface on QFX5100 and EX4600 switches.
- *fpc*—Flexible PIC Concentrator. QFX Series interfaces use the following convention for the FPC number in interface names:
 - On QFX3500, QFX3600, and QFX5100 devices running a QFabric software package, the FPC number is always **0**.

The FPC number indicates the slot number of the line card that contains the physical interface.

 - On QFX3500, QFX3600, QFX5100, and EX4600 switches running Enhanced Layer 2 Software, the member ID of a member in a Virtual Chassis determines the FPC number.



NOTE: Every member in a Virtual Chassis must have a unique member ID, otherwise the Virtual Chassis will not be created.

- On standalone QFX5100 and EX4600 switches, the FPC number is always **0**.

- *pic*—QFX Series and EX4600 device interfaces use the following convention for the PIC (Physical Interface Card) number in interface names:
 - On a QFX3500 switch running a QFabric software package, PIC 0 can support 48 ports, PIC 1 can support 16 10-Gigabit Ethernet ports, and PIC 2 can support 4 40-Gigabit Ethernet ports.
 - On a QFX3500 switch running Enhanced Layer 2 software, PIC 0 can support 48 ports, and PIC 1 can support 16 10-Gigabit Ethernet ports, and 4 40-Gigabit Ethernet ports.
 - On a QFX3500 Node device running a QFabric software package, PIC 0 can support 48 ports and PIC 1 can support four 40-Gigabit data plane uplink ports.
 - On a QFX3600 switch running a QFabric software package, PIC 0 can support 64 10-Gigabit Ethernet ports, and PIC 1 can support 16 40-Gigabit Ethernet ports.
 - On a QFX3600 switch running Enhanced Layer 2 software, PIC 0 can support 64 10-Gigabit Ethernet ports and can also support 16 40-Gigabit Ethernet ports.
 - On a QFX3600 Node device running a QFabric software package, PIC 0 can support 56 10-Gigabit Ethernet ports, and PIC 1 can support 8 40-Gigabit data plane uplink ports, and up to 14 40-Gigabit Ethernet ports.
 - On a QFX5100-48S switch running Enhanced Layer 2 software, PIC 0 provides six 40-Gbps QSFP+ ports and 48 10-Gigabit Ethernet interfaces.
 - On an EX4600 device running Enhanced Layer 2 software, PIC 0 provides 4 40-Gbps QSFP+ ports and 24 10-Gigabit Ethernet interfaces. There are two expansion bays (PIC 1 and PIC 2), and you can insert QFX-EM-4Q expansion modules and EX4600-EM-8F expansion modules. The QFX-EM-4Q expansion module provide 4 40-Gbps QSFP+ ports. The EX4600-EM-8F expansion module provides 8 40-Gbps QSFP+ ports. You can insert any combination of expansion modules. For example, you can insert two EX4600-EM-8F expansion modules, two QFX-EM-4Q expansion modules, or one of each.
 - On a QFX5100-48S switch running a QFabric software package, PIC 1 provides six 40-Gbps QSFP+ ports, and PIC 0 provides 48 10-Gigabit Ethernet interfaces.

- On a QFX5100-24Q switch running Enhanced Layer 2 software, PIC 0 provides 24 40-Gbps QSFP+ ports. PIC 1 and PIC 2 can each contain a QFX-EM-4Q expansion module, and each expansion module provides 4 40-Gbps QSFP+ ports
- On a QFX5100-96S switch running Enhanced Layer 2 software, PIC 0 provides 96 10-Gigabit Ethernet interfaces and 8 40-Gbps QSFP+ ports.
- *port*—Interfaces use the following convention for port numbers:

- On a QFX3500 switch running a QFabric software package, there are 48 network access ports (10-Gigabit Ethernet) labeled 0 through 47 on PIC 0 and, 16 network access ports labeled 0 through 15 on PIC 1, and four 40-Gbps QSFP+ ports labeled Q0 through Q3 on PIC 2. You can use the QSFP+ ports to connect the Node device to Interconnect devices.

By default, the 40-Gbps QSFP+ ports are configured to operate as 10-Gigabit Ethernet ports. You can use QSFP+ to four SFP+ copper breakout cables to connect the 10-Gigabit Ethernet ports to other servers, storage, and switches. Optionally, you can choose to configure the QSFP+ ports as 40-Gigabit Ethernet ports (see *Configuring the QSFP+ Port Type on QFX3500 Standalone Switches*).

- On a QFX3500 switch running Enhanced Layer 2 software, there are 48 network access ports labeled 0 through 47 on PIC 0 and 4 40-Gbps QSFP+ ports labeled Q0 through Q3 on PIC 1. See *Channelizing Interfaces* for information on how to configure and channelize the 40-Gbps QSFP+ ports.
- On a QFX3600 switch running a QFabric software package, there are 64 network access ports (10-Gigabit Ethernet) labeled Q0 through Q15 on PIC 0, and there are 16 network access ports (40-Gigabit Ethernet) labeled Q0 through Q15 on PIC 1.

By default, all the QSFP+ ports are configured to operate as 40-Gigabit Ethernet ports. Optionally, you can choose to configure the QSFP+ ports as 10-Gigabit Ethernet ports (see *Configuring the Port Type on QFX3600 Standalone Switches*) and use QSFP+ to four SFP+ copper breakout cables to connect the 10-Gigabit Ethernet ports to other servers, storage, and switches.

- On a QFX3600 Node device running a QFabric software package, PIC 0 can support up to 56 10-Gigabit Ethernet ports labeled Q2 through Q15, and PIC 1 can support up to 8 40-Gigabit data plane uplink ports labeled Q0 through Q7, and up to 14 40-Gigabit Ethernet ports labeled Q2 through Q15.

On a QFX3600 Node device, by default, four 40-Gbps QSFP+ ports (labeled Q0 through Q3) are configured for uplink connections between your Node device and your Interconnect devices, and twelve 40-Gbps QSFP+ ports (labeled Q4 through Q15) use QSFP+ to four SFP+ copper breakout cables to support up to 48 10-Gigabit Ethernet ports for connections to either endpoint systems (such as servers and storage devices) or external networks. Optionally, you can choose to configure the first eight ports (Q0 through Q7) for uplink connections between your Node device and your Interconnect devices, and ports Q2 through Q15 for 10-Gigabit Ethernet or 40-Gigabit Ethernet connections to either endpoint systems or external networks (see *Configuring the Port Type on QFX3600 Node Devices*).

- On a QFX3600 switch running Enhanced Layer 2 software, PIC 0 can support 64 network access ports (10-Gigabit Ethernet ports) labeled Q0 through Q15 and 16

40-Gigabit Ethernet ports labeled Q0 through Q15. See *Channelizing Interfaces* for information on how to configure and channelize the 40-Gbps QSFP+ ports.

- On a QFX5100-48S switch running Enhanced Layer 2 software, PIC 0 can support 48 network access ports (10-Gigabit Ethernet ports) labeled 0 through 47 and 6 40-Gbps QSFP+ ports labeled 48 through 53. See *Channelizing Interfaces* for information on how to configure and channelize the 40-Gbps QSFP+ ports.
- On an EX4600 switch running Enhanced Layer 2 software, PIC 0 can support 24 network access ports (10-Gigabit Ethernet ports) labeled 0 through 23 and 4 40-Gbps QSFP+ ports labeled 24 through 27. There are two expansion bays (PIC 1 and PIC 2), and you can insert QFX-EM-4Q expansion modules and EX4600-EM-8F expansion modules. The QFX-EM-4Q expansion module provide 4 40-Gbps QSFP+ ports. The EX4600-EM-8F expansion module provides 8 40-Gbps QSFP+ ports. You can insert any combination of expansion modules. For example, you can insert two EX4600-EM-8F expansion modules, two QFX-EM-4Q expansion modules, or one of each. See *Channelizing Interfaces* for information on how to configure and channelize the 40-Gbps QSFP+ ports.
- On a QFX5100-48S switch running a QFabric software package, PIC 0 can support 48 network access ports (10-Gigabit Ethernet ports) labeled 0 through 47, and PIC 1 can support 6 40-Gbps QSFP+ ports labeled 0 through 5. See *Configuring the QSFP+ Port Type on QFX5100 Switches* for information on how to configure the port mode of 40-Gbps QSFP+ ports.
- On a QFX5100-24Q switch running Enhanced Layer 2 software, PIC 0 can support 24 40-Gbps QSFP+ ports labeled 0 through 23. PIC 1 and PIC 2 each support 4 40-Gbps QSFP+ port, for a total of eight 40-Gbps QSFP+ ports. See *Channelizing Interfaces* for information on how to configure and channelize the 40-Gbps QSFP+ ports.



NOTE: You cannot channelize the 40-Gbps QSFP+ ports provided in the two QFX-EM-4Q expansion modules. Also, even though there is a total of 128 physical ports, only 104 logical ports can be channelized.

You can configure different system modes to achieve varying levels of port density on the QFX5100-24Q and QFX5100-96S switches. Depending on the system mode you configure, there are restrictions on which ports you can channelize. If you channelize ports that are restricted, the configuration is ignored. See *Configuring the System Mode* for information on how to configure the system mode.

- On a QFX5100-96S switch running Enhanced Layer 2 software, PIC 0 can support 96 10-Gigabit Ethernet ports labeled 0 through 95, and 8 40-Gbps QSFP+ ports labeled 96 through 103. See *Channelizing Interfaces* for information on how to configure and channelize the 40-Gbps QSFP+ ports.



NOTE: You can only channelize the 40-Gbps QSFP+ ports provided in ports 96 and 100, because only 104 logical ports can be channelized.

You can configure different system modes to achieve varying levels of port density on the QFX5100-24Q and QFX5100-96S switches. Depending on the system mode you configure, there are restrictions on which ports you can channelize. If you channelize ports that are restricted, the configuration is ignored. See *Configuring the System Mode* for information on how to configure the system mode.

Logical Part of an Interface Name on a Switch Running QFabric Software Package

The logical unit part of the interface name corresponds to the logical unit number, which can be a number from 0 through 16384. In the virtual part of the name, a period (.) separates the port and logical unit numbers: *device-name* (QFabric systems only): *type-fpc/pic/port.logical-unit-number*. For example, if you issue the **show ethernet-switching interfaces** command on a system with a default VLAN, the resulting display shows the logical interfaces associated with the VLAN:

| Interface | State | VLAN members | Blocking |
|-------------------------|-------|-----------------|-----------|
| node-device1:xe-0/0/1.0 | down | remote-analyzer | unblocked |
| node-device1:xe-0/0/2.0 | down | default | unblocked |
| node-device1:xe-0/0/3.0 | down | default | unblocked |

When you configure aggregated Ethernet interfaces, you configure a logical interface, which is called a *bundle* or a LAG. Each LAG can include up to eight Ethernet interfaces, depending on the switch model.

Logical Part of a Channelized Interface Name on a Switch Running Enhanced Layer 2 Software

Channelizing enables you to configure four 10-Gigabit Ethernet interfaces from a 40-Gigabit Ethernet QSFP+ interface. By default, a 40-Gigabit Ethernet QSFP+ interface is named *et-fpc/pic/port*. The resulting 10-Gigabit Ethernet interfaces appear in the following format: *xe-fpc/pic/port:channel*, where channel can be a value of 0 through 3.

For example, if an *et* interface named **et-0/0/3** is channelized to four 10-Gigabit Ethernet interfaces, the resulting 10-Gigabit Ethernet interface names will be **xe-0/0/3:0**, **xe-0/0/3:1**, **xe-0/0/3:2**, and **xe-0/0/3:3**:

| Interface | Admin | Link | Proto | Local | Remote |
|------------|-------|------|-------|-------|--------|
| xe-0/0/3:0 | up | down | | | |
| xe-0/0/3:1 | up | down | | | |
| xe-0/0/3:2 | up | down | | | |
| xe-0/0/3:3 | up | down | | | |

Wildcard Characters in Interface Names

In the **show interfaces** and **clear interfaces** commands, you can use wildcard characters in the *interface-name* option to specify groups of interface names without having to type each name individually. You must enclose all wildcard characters except the asterisk (*) in quotation marks (" ").

- Related Documentation**
- [Interfaces Overview on page 9](#)
 - [Channelizing Interfaces](#)
 - [Configuring the System Mode](#)
 - [Understanding Management Interfaces on page 18](#)

- [Understanding Port Ranges and System Modes on page 19](#)
- *Rear Panel of a QFX3500 Device*
- *Front Panel of a QFX3600 Device*
- *Junos OS Network Interfaces Library for Routing Devices*

Understanding Interface Ranges

Supported Platforms [EX4600, OCX1100, QFabric System, QFX Series standalone switches](#)

You can use the interface ranges to group interfaces of the same type that share a common configuration profile. This helps reduce the time and effort in configuring interfaces. The configurations common to all the interfaces can be included in the interface range definition.

The interface range definition contains the name of the interface range defined, the names of the individual member interfaces that do not fall in a series of interfaces, a range of interfaces defined in the member range, and the configuration statements common to all the interfaces. An interface range defined with member ranges and individual members but without any common configurations is also a valid definition.



NOTE: The interface range definition is supported only for Gigabit Ethernet, 10-Gigabit Ethernet, and Fibre Channel interfaces. OCX Series switches do not support Fibre Channel interfaces.

The common configurations defined in the interface range will be overridden by the local configuration.

The defined interface ranges can be used at places where the **interface** statement is used in the following configuration hierarchies:



NOTE: These statements are not supported on OCX Series switches:

- **protocols isis interface**
- **protocols sflow interfaces**

Related Documentation

- [Interfaces Overview on page 9](#)
- *Interfaces Overview*
- [Configuring Gigabit and 10-Gigabit Ethernet Interfaces on page 48](#)
- *Configuring Gigabit and 10-Gigabit Ethernet Interfaces*
- [Configuring Link Aggregation on page 67](#)
- [Configuring a Layer 3 Logical Interface on page 57](#)

- *Junos OS Network Interfaces Library for Routing Devices*
- [interface-range on page 160](#)

Understanding Management Interfaces

Supported Platforms [EX4600, OCX1100, QFabric System, QFX Series standalone switches](#)

You use management interfaces to access devices remotely. Typically, a management interface is not connected to the in-band network, but is connected to a device in the internal network. Through a management interface, you can access the device over the network using utilities such as **ssh** and **telnet** and configure it from anywhere, regardless of its physical location. As a security feature, users cannot log in as **root** through a management interface. To access the device as **root**, you must use the console port. You can also use **root** to log in using SSH.



NOTE: Before you can use management interfaces, you must configure the logical interfaces with valid IP addresses. Juniper Networks does not support configuring two management interfaces in the same subnet.

Management interface port ranges vary based on device type:

- QFX3500 devices:

The valid port range for a management interface (**me**) on a QFX3500 device is between 0 and 6, with a total of seven available ports. On a QFX3500 standalone switch, however, you can only configure **me0** and **me1** as management interfaces. The management interfaces are labeled **C0** and **C1**, and they correspond to **me0** and **me1**. On a QFX3500 Node device, the RJ-45 management interfaces and SFP management interfaces correspond to **me5** and **me6**.

- QFX3600 devices:

There are two RJ-45 management interfaces (labeled **C0** and **C1**) and two SFP management interfaces (labeled **C0S** and **C1S**). On a QFX3600 standalone switch, the RJ-45 management interfaces and SFP management interfaces correspond to **me0** and **me1**. On a QFX3600 Node device, the RJ-45 management interfaces and SFP management interfaces correspond to **me5** and **me6**. Each pair of management interfaces correspond to one Ethernet interface—for example, both RJ-45 management interfaces (labeled **C0** and **C0s**) can correspond to **me0**, and both SFP management interfaces (labeled **C1** and **C1s**) can correspond to **me1**. By default, both RJ-45 management interfaces are active. If you insert an SFP interface into the SFP management port (**C0S**, for example), the SFP interface would become the active management interface, and the corresponding RJ-45 management interface (**C0**) is disabled.



NOTE: On a QFX3600 device, you can use either the RJ-45 or the SFP management interfaces, but not both at the same time.

- On QFX5100, QFX5200, and EX4600 switches, there is one RJ-45 management interface (labeled **C0** and one SFP management interface (labeled **C1**), and they correspond to em0 and em1. You can use both management interfaces simultaneously.
- On QFX10002 and QFX10008 switches, there is one RJ-45 management interface (labeled **MGMT** and one SFP management interface (labeled **MGMT**), and they correspond to em0 and em1. Although the CLI permits you to configure two management Ethernet interfaces within the same subnet, only one interface is usable and supported.
- On OCX Series switches:

There is one RJ-45 management interface (labeled **MGMT**), which corresponds to em0. The em0 interface always has the status **up** in show command outputs, even if the physical port is empty. The me0 interface is a virtual interface between Junos and the host operating system, therefore its status is independent from the status of the physical port.
- QFabric system:

On a QFabric system, there are management interfaces on the Node devices, Interconnect devices, and Director devices. However, you cannot access the management interfaces on the Node devices or Interconnect devices directly. You can only manage and configure these devices using the Director device. You can connect to the management interface over the network using utilities such as SSH.

**Related
Documentation**

- [Interfaces Overview on page 9](#)

Understanding Port Ranges and System Modes

Supported Platforms [EX4600, QFabric System, QFX Series standalone switches](#)

QFX Series devices and EX4600 switches can support different port ranges depending on the device, media type of the interface, the software that is running on the device, and the system mode.

This topic describes:

- [Port Ranges for Different Media Types on page 19](#)
- [Supported System Modes on page 43](#)

Port Ranges for Different Media Types

The following media types support the following port ranges:

- On a QFX3500 device:

- The valid port range for a Fibre Channel (fc) interface is **0** through **5** and **42** through **47** on PIC **0**, with a total of 12 available Fibre Channel ports.



NOTE: Fibre Channel ports are not supported on QFX3500, QFX3600, and QFX5100 switches running Enhanced Layer 2 software.

- The valid port range for a Gigabit Ethernet (ge) interface is **6** through **41** on PIC **0** because the ports between **0** and **5** and **42** and **47** are reserved as Fibre Channel ports. The total number of available Gigabit Ethernet ports is 36, because 12 of the remaining 48 ports are reserved for Fibre Channel and 10-Gigabit Ethernet interfaces. Fibre Channel ports cannot be configured as Gigabit Ethernet ports.
- The valid port range for a 10-Gigabit Ethernet (xe) interface is **0** through **47** on PIC **0**. The valid port range for a 10-Gigabit Ethernet (xe) interface is **0** through **15** on PIC **1**. The total number of available 10-Gigabit Ethernet ports is 64.
- The valid port range for a 40-Gigabit data plane uplink interface is **0** through **3** on PIC **1**
- The valid port range for a 40-Gigabit Ethernet interface is **0** through **3** on PIC **2**. There are four available ports.
- On a QFX3600 Node device:
 - The valid port range for a 10-Gigabit Ethernet interface is **8** through **63** on PIC **0**. There are 56 available ports.
 - The valid port range for a 40-Gigabit Ethernet interface is **2** through **15** on PIC **1**. There are 14 available ports.
 - The valid port range for a 40-Gigabit data plane uplink interface is **0** through **7** on PIC **1**. There are eight available ports.

See [Table 7 on page 29](#) for physical port to logical port mappings.

- On a QFX3600 switch running Enhanced Layer 2 Software:
 - The valid port range for a 10-Gigabit Ethernet interface is **0** through **63** on PIC **0**. There are 64 available ports.
 - The valid port range for a 40-Gigabit Ethernet interface is **0** through **15** on PIC **0**. There are 16 available ports.

See [Table 8 on page 31](#) for physical port to logical port mappings.

- On QFX5100-48S and QFX5100-48T switches running Enhanced Layer 2 Software:
 - The valid port range for a 10-Gigabit Ethernet interface is **0** through **47** on PIC **0**. There are 48 available ports. When you channelize the 6 40-Gbps QSFP+ ports on **0** through **5** on PIC **1**, there are 72 available ports.



NOTE: On PIC **1**, ports **0** and **1** are reserved for fte ports. You cannot convert these fte ports to xe or xle ports.

- The valid port range for a 40-Gbps QSFP+ port is **0** through **5** on PIC **1**. There are six available ports.

See [Table 10 on page 37](#) for physical port to logical port mappings.

- On EX4600 switches running Enhanced Layer 2 Software:
 - The valid port range for a 10-Gigabit Ethernet interface is **0** through **23** on PIC **0**. There are 24 available ports. When you channelize the 4 40-Gbps QSFP+ ports on **24** through **27** on PIC **0**. There are 40 available ports.

See [Table 10 on page 37](#) for physical port to logical port mappings.

- On QFX5100-48S and QFX5100-48T switches running a QFabric software package:
 - The valid port range for a 10-Gigabit Ethernet interface is **0** through **47** on PIC **0**. There are 48 available ports.
 - The valid port range for a 40-Gbps QSFP+ port is **0** through **5** on PIC **1**. There are six available ports.



NOTE: On PIC 1, ports 0 and 1 are reserved for fte ports. You cannot convert these fte ports to xe or xle ports.

See [Table 11 on page 40](#) for physical port to logical port mappings.

- For QFX5100-24Q and QFX5100-96S switches running Enhanced Layer 2 Software, see [Table 12 on page 44](#) for physical port to logical port mappings for different system modes.

Table 5: Valid Port Ranges on QFX3500 Switches Running QFabric Software Package

| Port Number | Fibre Channel Interfaces (On PIC 0) | Gigabit Ethernet Interfaces (On PIC 0) | 10-Gigabit Ethernet Interfaces (On PIC 0 and 1) | 40-Gigabit Data Plane Uplink Interfaces (On PIC 1) | 40-Gigabit Ethernet Interfaces (On PIC 2) |
|-------------|--|---|--|--|--|
| 0 | fc-0/0/0 | Not supported on this port | xe-0/0/0 | Not supported on this port | Not supported on this port |
| 1 | fc-0/0/1 | Not supported on this port | xe-0/0/1 | Not supported on this port | Not supported on this port |
| 2 | fc-0/0/2 | Not supported on this port | xe-0/0/2 | Not supported on this port | Not supported on this port |
| 3 | fc-0/0/3 | Not supported on this port | xe-0/0/3 | Not supported on this port | Not supported on this port |
| 4 | fc-0/0/4 | Not supported on this port | xe-0/0/4 | Not supported on this port | Not supported on this port |

Table 5: Valid Port Ranges on QFX3500 Switches Running QFabric Software Package (*continued*)

| Port Number | Fibre Channel Interfaces (On PIC 0) | Gigabit Ethernet Interfaces (On PIC 0) | 10-Gigabit Ethernet Interfaces (On PIC 0 and 1) | 40-Gigabit Data Plane Uplink Interfaces (On PIC 1) | 40-Gigabit Ethernet Interfaces (On PIC 2) |
|-------------|--|---|--|--|--|
| 5 | fc-0/0/5 | Not supported on this port | xe-0/0/5 | Not supported on this port | Not supported on this port |
| 6 | Not supported on this port | ge-0/0/6 | xe-0/0/6 | Not supported on this port | Not supported on this port |
| 7 | Not supported on this port | ge-0/0/7 | xe-0/0/7 | Not supported on this port | Not supported on this port |
| 8 | Not supported on this port | ge-0/0/8 | xe-0/0/8 | Not supported on this port | Not supported on this port |
| 9 | Not supported on this port | ge-0/0/9 | xe-0/0/9 | Not supported on this port | Not supported on this port |
| 10 | Not supported on this port | ge-0/0/10 | xe-0/0/10 | Not supported on this port | Not supported on this port |
| 11 | Not supported on this port | ge-0/0/11 | xe-0/0/11 | Not supported on this port | Not supported on this port |
| 12 | Not supported on this port | ge-0/0/12 | xe-0/0/12 | Not supported on this port | Not supported on this port |
| 13 | Not supported on this port | ge-0/0/13 | xe-0/0/13 | Not supported on this port | Not supported on this port |
| 14 | Not supported on this port | ge-0/0/14 | xe-0/0/14 | Not supported on this port | Not supported on this port |
| 15 | Not supported on this port | ge-0/0/15 | xe-0/0/15 | Not supported on this port | Not supported on this port |
| 16 | Not supported on this port | ge-0/0/16 | xe-0/0/16 | Not supported on this port | Not supported on this port |
| 17 | Not supported on this port | ge-0/0/17 | xe-0/0/17 | Not supported on this port | Not supported on this port |
| 18 | Not supported on this port | ge-0/0/18 | xe-0/0/18 | Not supported on this port | Not supported on this port |
| 19 | Not supported on this port | ge-0/0/19 | xe-0/0/19 | Not supported on this port | Not supported on this port |

Table 5: Valid Port Ranges on QFX3500 Switches Running QFabric Software Package (*continued*)

| Port Number | Fibre Channel Interfaces (On PIC 0) | Gigabit Ethernet Interfaces (On PIC 0) | 10-Gigabit Ethernet Interfaces (On PIC 0 and 1) | 40-Gigabit Data Plane Uplink Interfaces (On PIC 1) | 40-Gigabit Ethernet Interfaces (On PIC 2) |
|-------------|--|---|--|--|--|
| 20 | Not supported on this port | ge-0/0/20 | xe-0/0/20 | Not supported on this port | Not supported on this port |
| 21 | Not supported on this port | ge-0/0/21 | xe-0/0/21 | Not supported on this port | Not supported on this port |
| 22 | Not supported on this port | ge-0/0/22 | xe-0/0/22 | Not supported on this port | Not supported on this port |
| 23 | Not supported on this port | ge-0/0/23 | xe-0/0/23 | Not supported on this port | Not supported on this port |
| 24 | Not supported on this port | ge-0/0/24 | xe-0/0/24 | Not supported on this port | Not supported on this port |
| 25 | Not supported on this port | ge-0/0/25 | xe-0/0/25 | Not supported on this port | Not supported on this port |
| 26 | Not supported on this port | ge-0/0/26 | xe-0/0/26 | Not supported on this port | Not supported on this port |
| 27 | Not supported on this port | ge-0/0/27 | xe-0/0/27 | Not supported on this port | Not supported on this port |
| 28 | Not supported on this port | ge-0/0/28 | xe-0/0/28 | Not supported on this port | Not supported on this port |
| 29 | Not supported on this port | ge-0/0/29 | xe-0/0/29 | Not supported on this port | Not supported on this port |
| 30 | Not supported on this port | ge-0/0/30 | xe-0/0/30 | Not supported on this port | Not supported on this port |
| 31 | Not supported on this port | ge-0/0/31 | xe-0/0/31 | Not supported on this port | Not supported on this port |
| 32 | Not supported on this port | ge-0/0/32 | xe-0/0/32 | Not supported on this port | Not supported on this port |
| 33 | Not supported on this port | ge-0/0/33 | xe-0/0/33 | Not supported on this port | Not supported on this port |
| 34 | Not supported on this port | ge-0/0/34 | xe-0/0/34 | Not supported on this port | Not supported on this port |

Table 5: Valid Port Ranges on QFX3500 Switches Running QFabric Software Package (*continued*)

| Port Number | Fibre Channel Interfaces (On PIC 0) | Gigabit Ethernet Interfaces (On PIC 0) | 10-Gigabit Ethernet Interfaces (On PIC 0 and 1) | 40-Gigabit Data Plane Uplink Interfaces (On PIC 1) | 40-Gigabit Ethernet Interfaces (On PIC 2) |
|-------------|--|---|--|--|--|
| 35 | Not supported on this port | ge-0/0/35 | xe-0/0/35 | Not supported on this port | Not supported on this port |
| 36 | Not supported on this port | ge-0/0/36 | xe-0/0/36 | Not supported on this port | Not supported on this port |
| 37 | Not supported on this port | ge-0/0/37 | xe-0/0/37 | Not supported on this port | Not supported on this port |
| 38 | Not supported on this port | ge-0/0/38 | xe-0/0/38 | Not supported on this port | Not supported on this port |
| 39 | Not supported on this port | ge-0/0/39 | xe-0/0/39 | Not supported on this port | Not supported on this port |
| 40 | Not supported on this port | ge-0/0/40 | xe-0/0/40 | Not supported on this port | Not supported on this port |
| 41 | Not supported on this port | ge-0/0/41 | xe-0/0/41 | Not supported on this port | Not supported on this port |
| 42 | fc-0/0/42 | Not supported on this port | xe-0/0/42 | Not supported on this port | Not supported on this port |
| 43 | fc-0/0/43 | Not supported on this port | xe-0/0/43 | Not supported on this port | Not supported on this port |
| 44 | fc-0/0/44 | Not supported on this port | xe-0/0/44 | Not supported on this port | Not supported on this port |
| 45 | fc-0/0/45 | Not supported on this port | xe-0/0/45 | Not supported on this port | Not supported on this port |
| 46 | fc-0/0/46 | Not supported on this port | xe-0/0/46 | Not supported on this port | Not supported on this port |
| 47 | fc-0/0/47 | Not supported on this port | xe-0/0/47 | Not supported on this port | Not supported on this port |

Table 5: Valid Port Ranges on QFX3500 Switches Running QFabric Software Package (*continued*)

| Port Number | Fibre Channel Interfaces (On PIC 0) | Gigabit Ethernet Interfaces (On PIC 0) | 10-Gigabit Ethernet Interfaces (On PIC 0 and 1) | 40-Gigabit Data Plane Uplink Interfaces (On PIC 1) | 40-Gigabit Ethernet Interfaces (On PIC 2) |
|-------------|--|---|--|--|--|
| Q0 | Not supported on this port | Not supported on this port | xe-0/1/0 xe-0/1/1 xe-0/1/2 xe-0/1/3 NOTE: Supported on QFX3500 standalone switch only. | fte-0/1/0 | xle-0/2/0 |
| Q1 | Not supported on this port | Not supported on this port | xe-0/1/4 xe-0/1/5 xe-0/1/6 xe-0/1/7 NOTE: Supported on QFX3500 standalone switch only. | fte-0/1/1 | xle-0/2/1 |
| Q2 | Not supported on this port | Not supported on this port | xe-0/1/8 xe-0/1/9 xe-0/1/10 xe-0/1/11 NOTE: Supported on QFX3500 standalone switch only. | fte-0/1/2 | xle-0/2/2 |
| Q3 | Not supported on this port | Not supported on this port | xe-0/1/12 xe-0/1/13 xe-0/1/14 xe-0/1/15 NOTE: Supported on QFX3500 standalone switch only. | fte-0/1/3 | xle-0/2/3 |

Table 6: Valid Port Ranges on QFX3500 Switches Running Enhanced Layer 2 Software

| Port Number | Gigabit Ethernet Interfaces (On PIC 0) | 10-Gigabit Ethernet Interfaces (On PIC 0 and 1) | 40-Gigabit Ethernet Interfaces (On PIC 1) |
|-------------|---|--|--|
| 0 | Not supported on this port | xe-0/0/0 | Not supported on this port |
| 1 | Not supported on this port | xe-0/0/1 | Not supported on this port |
| 2 | Not supported on this port | xe-0/0/2 | Not supported on this port |
| 3 | Not supported on this port | xe-0/0/3 | Not supported on this port |
| 4 | Not supported on this port | xe-0/0/4 | Not supported on this port |
| 5 | Not supported on this port | xe-0/0/5 | Not supported on this port |
| 6 | ge-0/0/6 | xe-0/0/6 | Not supported on this port |
| 7 | ge-0/0/7 | xe-0/0/7 | Not supported on this port |
| 8 | ge-0/0/8 | xe-0/0/8 | Not supported on this port |
| 9 | ge-0/0/9 | xe-0/0/9 | Not supported on this port |
| 10 | ge-0/0/10 | xe-0/0/10 | Not supported on this port |
| 11 | ge-0/0/11 | xe-0/0/11 | Not supported on this port |
| 12 | ge-0/0/12 | xe-0/0/12 | Not supported on this port |
| 13 | ge-0/0/13 | xe-0/0/13 | Not supported on this port |
| 14 | ge-0/0/14 | xe-0/0/14 | Not supported on this port |
| 15 | ge-0/0/15 | xe-0/0/15 | Not supported on this port |
| 16 | ge-0/0/16 | xe-0/0/16 | Not supported on this port |
| 17 | ge-0/0/17 | xe-0/0/17 | Not supported on this port |
| 18 | ge-0/0/18 | xe-0/0/18 | Not supported on this port |
| 19 | ge-0/0/19 | xe-0/0/19 | Not supported on this port |
| 20 | ge-0/0/20 | xe-0/0/20 | Not supported on this port |
| 21 | ge-0/0/21 | xe-0/0/21 | Not supported on this port |
| 22 | ge-0/0/22 | xe-0/0/22 | Not supported on this port |

Table 6: Valid Port Ranges on QFX3500 Switches Running Enhanced Layer 2 Software (*continued*)

| Port Number | Gigabit Ethernet Interfaces (On PIC 0) | 10-Gigabit Ethernet Interfaces (On PIC 0 and 1) | 40-Gigabit Ethernet Interfaces (On PIC 1) |
|-------------|---|--|--|
| 23 | ge-0/0/23 | xe-0/0/23 | Not supported on this port |
| 24 | ge-0/0/24 | xe-0/0/24 | Not supported on this port |
| 25 | ge-0/0/25 | xe-0/0/25 | Not supported on this port |
| 26 | ge-0/0/26 | xe-0/0/26 | Not supported on this port |
| 27 | ge-0/0/27 | xe-0/0/27 | Not supported on this port |
| 28 | ge-0/0/28 | xe-0/0/28 | Not supported on this port |
| 29 | ge-0/0/29 | xe-0/0/29 | Not supported on this port |
| 30 | ge-0/0/30 | xe-0/0/30 | Not supported on this port |
| 31 | ge-0/0/31 | xe-0/0/31 | Not supported on this port |
| 32 | ge-0/0/32 | xe-0/0/32 | Not supported on this port |
| 33 | ge-0/0/33 | xe-0/0/33 | Not supported on this port |
| 34 | ge-0/0/34 | xe-0/0/34 | Not supported on this port |
| 35 | ge-0/0/35 | xe-0/0/35 | Not supported on this port |
| 36 | ge-0/0/36 | xe-0/0/36 | Not supported on this port |
| 37 | ge-0/0/37 | xe-0/0/37 | Not supported on this port |
| 38 | ge-0/0/38 | xe-0/0/38 | Not supported on this port |
| 39 | ge-0/0/39 | xe-0/0/39 | Not supported on this port |
| 40 | ge-0/0/40 | xe-0/0/40 | Not supported on this port |
| 41 | ge-0/0/41 | xe-0/0/41 | Not supported on this port |
| 42 | Not supported on this port | xe-0/0/42 | Not supported on this port |
| 43 | Not supported on this port | xe-0/0/43 | Not supported on this port |
| 44 | Not supported on this port | xe-0/0/44 | Not supported on this port |

Table 6: Valid Port Ranges on QFX3500 Switches Running Enhanced Layer 2 Software (*continued*)

| Port Number | Gigabit Ethernet Interfaces (On PIC 0) | 10-Gigabit Ethernet Interfaces (On PIC 0 and 1) | 40-Gigabit Ethernet Interfaces (On PIC 1) |
|-------------|---|--|--|
| 45 | Not supported on this port | xe-0/0/45 | Not supported on this port |
| 46 | Not supported on this port | xe-0/0/46 | Not supported on this port |
| 47 | Not supported on this port | xe-0/0/47 | Not supported on this port |
| Q0 | Not supported on this port | xe-0/1/0:0 xe-0/1/0:1 xe-0/1/0:2 xe-0/1/0:3 | et-0/1/0 |
| Q1 | Not supported on this port | xe-0/1/1:0 xe-0/1/1:1 xe-0/1/1:2 xe-0/1/1:3 | et-0/1/1 |
| Q2 | Not supported on this port | xe-0/1/2:0 xe-0/1/2:1 xe-0/1/2:2 xe-0/1/2:3 | et-0/1/2 |
| Q3 | Not supported on this port | xe-0/1/3:0 xe-0/1/3:1 xe-0/1/3:2 xe-0/1/3:3 | et-0/1/3 |

Table 7: Valid Port Ranges on QFX3600 Switches Running QFabric Software Package

| Port Number | 10-Gigabit Ethernet Interfaces (On PIC 0) | 40-Gigabit Ethernet Interfaces (On PIC 1) |
|-------------|--|--|
| Q0 | xe-0/0/0 | xle-0/1/0 |
| | xe-0/0/1 | |
| | xe-0/0/2 | |
| | xe-0/0/3 | |
| Q1 | xe-0/0/4 | xle-0/1/1 |
| | xe-0/0/5 | |
| | xe-0/0/6 | |
| | xe-0/0/7 | |
| Q2 | xe-0/0/8 | xle-0/1/2 |
| | xe-0/0/9 | |
| | xe-0/0/10 | |
| | xe-0/0/11 | |
| Q3 | xe-0/0/12 | xle-0/1/3 |
| | xe-0/0/13 | |
| | xe-0/0/14 | |
| | xe-0/0/15 | |
| Q4 | xe-0/0/16 | xle-0/1/4 |
| | xe-0/0/17 | |
| | xe-0/0/18 | |
| | xe-0/0/19 | |
| Q5 | xe-0/0/20 | xle-0/1/5 |
| | xe-0/0/21 | |
| | xe-0/0/22 | |
| | xe-0/0/23 | |

Table 7: Valid Port Ranges on QFX3600 Switches Running QFabric Software Package (*continued*)

| Port Number | 10-Gigabit Ethernet Interfaces (On PIC 0) | 40-Gigabit Ethernet Interfaces (On PIC 1) |
|-------------|--|--|
| Q6 | xe-0/0/24 | xle-0/1/6 |
| | xe-0/0/25 | |
| | xe-0/0/26 | |
| | xe-0/0/27 | |
| Q7 | xe-0/0/28 | xle-0/1/7 |
| | xe-0/0/29 | |
| | xe-0/0/30 | |
| | xe-0/0/31 | |
| Q8 | xe-0/0/32 | xle-0/1/8 |
| | xe-0/0/33 | |
| | xe-0/0/34 | |
| | xe-0/0/35 | |
| Q9 | xe-0/0/36 | xle-0/1/9 |
| | xe-0/0/37 | |
| | xe-0/0/38 | |
| | xe-0/0/39 | |
| Q10 | xe-0/0/40 | xle-0/1/10 |
| | xe-0/0/41 | |
| | xe-0/0/42 | |
| | xe-0/0/43 | |
| Q11 | xe-0/0/44 | xle-0/1/11 |
| | xe-0/0/45 | |
| | xe-0/0/46 | |
| | xe-0/0/47 | |

Table 7: Valid Port Ranges on QFX3600 Switches Running QFabric Software Package (*continued*)

| Port Number | 10-Gigabit Ethernet Interfaces (On PIC 0) | 40-Gigabit Ethernet Interfaces (On PIC 1) |
|-------------|--|--|
| Q12 | xe-0/0/48 | xle-0/1/12 |
| | xe-0/0/49 | |
| | xe-0/0/50 | |
| | xe-0/0/51 | |
| Q13 | xe-0/0/52 | xle-0/1/13 |
| | xe-0/0/53 | |
| | xe-0/0/54 | |
| | xe-0/0/55 | |
| Q14 | xe-0/0/56 | xle-0/1/14 |
| | xe-0/0/57 | |
| | xe-0/0/58 | |
| | xe-0/0/59 | |
| Q15 | xe-0/0/60 | xle-0/1/15 |
| | xe-0/0/61 | |
| | xe-0/0/62 | |
| | xe-0/0/63 | |

Table 8: Valid Port Ranges on QFX3600 Switches Running Enhanced Layer 2 Software

| Port Number | 10-Gigabit Ethernet Interfaces (On PIC 0) | 40-Gigabit Ethernet Interfaces (On PIC 0) |
|-------------|--|--|
| Q0 | xe-0/0/0:0 | et-0/0/0 |
| | xe-0/0/0:1 | |
| | xe-0/0/0:2 | |
| | xe-0/0/0:3 | |

Table 8: Valid Port Ranges on QFX3600 Switches Running Enhanced Layer 2 Software (*continued*)

| Port Number | 10-Gigabit Ethernet Interfaces (On PIC 0) | 40-Gigabit Ethernet Interfaces (On PIC 0) |
|-------------|--|--|
| Q1 | xe-0/0/1:0 xe-0/0/1:1 xe-0/0/1:2 xe-0/0/1:3 | et-0/0/1 |
| Q2 | xe-0/0/2:0 xe-0/0/2:1 xe-0/0/2:2 xe-0/0/2:3 | et-0/0/2 |
| Q3 | xe-0/0/3:0 xe-0/0/3:1 xe-0/0/3:2 xe-0/0/3:3 | et-0/0/3 |
| Q4 | xe-0/0/4:0 xe-0/0/4:1 xe-0/0/4:2 xe-0/0/4:3 | et-0/0/4 |
| Q5 | xe-0/0/5:0 xe-0/0/5:1 xe-0/0/5:2 xe-0/0/5:3 | et-0/0/5 |
| Q6 | xe-0/0/6:0 xe-0/0/6:1 xe-0/0/6:2 xe-0/0/6:3 | et-0/0/6 |

Table 8: Valid Port Ranges on QFX3600 Switches Running Enhanced Layer 2 Software (*continued*)

| Port Number | 10-Gigabit Ethernet Interfaces (On PIC 0) | 40-Gigabit Ethernet Interfaces (On PIC 0) |
|-------------|--|--|
| Q7 | xe-0/0/7:0 xe-0/0/7:1 xe-0/0/7:2 xe-0/0/7:3 | et-0/0/7 |
| Q8 | xe-0/0/8:0 xe-0/0/8:1 xe-0/0/8:2 xe-0/0/8:3 | et-0/0/8 |
| Q9 | xe-0/0/9:0 xe-0/0/9:1 xe-0/0/9:2 xe-0/0/9:3 | et-0/0/9 |
| Q10 | xe-0/0/10:0 xe-0/0/10:1 xe-0/0/10:2 xe-0/0/10:3 | et-0/0/10 |
| Q11 | xe-0/0/11:0 xe-0/0/11:1 xe-0/0/11:2 xe-0/0/11:3 | et-0/0/11 |
| Q12 | xe-0/0/12:0 xe-0/0/12:1 xe-0/0/12:2 xe-0/0/12:3 | et-0/0/12 |

Table 8: Valid Port Ranges on QFX3600 Switches Running Enhanced Layer 2 Software (*continued*)

| Port Number | 10-Gigabit Ethernet Interfaces (On PIC 0) | 40-Gigabit Ethernet Interfaces (On PIC 0) |
|-------------|--|--|
| Q13 | xe-0/0/13:0 xe-0/0/13:1 xe-0/0/13:2 xe-0/0/13:3 | et-0/0/13 |
| Q14 | xe-0/0/14:0 xe-0/0/14:1 xe-0/0/14:2 xe-0/0/14:3 | et-0/0/14 |
| Q15 | xe-0/0/15:0 xe-0/0/15:1 xe-0/0/15:2 xe-0/0/15:3 | et-0/0/15 |

Table 9: Valid Port Ranges on QFX3600 Node Devices Running QFabric Software Package

| Port Number | 10-Gigabit Ethernet Interfaces (On PIC 0) | 40-Gigabit Data Plane Uplink Interfaces (On PIC 1) | 40-Gigabit Ethernet Interfaces (On PIC 1) |
|-------------|--|--|---|
| Q0 | Not supported on this port | fte-0/1/0 | xle-0/1/0 |
| Q1 | Not supported on this port | fte-0/1/1 | xle-0/1/1 |
| Q2 | xe-0/0/8 xe-0/0/9 xe-0/0/10 xe-0/0/11 | fte-0/1/2 | xle-0/1/2 |
| Q3 | xe-0/0/12 xe-0/0/13 xe-0/0/14 xe-0/0/15 | fte-0/1/3 | xle-0/1/3 |

Table 9: Valid Port Ranges on QFX3600 Node Devices Running QFabric Software Package (*continued*)

| Port Number | 10-Gigabit Ethernet Interfaces (On PIC 0) | 40-Gigabit Data Plane Uplink Interfaces (On PIC 1) | 40-Gigabit Ethernet Interfaces (On PIC 1) |
|-------------|--|--|---|
| Q4 | xe-0/0/16 | fte-0/1/4 | xle-0/1/4 |
| | xe-0/0/17 | | |
| | xe-0/0/18 | | |
| | xe-0/0/19 | | |
| Q5 | xe-0/0/20 | fte-0/1/5 | xle-0/1/5 |
| | xe-0/0/21 | | |
| | xe-0/0/22 | | |
| | xe-0/0/23 | | |
| Q6 | xe-0/0/24 | fte-0/1/6 | xle-0/1/6 |
| | xe-0/0/25 | | |
| | xe-0/0/26 | | |
| | xe-0/0/27 | | |
| Q7 | xe-0/0/28 | fte-0/1/7 | xle-0/1/7 |
| | xe-0/0/29 | | |
| | xe-0/0/30 | | |
| | xe-0/0/31 | | |
| Q8 | xe-0/0/32 | Not supported on this port | xle-0/1/8 |
| | xe-0/0/33 | | |
| | xe-0/0/34 | | |
| | xe-0/0/35 | | |
| Q9 | xe-0/0/36 | Not supported on this port | xle-0/1/9 |
| | xe-0/0/37 | | |
| | xe-0/0/38 | | |
| | xe-0/0/39 | | |

Table 9: Valid Port Ranges on QFX3600 Node Devices Running QFabric Software Package (*continued*)

| Port Number | 10-Gigabit Ethernet Interfaces (On PIC 0) | 40-Gigabit Data Plane Uplink Interfaces (On PIC 1) | 40-Gigabit Ethernet Interfaces (On PIC 1) |
|-------------|--|--|---|
| Q10 | xe-0/0/40 | Not supported on this port | xle-0/1/10 |
| | xe-0/0/41 | | |
| | xe-0/0/42 | | |
| | xe-0/0/43 | | |
| Q11 | xe-0/0/44 | Not supported on this port | xle-0/1/11 |
| | xe-0/0/45 | | |
| | xe-0/0/46 | | |
| | xe-0/0/47 | | |
| Q12 | xe-0/0/48 | Not supported on this port | xle-0/1/12 |
| | xe-0/0/49 | | |
| | xe-0/0/50 | | |
| | xe-0/0/51 | | |
| Q13 | xe-0/0/52 | Not supported on this port | xle-0/1/13 |
| | xe-0/0/53 | | |
| | xe-0/0/54 | | |
| | xe-0/0/55 | | |
| Q14 | xe-0/0/56 | Not supported on this port | xle-0/1/14 |
| | xe-0/0/57 | | |
| | xe-0/0/58 | | |
| | xe-0/0/59 | | |
| Q15 | xe-0/0/60 | Not supported on this port | xle-0/1/15 |
| | xe-0/0/61 | | |
| | xe-0/0/62 | | |
| | xe-0/0/63 | | |

Table 10: Valid Port Ranges on QFX5100-48S and QFX5100-48T Switches Running Enhanced Layer 2 Software

| Port Number | 10-Gigabit Ethernet Interfaces (On PIC 0) | 40-Gigabit Ethernet Interfaces (On PIC 0) |
|-------------|--|--|
| 0 | xe-0/0/0 | Not supported on this port |
| 1 | xe-0/0/1 | Not supported on this port |
| 2 | xe-0/0/2 | Not supported on this port |
| 3 | xe-0/0/3 | Not supported on this port |
| 4 | xe-0/0/4 | Not supported on this port |
| 5 | xe-0/0/5 | Not supported on this port |
| 6 | xe-0/0/6 | Not supported on this port |
| 7 | xe-0/0/7 | Not supported on this port |
| 8 | xe-0/0/8 | Not supported on this port |
| 9 | xe-0/0/9 | Not supported on this port |
| 10 | xe-0/0/10 | Not supported on this port |
| 11 | xe-0/0/11 | Not supported on this port |
| 12 | xe-0/0/12 | Not supported on this port |
| 13 | xe-0/0/13 | Not supported on this port |
| 14 | xe-0/0/14 | Not supported on this port |
| 15 | xe-0/0/15 | Not supported on this port |
| 16 | xe-0/0/16 | Not supported on this port |
| 17 | xe-0/0/17 | Not supported on this port |
| 18 | xe-0/0/18 | Not supported on this port |
| 19 | xe-0/0/19 | Not supported on this port |
| 20 | xe-0/0/20 | Not supported on this port |
| 21 | xe-0/0/21 | Not supported on this port |

Table 10: Valid Port Ranges on QFX5100-48S and QFX5100-48T Switches Running Enhanced Layer 2 Software (*continued*)

| Port Number | 10-Gigabit Ethernet Interfaces (On PIC 0) | 40-Gigabit Ethernet Interfaces (On PIC 0) |
|-------------|--|--|
| 22 | xe-0/0/22 | Not supported on this port |
| 23 | xe-0/0/23 | Not supported on this port |
| 24 | xe-0/0/24 | Not supported on this port |
| 25 | xe-0/0/25 | Not supported on this port |
| 26 | xe-0/0/26 | Not supported on this port |
| 27 | xe-0/0/27 | Not supported on this port |
| 28 | xe-0/0/28 | Not supported on this port |
| 29 | xe-0/0/29 | Not supported on this port |
| 30 | xe-0/0/30 | Not supported on this port |
| 31 | xe-0/0/31 | Not supported on this port |
| 32 | xe-0/0/32 | Not supported on this port |
| 33 | xe-0/0/33 | Not supported on this port |
| 34 | xe-0/0/34 | Not supported on this port |
| 35 | xe-0/0/35 | Not supported on this port |
| 36 | xe-0/0/36 | Not supported on this port |
| 37 | xe-0/0/37 | Not supported on this port |
| 38 | xe-0/0/38 | Not supported on this port |
| 39 | xe-0/0/39 | Not supported on this port |
| 40 | xe-0/0/40 | Not supported on this port |
| 41 | xe-0/0/41 | Not supported on this port |
| 42 | xe-0/0/42 | Not supported on this port |
| 43 | xe-0/0/43 | Not supported on this port |

Table 10: Valid Port Ranges on QFX5100-48S and QFX5100-48T Switches Running Enhanced Layer 2 Software (*continued*)

| Port Number | 10-Gigabit Ethernet Interfaces (On PIC 0) | 40-Gigabit Ethernet Interfaces (On PIC 0) |
|-------------|--|--|
| 44 | xe-0/0/44 | Not supported on this port |
| 45 | xe-0/0/45 | Not supported on this port |
| 46 | xe-0/0/46 | Not supported on this port |
| 47 | xe-0/0/47 | Not supported on this port |
| 48 | xe-0/0/48:0 xe-0/0/48:1 xe-0/0/48:2 xe-0/0/48:3 | et-0/0/48 |
| 49 | xe-0/0/49:0 xe-0/0/49:1 xe-0/0/49:2 xe-0/0/49:3 | et-0/0/49 |
| 50 | xe-0/0/50:0 xe-0/0/50:1 xe-0/0/50:2 xe-0/0/50:3 | et-0/0/50 |
| 51 | xe-0/0/51:0 xe-0/0/51:1 xe-0/0/51:2 xe-0/0/51:3 | et-0/0/51 |
| 52 | xe-0/0/52:0 xe-0/0/52:1 xe-0/0/52:2 xe-0/0/52:3 | et-0/0/52 |

Table 10: Valid Port Ranges on QFX5100-48S and QFX5100-48T Switches Running Enhanced Layer 2 Software (*continued*)

| Port Number | 10-Gigabit Ethernet Interfaces (On PIC 0) | 40-Gigabit Ethernet Interfaces (On PIC 0) |
|-------------|--|--|
| 53 | xe-0/0/53:0 xe-0/0/53:1 xe-0/0/53:2 xe-0/0/53:3 | et-0/0/53 |

Table 11: Valid Port Ranges on QFX5100-48S and QFX5100-48T Switches Running QFabric Software Package

| Port Number | 10-Gigabit Ethernet Interfaces (On PIC 0) | 40-Gigabit Ethernet Interfaces (On PIC 1) | 40-Gigabit Data Plane Uplink Interfaces (On PIC 1) |
|-------------|--|--|---|
| 0 | xe-0/0/0 | Not supported on this port | Not supported on this port |
| 1 | xe-0/0/1 | Not supported on this port | Not supported on this port |
| 2 | xe-0/0/2 | Not supported on this port | Not supported on this port |
| 3 | xe-0/0/3 | Not supported on this port | Not supported on this port |
| 4 | xe-0/0/4 | Not supported on this port | Not supported on this port |
| 5 | xe-0/0/5 | Not supported on this port | Not supported on this port |
| 6 | xe-0/0/6 | Not supported on this port | Not supported on this port |
| 7 | xe-0/0/7 | Not supported on this port | Not supported on this port |
| 8 | xe-0/0/8 | Not supported on this port | Not supported on this port |
| 9 | xe-0/0/9 | Not supported on this port | Not supported on this port |
| 10 | xe-0/0/10 | Not supported on this port | Not supported on this port |
| 11 | xe-0/0/11 | Not supported on this port | Not supported on this port |
| 12 | xe-0/0/12 | Not supported on this port | Not supported on this port |
| 13 | xe-0/0/13 | Not supported on this port | Not supported on this port |
| 14 | xe-0/0/14 | Not supported on this port | Not supported on this port |

Table 11: Valid Port Ranges on QFX5100-48S and QFX5100-48T Switches Running QFabric Software Package (*continued*)

| Port Number | 10-Gigabit Ethernet Interfaces (On PIC 0) | 40-Gigabit Ethernet Interfaces (On PIC 1) | 40-Gigabit Data Plane Uplink Interfaces (On PIC 1) |
|-------------|--|---|---|
| 15 | xe-0/0/15 | Not supported on this port | Not supported on this port |
| 16 | xe-0/0/16 | Not supported on this port | Not supported on this port |
| 17 | xe-0/0/17 | Not supported on this port | Not supported on this port |
| 18 | xe-0/0/18 | Not supported on this port | Not supported on this port |
| 19 | xe-0/0/19 | Not supported on this port | Not supported on this port |
| 20 | xe-0/0/20 | Not supported on this port | Not supported on this port |
| 21 | xe-0/0/21 | Not supported on this port | Not supported on this port |
| 22 | xe-0/0/22 | Not supported on this port | Not supported on this port |
| 23 | xe-0/0/23 | Not supported on this port | Not supported on this port |
| 24 | xe-0/0/24 | Not supported on this port | Not supported on this port |
| 25 | xe-0/0/25 | Not supported on this port | Not supported on this port |
| 26 | xe-0/0/26 | Not supported on this port | Not supported on this port |
| 27 | xe-0/0/27 | Not supported on this port | Not supported on this port |
| 28 | xe-0/0/28 | Not supported on this port | Not supported on this port |
| 29 | xe-0/0/29 | Not supported on this port | Not supported on this port |
| 30 | xe-0/0/30 | Not supported on this port | Not supported on this port |
| 31 | xe-0/0/31 | Not supported on this port | Not supported on this port |
| 32 | xe-0/0/32 | Not supported on this port | Not supported on this port |
| 33 | xe-0/0/33 | Not supported on this port | Not supported on this port |
| 34 | xe-0/0/34 | Not supported on this port | Not supported on this port |
| 35 | xe-0/0/35 | Not supported on this port | Not supported on this port |
| 36 | xe-0/0/36 | Not supported on this port | Not supported on this port |

Table 11: Valid Port Ranges on QFX5100-48S and QFX5100-48T Switches Running QFabric Software Package (*continued*)

| Port Number | 10-Gigabit Ethernet Interfaces (On PIC 0) | 40-Gigabit Ethernet Interfaces (On PIC 1) | 40-Gigabit Data Plane Uplink Interfaces (On PIC 1) |
|-------------|--|---|---|
| 37 | xe-0/0/37 | Not supported on this port | Not supported on this port |
| 38 | xe-0/0/38 | Not supported on this port | Not supported on this port |
| 39 | xe-0/0/39 | Not supported on this port | Not supported on this port |
| 40 | xe-0/0/40 | Not supported on this port | Not supported on this port |
| 41 | xe-0/0/41 | Not supported on this port | Not supported on this port |
| 42 | xe-0/0/42 | Not supported on this port | Not supported on this port |
| 43 | xe-0/0/43 | Not supported on this port | Not supported on this port |
| 44 | xe-0/0/44 | Not supported on this port | Not supported on this port |
| 45 | xe-0/0/45 | Not supported on this port | Not supported on this port |
| 46 | xe-0/0/46 | Not supported on this port | Not supported on this port |
| 47 | xe-0/0/47 | Not supported on this port | Not supported on this port |
| 48 | Not supported on this port | Not supported on this PIC | fte-0/1/0 NOTE: This interface is a fixed fte interface and cannot be changed to xle. |
| 49 | Not supported on this port | Not supported on this PIC | fte-0/1/1 NOTE: This interface is a fixed fte interface and cannot be changed to xle. |
| 50 | Not supported on this port | xle-0/1/2 | fte-0/1/2 NOTE: By default, this interface is an fte interface but can be configured as an xle interface. |
| 51 | Not supported on this port | xle-0/1/3 | fte-0/1/3 NOTE: By default, this interface is an fte interface but can be configured as an xle interface. |

Table 11: Valid Port Ranges on QFX5100-48S and QFX5100-48T Switches Running QFabric Software Package (*continued*)

| Port Number | 10-Gigabit Ethernet Interfaces (On PIC 0) | 40-Gigabit Ethernet Interfaces (On PIC 1) | 40-Gigabit Data Plane Uplink Interfaces (On PIC 1) |
|-------------|--|---|---|
| 52 | Not supported on this port | xle-0/1/4 <i>NOTE:</i> By default, this interface is an xle interface but can be configured as an fte interface. | fte-0/1/4 |
| 53 | Not supported on this port | xle-0/1/5 <i>NOTE:</i> By default, this interface is an xle interface but can be configured as an fte interface. | fte-0/1/5 |

Supported System Modes



NOTE: There are restrictions on the ports you can channelize on the QFX5100-24Q and QFX5100-96S switches depending on the system mode you configure. If you try to channelize ports that are restricted, the configuration is ignored.

The following system modes are available on the QFX5100-24Q switch:

- Default mode
- Mode-104-port
- Flexi-PIC mode
- Non-oversubscribed mode

See [Table 12 on page 44](#) for more information regarding the supported system modes for your switch.

The following system modes are available on the QFX5100-96S switch:

- Default-mode
- Non-oversubscribed mode

See [Table 12 on page 44](#) for more information regarding the supported system modes for your switch.

Table 12: System Modes Supported on QFX5100 Switches Running Enhanced Layer 2 Software

| | Default-mode | Mode-104port | Flexi-pic-mode | Non-oversubscribed-mode |
|-----------------------------|--|--|---|---|
| QFX5100-48S and QFX5100-48T | Not supported | Not supported | Not supported | Not supported |
| QFX5100-24Q | Supported You do not need to configure the switch to be in this mode. On PIC 0, you can channelize all 24 40-Gbps QSFP+ ports. On PIC 1 and PIC 2, the 40-Gbps QSFP+ ports in the expansion modules are supported but cannot be channelized. In this mode, you can have one of two port combinations: 32 40-Gbps QSFP+ ports, or 96 10-Gigabit Ethernet ports plus 8 40-Gbps QSFP+ ports. | Supported On PIC 0, all 24 40-Gbps QSFP+ ports are channelized by default, which provides 96 10-Gigabit Ethernet ports. 40-Gbps QSFP+ ports contained in an expansion module on PIC 1 are supported. On PIC 1, ports 0 and 2 are channelized by default, and ports 1 and 3 are disabled. If 40-Gbps QSFP+ ports contained in an expansion module are detected on PIC 2, they are ignored. | Supported On PIC 0, the first four ports (ports 0 through 3) cannot be channelized. 40-Gbps QSFP+ ports contained in expansion modules on PIC 1 and PIC 2 are supported but cannot be channelized. | Supported All 24 40-Gbps QSFP+ ports on PIC 0 can be channelized to 96 10-Gigabit Ethernet ports. 40-Gbps QSFP+ ports contained in the expansion modules on PIC 1 and PIC 2 are not supported and cannot be channelized. There is no packet loss for packets of any size in this mode. |
| QFX5100-96S | Supported You do not need to configure the switch to be in this mode. On PIC 0, all 96 10-Gigabit Ethernet ports are supported. You can only channelize the 40-Gbps QSFP+ interfaces to 10-Gigabit Ethernet interfaces on ports 96 and 100. When you channelize the interfaces on ports 96 and 100, ports 97, 98, 99, 101, 102 and 103 are disabled. | Not supported | Not supported | Supported On PIC 0, all 96 10-Gigabit Ethernet ports are supported. However, the eight 40-Gbps QSFP+ ports are not supported and cannot be channelized. There is no packet loss for packets of any size in this mode. |

- Related Documentation**
- [Interfaces Overview on page 9](#)
 - [Channelizing Interfaces](#)
 - [Configuring the System Mode](#)
 - [Understanding Interface Naming Conventions on page 11](#)
 - [Rear Panel of a QFX3500 Device](#)
 - [Front Panel of a QFX3600 Device](#)

Configuring the Interface Address

Supported Platforms EX Series, M Series, MX Series, OCX1100, PTX Series, QFabric System, QFX Series standalone switches, T Series

You assign an address to an interface by specifying the address when configuring the protocol family. For the **inet** or **inet6** family, configure the interface IP address. For the **iso** family, configure one or more addresses for the loopback interface. For the **ccc**, **ethernet-switching**, **tcc**, **mpls**, **tnp**, and **vpls** families, you never configure an address.



NOTE: The point-to-point (PPP) address is taken from the loopback interface address that has the primary attribute. When the loopback interface is configured as an unnumbered interface, it takes the primary address from the donor interface.

To assign an address to an interface, perform the following steps:

1. Configure the interface address at the **[edit interfaces *interface-name* unit *logical-unit-number* family *family*]** hierarchy level.
 - To configure an IPv4 address on routers and switches running Junos OS, use the **interface *interface-name* unit *number* family inet address *a.b.c.d/nn*** statement at the **[edit interfaces]** hierarchy level.

```
[edit interfaces ]
```

```
user@host# set interface-name unit logical-unit-number family inet address a.b.c.d/nn
```



NOTE:

- Juniper Networks routers and switches support /31 destination prefixes when used in point-to-point Ethernet configurations; however, they are not supported by many other devices, such as hosts, hubs, routers, or switches. You must determine if the peer system also supports /31 destination prefixes before configuration.
- You can configure the same IPv4 address on multiple physical interfaces. When you assign the same IPv4 address to multiple physical interfaces, the operational behavior of those interfaces differs, depending on whether they are implicitly or explicitly point-to-point .
- By default, all interfaces are assumed to be point-to-point (PPP) interfaces. For all interfaces except aggregated Ethernet, Fast Ethernet, and Gigabit Ethernet, you can explicitly configure an interface to be a point-to-point connection.
- If you configure the same IP address on multiple interfaces in the same routing instance, Junos OS uses only the first configuration. The remaining IP address configurations are ignored, leaving some interfaces without an assigned address. Interfaces without an assigned address cannot be used as a donor interface for an unnumbered Ethernet interface.

- To configure an IPv6 address on routers and switches running Junos OS, use the **interface *interface-name* unit *number* family inet6 address *aaaa:bbbb:::zzzz/nn*** statement at the **[edit interfaces]** hierarchy level.

```
[edit interfaces ]
```

```
user@host# set interface-name unit logical-unit-number family inet6 address  
aaaa:bbbb:::zzzz/nn
```



NOTE:

- You represent IP version 6 (IPv6) addresses in hexadecimal notation using a colon-separated list of 16-bit values. The double colon (::) represents all bits set to 0.
- You must manually configure the router or switch advertisement and advertise the default prefix for autoconfiguration to work on a specific interface.

2. [Optional] Set the broadcast address on the network or subnet .

[edit interfaces *interface-name* unit *logical-unit-number* family *family* address *address*],
user@host# **set broadcast address**



NOTE: The broadcast address must have a host portion of either all ones or all zeros. You cannot specify the addresses 0.0.0.0 or 255.255.255.255

3. [Optional] specify the remote address of the connection for the encrypted, PPP-encapsulated, and tunnel interfaces.

[edit logical-systems *logical-system-name* interfaces *interface-name* unit
logical-unit-number family *family* **address** *address*]
user@host# **set destination address**

4. [Optional] For interfaces that carry IP version 6 (IPv6) traffic, configure the host to assign itself a unique 64-Bit IP Version 6 interface identifier (EUI-64).

[edit logical-systems *logical-system-name* interfaces *interface-name* unit
logical-unit-number family *family* **address** *address*]
user@host# **set eui-64**

Related Documentation

- [Configuring Default, Primary, and Preferred Addresses and Interfaces](#)

Configuring Gigabit and 10-Gigabit Ethernet Interfaces

Supported Platforms [EX4600, QFabric System, QFX Series standalone switches](#)

Devices include a factory default configuration that:

- Enables all 10-Gigabit Ethernet network interfaces on the switch
- Sets a default port mode (access)
- Sets default link settings
- Specifies a logical unit (**unit 0**) and assigns it to **family ethernet-switching**
- Configures Storm Control on all 10-Gigabit Ethernet network interfaces
- Provides basic Rapid Spanning Tree Protocol (RSTP) and Link Layer Discovery Protocol (LLDP) configuration



NOTE: RSTP and LLDP are not supported on the OCX Series.

The **ether-options** statement enables you to modify the following options:

- **802.3ad**—Specify an aggregated Ethernet bundle for both Gigabit Ethernet and 10-Gigabit Ethernet interfaces.
- **autonegotiation**—Enable or disable autonegotiation of flow control, link mode, and speed for interfaces.
- **link-mode**—Specify **full-duplex**, **half-duplex**, or **automatic** for Gigabit Ethernet interfaces.
- **loopback**—Enable or disable a loopback interface for both Gigabit Ethernet and 10-Gigabit Ethernet interfaces.

To set **ether-options** for both Gigabit Ethernet and 10-Gigabit Ethernet interfaces:

[edit]

user@switch# **set interfaces *interface-name* ether-options**

This topic describes:

- [Configuring Port Mode on QFX5100-48S, QFX5100-48T, QFX5100-24Q, EX4600, QFX5200, QFX10002, and QFX10008 Switches on page 49](#)
- [Configuring the Link Settings for Gigabit Ethernet Interfaces on QFX5100-48S, QFX5100-24Q Switches, and EX4600 Switches on page 50](#)
- [Configuring the Link Settings for Gigabit Ethernet Interfaces on QFX5100-48T Switches on page 50](#)
- [Configuring the Link Settings for 10-Gigabit Ethernet Interfaces on QFX5100-48S, QFX5100-24Q Switches, and EX4600 Switches on page 52](#)
- [Configuring the Link Settings for 10-Gigabit Ethernet Interfaces on QFX5100-48T Switches on page 52](#)
- [Configuring the IP Options on QFX5100-48S, QFX5100-48T, QFX5100-24Q, EX4600, QFX5200, QFX10002, and QFX10008 Switches on page 52](#)

Configuring Port Mode on QFX5100-48S, QFX5100-48T, QFX5100-24Q, EX4600, QFX5200, QFX10002, and QFX10008 Switches

If you are connecting a switch to other switches and to routers on the LAN, you need to assign the interface to a logical port and you need to configure the logical port as a trunk port.

To configure a Gigabit Ethernet or 10-Gigabit interface for trunk port mode on the original CLI:

```
[edit]
user@switch# set interfaces interface-name unit logical-unit-number family ethernet-switching
port-mode trunk
```

To configure a Gigabit Ethernet or 10-Gigabit interface for trunk port mode on the Enhanced Layer 2 software (ELS):

```
[edit]
user@switch# set interfaces interface-name unit logical-unit-number family ethernet-switching
interface-mode trunk
```

Configuring the Link Settings for Gigabit Ethernet Interfaces on QFX5100-48S, QFX5100-24Q Switches, and EX4600 Switches

Devices include a factory default configuration that enables Gigabit Ethernet interfaces with applicable link settings.

The following default configurations are available on Gigabit Ethernet interfaces:

- You cannot set the speed on these interfaces.
- Gigabit Ethernet interfaces operate in full-duplex mode.
- Autonegotiation is supported by default.

If for some reason you have disabled autonegotiation, you can enable it by issuing the **set interfaces *name* ether-options auto-negotiate** command.

To disable autonegotiation, issue the **delete interfaces *name* ether-options auto-negotiate** command.



NOTE: Do not use the **set interface *name* ether-options no-auto-negotiate** command to remove the autonegotiation configuration.

Issue the **show chassis interface extensive** command to see if autonegotiation is enabled or disabled and the negotiated speed of the interface.

Configuring the Link Settings for Gigabit Ethernet Interfaces on QFX5100-48T Switches

Devices include a factory default configuration that enables Gigabit Ethernet interfaces with applicable link settings.

The following default configurations are available on Gigabit Ethernet interfaces:

- Gigabit Ethernet interfaces operate in full-duplex mode.
- Autonegotiation is enabled by default, and will autonegotiate the speed with the link partner. We recommend that you keep autonegotiation enabled for interfaces operating at 100M, 1G, and 10G.

If you need to force the speed of the interface to 100M, you can do this by disabling autonegotiation.

To disable autonegotiation, issue the **delete interfaces *name* ether-options auto-negotiate** command.



NOTE: Do not use the **set interface *name* ether-options no-auto-negotiate** command to remove the autonegotiation configuration.

You can reenabling autonegotiation by issuing the **set interfaces *name* ether-options auto-negotiate** command.

Issue the **show chassis interface extensive** command to see if autonegotiation is enabled or disabled and the negotiated speed of the interface.

Configuring the Link Settings for 10-Gigabit Ethernet Interfaces on QFX5100-48S, QFX5100-24Q Switches, and EX4600 Switches

The following default configurations are available on 10-Gigabit Ethernet interfaces:

- All the 10-Gigabit Ethernet interfaces are set to **auto-negotiation**.
- Flow control for 10-Gigabit Ethernet interfaces is set to **enabled** by default. You can disable flow control by specifying the **no-flow-control** option.
- The speed cannot be configured.
- 10-Gigabit Ethernet interfaces operate in full-duplex mode by default.
- Autonegotiation is supported by default.

If for some reason you have disabled autonegotiation, you can enable it by issuing the **set interfaces *name* ether-options auto-negotiate** command.

To disable autonegotiation, issue the **delete interfaces *name* ether-options auto-negotiate** command.



NOTE: Do not use the **set interface *name* ether-options no-auto-negotiate** command to remove the autonegotiation configuration.

Issue the **show chassis interface extensive** command to see if autonegotiation is enabled or disabled and the negotiated speed of the interface.

Configuring the Link Settings for 10-Gigabit Ethernet Interfaces on QFX5100-48T Switches

The following default configurations are available on 10-Gigabit Ethernet interfaces:

- All the 10-Gigabit Ethernet interfaces are set to **auto-negotiation**.
- Flow control for 10-Gigabit Ethernet interfaces is set to **enabled** by default. You can disable flow control by specifying the **no-flow-control** option.
- The speed cannot be configured.
- 10-Gigabit Ethernet interfaces operate in full-duplex mode by default.
- Autonegotiation is supported by default, and will autonegotiate the speed with the link partner.

If for some reason you have disabled autonegotiation, you can enable it by issuing the **set interfaces *name* ether-options auto-negotiate** command.

Issue the **show chassis interface extensive** command to see if autonegotiation is enabled or disabled and the negotiated speed of the interface.

Configuring the IP Options on QFX5100-48S, QFX5100-48T, QFX5100-24Q, EX4600, QFX5200, QFX10002, and QFX10008 Switches

To specify an IP address for the logical unit:

```
[edit]
user@switch# set interfaces interface-name unit logical-unit-number family inet address ip-address
```

- Related Documentation**
- [Monitoring Interface Status and Traffic on page 53](#)
 - [show interfaces xe on page 303](#)
 - [show interfaces ge-](#)
 - [speed on page 181](#)
 - [Understanding Interface Naming Conventions on page 11](#)

Configuring Ethernet Loopback Capability

Supported Platforms EX4600, OCX1100, QFabric System, QFX Series standalone switches

To place an interface in loopback mode, include the **loopback** statement:

```
loopback;
```

To return to the default—that is, to disable loopback mode—delete the **loopback** statement from the configuration:

```
[edit]
user@switch# delete interfaces interface-name ether-options loopback
```

To explicitly disable loopback mode, include the **no-loopback** statement:

```
no-loopback;
```

You can include the **loopback** and **no-loopback** statements at the following hierarchy levels:

- `[edit interfaces interface-name aggregated-ether-options]`
- `[edit interfaces interface-name ether-options]`

- Related Documentation**
- [Configuring Gigabit and 10-Gigabit Ethernet Interfaces on page 48](#)
 - [Configuring Gigabit and 10-Gigabit Ethernet Interfaces](#)

Monitoring Interface Status and Traffic

Supported Platforms EX4600, OCX1100, QFabric System, QFX Series standalone switches

Purpose View interface status to monitor interface bandwidth utilization and traffic statistics.

- Action**
- To view interface status for all the interfaces, enter **show interfaces xe**.
 - To view status and statistics for a specific interface, enter **show interfaces xe *interface-name***.
 - To view status and traffic statistics for all interfaces, enter either **show interfaces xe detail** or **show interfaces xe extensive**.

Meaning For details about output from the CLI commands, see [show interfaces xe](#).

Troubleshooting Network Interfaces

Supported Platforms EX4600, OCX1100, OCX1100, QFabric System, QFX Series standalone switches

The interface on the port in which an SFP or SFP+ transceiver is installed in an SFP or SFP+ module is down

Supported Platforms

Problem **Description:** The switch has an SFP or SFP+ module installed. The interface on the port in which an SFP or SFP+ transceiver is installed is down.

Symptoms: When you check the status with the CLI command **show interfaces *interface-name***, the disabled port is not listed.

Cause By default, the SFP or SFP+ module operates in the 10-Gigabit Ethernet mode and supports only SFP or SFP+ transceivers. The operating mode for the module is incorrectly set.

Solution Only SFP or SFP+ transceivers can be installed in SFP or SFP+ modules. You must configure the operating mode of the SFP or SFP+ module to match the type of transceiver you want to use. For SFP+ transceivers, configure 10-Gigabit Ethernet operating mode.

PART 3

Layer 3 Logical Interfaces

- [Understanding Layer 3 Logical Interfaces on page 57](#)

CHAPTER 3

Understanding Layer 3 Logical Interfaces

- [Understanding Layer 3 Logical Interfaces on page 57](#)
- [Configuring a Layer 3 Logical Interface on page 57](#)
- [Verifying That Layer 3 Logical Interfaces Are Working on page 58](#)

Understanding Layer 3 Logical Interfaces

Supported Platforms [EX4600, QFabric System, QFX Series standalone switches](#)

A Layer 3 logical interface is a logical division of a physical interface that operates at the network level and therefore can receive and forward 802.1Q VLAN tags. You can use Layer 3 logical interfaces to route traffic among multiple VLANs along a single trunk line that connects a Juniper Networks switch to a Layer 2 switch. Only one physical connection is required between the switches.

To create Layer 3 logical interfaces on a switch, enable VLAN tagging, partition the physical interface into logical partitions, and bind the VLAN ID to the logical interface.

We recommend that you use the VLAN ID as the logical interface number when you configure the logical interface. QFX Series and EX4600 switches support a maximum of 4089 VLANs, which includes the default VLAN. You can, however, assign a VLAN ID in the range of 1 to 4094, but five of these VLAN IDs are reserved for internal use.

VLAN tagging places the VLAN ID in the frame header, allowing each physical interface to handle multiple VLANs. When you configure multiple VLANs on an interface, you must also enable tagging on that interface. Junos OS on switches supports a subset of the 802.1Q standard for receiving and forwarding routed or bridged Ethernet frames with single VLAN tags and running Virtual Router Redundancy Protocol (VRRP) over 802.1Q-tagged interfaces.

- Related Documentation**
- [Interfaces Overview on page 9](#)
 - [Configuring a Layer 3 Logical Interface on page 57](#)
 - *Junos OS Network Interfaces Library for Routing Devices*

Configuring a Layer 3 Logical Interface

Supported Platforms [EX4600, QFX Series standalone switches](#)

Devices use Layer 3 logical interfaces to divide a physical interface into multiple logical interfaces, each corresponding to a VLAN. Layer 3 logical interfaces route traffic between subnets.

To configure Layer 3 logical interfaces, enable VLAN tagging and partition one or more physical ports into multiple logical interfaces, each corresponding to a VLAN ID.

Before you begin, make sure you set up your VLANs. See *Configuring VLANs*.

To configure Layer 3 logical interfaces:

1. Enable VLAN tagging:

```
[edit interfaces interface-name]
user@switch# set vlan-tagging
```

2. Bind each VLAN ID to a logical interface:

```
[edit interfaces interface-name]
user@switch# set unit logical-unit-number vlan-id vlan-id-number
```

Related Documentation

- [Understanding Layer 3 Logical Interfaces on page 57](#)
- [Verifying That Layer 3 Logical Interfaces Are Working on page 58](#)

Verifying That Layer 3 Logical Interfaces Are Working

Supported Platforms EX4600, QFabric System, QFX Series standalone switches

Purpose After configuring Layer 3 logical interfaces, verify that they are set up properly and transmitting data.

- Action**
1. To determine if you have successfully created the logical interfaces and the links are up:

```
[edit interfaces]
user@switch> show interfaces interface-name terse
```

| Interface | Admin | Link | Proto | Local | Remote |
|----------------|-------|------|-------|------------|--------|
| ge-0/0/0 | up | up | | | |
| ge-0/0/0.0 | up | up | inet | 1.1.1.1/24 | |
| ge-0/0/0.1 | up | up | inet | 2.1.1.1/24 | |
| ge-0/0/0.2 | up | up | inet | 3.1.1.1/24 | |
| ge-0/0/0.3 | up | up | inet | 4.1.1.1/24 | |
| ge-0/0/0.4 | up | up | inet | 5.1.1.1/24 | |
| ge-0/0/0.32767 | up | up | | | |

2. Use the **ping** command from a device on one subnet to an address on another subnet to determine if packets were transmitted correctly on the logical interface VLANs:

```
user@switch> ping ip-address
PING 1.1.1.1 (1.1.1.1): 56 data bytes
64 bytes from 1.1.1.1: icmp_seq=0 ttl=64 time=0.157 ms
64 bytes from 1.1.1.1: icmp_seq=1 ttl=64 time=0.238 ms
64 bytes from 1.1.1.1: icmp_seq=2 ttl=64 time=0.255 ms
64 bytes from 1.1.1.1: icmp_seq=3 ttl=64 time=0.128 ms
--- 1.1.1.1 ping statistics ---
4 packets transmitted, 4 packets received, 0% packet loss
```

Meaning The output confirms that the logical interfaces have been created and the links are up.

Related Documentation

- [Configuring a Layer 3 Logical Interface on page 57](#)

PART 4

Link Aggregation Groups (LAGs) and Link Aggregation Control Protocol (LACP)

- [Understanding LAGs and LACP on page 63](#)

CHAPTER 4

Understanding LAGs and LACP

- Understanding Aggregated Ethernet Interfaces and LACP on page 63
- Configuring Aggregated Ethernet LACP on page 66
- Configuring Link Aggregation on page 67
- Configuring LACP Link Protection of Aggregated Ethernet Interfaces (CLI Procedure) on page 69
- Configuring Periodic Rebalancing of Subscribers in an Aggregated Ethernet Interface on page 73
- Verifying the Status of a LAG Interface on page 74
- Verifying That LACP Is Configured Correctly and Bundle Members Are Exchanging LACP Protocol Packets on page 74
- Troubleshooting an Aggregated Ethernet Interface on page 75

Understanding Aggregated Ethernet Interfaces and LACP

Supported Platforms EX4600, OCX1100, QFabric System, QFX Series standalone switches

IEEE 802.3ad link aggregation enables you to group Ethernet interfaces to form a single, aggregated Ethernet interface, also known as a *link aggregation group (LAG)* or *bundle*.

Link aggregation is used to aggregate Ethernet interfaces between two devices. You can create a LAG between a Juniper Networks device and a router, switch, aggregation switch, server, or other devices. The aggregated Ethernet interfaces that participate in a 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.



NOTE: On QFX5100 and EX4600 standalone switches and on a QFX5100 Virtual Chassis and EX4600 Virtual Chassis, you can configure a mixed rate of link speeds for the aggregated Ethernet bundle. Only link speeds of 40G and 10G are supported. Load balancing will not work if you configure link speeds that are not supported.



NOTE: The QFX5200 switches do not support mixed rate aggregated Ethernet bundles.

Link Aggregation Control Protocol (LACP) is a subcomponent of the IEEE 802.3ad standard and is used as a discovery protocol.



NOTE: To ensure load balancing across the aggregated Ethernet (AE) interfaces on a redundant server Node group, the members of the AE must be equally distributed across the redundant server Node group.



NOTE: During a network Node group switchover, traffic might be dropped for a few seconds.

- [Link Aggregation Group on page 64](#)
- [Link Aggregation Control Protocol \(LACP\) on page 65](#)

Link Aggregation Group

To create a LAG:

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 10-Gigabit Ethernet interfaces.
4. Configure LACP for link detection.

Keep in mind these hardware and software guidelines:

- Up to 32 Ethernet interfaces can be grouped to form a LAG on a redundant server Node group, a server Node group, and a network Node group on a QFabric system. Up to 48 LAGs are supported on redundant server Node groups and server Node groups on a QFabric system, and up to 128 LAGs are supported on network Node groups on a QFabric system. You can configure LAGs across Node devices in redundant server Node groups, server Node groups, and network Node groups.



NOTE: If you try to commit a configuration containing more than 32 Ethernet interfaces in a LAG, you will receive an error message saying that the group limit of 32 has been exceeded, and the configuration checkout has failed.

- Up to 64 Ethernet interfaces can be grouped to form a LAG, and up to 448 LAGs are supported on QFX3500, QFX3600, EX4600, and OCX Series switches, and up to 1,000 LAGs are supported on QFX5100 switches.



NOTE: If you try to commit a configuration containing more than 64 Ethernet interfaces in a LAG, you will receive an error message saying that the group limit of 64 has been exceeded, and the configuration checkout has failed.

- Up to 64 Ethernet interfaces can be grouped to form a LAG, and up to 144 LAGs are supported on QFX10002-36Q switches, and up to 288 LAGs are supported on QFX10002-72Q switches.
- The LAG must be configured 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.



NOTE: On a QFX5100, EX4600, QFX10002 standalone switch or QFX5100 Virtual Chassis and EX4600 Virtual Chassis, you can configure mixed rate aggregated Ethernet bundles (LAGs with different link speeds). OCX Series switches do not support LAGs with different speeds.



NOTE: Junos OS assigns a unique ID and port priority to each port. The ID and priority are not configurable.

- QFabric systems support a special LAG called an FCoE LAG, which enables you to transport FCoE traffic and regular Ethernet traffic (traffic that is not FCoE traffic) across the same link aggregation bundle. Standard LAGs use a hashing algorithm to determine which physical link in the LAG is used for a transmission, so communication between two devices might use different physical links in the LAG for different transmissions. An FCoE LAG ensures that FCoE traffic uses the same physical link in the LAG for requests and replies in order to preserve the virtual point-to-point link between the FCoE device converged network adapter (CNA) and the FC SAN switch across a QFabric system Node device. An FCoE LAG does not provide load balancing or link redundancy for FCoE traffic. However, regular Ethernet traffic uses the standard hashing algorithm and receives the usual LAG benefits of load balancing and link redundancy in an FCoE LAG. See *Understanding FCoE LAGs* for more information.

Link Aggregation Control Protocol (LACP)

LACP is one method of bundling several physical interfaces to form one logical aggregated Ethernet interface. 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

PDU 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.

When a dual-homed server is deployed with a switch, the network interface cards form a LAG with the switch. During a server upgrade, the server 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 switch and peer are both in active or passive mode. 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.

If the remote end of the LAG link is a security device, LACP might not be supported because security devices require a deterministic configuration. In this case, do not configure LACP. All links in the LAG are permanently operational unless the switch detects a link failure within the Ethernet physical layer or data link layers.

**Related
Documentation**

- [Configuring Link Aggregation on page 67](#)
- [Configuring an FCoE LAG](#)
- [Example: Configuring Link Aggregation Between a QFX Series Product and an Aggregation Switch](#)
- [Example: Configuring an FCoE LAG on a Redundant Server Node Group](#)
- [Verifying the Status of a LAG Interface on page 74](#)
- [Junos OS Network Interfaces Library for Routing Devices](#)

Configuring Aggregated Ethernet LACP

Supported Platforms [QFX Series standalone switches](#)

For aggregated Ethernet interfaces, you can configure the Link Aggregation Control Protocol (LACP). LACP is one method of bundling several physical interfaces to form one logical interface. You can configure aggregated Ethernet with or without LACP enabled.

Before you configure LACP, be sure you have configured the aggregated Ethernet bundles—also known as link aggregation groups (LAGs).

When LACP is enabled, the local and remote sides of the aggregated Ethernet links exchange protocol data units (PDUs), containing information about the state of the link. You can configure Ethernet links to actively transmit PDUs, or you can configure the links

to passively transmit them, sending out LACP PDUs only when they receive them from another link. One side of the link must be configured as **active** for the link to be up.



NOTE: Do not add LACP to a LAG if the remote end of the LAG link is a security device, unless the security device supports LACP. Security devices often do not support LACP because they require a deterministic configuration.

To configure LACP:

1. Enable the LACP mode:

```
[edit interfaces]
user@switch# set aex aggregated-ether-options lacp mode
```

For example, to specify the mode as active, execute the following command:

```
[edit interfaces]
user@switch# set aex aggregated-ether-options lacp active
```

2. Specify the interval and speed at which the interfaces send LACP packets:

```
[edit interfaces]
user@switch# set aex aggregated-ether-options lacp periodic interval
```

For example, to specify the interval as fast, execute the following command:

```
[edit interfaces]
user@switch# set aex aggregated-ether-options lacp periodic fast
```

Configuring Link Aggregation

Supported Platforms EX4600, OCX1100, OCX1100, OCX1100, QFabric System, QFX Series standalone switches

Use the link aggregation feature to aggregate one or more links to form a virtual link or aggregation group. The MAC client can treat this virtual link as if it were a single link. Link aggregation increases bandwidth, provides graceful degradation as failure occurs, and increases link availability.



NOTE: An interface with an already configured IP address cannot form part of the aggregation group.



NOTE: On QFX5100, QFX5200, EX4600, QFX10002, and QFX10008 standalone switches and on QFX5100 Virtual Chassis and EX4600 Virtual Chassis, you can configure a mixed rate of link speeds for the aggregated Ethernet bundle. Load balancing will not work if you configure link speeds that are not supported.

1. [Creating an Aggregated Ethernet Interface on page 68](#)
2. [Configuring the VLAN Name and VLAN ID Number on page 68](#)
3. [Configuring Aggregated Ethernet LACP on page 68](#)

Creating an Aggregated Ethernet Interface

Supported Platforms

To create an aggregated Ethernet interface:

1. Specify the number of aggregated Ethernet interfaces to be created:

```
[edit chassis]
user@switch# set aggregated-devices interfaces device-count device-count
```

For example, to specify 5:

```
[edit chassis]
user@switch# set aggregated-devices interfaces device-count
```

2. Specify the minimum number of links for the aggregated Ethernet interface (aex), that is, the defined bundle, to be labeled “up”:



NOTE: By default only one link must be up for the bundle to be labeled “up”.

```
[edit interfaces]
user@switch# set interface-name aggregated-ether-options minimum-links minimum-links
```

For example, to specify 5:

```
[edit interfaces]
user@switch# set interface-name aggregated-ether-options minimum-links 5
```

3. Specify the link speed for the aggregated Ethernet bundle:

```
[edit interfaces]
user@switch# set interface-name aggregated-ether-options link-speed link-speed
```

For example, to specify 10g:

```
[edit interfaces]
user@switch# set interface-name aggregated-ether-options link-speed 10g
```

4. Specify the members to be included within the aggregated Ethernet bundle:

```
[edit interfaces]
user@switch# set interface-name ether-options 802.3ad aex
user@switch# set interface-name ether-options 802.3ad aex
```

Configuring the VLAN Name and VLAN ID Number

Supported Platforms



NOTE: VLANs are not supported on OCX Series switches.

```
[edit vlans]
user@switch# set vlan-name vlan-id vlan-id-number
```

For example, 100.

Configuring Aggregated Ethernet LACP

Supported Platforms QFX Series standalone switches

For aggregated Ethernet interfaces, you can configure the Link Aggregation Control Protocol (LACP). LACP is one method of bundling several physical interfaces to form one logical interface. You can configure aggregated Ethernet with or without LACP enabled.

Before you configure LACP, be sure you have configured the aggregated Ethernet bundles—also known as link aggregation groups (LAGs).

When LACP is enabled, the local and remote sides of the aggregated Ethernet links exchange protocol data units (PDUs), containing information about the state of the link. You can configure Ethernet links to actively transmit PDUs, or you can configure the links to passively transmit them, sending out LACP PDUs only when they receive them from another link. One side of the link must be configured as **active** for the link to be up.



NOTE: Do not add LACP to a LAG if the remote end of the LAG link is a security device, unless the security device supports LACP. Security devices often do not support LACP because they require a deterministic configuration.

To configure LACP:

1. Enable the LACP mode:

```
[edit interfaces]
user@switch# set aex aggregated-ether-options lacp mode
```

For example, to specify the mode as active, execute the following command:

```
[edit interfaces]
user@switch# set aex aggregated-ether-options lacp active
```

2. Specify the interval and speed at which the interfaces send LACP packets:

```
[edit interfaces]
user@switch# set aex aggregated-ether-options lacp periodic interval
```

For example, to specify the interval as fast, execute the following command:

```
[edit interfaces]
user@switch# set aex aggregated-ether-options lacp periodic fast
```

Related Documentation

- [Understanding Interface Naming Conventions on page 11](#)
- [Configuring an FCoE LAG](#)
- [Example: Configuring Link Aggregation Between a QFX Series Product and an Aggregation Switch](#)
- [Verifying the Status of a LAG Interface on page 74](#)
- [Verifying That LACP Is Configured Correctly and Bundle Members Are Exchanging LACP Protocol Packets on page 74](#)
- [show lacp statistics interfaces \(View\) on page 327](#)

Configuring LACP Link Protection of Aggregated Ethernet Interfaces (CLI Procedure)

Supported Platforms QFX Series standalone switches

You can configure LACP link protection and system priority at the global level on QFX10000 switches for a specific aggregated Ethernet interface. When using LACP link protection to protect a single link in the aggregated ethernet bundle, you configure only two member links for an aggregated Ethernet interface: one active and one standby. LACP link protection ensures that only one link—the link with the higher priority—is used for traffic. The other link is forced to stay in a *waiting* state.

When using LACP link protection to protect multiple links in an aggregated ethernet bundle, you configure links into primary and backup subgroups. A link protection subgroup is a collection of ethernet links within the aggregated ethernet bundle. When you use link protection subgroups, you configure a primary subgroup and a backup subgroup. The configuration process includes assigning member links to each subgroup. When the configuration process is complete, the primary subgroup is used to forward traffic until a switchover event, such as a link failure, occurs and causes the backup subgroup to assume control of traffic that was travelling on the links in the primary subgroup within the bundle.

By default LACP link protection reverts to a higher-priority (lower-numbered) link when the higher-priority link becomes operational or when a higher-priority link is added to the aggregated Ethernet bundle. For priority purposes, LACP link protection treats subgroups like links. You can suppress link calculation by adding the **non-revertive** statement to the link protection configuration. In nonrevertive mode, when a link is active in sending and receiving LACP packets, adding a higher-priority link to the bundle does not change the status of the currently active link. It remains active.

If LACP link configuration is specified to be nonrevertive at the global **[edit chassis]** hierarchy level, you can specify the **revertive** statement in the LACP link protection configuration at the aggregated Ethernet interface level to override the nonrevertive setting for the interface. In revertive mode, adding a higher-priority link to the aggregated Ethernet bundle results in LACP recalculating the priority and switching the status from the currently active link to the newly added, higher-priority link.



NOTE: When LACP link protection is enabled on both local and remote sides of the link, both sides must use the same mode (either revertive or nonrevertive).

Configuring LACP link configuration at the aggregated Ethernet level results in only the configured interfaces using the defined configuration. LACP interface configuration also enables you to override global (chassis) LACP settings.

Before you configure LACP link protection, be sure you have:

- Configured the aggregated Ethernet bundles—also known as link aggregation groups (LAGs). See *Configuring Link Aggregation*.

- Configured LACP for the interface. See [“Configuring Aggregated Ethernet LACP” on page 66](#).

You can configure LACP link protection for all aggregated Ethernet interfaces on the switch by enabling it at the global level on the switch or configure it for a specific aggregated Ethernet interface by enabling it on that interface.

- [Configuring LACP Link Protection for a Single Link at the Global Level on page 71](#)
- [Configuring LACP Link Protection for a Single Link at the Aggregated Interface Level on page 71](#)
- [Configuring Subgroup Bundles to Provide LACP Link Protection to Multiple Links in an Aggregated Ethernet Interface on page 72](#)

Configuring LACP Link Protection for a Single Link at the Global Level

To configure LACP link protection for aggregated Ethernet interfaces at the global level:

1. Enable LACP link protection on the switch:

```
[edit chassis aggregated-devices ethernet lacp]
user@switch# set link-protection
```
2. (Optional) Configure the LACP link protection for the aggregated Ethernet interfaces to be in nonrevertive mode:



NOTE: LACP link protection is in revertive mode by default.

- ```
[edit chassis aggregated-devices ethernet lacp link-protection]
user@switch# set non-revertive
```
3. (Optional) To configure LACP system priority for the aggregated Ethernet interfaces:  

```
[edit chassis aggregated-devices ethernet lacp]
user@switch# set system-priority
```

## Configuring LACP Link Protection for a Single Link at the Aggregated Interface Level

To enable LACP link protection for a specific aggregated Ethernet interface:

1. Enable LACP link protection for the interface:  

```
[edit interfaces aeX aggregated-ether-options lacp]
user@switch# set link-protection
```
2. (Optional) Configure the LACP link protection for the aggregated Ethernet interface to be in revertive or nonrevertive mode:
  - To specify revertive mode:  

```
[edit interfaces aeX aggregated-ether-options lacp link-protection]
user@switch# set revertive
```
  - To specify nonrevertive mode:  

```
[edit interfaces aeX aggregated-ether-options lacp link-protection]
user@switch# set non-revertive
```
3. (Optional) To configure LACP system priority for an aggregated Ethernet interface:  

```
[edit interfaces aeX aggregated-ether-options lacp link-protection]
```

```
user@switch# set system-priority
```

4. (Optional) To configure LACP port priority for an aggregated Ethernet interface:

```
[edit interfaces ge-fpc/pic/port ether-options 802.3ad lacp]
user@switch# set port-priority
```

## Configuring Subgroup Bundles to Provide LACP Link Protection to Multiple Links in an Aggregated Ethernet Interface

You can configure link protection subgroup bundles to provide link protection for multiple links in an aggregated ethernet bundle.

Link protection subgroups allow you to provide link protection to a collection of Ethernet links within a LAG bundle, instead of providing protection to a single link in the aggregated ethernet bundle only. You can, for instance, configure a primary subgroup with three member links and a backup subgroup with three different member links and use the backup subgroup to provide link protection for the primary subgroup.

To configure link protection using subgroups:

1. Configure the primary link protection subgroup in the aggregated ethernet interface:

```
[edit interfaces aeX aggregated-ether-options]
user@switch# set link-protection-sub-group group-name primary
```

For instance, to create a primary link protection subgroup named **subgroup-primary** for interface **ae0**:

```
[edit interfaces ae0 aggregated-ether-options]
user@switch# set link-protection-sub-group subgroup-primary primary
```

2. Configure the backup link protection subgroup in the aggregated ethernet interface:

```
[edit interfaces aeX aggregated-ether-options]
user@switch# set link-protection-sub-group group-name backup
```

For instance, to create a backup link protection subgroup named **subgroup-backup** for interface **ae0**:

```
[edit interfaces ae0 aggregated-ether-options]
user@switch# set link-protection-sub-group subgroup-backup backup
```



**NOTE:** You can create one primary and one backup link protection subgroup per aggregated ethernet interface.

3. Attach interfaces to the link protection subgroups:

```
[edit interfaces interface-name ether-options 802.3ad]
user@switch# set link-protection-sub-group group-name
```



**NOTE:** The primary and backup link protection subgroups must contain the same number of interfaces. For instance, if the primary link protection subgroup contains three interfaces, the backup link protection subgroup must also contain three interfaces.

For instance, to configure interfaces **ge-0/0/0** and **ge-0/0/1** into link protection subgroup **subgroup-primary** and interfaces **ge-0/0/2** and **ge-0/0/3** into link protection subgroup **subgroup-backup**:

```
[edit interfaces ge-0/0/0 ether-options 802.3ad]
user@switch# set link-protection-sub-group subgroup-primary
[edit interfaces ge-0/0/1 ether-options 802.3ad]
user@switch# set link-protection-sub-group subgroup-primary
[edit interfaces ge-0/0/2 ether-options 802.3ad]
user@switch# set link-protection-sub-group subgroup-backup
[edit interfaces ge-0/0/3 ether-options 802.3ad]
user@switch# set link-protection-sub-group subgroup-backup
```

4. (Optional) Configure the port priority for link protection:

```
[edit interfaces interface-name ether-options 802.3ad]
user@switch# set port-priority priority
```

The port priority is used to select the active link.

5. Enable link protection

To enable link protection at the LAG level:

```
[edit interfaces aeX aggregated-ether-options]
user@switch# set link-protection
```

To enable link protection at the LACP level:

```
[edit interfaces aeX aggregated-ether-options lacp]
user@switch# set link-protection
```

For instance, to enable link protection on **ae0** at the LAG level:

```
[edit interfaces ae0 aggregated-ether-options]
user@switch# set link-protection
```

For instance, to enable link protection on **ae0** at the LACP level:

```
[edit interfaces ae0 aggregated-ether-options lacp]
user@switch# set link-protection
```

Related Documentation

- [lACP \(Aggregated Ethernet\) on page 199](#)

## Configuring Periodic Rebalancing of Subscribers in an Aggregated Ethernet Interface

Supported Platforms [MX Series, QFX Series standalone switches](#)

If subscribers are frequently logging in and logging out of your network, you can configure the system to periodically rebalance the links based on a specific time and interval.

To configure periodic rebalancing:

1. Access the aggregated Ethernet interface for which you want to configure periodic rebalancing.

```
edit
user@host# edit interfaces aenumber aggregated-ether-options
```

2. Configure the rebalancing parameters for the interface, including the time and the interval between rebalancing actions.

```
[edit interfaces aenumber aggregated-ether-options]
```

user@host# **rebalance-periodic** time *hour:minute* <interval hours>

- Related Documentation**
- [Verifying the Distribution of Demux Subscribers in an Aggregated Ethernet Interface](#)
  - [Configuring the Distribution Type for Demux Subscribers on Aggregated Ethernet Interfaces](#)
  - [Distribution of Demux Subscribers in an Aggregated Ethernet Interface](#)

## Verifying the Status of a LAG Interface

**Supported Platforms** [EX Series](#), [MX Series](#), [OCX1100](#), [QFabric System](#), [QFX Series standalone switches](#)

**Purpose** Verify that a link aggregation group (LAG) (**ae0**) has been created on the switch.

**Action** To verify that the **ae0** LAG has been created:

```
[edit interfaces]
show interfaces ae0 terse
```

| Interface | Admin | Link | Proto | Local         | Remote |
|-----------|-------|------|-------|---------------|--------|
| ae0       | up    | up   |       |               |        |
| ae0.0     | up    | up   | inet  | 10.10.10.2/24 |        |

**Meaning** The output confirms that the **ae0** link is up and shows the family and IP address assigned to this link.

- Related Documentation**
- [Configuring Link Aggregation on page 67](#)
  - [Verifying That LACP Is Configured Correctly and Bundle Members Are Exchanging LACP Protocol Packets on page 74](#)
  - [Example: Configuring Link Aggregation Between a QFX Series Product and an Aggregation Switch](#)
  - [Example: Configuring Link Aggregation with LACP Between a QFX Series Product and an Aggregation Switch](#)
  - [show lacp statistics interfaces \(View\) on page 327](#)

## Verifying That LACP Is Configured Correctly and Bundle Members Are Exchanging LACP Protocol Packets

**Supported Platforms** [QFX Series](#)

Verify that LACP has been set up correctly and that the bundle members are transmitting LACP protocol packets.

1. [Verifying the LACP Setup on page 75](#)
2. [Verifying That LACP Packets Are Being Exchanged on page 75](#)

## Verifying the LACP Setup

### Supported Platforms

**Purpose** Verify that the LACP has been set up correctly.

**Action** To verify that LACP has been enabled as active on one end:

```
user@switch>show lacp interfaces xe-0/0/0
Aggregated interface: ae0
LACP state: Role Exp Def Dist Col Syn Aggr Timeout Activity
xe-0/1/0 Actor No Yes No No No Yes Fast Active
xe-0/1/0 PartnerNo Yes No No No Yes Fast Passive
LACP protocol: Receive State Transmit State Mux State
xe-0/1/0 Defaulted Fast periodic Detached
```

**Meaning** This example shows that LACP has been configured with one side as active and the other as passive. When LACP is enabled, one side must be set as active in order for the bundled link to be up.

## Verifying That LACP Packets Are Being Exchanged

### Supported Platforms

**Purpose** Verify that LACP packets are being exchanged between interfaces.

**Action** Use the `show lacp statistics interfaces interface-name` command to display LACP BPDU exchange information.

```
show lacp statistics interfaces ae0
Aggregated interface: ae0
LACP Statistics: LACP Rx LACP Tx Unknown Rx Illegal Rx
xe-0/0/2 1352 2035 0 0
xe-0/0/3 1352 2056 0 0
```

**Meaning** The output here shows that the link is up and that PDUs are being exchanged.

- Related Documentation**
- [Configuring Link Aggregation on page 67](#)
  - [Verifying the Status of a LAG Interface on page 74](#)
  - [Example: Configuring Link Aggregation Between a QFX Series Product and an Aggregation Switch](#)
  - [Example: Configuring Link Aggregation with LACP Between a QFX Series Product and an Aggregation Switch](#)
  - [show lacp statistics interfaces \(View\) on page 327](#)

## Troubleshooting an Aggregated Ethernet Interface

**Supported Platforms** EX Series, MX Series, OCX1100, QFabric System, QFX Series standalone switches

**Problem**    **Description:** The `show interfaces terse` command shows that the LAG is down.

**Solution**    Check the following:

- Verify that there is no configuration mismatch.
- Verify that all member ports are up.
- Verify that a LAG is part of family ethernet-switching (Layer 2 LAG) or family inet (Layer 3 LAG).



**NOTE:** Layer 2 LAGs are not supported on OCX Series switches.

---

- Verify that the LAG member is connected to the correct LAG at the other end.
- Verify that the LAG members belong to the same switch.

**Related  
Documentation**

- [Verifying the Status of a LAG Interface on page 74](#)
- *Example: Configuring Link Aggregation Between a QFX Series Product and an Aggregation Switch*

## PART 5

# Load Balancing

- [Understanding Load Balancing on page 79](#)





## CHAPTER 5

# Understanding Load Balancing

- [Configuring Load Balancing Based on MAC Addresses on page 79](#)

## Configuring Load Balancing Based on MAC Addresses

---

**Supported Platforms**    [QFX Series standalone switches](#)

The hash key mechanism for load-balancing uses Layer 2 media access control (MAC) information such as frame source and destination address. To load-balance traffic based on Layer 2 MAC information, include the **multiservice** statement at the **[edit forwarding-options hash-key]** or **[edit chassis fpc slot number pic PIC number hash-key]** hierarchy level:

```
multiservice {
 source-mac;
 destination-mac;
 payload {
 ip {
 layer3-only;
 layer-3 (source-ip-only | destination-ip-only);
 layer-4;
 inner-vlan-id;
 outer-vlan-id;
 }
 }
}
```

To include the destination-address MAC information in the hash key, include the **destination-mac** option. To include the source-address MAC information in the hash key, include the **source-mac** option.



**NOTE:** Any packets that have the same source and destination address will be sent over the same path.



**NOTE:** You can configure per-packet load balancing to optimize EVPN traffic flows across multiple paths.



**NOTE:** Aggregated Ethernet member links will now use the physical MAC address as the source MAC address in 802.3ah OAM packets.

**Related Documentation**

- *multiservice*

## PART 6

# Local Link Bias

- [Understanding Local Link Bias on page 83](#)



## CHAPTER 6

# Understanding Local Link Bias

- [Understanding Local Link Bias on page 83](#)
- [Configuring Local Link Bias \(CLI Procedure\) on page 84](#)

## Understanding Local Link Bias

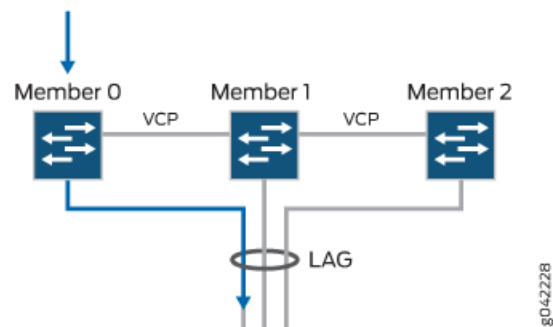
**Supported Platforms** EX Series, QFX Series standalone switches



**NOTE:** The QFX5200 switches do not support Virtual Chassis or Virtual Chassis ports.

Local link bias conserves bandwidth on Virtual Chassis ports (VCPs) by using local links to forward unicast traffic exiting a Virtual Chassis or Virtual Chassis Fabric (VCF) that has a Link Aggregation group (LAG) bundle composed of member links on different member switches in the same Virtual Chassis or VCF. A local link is a member link in the LAG bundle that is on the member switch that received the traffic. Because traffic is received and forwarded on the same member switch when local link bias is enabled, no VCP bandwidth is consumed by traffic traversing the VCPs to exit the Virtual Chassis or VCF using a different member link in the LAG bundle. The traffic flow of traffic exiting a Virtual Chassis or VCF over a LAG bundle when local link bias is enabled is illustrated in [Figure 1 on page 83](#).

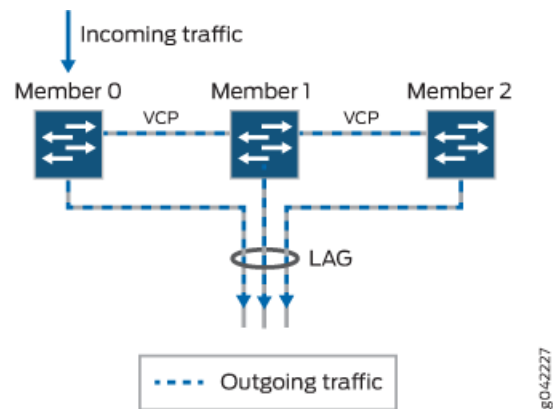
**Figure 1: Egress Traffic Flow with Local Link Bias**



When local link bias is disabled, egress traffic exiting a Virtual Chassis or VCF on a LAG bundle can be forwarded out of any member link in the LAG bundle. Traffic forwarding decisions are made by an internal algorithm that attempts to load-balance traffic between

the member links in the bundle. VCP bandwidth is frequently consumed by egress traffic when local link bias is disabled because the egress traffic traverses the VCPs to reach the destination egress member link in the LAG bundle. The traffic flow of traffic exiting a Virtual Chassis or VCF over a LAG bundle when local link bias is disabled is illustrated in [Figure 2 on page 84](#).

**Figure 2: Egress Traffic Flow without Local Link Bias**



Local link bias is configured in a LAG bundle. A Virtual Chassis or VCF that has multiple LAG bundles can contain bundles that have and have not enabled local link bias. Local link bias only impacts the forwarding of unicast traffic exiting a Virtual Chassis or VCF; ingress traffic handling is not impacted by the local link bias setting. Egress multicast, unknown unicast, and broadcast traffic exiting a Virtual Chassis or VCF over a LAG bundle is not impacted by the local link bias setting and is always load-balanced among the member links. Local link bias is disabled, by default.

You should enable local link bias if you want to conserve VCP bandwidth by always forwarding egress unicast traffic on a LAG bundle out of a local link. You should not enable local link bias if you want egress traffic load-balanced across the member links in the LAG bundle as it exits the Virtual Chassis or VCF.

**Related Documentation**

- [Configuring Local Link Bias \(CLI Procedure\) on page 84](#)

## Configuring Local Link Bias (CLI Procedure)

**Supported Platforms** [EX Series, QFX Series standalone switches](#)

Local link bias is used to conserve bandwidth on Virtual Chassis ports (VCPs) by using local links to forward unicast traffic exiting a Virtual Chassis or Virtual Chassis Fabric (VCF) that has a Link Aggregation group (LAG) bundle composed of member links on different member switches in the same Virtual Chassis or VCF. A local link is a member link in the LAG bundle that is on the member switch that received the traffic. Because traffic is received and forwarded on the same member switch when local link bias is enabled, no VCP bandwidth is consumed by traffic traversing the VCPs to exit the Virtual Chassis or VCF on a different member link in the LAG bundle.

You should enable local link bias if you want to conserve VCP bandwidth by always forwarding egress unicast traffic on a LAG out of a local link. You should not enable local link bias if you want egress traffic load-balanced as it exits the Virtual Chassis or VCF.

To enable local link bias on a LAG bundle:

```
[edit]
user@switch# set interface aex aggregated-ether-options local-bias
where aex is the name of the aggregated Ethernet link bundle.
```

For instance, to enable local link bias on aggregated Ethernet interface ae0:

```
[edit]
user@switch# set interface ae0 aggregated-ether-options local-bias
```

**Related Documentation**

- [Understanding Local Link Bias on page 83](#)





## PART 7

# Redundant Trunk Groups

- [Understanding Redundant Trunk Groups on page 89](#)



## CHAPTER 7

# Understanding Redundant Trunk Groups

- [Understanding Redundant Trunk Links on page 89](#)
- [Example: Configuring Redundant Trunk Links for Faster Recovery on page 91](#)

## Understanding Redundant Trunk Links

---

**Supported Platforms**    [EX Series, QFX Series standalone switches](#)

In a typical enterprise network composed of distribution and access layers, a redundant trunk link provides a simple solution for network recovery when a trunk port on a switch goes down. In that case, traffic is routed to another trunk port, keeping network convergence time to a minimum.

To configure a redundant trunk link, create a redundant trunk group. The redundant trunk group is configured on the access switch and contains two links: a primary or active link, and a secondary link. If the active link fails, the secondary link automatically starts forwarding data traffic without waiting for normal spanning-tree protocol convergence.

Data traffic is forwarded only on the active link. Data traffic on the secondary link is dropped and shown as dropped packets when you issue the operational mode command **show interfaces *interface-name* extensive**.

While data traffic is blocked on the secondary link, Layer 2 control traffic is still permitted. For example, an LLDP session can be run between two switches on the secondary link.

Rapid Spanning Tree Protocol (RSTP) is enabled by default on the switches to create a loop-free topology, but an interface is not allowed to be in both a redundant trunk group and in a spanning-tree protocol topology at the same time. You must disable RSTP on an interface if a redundant trunk group is configured on that interface. For example, in [Figure 3 on page 90](#), in addition to disabling RSTP on the Switch 3 interfaces, you must also disable RSTP on the Switch 1 and Switch 2 interfaces connected to Switch 3. Spanning-tree protocols can, however, continue operating on other interfaces on those switches—for example on the link between Switch 1 and Switch 2.

[Figure 3 on page 90](#) shows three switches in a basic topology for redundant trunk links. Switch 1 and Switch 2 make up the distribution layer, and Switch 3 makes up the access layer. Switch 3 is connected to the distribution layer through trunk ports ge-0/0/9.0 (Link 1) and ge-0/0/10.0 (Link 2). Link 1 and Link 2 are in a redundant trunk group called group1. Link 1 is designated as the primary link. Traffic flows between Switch 3 in the access layer

and Switch 1 in the distribution layer through Link 1. While Link 1 is active, Link 2 blocks traffic.

Figure 3: Redundant Trunk Group, Link 1 Active

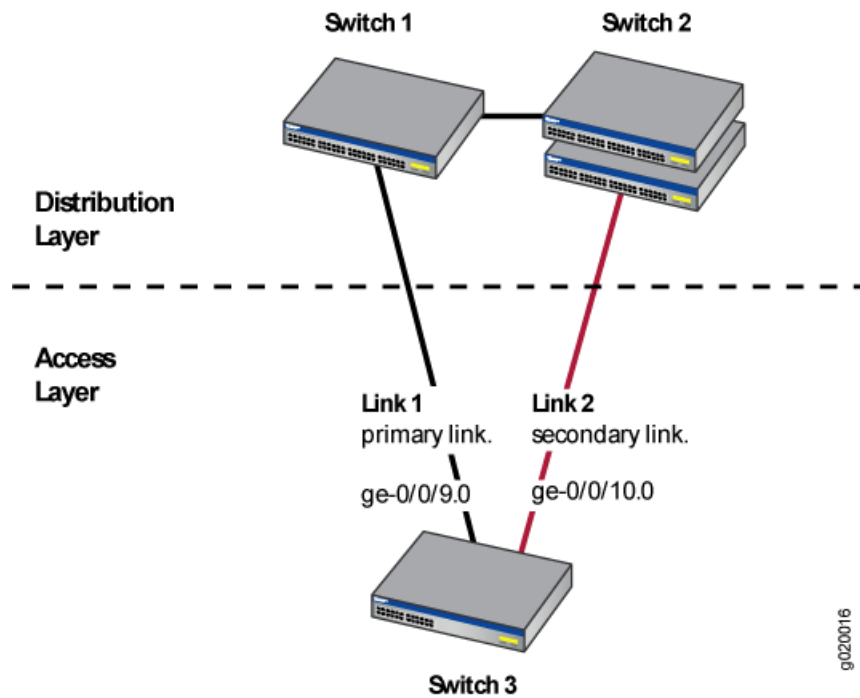
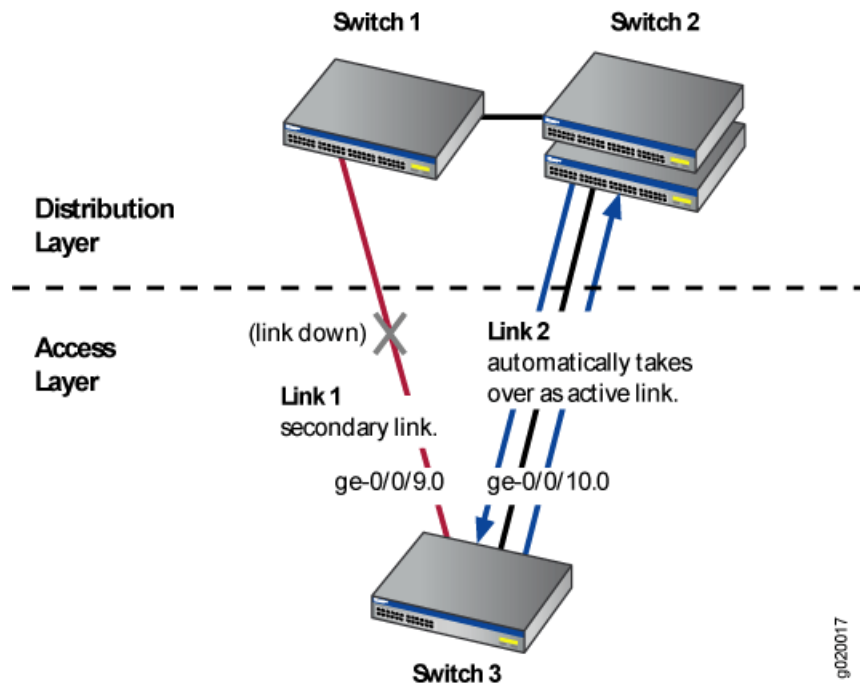


Figure 4 on page 91 illustrates how the redundant trunk link topology works when the primary link goes down.

Figure 4: Redundant Trunk Group, Link 2 Active



When Link 1 between Switch 1 and Switch 3 goes down, Link 2 takes over as the active link. Traffic between the access layer and the distribution layer is then automatically switched to Link 2 between Switch 1 and Switch 2.

#### Related Documentation

- [Example: Configuring Redundant Trunk Links for Faster Recovery](#)
- [Example: Configuring Redundant Trunk Links for Faster Recovery on page 91](#)

## Example: Configuring Redundant Trunk Links for Faster Recovery

**Supported Platforms** EX Series, QFX Series standalone switches



**NOTE:** This example uses Junos OS for EX Series switches or QFX Series with support for the Enhanced Layer 2 Software (ELS) configuration style. If your EX Series switch runs software that does not support ELS, see *Example: Configuring Redundant Trunk Links for Faster Recovery*. For ELS details, see *Getting Started with Enhanced Layer 2 Software*.

You can manage network convergence by configuring both a primary link and a secondary link on a switch; this is called a redundant trunk group (RTG). If the primary link in a redundant trunk group fails, it passes its known MAC address locations to the secondary link, which automatically takes over after one minute.

This example describes how to create a redundant trunk group with a primary and a secondary link:

- [Requirements on page 92](#)
- [Overview and Topology on page 92](#)
- [Disabling RSTP on Switches 1 and 2 on page 94](#)
- [Configuring Redundant Trunk Links on Switch 3 on page 95](#)
- [Verification on page 96](#)

## Requirements

This example uses the following hardware and software components:

- Two EX Series or QFX Series distribution switches
- One EX Series or QFX Series access switch
- The appropriate software release for your platform:
  - For EX Series switches: Junos OS Release 13.2X50-D10 or later
  - For the QFX Series: Junos OS Release 13.2X50-D15 or later

Before you configure the redundant trunk links network on the access and distribution switches, be sure you have:

- Configured interfaces ge-0/0/9 and ge-0/0/10 on the access switch, Switch 3, as trunk interfaces.
- Configured one trunk interface on each distribution switch, Switch 1 and Switch 2.
- Connected the three switches as shown in the topology for this example (see [Figure 5 on page 94](#)).

## Overview and Topology

In a typical enterprise network composed of distribution and access layers, a redundant trunk link provides a simple solution for trunk interface network recovery. When a trunk interface fails, data traffic is routed to another trunk interface after one minute, thereby keeping network convergence time to a minimum.

This example shows the configuration of a redundant trunk group that includes one primary link (and its interface) and one unspecified link (and its interface) that serves as the secondary link.

A second type of redundant trunk group, not illustrated in the example, consists of two unspecified links (and their interfaces); in this case, neither of the links is primary. The software selects an active link by comparing the port numbers of the two links and activating the link with the higher port number. For example, if the two link interfaces use interfaces ge-0/1/0 and ge-0/1/1, the software activates ge-0/1/1. (In the interface names, the final number is the port number.)

The two links in a redundant trunk group generally operate the same way, whether they are configured as primary/unspecified or unspecified/unspecified. Data traffic initially passes through the active link but is blocked on the inactive link. While data traffic is blocked on the secondary link, note that Layer 2 control traffic is still permitted if the link is active. For example, an LLDP session can be run between two switches on the secondary link. If the active link either goes down or is disabled administratively, it broadcasts a list of its known MAC addresses for data traffic; the other link immediately picks up and adds the MAC addresses to its address table, becomes active, and begins forwarding traffic.

The one difference in operation between the two types of redundant trunk groups occurs when a primary link is active, goes down, is replaced by the secondary link, and then reactivates. When a primary link is re-enabled while the secondary link is active, the primary link waits 1 second (you can change the time interval by using the preempt cutover timer to accommodate your network) and then takes over as the active link. In other words, the primary link has priority and is always activated if it is available. This differs from the behavior of two unspecified links, both of which act as equals. Because the unspecified links are equal, the active link remains active until it either goes down or is disabled administratively; this is the only time that the other unspecified link learns the MAC addresses and immediately becomes active.

The example given here illustrates a primary/unspecified configuration for a redundant trunk group because that configuration gives you more control and is more commonly used.



**NOTE:** Rapid Spanning Tree Protocol (RSTP) is enabled by default on the switches to create a loop-free topology, but an interface is not allowed to be in both a redundant trunk group and in a spanning-tree protocol topology at the same time. You will need to disable RSTP on the two distribution switches in the example, Switch 1 and Switch 2. Spanning-tree protocols can, however, continue operating in other parts of the network—for example, between the distribution switches and also in links between distribution switches and the enterprise core.

Figure 5 on page 94 displays an example topology containing three switches. Switch 1 and Switch 2 make up the distribution layer, and Switch 3 makes up the access layer. Switch 3 is connected to the distribution layer through trunk interfaces ge-0/0/9.0 (Link 1) and ge-0/0/10.0 (Link 2).

Table 13 on page 94 lists the components used in this redundant trunk group.

Because RSTP and RTGs cannot operate simultaneously on a switch, you disable RSTP on Switch 1 and Switch 2 in the first configuration task, and you disable RSTP on Switch 3 in the second task.

The second configuration task creates a redundant trunk group called example 1 on Switch 3. The trunk interfaces ge-0/0/9.0 and ge-0/0/10.0 are the two links configured in the second configuration task. You configure the trunk interface ge-0/0/9.0 as the primary link. You configure the trunk interface ge-0/0/10.0 as an unspecified link, which becomes the secondary link by default.

Figure 5: Topology for Configuring the Redundant Trunk Links

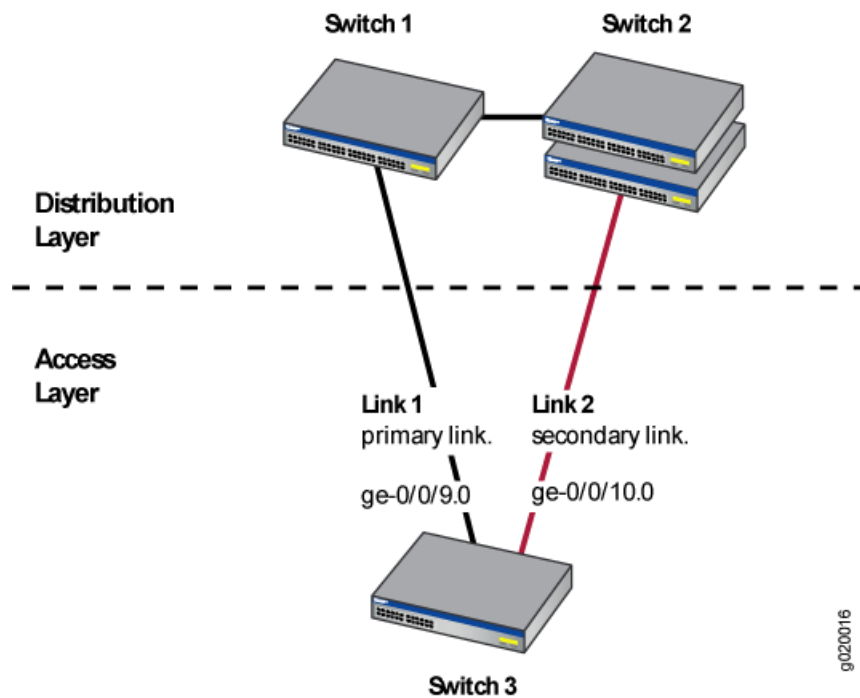


Table 13: Components of the Redundant Trunk Link Topology

| Property              | Settings                                                                                                                                                                                                                           |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Switch hardware       | <ul style="list-style-type: none"> <li>Switch 1—1 EX Series or QFX Series distribution switch</li> <li>Switch 2—1 EX Series or QFX Series distribution switch</li> <li>Switch 3—1 EX Series or QFX Series access switch</li> </ul> |
| Trunk interfaces      | On Switch 3 (access switch): ge-0/0/9.0 and ge-0/0/10.0                                                                                                                                                                            |
| Redundant trunk group | rtg0                                                                                                                                                                                                                               |

## Disabling RSTP on Switches 1 and 2

To disable RSTP on Switch 1 and Switch 2, perform this task on each switch:

### CLI Quick Configuration

To quickly disable RSTP on Switch 1 and Switch 2, copy the following command and paste it into each switch terminal window:

```
[edit]
set protocols rstp disable
```

### Step-by-Step Procedure

To disable RSTP on Switch 1 and Switch 2:

1. Disable RSTP on Switch 1 and Switch 2:

```
[edit]
user@switch# set protocols rstp disable
```

**Results** Check the results of the configuration:



```
[edit]
user@switch# show
protocols {
 rstp {
 disable;
 }
}
```

## Configuring Redundant Trunk Links on Switch 3

To configure redundant trunk links on Switch 3, perform this task:

**CLI Quick Configuration** To quickly configure the redundant trunk group rtg0 on Switch 3, copy the following commands and paste them into the switch terminal window:

```
[edit]
set protocols rstp disable
set switch-options redundant-trunk-group group rtg0 interface ge-0/0/9.0 primary
set switch-options redundant-trunk-group group rtg0 interface ge-0/0/10.0
set redundant-trunk-group group rtg0 preempt-cutover-timer 60
```

**Step-by-Step Procedure** Configure the redundant trunk group rtg0 on Switch 3.

1. Turn off RSTP:

```
[edit]
user@switch# set protocols rstp disable
```

2. Name the redundant trunk group rtg0 while configuring trunk interface ge-0/0/9.0 as the primary link and ge-0/0/10 as an unspecified link to serve as the secondary link:

```
[edit switch-options]
user@switch# set redundant-trunk-group group rtg0 interface ge-0/0/9.0 primary
user@switch# set redundant-trunk-group group rtg0 interface ge-0/0/10.0
```

3. (Optional) Change the time interval (from the default of 1 second) that a re-enabled primary link waits to take over for an active secondary link:

```
[edit switch-options]
user@switch# set redundant-trunk-group group rtg0 preempt-cutover-timer 60
```

**Results** Check the results of the configuration:

```
[edit]
user@switch# show
switch-options
 redundant-trunk-group {
 group rtg0 {
 preempt-cutover-timer 60;
 interface ge-0/0/9.0 {
 primary;
 }
 interface ge-0/0/10.0;
 }
 }
protocols {
 rstp {
 disable;
```

```
}
}
```

## Verification

To confirm that the configuration is set up correctly, perform this task:

- [Verifying That a Redundant Trunk Group Was Created on page 96](#)

### Verifying That a Redundant Trunk Group Was Created

**Purpose** Verify that the redundant trunk group rtg0 has been created on Switch 1 and that trunk interfaces are members of the redundant trunk group.

**Action** List all redundant trunk groups configured on the switch:

```
user@switch> show redundant-trunk-group
```

| Group name | Interface   | State  | Time of last flap | Flap count |
|------------|-------------|--------|-------------------|------------|
| rtg0       | ge-0/0/9.0  | Up/Pri | Never             | 0          |
|            | ge-0/0/10.0 | Up     | Never             | 0          |

**Meaning** The **show redundant-trunk-group** command lists all redundant trunk groups configured on the switch as well as the interface names and their current states (up or down for an unspecified link, and up or down and primary for a primary link). For this configuration example, the output shows that the redundant trunk group rtg0 is configured on the switch. The **Up** beside the interfaces indicates that both link cables are physically connected. The **Pri** beside trunk interface ge-0/0/9.0 indicates that it is configured as the primary link.

**Related Documentation** • [Understanding Redundant Trunk Links on page 89](#)

## PART 8

# Configuration Statements and Operational Commands

- [Ethernet OAM Link Fault Management Configuration Statements on page 99](#)
- [Interfaces Configuration Statements on page 123](#)
- [LAGs and LACP Configuration Statements on page 189](#)
- [Redundant Trunk Groups Configuration Statements on page 203](#)
- [Ethernet OAM Link Fault Management Operational Command on page 209](#)
- [Interfaces Operational Commands on page 215](#)
- [LAGs and LACP Operational Commands on page 321](#)
- [Redundant Trunk Group Operational Command on page 329](#)



## CHAPTER 8

# Ethernet OAM Link Fault Management Configuration Statements

- [action \(OAM LFM\) on page 100](#)
- [action-profile on page 101](#)
- [allow-remote-loopback on page 102](#)
- [ethernet \(OAM LFM\) on page 103](#)
- [event-thresholds on page 105](#)
- [event \(OAM LFM\) on page 106](#)
- [frame-error on page 107](#)
- [frame-period on page 108](#)
- [frame-period-summary on page 109](#)
- [oam on page 110](#)
- [interface \(OAM LFM\) on page 112](#)
- [link-adjacency-loss on page 113](#)
- [link-discovery on page 113](#)
- [link-down on page 114](#)
- [link-event-rate on page 114](#)
- [link-fault-management on page 115](#)
- [negotiation-options on page 116](#)
- [no-allow-link-events on page 116](#)
- [pdu-interval on page 117](#)
- [pdu-threshold on page 117](#)
- [remote-loopback on page 118](#)
- [symbol-period on page 118](#)
- [syslog \(OAM LFM\) on page 119](#)
- [traceoptions \(OAM LFM\) on page 120](#)

## action (OAM LFM)

---

**Supported Platforms** [EX Series](#)

**Syntax**

```
action {
 syslog;
 link-down;
}
```

**Hierarchy Level** [edit protocols [oam ethernet link-fault-management](#)]

**Release Information** Statement introduced in Junos OS Release 9.4 for EX Series switches.

**Description** Define the action or actions to be taken when the OAM link fault management (LFM) fault event occurs.

The remaining statements are explained separately.

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

**Related Documentation**

- [Configuring Ethernet OAM Link Fault Management \(CLI Procedure\)](#) on page 4

## action-profile

---

**Supported Platforms** [EX Series](#)

**Syntax**

```

action-profile profile-name;
 action {
 syslog;
 link-down;
 }
 event {
 link-adjacency-loss;
 link-event-rate {
 frame-error count;
 frame-period count;
 frame-period-summary count;
 symbol-period count;
 }
 }

```

**Hierarchy Level** [edit protocols [oam ethernet link-fault-management](#)]

**Release Information** Statement introduced in Junos OS Release 9.4 for EX Series switches.

**Description** Configure an Ethernet OAM link fault management (LFM) action profile by specifying a profile name.

The remaining statements are explained separately.

**Options** *profile-name*—Name of the action profile.

**Required Privilege Level**

|                                                             |
|-------------------------------------------------------------|
| routing—To view this statement in the configuration.        |
| routing-control—To add this statement to the configuration. |

**Related Documentation**

- [Configuring Ethernet OAM Link Fault Management \(CLI Procedure\) on page 4](#)

## allow-remote-loopback

---

|                                 |                                                                                                                                                                                                                                           |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supported Platforms</b>      | EX Series                                                                                                                                                                                                                                 |
| <b>Syntax</b>                   | allow-remote-loopback;                                                                                                                                                                                                                    |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet link-fault-management interface</a> <i>interface-name</i> ]                                                                                                                                      |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.4 for EX Series switches.                                                                                                                                                                      |
| <b>Description</b>              | Advertise that the interface is capable of getting into loopback mode. Enable remote loopback in Ethernet OAM link fault management (LFM) on all Ethernet interfaces or the specified interface on the EX Series switch.                  |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Example: Configuring Ethernet OAM Link Fault Management on EX Series Switches</i></li><li>• <a href="#">Configuring Ethernet OAM Link Fault Management (CLI Procedure)</a> on page 4</li></ul> |



## ethernet (OAM LFM)

### Supported Platforms

```
Syntax ethernet {
 connectivity-fault-management {
 action-profile profile-name {
 action {
 interface-down;
 }
 default-actions {
 interface-down;
 }
 event {
 adjacency-loss;
 }
 }
 }
 esp-traceoptions {
 file filename <files number> <no-stamp> <replace> <size size> <world-readable |
 no-world-readable>;
 flag (all | error | esp | interface | krt | lib | normal | task | timer);
 }
 linktrace {
 age (30m | 10m | 1m | 30s | 10s);
 path-database-size path-database-size;
 }
 maintenance-domain domain-name {
 level number;
 mip-half-function (none | default | explicit);
 name-format (character-string | none | dns | mac+2oct);
 maintenance-association ma-name {
 continuity-check {
 hold-interval minutes;
 interface-status-tlv;
 interval (10m | 10s | 1m | 1s | 100ms);
 loss-threshold number;
 port-status-tlv;
 }
 mep mep-id {
 auto-discovery;
 direction down;
 interface interface-name;
 priority
 remote-mep mep-id {
 action-profile profile-name;
 sla-iterator-profile profile-name {
 data-tlv-size size;
 iteration-count count-value;
 priority priority-value;
 }
 }
 }
 }
 short-name-format (character-string | vlan | 2octet | rfc-2685-vpn-id);
 }
}
```

```
performance-monitoring {
 sla-iterator-profiles {
 profile-name {
 calculation-weight {
 delay delay-value;
 delay-variation delay-variation-value;
 }
 cycle-time cycle-time-value;
 iteration-period iteration-period-value;
 measurement-type two-way-delay;
 passive;
 }
 }
}

traceoptions {
 file filename <files number> <match regex> <size size> <world-readable |
 no-world-readable>;
 flag flag ;
 no-remote-trace;
}

link-fault-management {
 action-profile profile-name;
 action {
 syslog;
 link-down;
 }
 event {
 link-adjacency-loss;
 link-event-rate {
 frame-error count;
 frame-period count;
 frame-period-summary count;
 symbol-period count;
 }
 }
}

interface interface-name {
 link-discovery (active | passive);
 pdu-interval interval;
 pdu-threshold threshold-value;
 remote-loopback;
 event-thresholds {
 frame-error count;
 frame-period count;
 frame-period-summary count;
 symbol-period count;
 }
 negotiation-options {
 allow-remote-loopback;
 no-allow-link-events;
 }
}

traceoptions {
 file filename <files number> <match regex> <size size> <world-readable |
 no-world-readable>;
 flag flag ;
```

```

 no-remote-trace;
 }
}

```

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam</a> ]                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.4 for EX Series switches.<br><b>connectivity-fault-management</b> introduced in Junos OS Release 10.2 for EX Series switches.                                                                                                                                                                                                                                                                      |
| <b>Description</b>              | Provide IEEE 802.3ah Operation, Administration, and Maintenance (OAM) support for Ethernet interfaces on EX Series switches or configure connectivity fault management (CFM) for IEEE 802.1ag Operation, Administration, and Management (OAM) support on the switches.<br><br>The remaining statements are explained separately.                                                                                                              |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Example: Configuring Ethernet OAM Link Fault Management on EX Series Switches</i></li> <li>• <i>Example: Configuring Ethernet OAM Connectivity Fault Management on EX Series Switches</i></li> <li>• <a href="#">Configuring Ethernet OAM Link Fault Management (CLI Procedure) on page 4</a></li> <li>• <i>Configuring Ethernet OAM Connectivity Fault Management (CLI Procedure)</i></li> </ul> |

## event-thresholds

### Supported Platforms

|                                 |                                                                                                                                              |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre> event-thresholds {     frame-error count;     frame-period count;     frame-period-summary count;     symbol-period count; } </pre>    |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam</a> <a href="#">ethernet link-fault-management interface</a> <i>interface-name</i> ]                         |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.4 for EX Series switches.                                                                         |
| <b>Description</b>              | Configure threshold limit values for link events in periodic OAM PDUs.<br><br>The remaining statements are explained separately.             |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Ethernet OAM Link Fault Management (CLI Procedure) on page 4</a></li> </ul> |

## event (OAM LFM)

---

### Supported Platforms

**Syntax**

```
event {
 link-adjacency-loss;
 link-event-rate {
 frame-error count;
 frame-period count;
 frame-period-summary count;
 symbol-period count;
 }
}
```

**Hierarchy Level** [edit protocols [oam ethernet link-fault-management action-profile](#) *profile-name*]

**Release Information** Statement introduced in Junos OS Release 9.4 for EX Series switches.

**Description** Configure link events in an action profile for Ethernet OAM link fault management (LFM).  
  
The remaining statements are explained separately.

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

**Related Documentation**

- [Configuring Ethernet OAM Link Fault Management \(CLI Procedure\)](#) on page 4

## frame-error

---

|                          |                                                                                                                                                                                                                                                                              |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Supported Platforms      | EX Series                                                                                                                                                                                                                                                                    |
| Syntax                   | frame-error <i>count</i> ;                                                                                                                                                                                                                                                   |
| Hierarchy Level          | [edit protocols <a href="#">oam ethernet link-fault-management event link-event-rate</a> ],<br>[edit protocols <a href="#">oam ethernet link-fault-management interface <i>interface-name</i> event-thresholds</a> ]                                                         |
| Release Information      | Statement introduced in Junos OS Release 9.4 for EX Series switches.                                                                                                                                                                                                         |
| Description              | <p>Configure the threshold value for sending frame error events or taking the action specified in the action profile.</p> <p>Frame errors occur on the underlying physical layer. The threshold is reached when the number of frame errors reaches the configured value.</p> |
| Options                  | <p><i>count</i>—Threshold count in seconds for frame error events.</p> <p><b>Range:</b> 1 through 100 seconds</p> <p><b>Default:</b> 1 second</p>                                                                                                                            |
| Required Privilege Level | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                               |
| Related Documentation    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Ethernet OAM Link Fault Management (CLI Procedure) on page 4</a></li></ul>                                                                                                                                   |

## frame-period

---

|                                 |                                                                                                                                                                                                                                                        |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supported Platforms</b>      | EX Series                                                                                                                                                                                                                                              |
| <b>Syntax</b>                   | frame-period <i>count</i> ;                                                                                                                                                                                                                            |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet link-fault-management event link-event-rate</a> ],<br>[edit protocols <a href="#">oam ethernet link-fault-management interface</a> <i>interface-name</i><br><a href="#">event-thresholds</a> ]                |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.4 for EX Series switches.                                                                                                                                                                                   |
| <b>Description</b>              | <p>Configure the number of frame errors within the last N frames that has exceeded a threshold.</p> <p>Frame errors occur on the underlying physical layer. The threshold is reached when the number of frame errors reaches the configured value.</p> |
| <b>Options</b>                  | <p><i>count</i>—Threshold count in seconds for frame error events.</p> <p><b>Range:</b> 1 through 100 seconds</p>                                                                                                                                      |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Ethernet OAM Link Fault Management (CLI Procedure)</a> on page 4</li></ul>                                                                                                             |

## frame-period-summary

---

### Supported Platforms

**Syntax** `frame-period-summary count;`

**Hierarchy Level** [edit protocols [oam ethernet link-fault-management event link-event-rate](#)],  
[edit protocols [oam ethernet link-fault-management interface interface-name event-thresholds](#)]

**Release Information** Statement introduced in Junos OS Release 9.4 for EX Series switches.

**Description** Configure the threshold value for sending frame period summary error events or taking the action specified in the action profile.

An errored frame second is any 1-second period that has at least one errored frame. This event is generated if the number of errored frame seconds is equal to or greater than the specified threshold for that period.

**Options** `count`—Threshold count in seconds for frame period summary error events.  
**Range:** 1 through 100 seconds

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

**Related Documentation**

- [Configuring Ethernet OAM Link Fault Management \(CLI Procedure\)](#) on page 4

## oam

### Supported Platforms

```
Syntax oam {
 ethernet{
 connectivity-fault-management {
 action-profile profile-name {
 action {
 interface-down;
 }
 default-actions {
 interface-down;
 }
 event {
 adjacency-loss;
 }
 }
 }
 linktrace {
 age (30m | 10m | 1m | 30s | 10s);
 path-database-size path-database-size;
 }
 maintenance-domain domain-name {
 level number;
 mip-half-function (none | default | explicit);
 name-format (character-string | none | dns | mac+2oct);
 maintenance-association ma-name {
 continuity-check {
 hold-interval minutes;
 interface-status-tlv;
 interval (10m | 10s | 1m | 1s | 100ms);
 loss-threshold number;
 port-status-tlv;
 }
 mep mep-id {
 auto-discovery;
 direction down;
 interface interface-name;
 remote-mep mep-id {
 action-profile profile-name;
 }
 }
 }
 }
 }
 performance-monitoring {
 sla-iterator-profiles {
 profile-name {
 calculation-weight {
 delay delay-value;
 delay-variation delay-variation-value;
 }
 cycle-time cycle-time-value;
 iteration-period iteration-period-value;
 measurement-type two-way-delay;
 passive;
 }
 }
 }
}
```



```

 }
 }
}
link-fault-management {
 action-profile profile-name;
 action {
 syslog;
 link-down;
 }
 event {
 link-adjacency-loss;
 link-event-rate {
 frame-error count;
 frame-period count;
 frame-period-summary count;
 symbol-period count;
 }
 }
}
interface interface-name {
 link-discovery (active | passive);
 pdu-interval interval;
 pdu-threshold threshold-value;
 remote-loopback;
 event-thresholds {
 frame-error count;
 frame-period count;
 frame-period-summary count;
 symbol-period count;
 }
 negotiation-options {
 allow-remote-loopback;
 no-allow-link-events;
 }
}
}
}

```

**Hierarchy Level** [edit protocols]

**Release Information** Statement introduced in Junos OS Release 9.4 for EX Series switches.  
**connectivity-fault-management** introduced in Junos OS Release 10.2 for EX Series switches.

**Description** Provide IEEE 802.3ah Operation, Administration, and Maintenance (OAM) link fault management (LFM) support for Ethernet interfaces on EX Series switches or configure connectivity fault management (CFM) for IEEE 802.1ag Operation, Administration, and Management (OAM) support on the switches.

The remaining statements are explained separately.

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

- Related Documentation**
- [Example: Configuring Ethernet OAM Link Fault Management on EX Series Switches](#)
  - [Example: Configuring Ethernet OAM Connectivity Fault Management on EX Series Switches](#)
  - [Configuring Ethernet OAM Link Fault Management \(CLI Procedure\) on page 4](#)
  - [Configuring Ethernet OAM Connectivity Fault Management \(CLI Procedure\)](#)

---

## interface (OAM LFM)

---

### Supported Platforms

**Syntax**

```
interface interface-name {
 link-discovery (active | passive);
 pdu-interval interval;
 pdu-threshold threshold-value;
 remote-loopback;
 event-thresholds {
 frame-error count;
 frame-period count;
 frame-period-summary count;
 symbol-period count;
 }
 negotiation-options {
 allow-remote-loopback;
 no-allow-link-events;
 }
}
```

**Hierarchy Level** [edit protocols [oam ethernet link-fault-management](#)]

**Release Information** Statement introduced in Junos OS Release 9.4 for EX Series switches.

**Description** Configure Ethernet OAM link fault management (LFM) for all interfaces or for specific interfaces.

The remaining statements are explained separately.

**Options** *interface-name*—Name of the interface to be enabled for IEEE 802.3ah OAM link fault management (LFM) support.

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

- Related Documentation**
- [Example: Configuring Ethernet OAM Link Fault Management on EX Series Switches](#)
  - [Configuring Ethernet OAM Link Fault Management \(CLI Procedure\) on page 4](#)

## link-adjacency-loss

---

### Supported Platforms

**Syntax** link-adjacency-loss;

**Hierarchy Level** [edit protocols [oam ethernet link-fault-management action-profile event](#)]

**Release Information** Statement introduced in Junos OS Release 9.4 for EX Series switches.

**Description** Configure **loss of adjacency** event with the IEEE 802.3ah link fault management (LFM) peer. When included, the loss of adjacency event triggers the action specified under the [action](#) statement.

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

**Related Documentation**

- [Example: Configuring Ethernet OAM Link Fault Management on EX Series Switches](#)
- [Configuring Ethernet OAM Link Fault Management \(CLI Procedure\) on page 4](#)

## link-discovery

---

### Supported Platforms

**Syntax** link-discovery (active | passive);

**Hierarchy Level** [edit protocols [oam ethernet link-fault-management interface interface-name](#)]

**Release Information** Statement introduced in Junos OS Release 9.4 for EX Series switches.

**Description** Specify the discovery mode used for IEEE 802.3ah Operation, Administration, and Maintenance (OAM) link fault management (LFM) support. The discovery process is triggered automatically when OAM 802.3ah functionality is enabled on an interface. Link monitoring is done when the interface sends periodic OAM PDUs.

**Options** *active*—In active mode, the interface discovers and monitors the peer on the link if the peer also supports IEEE 802.3ah OAM functionality.

*passive*—In passive mode, the peer initiates the discovery process.

Once the discovery process is initiated, both sides participate in discovery.

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

**Related Documentation**

- [Configuring Ethernet OAM Link Fault Management \(CLI Procedure\) on page 4](#)

## link-down

---

### Supported Platforms

|                                 |                                                                                                                                            |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | link-down;                                                                                                                                 |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet link-fault-management action-profile action</a> ]                                                 |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.4 for EX Series switches.                                                                       |
| <b>Description</b>              | Mark the interface as down for transit traffic.                                                                                            |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Ethernet OAM Link Fault Management (CLI Procedure) on page 4</a></li></ul> |

## link-event-rate

---

### Supported Platforms

|                                 |                                                                                                                                                                                                                            |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | link-event-rate {<br><a href="#">frame-error</a> <i>count</i> ;<br><a href="#">frame-period</a> <i>count</i> ;<br><a href="#">frame-period-summary</a> <i>count</i> ;<br><a href="#">symbol-period</a> <i>count</i> ;<br>} |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet link-fault-management action-profile event</a> ]                                                                                                                                  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.4 for EX Series switches.                                                                                                                                                       |
| <b>Description</b>              | Configure the number of link fault management (LFM) events per second.<br><br>The remaining statements are explained separately.                                                                                           |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Ethernet OAM Link Fault Management (CLI Procedure) on page 4</a></li></ul>                                                                                 |

## link-fault-management

### Supported Platforms

**Syntax**

```
link-fault-management {
 action-profile profile-name;
 action {
 syslog;
 link-down;
 }
 event {
 link-adjacency-loss;
 link-event-rate {
 frame-error count;
 frame-period count;
 frame-period-summary count;
 symbol-period count;
 }
 }
}
interface interface-name {
 link-discovery (active | passive);
 pdu-interval interval;
 pdu-threshold threshold-value;
 remote-loopback;
 event-thresholds {
 frame-error count;
 frame-period count;
 frame-period-summary count;
 symbol-period count;
 }
 negotiation-options {
 allow-remote-loopback;
 no-allow-link-events;
 }
}
```

**Hierarchy Level** [edit protocols [oam](#) [ethernet](#)]

**Release Information** Statement introduced in Junos OS Release 9.4 for EX Series switches.

**Description** Configure Ethernet OAM link fault management (LFM) for all interfaces or for specific interfaces.

The remaining statements are explained separately.

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

**Related Documentation**

- *Example: Configuring Ethernet OAM Link Fault Management on EX Series Switches*
- [Configuring Ethernet OAM Link Fault Management \(CLI Procedure\) on page 4](#)

## negotiation-options

---

### Supported Platforms

**Syntax**    negotiation-options {  
                  allow-remote-loopback;  
                  no-allow-link-events;  
                  }

**Hierarchy Level**    [edit protocols [oam](#) [ethernet](#) [link-fault-management](#) [interface](#) *interface-name*]

**Release Information**    Statement introduced in Junos OS Release 9.4 for EX Series switches.

**Description**    Enable and disable IEEE 802.3ah Operation, Administration, and Maintenance (OAM) link fault management (LFM) features for Ethernet interfaces.

The remaining statements are explained separately.

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

**Related Documentation**    • [Configuring Ethernet OAM Link Fault Management \(CLI Procedure\) on page 4](#)

## no-allow-link-events

---

### Supported Platforms

**Syntax**    no-allow-link-events;

**Hierarchy Level**    [edit protocols [oam](#) [ethernet](#) [link-fault-management](#) [interface](#) *interface-name* [negotiation-options](#)]

**Release Information**    Statement introduced in Junos OS Release 9.4 for EX Series switches.

**Description**    Disable the sending of link event TLVs.

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

**Related Documentation**    • [Configuring Ethernet OAM Link Fault Management \(CLI Procedure\) on page 4](#)

## pdu-interval

### Supported Platforms

**Syntax** `pdu-interval interval;`

**Hierarchy Level** [edit protocols [oam ethernet link-fault-management interface](#) *interface-name*]

**Release Information** Statement introduced in Junos OS Release 9.4 for EX Series switches.

**Description** Specify the periodic OAM PDU sending interval for fault detection. It is used for IEEE 802.3ah Operation, Administration, and Maintenance (OAM) link fault management (LFM) support.

**Options** *interval*—Periodic OAM PDU sending interval.

**Range:** 400 through 1000 milliseconds

**Default:** 1000 milliseconds

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

**Related Documentation**

- [Example: Configuring Ethernet OAM Link Fault Management on EX Series Switches](#)
- [Configuring Ethernet OAM Link Fault Management \(CLI Procedure\) on page 4](#)

## pdu-threshold

**Supported Platforms** [EX Series](#)

**Syntax** `pdu-threshold threshold-value;`

**Hierarchy Level** [edit protocols [oam ethernet link-fault-management interface](#) *interface-name*]

**Release Information** Statement introduced in Junos OS Release 9.4 for EX Series switches.

**Description** Configure how many protocol data units (PDUs) are missed before declaring the peer lost in Ethernet OAM link fault management (LFM) for all interfaces or for specific interfaces.

**Options** *threshold-value* —Number of PDUs missed before declaring the peer lost.

**Range:** 3 through 10 PDUs

**Default:** 3 PDUs

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

**Related Documentation**

- [Configuring Ethernet OAM Link Fault Management \(CLI Procedure\) on page 4](#)

## remote-loopback

---

### Supported Platforms

**Syntax** remote-loopback;

**Hierarchy Level** [edit protocols [oam ethernet link-fault-management interface](#) *interface-name*]

**Release Information** Statement introduced in Junos OS Release 9.4 for EX Series switches.

**Description** Set the data terminal equipment (DTE) in loopback mode. Remove the statement from the configuration to take the DTE out of loopback mode. It is used for IEEE 802.3ah Operation, Administration, and Maintenance (OAM) link fault management (LFM) support.

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

**Related Documentation**

- [Example: Configuring Ethernet OAM Link Fault Management on EX Series Switches](#)
- [Configuring Ethernet OAM Link Fault Management \(CLI Procedure\) on page 4](#)

## symbol-period

---

### Supported Platforms

**Syntax** symbol-period *count*;

**Hierarchy Level** [edit protocols [oam ethernet link-fault-management action-profile](#) *profile-name*; [event link-event-rate](#)],  
[edit protocols [oam ethernet link-fault-management interface](#) *interface-name* [event-thresholds](#)]

**Release Information** Statement introduced in Junos OS Release 9.4 for EX Series switches.

**Description** Configure the threshold for sending symbol period events or taking the action specified in the action profile.

Symbol code errors occur on the underlying physical layer. The symbol period threshold is reached when the number of symbol errors reaches the configured value within the period. You cannot configure the default value to a different value.

**Options** *count*—Threshold count in seconds for symbol period events.  
**Range:** 1 through 100 seconds

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

**Related Documentation**

- [Configuring Ethernet OAM Link Fault Management \(CLI Procedure\) on page 4](#)



## syslog (OAM LFM)

---

### Supported Platforms

**Syntax**    `syslog;`

**Hierarchy Level**    [edit protocols [oam ethernet link-fault-management action-profile](#) *profile-name*; [action](#)]

**Release Information**    Statement introduced in Junos OS Release 9.4 for EX Series switches.

**Description**    Generate a system log message for the Ethernet Operation, Administration, and Maintenance (OAM) link fault management (LFM) event.

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

**Related Documentation**    • [Configuring Ethernet OAM Link Fault Management \(CLI Procedure\)](#) on page 4

## traceoptions (OAM LFM)

**Supported Platforms** EX Series, QFX Series standalone switches

**Syntax**

```
traceoptions {
 file filename <files number> <match regex> <size size> <world-readable |
 no-world-readable>;
 flag flag ;
 no-remote-trace;
}
```

**Release Information** Statement introduced in JUNOS Release 10.2 for EX Series switches.

**Description** Configure tracing options the link fault management.

**Options** **file *filename***—Name of the file to receive the output of the tracing operation. Enclose the name within quotation marks. All files are placed in the directory **/var/log**.

**files *number***—(Optional) Maximum number of trace files. When a trace file named **trace-file** reaches its maximum size, it is renamed **trace-file.0**, then **trace-file.1**, and so on, until the maximum **xk** to specify KB, **xm** to specify MB, or **xg** to specify GB number of trace files is reached. Then the oldest trace file is overwritten. If you specify a maximum number of files, you also must specify a maximum file size with the **size** option.

**Range:** 2 through 1000

**Default:** 3 files

**flag *flag***—Tracing operation to perform. To specify more than one tracing operation, include multiple flag statements. You can include the following flags:

- **action-profile**—Trace action profile invocation events.
- **all**—Trace all events.
- **configuration**—Trace configuration events.
- **protocol**—Trace protocol processing events.
- **routing socket**—Trace routing socket events.

**match**—(Optional) Refine the output to log only those lines that match the given regular expression.

**no-world-readable**—(Optional) Restrict file access to the user who created the file.

**no-remote-trace**—(Optional) Disable the remote trace.

**size *size***—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named **trace-file** reaches its maximum size, it is renamed **trace-file.0**, then **trace-file.1**, and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten. If you specify a maximum number of files, you also must specify a maximum file size with the **files** option.

**Syntax:** *xk* to specify KB, *xm* to specify MB, or *xg* to specify GB

**Range:** 10 KB through 1 GB

**Default:** 128 KB

**Default:** If you do not include this option, tracing output is appended to an existing trace file.

**world-readable**—(Optional) Enable unrestricted file access.

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

- |                              |                                                                                                                                                                                                                                           |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Related Documentation</b> | <ul style="list-style-type: none"><li>• <i>Example: Configuring Ethernet OAM Link Fault Management on EX Series Switches</i></li><li>• <a href="#">Configuring Ethernet OAM Link Fault Management (CLI Procedure) on page 4</a></li></ul> |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



## CHAPTER 9

# Interfaces Configuration Statements

- [address on page 125](#)
- [alarm on page 129](#)
- [auto-negotiation on page 130](#)
- [channel-speed on page 131](#)
- [configured-flow-control on page 132](#)
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## address

**Supported Platforms** EX Series, M Series, MX Series, OCX1100, QFabric System, QFX Series standalone switches, SRX Series, T Series

**Syntax**

```

address address {
 arp ip-address (mac | multicast-mac) mac-address <publish>;
 broadcast address;
 destination address;
 destination-profile name;
 eui-64;
 master-only;
 multipoint-destination address dlci dlcid-identifier;
 multipoint-destination address {
 epd-threshold cells;
 inverse-arp;
 oam-liveness {
 up-count cells;
 down-count cells;
 }
 oam-period (disable | seconds);
 shaping {
 (cbr rate | rtvbr peak rate sustained rate burst length | vbr peak rate sustained rate burst
 length);
 queue-length number;
 }
 vci vpi-identifier.vci-identifier;
 }
 primary;
 preferred;
 (vrrp-group | vrrp-inet6-group) group-number {
 (accept-data | no-accept-data);
 advertise-interval seconds;
 authentication-type authentication;
 authentication-key key;
 fast-interval milliseconds;
 (preempt | no-preempt) {
 hold-time seconds;
 }
 }
 priority-number number;
 track {
 priority-cost seconds;
 priority-hold-time interface-name {
 interface priority;
 bandwidth-threshold bits-per-second {
 priority;
 }
 }
 }
 route ip-address/mask routing-instance instance-name priority-cost cost;
 virtual-address [addresses];
}

```

**Hierarchy Level** [edit interfaces *interface-name* unit *logical-unit-number* family *family*],  
[edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number*  
family *family*]

**Release Information** Statement introduced before Junos OS Release 7.4.  
Statement introduced in Junos OS Release 11.1 for the QFX Series.  
Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

**Description** Configure the interface address.



**NOTE:** The vrrp High Availability functionality is not available on the QFX Series.



**Options** *address*—Address of the interface.

- In Junos OS Release 13.3 and later, when you configure an IPv6 host address and an IPv6 subnet address on an interface, the commit operation fails.
- In releases earlier than Junos OS Release 13.3, when you use the same configuration on an interface, the commit operation succeeds, but only one of the IPv6 addresses that was entered is assigned to the interface. The other address is not applied.



**NOTE:** If you configure the same address on multiple interfaces in the same routing instance, Junos OS uses only the first configuration. The remaining address configurations are ignored and can leave interfaces without an address. Interfaces that do not have an assigned address cannot be used as a donor interface for an unnumbered Ethernet interface.

For example, in the following configuration the address configuration of interface xe-0/0/1.0 is ignored:

```
interfaces {
 xe-0/0/0 {
 unit 0 {
 family inet {
 address 192.168.1.1/24;
 }
 }
 }
 xe-0/0/1 {
 unit 0 {
 family inet {
 address 192.168.1.1/24;
 }
 }
 }
}
```

For more information on configuring the same address on multiple interfaces, see [“Configuring the Interface Address” on page 45](#).

The remaining statements are explained separately.



**NOTE:** The `edit logical-systems` hierarchy is not available on QFabric systems.

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


- Related Documentation**
- *Configuring the Protocol Family*
  - *Junos OS Administration Library for Routing Devices*
  - *family*
  - *negotiate-address*
  - *unnumbered-address (Ethernet)*
  - *Junos OS Administration Library for Routing Devices*

## alarm

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supported Platforms</b>      | ACX Series, LN Series, M Series, MX Series, PTX Series, QFX Series, T Series                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Syntax</b>                   | <pre>alarm {   interface-type {     alarm-name (red   yellow   ignore);   } }</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Hierarchy Level</b>          | [edit chassis],<br>[edit chassis interconnect-device <i>name</i> ],<br>[edit chassis node-group <i>name</i> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 11.1 for the QFX Series.<br>Statement introduced in Junos OS Release 12.2 for the ACX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Description</b>              | <p>Configure the chassis alarms and whether they trigger a red or yellow alarm, or whether they are ignored. Red alarm conditions light the <b>RED ALARM</b> LED on either the router's craft interface or the switch's LCD screen and trigger an audible alarm if one is connected to the contact on the craft interface or LCD screen. Yellow alarm conditions light the <b>YELLOW ALARM</b> LED on either the router's craft interface or the switch's LCD screen and trigger an audible alarm if one is connected to the craft interface or LCD screen.</p> <p>To configure more than one alarm, include multiple <i>alarm-name</i> lines.</p> |
| <b>Options</b>                  | <p><i>alarm-name</i>—Alarm condition. For a list of conditions, see <i>System-Wide Alarms and Alarms for Each Interface Type</i>.</p> <p><i>ignore</i>—The specified alarm condition does not set off any alarm.</p> <p><i>interface-type</i>—Type of interface on which you are configuring the alarm: <b>atm</b>, <b>ethernet</b>, <b>sonet</b>, or <b>t3</b>.</p> <p><b>red</b>—The specified alarm condition sets off a red alarm.</p> <p><b>yellow</b>—The specified alarm condition sets off a yellow alarm.</p>                                                                                                                             |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Understanding Alarms</i></li> <li>• <i>Chassis Conditions That Trigger Alarms</i></li> <li>• <i>Chassis Alarm Messages on a QFX3500 Device</i></li> <li>• <i>Interface Alarm Messages</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                   |

## auto-negotiation


---

|                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Supported Platforms                                                                                                                                                                                                                                                                | EX4600, OCX1100, QFabric System, QFX Series standalone switches                                                                                                                                                                                                                                                                  |
| Syntax                                                                                                                                                                                                                                                                             | (auto-negotiation   no-auto-negotiation);                                                                                                                                                                                                                                                                                        |
| Hierarchy Level                                                                                                                                                                                                                                                                    | [edit <a href="#">interfaces interface-name ether-options</a> ]                                                                                                                                                                                                                                                                  |
| Release Information                                                                                                                                                                                                                                                                | Statement introduced in Junos OS Release 11.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                    |
| Description                                                                                                                                                                                                                                                                        | Explicitly enable or disable autonegotiation. <ul style="list-style-type: none"><li>• <b>auto-negotiation</b>—Enable autonegotiation.</li><li>• <b>no-auto-negotiation</b>—Disable autonegotiation. When autonegotiation is disabled, you must explicitly configure link mode and speed options.</li></ul>                       |
| Default                                                                                                                                                                                                                                                                            | Autonegotiation is automatically enabled for Gigabit Ethernet interfaces. Autonegotiation is not an option for 10-Gigabit Ethernet interfaces. No explicit action is taken after the autonegotiation is complete or if the negotiation fails.                                                                                    |
| <div> <b>NOTE:</b> Autonegotiation is not supported on QFX5100 switches. On QFX5200 switches, autonegotiation is not supported on 40-Gigabit Ethernet and 100-Gigabit Ethernet interfaces</div> |                                                                                                                                                                                                                                                                                                                                  |
| Required Privilege Level                                                                                                                                                                                                                                                           | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                          |
| Related Documentation                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"><li>• <a href="#">speed on page 181</a></li><li>• <a href="#">Configuring Gigabit and 10-Gigabit Ethernet Interfaces on page 48</a></li><li>• <i>Configuring Gigabit and 10-Gigabit Ethernet Interfaces</i></li><li>• <i>Junos OS Network Interfaces Library for Routing Devices</i></li></ul> |

## channel-speed

|                                 |                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supported Platforms</b>      | EX4600, OCX1100, QFX Series standalone switches                                                                                                                                                                                                                                                                                  |
| <b>Syntax</b>                   | channel-speed (10g   25g   50g;   100g   disable-auto-speed-detection) ;                                                                                                                                                                                                                                                         |
| <b>Hierarchy Level</b>          | [edit chassis fpc <i>slot-number</i> pic <i>pic-number</i> (port <i>port-number</i>   port-range <i>port-range-low</i> <i>port-range-high</i> )]                                                                                                                                                                                 |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 13.2 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                    |
| <b>Description</b>              | —Enable the specified port on the Physical Interface Card (PIC) to perform in the specified channel speed. Additionally, you can disable auto-speed detection.                                                                                                                                                                   |
| <b>Default</b>                  | 40g (40-Gigabit Ethernet).                                                                                                                                                                                                                                                                                                       |
| <b>Options</b>                  | <p>10g—Set the channel speed to 10g (10-Gigabit Ethernet).</p> <p>25g—Set the channel speed to 25g (25-Gigabit Ethernet).</p> <p>50g—Set the channel speed to 50g (50-Gigabit Ethernet).</p> <p>100g—Set the channel speed to 100g (100-Gigabit Ethernet).</p> <p>disable-auto-speed-detection—Disable auto-speed detection.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Channelizing Interfaces</i></li> <li>• <i>Channelizing Interfaces on QFX5200 Switches</i></li> </ul>                                                                                                                                                                                 |

## configured-flow-control

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supported Platforms</b>      | EX4600, QFabric System, QFX Series standalone switches                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Syntax</b>                   | <pre>configured-flow-control {     rx-buffers (on   off);     tx-buffers (on   off); }</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit <a href="#">interfaces interface-name ether-options</a> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 12.1 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Description</b>              | <p>Configure Ethernet PAUSE asymmetric flow control on an interface. You can set an interface to generate and send PAUSE messages, and you can set an interface to respond to PAUSE messages sent by the connected peer. You must set both the <b>rx-buffers</b> and the <b>tx-buffers</b> values when you configure asymmetric flow control.</p> <p>Use the <b>flow-control</b> and <b>no-flow-control</b> statements to enable and disable symmetric PAUSE on an interface. Symmetric flow control and asymmetric flow control are mutually exclusive features. If you attempt to configure both, the switch returns a commit error.</p> <hr/> <div style="display: flex; align-items: flex-start;"> <div style="margin-right: 10px;">  </div> <div> <p><b>NOTE:</b> Ethernet PAUSE temporarily stops transmitting all traffic on a link when the buffers fill to a certain threshold. To temporarily pause traffic on individual “lanes” of traffic (each lane contains the traffic associated with a particular IEEE 802.1p code point, so there can be eight lanes of traffic on a link), use priority-based flow control (PFC) by applying a congestion notification profile to the interface.</p> <p>Ethernet PAUSE and PFC are mutually exclusive features, so you cannot configure both of them on the same interface. If you attempt to configure both Ethernet PAUSE and PFC on an interface, the switch returns a commit error.</p> </div> </div> <hr/> |
| <b>Default</b>                  | Flow control is disabled. You must explicitly configure Ethernet PAUSE flow control on interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Options</b>                  | The statements are explained separately.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">congestion-notification-profile</a></li> <li>• <a href="#">flow-control on page 148</a></li> <li>• <a href="#">Configuring CoS Asymmetric Ethernet PAUSE Flow Control</a></li> <li>• <a href="#">Enabling and Disabling CoS Symmetric Ethernet PAUSE Flow Control</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

- *Understanding CoS Flow Control (Ethernet PAUSE and PFC)*

## craft-lockout

**Supported Platforms** EX4600, QFabric System, QFX Series standalone switches

**Syntax**

```
craft-lockout {
 alarm {
 interface-type {
 link-down (red | yellow | ignore);
 }
 }
 container-devices {
 device-count number;
 }
 fpc slot {
 pic pic-number {
 fibre-channel {
 port-range {
 port-range-low port-range-high;
 }
 }
 }
 }
 routing-engine
 on-disk-failure {
 disk-failure-action (halt | reboot);
 }
}
```

**Hierarchy Level** [edit chassis -interconnect-device]

**Release Information** Statement introduced in Junos Release 11.3 for the QFX Series.

**Description** Disable the physical operation of the craft interface front panel.

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

**Related Documentation**

- *Configuring the Junos OS to Disable the Physical Operation of the Craft Interface*

## description

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>description text;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Hierarchy Level</b>          | <code>[edit interfaces <i>interface-name</i>],</code><br><code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i>],</code><br><code>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i>]</code>                                                                                                                                                                                   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.                                                                                                                                                                                                                                                                                                                                           |
| <b>Description</b>              | <p>Provide a textual description of the interface or the logical unit. Any descriptive text you include is displayed in the output of the <b>show interfaces</b> commands, and is also exposed in the <b>ifAlias</b> Management Information Base (MIB) object. It has no effect on the operation of the interface on the router or switch.</p> <p>The textual description can also be included in the extended DHCP relay option 82 Agent Circuit ID suboption.</p> |
| <b>Options</b>                  | <b>text</b> —Text to describe the interface. If the text includes spaces, enclose the entire text in quotation marks.                                                                                                                                                                                                                                                                                                                                               |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Adding an Interface Description to the Configuration</i></li><li>• <i>Adding a Logical Unit Description to the Configuration</i></li><li>• <i>Configuring Gigabit Ethernet Interfaces (CLI Procedure)</i></li><li>• <i>Using DHCP Relay Agent Option 82 Information</i></li></ul>                                                                                                                                        |



---

## ethernet (Alarm)

---

|                                 |                                                                                                                                                       |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supported Platforms</b>      | EX4600, OCX1100, QFabric System, QFX Series standalone switches                                                                                       |
| <b>Syntax</b>                   | <pre>ethernet {<br/>  link-down (red   yellow   ignore);<br/>}</pre>                                                                                  |
| <b>Hierarchy Level</b>          | [edit chassis <b>alarm</b> ],<br>[edit chassis interconnect-device <i>name</i> <b>alarm</b> ],<br>[edit chassis node-group <i>name</i> <b>alarm</b> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.         |
| <b>Description</b>              | Configure alarms for an Ethernet interface.                                                                                                           |
| <b>Options</b>                  | The remaining statement is explained separately.—                                                                                                     |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Understanding Alarms</i></li><li>• <i>Interface Alarm Messages</i></li></ul>                               |

## ethernet-switch-profile

**Supported Platforms** ACX Series, EX Series, M Series, MX Series, QFX Series standalone switches, SRX Series, T Series

**Syntax**

```
ethernet-switch-profile {
 ethernet-policer-profile {
 input-priority-map {
 ieee802.1p premium [values];
 }
 output-priority-map {
 classifier {
 premium {
 forwarding-class class-name {
 loss-priority (high | low);
 }
 }
 }
 }
 }
 policer cos-policer-name {
 aggregate {
 bandwidth-limit bps;
 burst-size-limit bytes;
 }
 premium {
 bandwidth-limit bps;
 burst-size-limit bytes;
 }
 }
 tag-protocol-id tpid;
}
mac-learn-enable;
```

**Hierarchy Level** [edit interfaces *interface-name* gigether-options],  
[edit interfaces *interface-name* aggregated-ether-options],  
[edit interfaces *interface-name* aggregated-ether-options],  
[edit interfaces *interface-name* ether-options]

**Release Information** Statement introduced before Junos OS Release 7.4.  
Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.  
Statement introduced in Junos OS Release 13.2 for the QFX Series.  
Statement introduced in Junos OS Release 13.2X50-D15 for the EX Series switches.

**Description**



**NOTE:** On QFX Series standalone switches, the `ethernet-policer-profile` CLI hierarchy and the `mac-learn-enable` statement are supported only on the Enhanced Layer 2 Switching CLI.

For Gigabit Ethernet IQ, 10-Gigabit Ethernet IQ2 and IQ2-E, and Gigabit Ethernet PICs with SFPs (except the 10-port Gigabit Ethernet PIC, aggregated Ethernet with Gigabit

Ethernet IQ interfaces, the built-in Gigabit Ethernet port on the M7i router); 100-Gigabit Ethernet Type 5 PIC with CFP; and Gigabit Ethernet, 10-Gigabit Ethernet, 40-Gigabit Ethernet, and aggregated Ethernet interfaces on EX Series switches, configure VLAN tag and MAC address accounting and filtering properties.

The remaining statements are explained separately.




**NOTE:** When you gather interfaces into a bridge domain, the `no-mac-learn-enable` statement at the [edit interfaces *interface-name* *gigether-options* ethernet-switch-profile] hierarchy level is not supported. You must use the `no-mac-learning` statement at the [edit bridge-domains *bridge-domain-name* bridge-options interface *interface-name*] hierarchy level to disable MAC learning on an interface in a bridge domain. For information on disabling MAC learning for a bridge domain, see the *MX Series Layer 2 Configuration Guide*.

|                                 |                                                                                                                                                                                                                                                                                                  |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Default</b>                  | If the <code>ethernet-switch-profile</code> statement is not configured, Gigabit Ethernet IQ and Gigabit Ethernet PICs with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router) behave like Gigabit Ethernet interfaces.                     |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Gigabit Ethernet Policers</i></li> <li>• <i>Configuring MAC Address Filtering</i></li> <li>• <i>Stacking and Rewriting Gigabit Ethernet VLAN Tags Overview</i></li> <li>• <i>Configuring Q-in-Q Tunneling (CLI Procedure)</i></li> </ul> |

## ethernet-switching

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supported Platforms</b>      | EX4600, QFX Series standalone switches                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Syntax</b>                   | <pre> ethernet-switching {   filter {     group <i>filter-group-number</i>;     input <i>filter-name</i>;     input-list [ <i>filter-names</i> ];     output <i>filter-name</i>;     output-list [ <i>filter-names</i> ];   }   <b>interface-mode</b> (access   trunk);   recovery-timeout <i>seconds</i>;   storm-control <i>profile-name</i>;   vlan {     members (<i>vlan-name</i>   [<i>-vlan-names</i>]   all);   } } </pre> |
| <b>Hierarchy Level</b>          | [edit <b>interfaces</b> <i>ge-chassis/slot/port unit logical-unit-number</i> ] family                                                                                                                                                                                                                                                                                                                                              |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.1 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>              | <p>Configure Ethernet switching protocol family information for the logical interface.</p> <p>The remaining statements are explained separately.</p>                                                                                                                                                                                                                                                                               |
| <b>Default</b>                  | You must configure a logical interface to be able to use the physical device.                                                                                                                                                                                                                                                                                                                                                      |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Gigabit and 10-Gigabit Ethernet Interfaces on page 48</a></li> <li>• <a href="#">JUNOS Software Network Interfaces Configuration Guide</a></li> </ul>                                                                                                                                                                                                             |

## ether-options

|                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supported Platforms</b>                                                                                                                                                                                                                                        | EX4600, OCX1100, QFabric System, QFX Series standalone switches                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Syntax</b>                                                                                                                                                                                                                                                     | <p>The <b>auto-negotiation</b> and <b>speed</b> statements are not supported on the OCX Series.</p> <pre> ether-options {   802.3ad aex {     lacp {       force-up;       (primary   backup);     }   }   (auto-negotiation   no-auto-negotiation);   configured-flow-control {     rx-buffers (on   off);     tx-buffers (on   off);   }   (flow-control   no-flow-control);   link-mode mode;   (loopback   no-loopback);   speed (auto-negotiation   no-auto-negotiation); } </pre> |
| <b>Hierarchy Level</b>                                                                                                                                                                                                                                            | [edit <b>interfaces</b> <i>interface-name</i> ]                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Release Information</b>                                                                                                                                                                                                                                        | <p>Statement introduced in Junos OS Release 11.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>                                                                                                                                                                                                                                                                                                                                |
| <b>Description</b>                                                                                                                                                                                                                                                | Configure <b>ether-options</b> properties for a Gigabit Ethernet or 10-Gigabit Ethernet interface.                                                                                                                                                                                                                                                                                                                                                                                      |
| <div>  <p><b>NOTE:</b> The <b>auto-negotiation</b> and <b>speed</b> statements are not supported on the OCX Series.</p> </div> <p>The statements are explained separately.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Default</b>                                                                                                                                                                                                                                                    | Enabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Required Privilege Level</b>                                                                                                                                                                                                                                   | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                      |
| <b>Related Documentation</b>                                                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Gigabit and 10-Gigabit Ethernet Interfaces on page 48</a></li> <li>• <i>Configuring Gigabit and 10-Gigabit Ethernet Interfaces</i></li> <li>• <i>Junos OS Network Interfaces Library for Routing Devices</i></li> </ul>                                                                                                                                                                                                |

## eui-64

---

|                                 |                                                                                                                                                                                                                                                                            |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supported Platforms</b>      | EX Series, M Series, MX Series, OCX1100, QFabric System, QFX Series standalone switches, SRX Series, T Series                                                                                                                                                              |
| <b>Syntax</b>                   | eui-64;                                                                                                                                                                                                                                                                    |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>number</i> family inet6 address <i>address</i> ]                                                                                                                                                                            |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.3 for EX Series switches.<br>Statement introduced in Junos OS Release 12.2 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series. |
| <b>Description</b>              | For interfaces that carry IP version 6 (IPv6) traffic, automatically generate the host number portion of interface addresses.                                                                                                                                              |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the Interface Address on page 45</a></li></ul>                                                                                                                                                             |

## family

**Supported Platforms** EX4600, OCX1100, QFX Series standalone switches

**Syntax** The **ethernet-switching** statement and all of its substatements are not supported on OCX Series switches.

```
family {
 ethernet-switching {
 filter {
 group filter-group-number;
 input filter-name;
 input-list [filter-names];
 output filter-name;
 output-list [filter-names];
 }
 interface-mode (access | trunk);
 recovery-timeout seconds;
 storm-control profile-name;
 vlan {
 members (vlan-name | [-vlan-names] | all);
 }
 }
 inet {
 accounting {
 destination-class-usage;
 source-class-usage {
 input;
 output;
 }
 }
 address ipv4-address {
 arp ip-address (mac | multicast-mac) mac-address <publish>;
 broadcast address;
 preferred;
 primary;
 vrrp-group group-number {
 (accept-data | no-accept-data);
 advertise-interval seconds;
 advertisements-threshold number;
 authentication-key key;
 authentication-type authentication;
 fast-interval milliseconds;
 (preempt | no-preempt) {
 hold-time seconds;
 }
 priority number;
 track {
 interface interface-name {
 priority-cost number;
 }
 priority-hold-time seconds;
 route ip-address/mask routing-instance instance-name priority-cost cost;
 }
 }
 virtual-address [addresses];
 }
 }
}
```

```

 vrrp-inherit-from {
 active-group group-number;
 active-interface interface-name;
 }
 }
}
filter {
 group filter-group-number;
 input filter-name;
 input-list [filter-names];
 output filter-name;
 output-list [filter-names];
}
mtu bytes;
no-neighbor-learn;
no-redirects;
primary;
rpf-check {
 fail-filter filter-name;
 mode {
 loose;
 }
}
}
inet6 {
 accounting {
 destination-class-usage;
 source-class-usage {
 input;
 output;
 }
 }
}
address address {
 eui-64;
 ndp ip-address (mac | multicast-mac) mac-address <publish>;
 preferred;
 primary;
 vrrp-inet6-group group-id {
 accept-data | no-accept-data;
 advertisements-threshold number;
 authentication-key key;
 authentication-type authentication;
 fast-interval milliseconds;
 inet6-advertise-interval milliseconds;
 preempt | no-preempt {
 hold-time seconds;
 }
 priority number;
 track {
 interface interface-name {
 priority-cost number;
 }
 priority-hold-time seconds;
 route ip-address/mask routing-instance instance-name priority-cost cost;
 }
 virtual-inet6-address [addresses];
 }
}

```



```

 virtual-link-local-address ipv6-address;
 vrrp-inherit-from {
 active-group group-name;
 active-interface interface-name;
 }
 }
 (dad-disable | no-dad-disable);
 filter {
 group filter-group-number;
 input filter-name;
 input-list [filter-names];
 output filter-name;
 output-list [filter-names];
 }
 mtu bytes;
 nd6-stale-time time;
 no-neighbor-learn;
 no-redirects;
 policer {
 input policer-name;
 output policer-name;
 }
 rpf-check {
 fail-filter filter-name;
 mode {
 loose;
 }
 }
 mpls {
 filter {
 group filter-group-number;
 input filter-name;
 input-list [filter-names];
 output filter-name;
 output-list [filter-names];
 }
 mtu bytes;
 }
}

```

|                            |                                                                                                                                                                                  |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Hierarchy Level</b>     | [edit <a href="#">interfaces interface-name unit logical-unit-number</a> ],<br>[edit <a href="#">interfaces interface-range interface-name unit logical-unit-number family</a> ] |
| <b>Release Information</b> | Statement introduced in Junos OS Release 11.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                    |
| <b>Description</b>         | Configure protocol family information for the logical interface on the QFX Series and OCX Series product.                                                                        |

**Default**

**NOTE:** The **ethernet-switching** statement and all of its substatements are not supported on OCX Series switches.

Access interfaces on the QFX Series are set to **family ethernet-switching** by default. If you are going to change the family setting for an interface, you might have to delete this default setting or any user-configured family setting first.

You must configure a logical interface to be able to use the physical device.

**Options**

Interface types on the switch are:

- Aggregated Ethernet (**ae**)
- Gigabit Ethernet (**ge**)
- Loopback (**lo0**)
- Management Ethernet (**me0**)
- Routed VLAN interface (RVI) (**vlan**)



**NOTE:** Routed VLAN interfaces, also referred to as integrated routing and bridging (IRB) interfaces, are not supported on OCX Series switches.

- 10-Gigabit Ethernet (**xe**)

Not all interface types support all **family** substatements. Check your switch CLI for supported substatements for a particular protocol family configuration.

**Required Privilege Level**

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

**Related Documentation**

- [Configuring Gigabit and 10-Gigabit Ethernet Interfaces on page 48](#)
- *Configuring Gigabit and 10-Gigabit Ethernet Interfaces*
- [Configuring Link Aggregation on page 67](#)
- *Configuring IRB Interfaces*
- *Junos OS Network Interfaces Library for Routing Devices*

---

## fibre-channel (Alarm)

---

|                                 |                                                                                                                                                       |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supported Platforms</b>      | EX4600, QFabric System, QFX Series standalone switches                                                                                                |
| <b>Syntax</b>                   | <pre>fibre-channel {<br/>    link-down (red   yellow   ignore);<br/>}</pre>                                                                           |
| <b>Hierarchy Level</b>          | [edit chassis <b>alarm</b> ],<br>[edit chassis interconnect-device <i>name</i> <b>alarm</b> ],<br>[edit chassis node-group <i>name</i> <b>alarm</b> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.3 for the QFX Series.                                                                                     |
| <b>Description</b>              | Configure alarms for a Fibre Channel interface.                                                                                                       |
| <b>Options</b>                  | The remaining statement is explained separately.—                                                                                                     |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Understanding Alarms</i></li><li>• <i>Interface Alarm Messages</i></li></ul>                               |

## filter

**Supported Platforms** EX Series, M Series, MX Series, SRX Series, T Series

**Syntax**

```
filter {
 group filter-group-number;
 input filter-name;
 input-list [filter-names];
 output filter-name;
 output-list [filter-names];
}
```

**Hierarchy Level** [edit interfaces *interface-name* unit *logical-unit-number* family *family*],  
[edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number*  
family *family*]

**Release Information** Statement introduced before Junos OS Release 7.4.  
Statement introduced in Junos OS Release 9.0 for EX Series switches.

**Description**



**NOTE:** On EX Series switches, the group, input-list, output-filter statements are not supported under the [edit interfaces *interface-name* unit *logical-unit-number* family inet], [edit interfaces *interface-name* unit *logical-unit-number* family inet6], and [edit interfaces *interface-name* unit *logical-unit-number* family mpls] hierarchies.

Apply a filter to an interface. You can also use filters for encrypted traffic. When you configure filters, you can configure them under the **family ethernet-switching**, **inet**, **inet6**, **mpls**, or **vpls** only.

**Options** **group *filter-group-number***—Define an interface to be part of a filter group. The default filter group number is 0.

**Range:** 0 through 255

**input *filter-name***—Name of one filter to evaluate when packets are received on the interface.

**output *filter-name***—Name of one filter to evaluate when packets are transmitted on the interface.

The remaining statements are explained separately.

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

**Related Documentation**

- *Applying a Filter to an Interface*
- *Junos OS Administration Library for Routing Devices*
- *Configuring Gigabit Ethernet Interfaces (CLI Procedure)*

- *Configuring Firewall Filters (CLI Procedure)*
- *family*

## flow-control

**Supported Platforms** EX4600, OCX1100, QFabric System, QFX Series standalone switches

**Syntax** (flow-control | no-flow-control);

**Hierarchy Level** [edit **interfaces** *interface-name* **ether-options**]

**Release Information** Statement introduced in Junos OS Release 11.1 for the QFX Series.  
Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

**Description** Explicitly enable or disable symmetric Ethernet PAUSE flow control, which regulates the flow of packets from the switch to the remote side of the connection by pausing all traffic flows on a link during periods of network congestion. Symmetric flow control means that Ethernet PAUSE is enabled in both directions. The interface generates and sends Ethernet PAUSE messages when the receive buffers fill to a certain threshold and the interface responds to PAUSE messages received from the connected peer. By default, flow control is disabled.

You can configure asymmetric flow control by including the **configured-flow-control** statement at the [edit **interfaces** *interface-name* **ether-options** hierarchy level. Symmetric flow control and asymmetric flow control are mutually exclusive features. If you attempt to configure both, the switch returns a commit error.



**NOTE:** Ethernet PAUSE temporarily stops transmitting all traffic on a link when the buffers fill to a certain threshold. To temporarily pause traffic on individual “lanes” of traffic (each lane contains the traffic associated with a particular IEEE 802.1p code point, so there can be eight lanes of traffic on a link), use priority-based flow control (PFC).

Ethernet PAUSE and PFC are mutually exclusive features, so you cannot configure both of them on the same interface. If you attempt to configure both Ethernet PAUSE and PFC on an interface, the switch returns a commit error.

OCX Series switches do not support PFC.

- **flow-control**—Enable flow control; flow control is useful when the remote device is a Gigabit Ethernet switch.
- **no-flow-control**—Disable flow control.

**Default** Flow control is disabled.

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

- Related Documentation**
- [configured-flow-control on page 132](#)
  - [Configuring Gigabit and 10-Gigabit Ethernet Interfaces on page 48](#)
  - *Configuring Gigabit and 10-Gigabit Ethernet Interfaces*
  - *Understanding CoS Flow Control (Ethernet PAUSE and PFC)*
  - *Junos OS Network Interfaces Library for Routing Devices*

## fpc

**Supported Platforms** [EX4600, OCX1100, QFX Series standalone switches](#)

**Syntax**

```
fpc slot {
 auto-speed-detection disable;
 pic pic-number {
 tunnel-port port-number tunnel-services;
 port port-number {
 channel-speed (speed|disable-auto-speed-detection) ;
 }
 port-range port-range-low port-range-high {
 channel-speed (speed|disable-auto-speed-detection);
 }
 }
}
```

**Hierarchy Level** [edit chassis]

**Release Information** Statement introduced in Junos OS Release 11.1 for the QFX Series.  
Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

**Description** Configure the FPC slot number. For QFX3500 switches, the slot is a line card slot.

For generic routing encapsulation (GRE) tunneling, use the **tunnel-port** statement to specify the port that you want to convert to a GRE tunnel port.

**Options** *slot*—Number of the FPC slot. For QFX3500, QFX3600, QFX5200, and OCX Series devices, the slot number is always 0.

The remaining statements are explained separately.

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

- Related Documentation**
- *show chassis fpc*
  - *Configuring Generic Routing Encapsulation Tunneling (CLI Procedure)*

## gratuitous-arp-reply

---

|                                 |                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Supported Platforms</b>      | EX4600, QFabric System, QFX Series standalone switches                                                                  |
| <b>Syntax</b>                   | (gratuitous-arp-reply   no-gratuitous-arp-reply);                                                                       |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ],<br>[edit interfaces <i>interface-range</i> <i>interface-range-name</i> ]      |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.1 for the QFX Series.                                                       |
| <b>Description</b>              | Enable processing of ARP updates received via gratuitous ARP reply messages.                                            |
| <b>Default</b>                  | Updating of the ARP cache is disabled on all Ethernet interfaces.                                                       |
| <b>Options</b>                  | <b>gratuitous-arp-reply</b> —Update the ARP cache.<br><b>no-gratuitous-arp-reply</b> —Do not update the ARP cache.      |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |



## hold-time (Physical Interface)

**Supported Platforms** ACX Series, EX Series, M Series, MX Series, OCX1100, PTX Series, QFabric System, QFX Series standalone switches, SRX Series, T Series

**Syntax** hold-time up *milliseconds* down *milliseconds*;

**Hierarchy Level** [edit *interfaces interface-name*],  
[edit *interfaces interface-range interface-range-name*]

**Release Information** Statement introduced before Junos OS Release 7.4.  
Statement introduced in Junos OS Release 10.4R5 for EX Series switches.  
Statement introduced in Junos OS Release 11.1 for the QFX Series.  
Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.  
Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

**Description** Specify the **hold-time** value to use to damp shorter interface transitions milliseconds. The hold timer enables interface damping by not advertising interface transitions until the hold timer duration has passed. When a hold-down timer is configured and the interface goes from up to down, the down hold-time timer is triggered. Every interface transition that occurs during the hold-time is ignored. When the timer expires and the interface state is still down, then the router begins to advertise the interface as being down. Similarly, when a hold-up timer is configured and an interface goes from down to up, the up hold-time timer is triggered. Every interface transition that occurs during the hold-time is ignored. When the timer expires and the interface state is still up, then the router begins to advertise the interface as being up.



### NOTE:

- We recommend that you configure the **hold-time** value after determining an appropriate value by performing repeated tests in the actual hardware environment. This is because the appropriate value for hold-time depends on the hardware (XFP, SFP, SR, ER, or LR) used in the networking environment.
- The **hold-time** option is not available for controller interfaces.



**NOTE:** On MX Series routers with MPC3E and MPC4E, we recommend that you do not configure the hold-down timer to be less than 1 second. On MX Series routers with MPC5EQ-100G10G (MPC5EQ) or MPC6E (MX2K-MPC6E) with 100-Gigabit Ethernet MIC with CFP2 OTN interfaces, we recommend that you do not configure the hold-down timer to be less than 3 seconds.

**Default** Interface transitions are not damped.

**Options**    **down *milliseconds***—Hold time to use when an interface transitions from up to down. Junos OS advertises the transition within 100 milliseconds of the time value you specify.

**Range:** 0 through 4,294,967,295

**Default:** 0 (interface transitions are not damped)

**up *milliseconds***—Hold time to use when an interface transitions from down to up. Junos OS advertises the transition within 100 milliseconds of the time value you specify.

**Range:** 0 through 4,294,967,295

**Default:** 0 (interface transitions are not damped)

**Required Privilege**    interface—To view this statement in the configuration.

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

- Related Documentation**
- *advertise-interval*
  - *interfaces (for EX Series switches)*
  - *Physical Interface Damping Overview*
  - *Damping Shorter Physical Interface Transitions*
  - *Damping Longer Physical Interface Transitions*

## irb (Interfaces)

**Supported Platforms** EX Series, MX Series, QFX Series standalone switches

**Syntax**

```

irb {
 accounting-profile name;
 description text;

 (gratuitous-arp-reply | no-gratuitous-arp-reply);
 hold-time up milliseconds down milliseconds;
 mtu bytes;
 no-gratuitous-arp-request;

 traceoptions {
 flag flag;
 }
 (traps | no-traps);
 unit logical-unit-number {
 accounting-profile name;
 bandwidth rate;
 description text;
 enhanced-convergence;
 disable;
 encapsulation type;
 family inet {
 accounting {
 destination-class-usage;
 source-class-usage {
 input;
 output;
 }
 }
 }
 address ipv4-address {
 arp ip-address (mac | multicast-mac) mac-address <publish>;
 broadcast address;
 preferred;
 primary;
 vrrp-group group-number {
 (accept-data | no-accept-data);
 advertise-interval seconds;
 advertisements-threshold number;
 authentication-key key;
 authentication-type authentication;
 fast-interval milliseconds;
 (preempt | no-preempt) {
 hold-time seconds;
 }
 }
 priority number;
 track {
 interface interface-name {
 bandwidth-threshold bandwidth;
 priority-cost number;
 }
 priority-hold-time seconds;
 }
 }
 }
}

```

```

 route ip-address/mask routing-instance instance-name priority-cost cost;
 }
 virtual-address [addresses];
 vrrp-inherit-from {
 active-group group-number;
 active-interface interface-name;
 }
}
}
filter {
 input filter-name;
 output filter-name;
}
mtu bytes;
no-neighbor-learn;
no-redirects;
primary;
rpf-check {
 fail-filter filter-name;
 mode {
 loose;
 }
}
targeted-broadcast {
 forward-and-send-to-re;
 forward-only;
}
}
family inet6 {
 accounting {
 destination-class-usage;
 source-class-usage {
 input;
 output;
 }
 }
}
address address {
 eui-64;
 ndp ip-address (mac | multicast-mac) mac-address <publish>;
 preferred;
 primary;
 vrrp-inet6-group group-id {
 accept-data | no-accept-data;
 advertisements-threshold number;
 authentication-key key;
 authentication-type authentication;
 fast-interval milliseconds;
 inet6-advertise-interval milliseconds;
 preempt | no-preempt {
 hold-time seconds;
 }
 }
 priority number;
 track {
 interface interface-name {
 bandwidth-threshold bandwidth priority-cost number;
 priority-cost number;

```

```

 }
 priority-hold-time seconds;
 route ip-address/mask routing-instance instance-name priority-cost cost;
 }
 virtual-inet6-address [addresses];
 virtual-link-local-address ipv6-address;
 vrrp-inherit-from {
 active-group group-number;
 active-interface interface-name;
 }
}
}
(dad-disable | no-dad-disable);
filter {
 input filter-name;
 output filter-name;
}
mtu bytes;
nd6-stale-time seconds;
no-neighbor-learn;
no-redirects;
policer {
 input policer-name;
 output policer-name;
}
rpf-check {
 fail-filter filter-name;
 mode {
 loose;
 }
}
}
family iso {
 address interface-address;
 mtu bytes;
}
family mpls {
 filter {
 input filter-name;
 output filter-name;
 }
 mtu bytes;
 policer {
 input policer-name;
 output policer-name;
 }
}
native-inner-vlan-id vlan-id;
proxy-arp (restricted | unrestricted);
(traps | no-traps);
vlan-id-list [vlan-id's];
vlan-id-range [vlan-id-range];
}
}

```

|                                 |                                                                                                                                                   |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i>                                                                                                            |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 12.3R2 for EX Series switches.<br>irb option introduced in Junos OS Release 13.2 for the QFX Series.     |
| <b>Description</b>              | Configure the properties of a specific integrated bridging and routing (IRB) interface.<br><br>The remaining statements are explained separately. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                           |

---

## inet (interfaces)

---

|                                 |                                                                                                                                                                                                                                                                   |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supported Platforms</b>      | EX4600, OCX1100, QFabric System, QFX Series standalone switches                                                                                                                                                                                                   |
| <b>Syntax</b>                   | <pre>inet {<br/>  address <i>address</i> {<br/>    primary;<br/>    filter input <i>filter-name</i>;<br/>    filter output <i>filter-name</i>;<br/>    targeted-broadcast;<br/>  }<br/>}</pre>                                                                    |
| <b>Hierarchy Level</b>          | [edit <a href="#">interfaces</a> <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> family],<br>[edit <a href="#">interfaces</a> <a href="#">interface-range</a> <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> family] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                     |
| <b>Description</b>              | Configure the primary IP address for the logical interface.                                                                                                                                                                                                       |
| <b>Default</b>                  | You must configure a logical interface to be able to use the physical device.                                                                                                                                                                                     |
| <b>Options</b>                  | The remaining statements are explained separately.—                                                                                                                                                                                                               |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Gigabit and 10-Gigabit Ethernet Interfaces on page 48</a></li></ul>                                                                                                                               |

## inet6 (interfaces)

|                                 |                                                                                                                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supported Platforms</b>      | EX4600, OCX1100, QFabric System, QFX Series standalone switches                                                                                                                                                         |
| <b>Syntax</b>                   | <pre> inet6 {   address address {     eui-64     preferred     primary;     filter input <i>filter-name</i>;     filter output <i>filter-name</i>;   } } </pre>                                                         |
| <b>Hierarchy Level</b>          | [edit <a href="#">interfaces interface-name unit logical-unit-number</a> family],<br>[edit <a href="#">interfaces interface-range interface-name unit logical-unit-number</a> family]                                   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 12.2 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                           |
| <b>Description</b>              | Configure the primary IP address for the logical interface.                                                                                                                                                             |
| <b>Default</b>                  | You must configure a logical interface to be able to use the physical device.                                                                                                                                           |
| <b>Options</b>                  | The remaining statements are explained separately.—                                                                                                                                                                     |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Gigabit and 10-Gigabit Ethernet Interfaces on page 48</a></li> <li>• <a href="#">Configuring Gigabit and 10-Gigabit Ethernet Interfaces</a></li> </ul> |

## interface-mode

**Supported Platforms** EX Series, MX Series, QFX Series standalone switches, SRX Series

**Syntax** interface-mode (access | trunk <inter-switch-link>);

**Hierarchy Level** [edit interfaces *interface-name* unit *logical-unit-number* family bridge],  
[edit interfaces *interface-name* unit *logical-unit-number* family ethernet-switching],  
[edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number* family bridge]

**Release Information** Statement introduced in Junos OS Release 9.2.  
Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches.  
Statement introduced in Junos OS Release 13.2 for the QFX Series.  
Statement introduced in Junos OS Release 15.1.  
**inter-switch-link** option introduced in Junos OS Release 14.2 for MX240, MX480, and MX960 routers in enhanced LAN mode.

**Description**



**NOTE:** This statement supports the Enhanced Layer 2 Software (ELS) configuration style. If your switch runs software that does not support ELS, see *port-mode*. For ELS details, see *Getting Started with Enhanced Layer 2 Software*.

(QFX Series 3500 and 3600 standalone switches)—Determine whether the logical interface accepts or discards packets based on VLAN tags. Specify the **trunk** option to accept packets with a VLAN ID that matches the list of VLAN IDs specified in the **vlan-id** or **vlan-id-list** statement, then forward the packet within the bridge domain or VLAN configured with the matching VLAN ID. Specify the **access** option to accept packets with no VLAN ID, then forward the packet within the bridge domain or VLAN configured with the VLAN ID that matches the VLAN ID specified in the **vlan-id** statement.



**NOTE:** On MX Series routers, if you want IGMP snooping to be functional for a bridge domain, then you should not configure **interface-mode** and **irb** for that bridge. Such a configuration commit succeeds, but IGMP snooping is not functional, and a message informing the same is displayed. For more information, see *Configuring a Trunk Interface on a Bridge Network*.

- Options**
- access**—Configure a logical interface to accept untagged packets. Specify the VLAN to which this interface belongs using the **vlan-id** statement.
  - trunk**—Configure a single logical interface to accept packets tagged with any VLAN ID specified with the **vlan-id** or **vlan-id-list** statement.
  - trunk inter-switch-link**—For a private VLAN, configure the InterSwitch Link protocol (ISL) on a trunk port of the primary VLAN in order to connect the switches composing the



PVLAN to each other. You do not need to configure an ISL when a PVLAN is configured on a single switch. This configuration specifies whether the particular interface assumes the role of interswitch link for the PVLAN domains of which it is a member. This option is supported only on MX240, MX480, and MX960 routers in enhanced LAN mode.

|                                 |                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Access Mode on a Logical Interface</i></li><li>• <i>Configuring a Logical Interface for Trunk Mode</i></li><li>• <i>Example: Connecting Access Switches to a Distribution Switch</i></li><li>• <i>Tunnel Services Overview</i></li><li>• <i>Configuring Tunnel Interfaces on MX Series Routers</i></li></ul> |

## interface-range

**Supported Platforms** EX4600, OCX1100, QFabric System, QFX Series standalone switches

**Syntax** The `vlan-id` statement is not supported on OCX Series switches.

```
interface-range interface-range-name {
 disable;
 description text;
 ether-options {
 802.3ad aex {
 lacp {
 force-up;
 }
 }
 }
 (auto-negotiation| no-auto-negotiation);
 (flow-control | no-flow-control);
 link-mode mode;
 speed (auto-negotiation | speed);
}
hold-time milliseconds down milliseconds;
member interface-name;
member-range starting-interface-name to ending-interface-name;
mtu bytes;
unit logical-unit-number {
 description text;
 disable;
 family family-name {...}
 (traps | no traps);
 vlan-id vlan-id-number;
}
```

**Hierarchy Level** [edit [interfaces](#)]

**Release Information** Statement introduced in Junos OS Release 11.1 for the QFX series.  
Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

**Description**



**NOTE:** The `vlan-id` statement and Fibre Channel interfaces are not supported on OCX Series switches.

Group interfaces that share a common configuration profile.



**NOTE:** The interface range definition is supported only for Gigabit Ethernet, 10-Gigabit Ethernet, and Fibre Channel interfaces.

**Options** *interface-range-name*—Name of the interface range.



**NOTE:** You can use regular expressions and wildcards to specify the interfaces in the member range configuration. Do not use wildcards for interface types.

The remaining statements are explained separately.

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

**Related Documentation**

- [Understanding Interface Ranges on page 17](#)
- [Interfaces Overview on page 9](#)
- *Interfaces Overview*
- [Configuring Gigabit and 10-Gigabit Ethernet Interfaces on page 48](#)
- *Configuring Gigabit and 10-Gigabit Ethernet Interfaces*
- *Junos OS Network Interfaces Library for Routing Devices*

## interfaces

**Supported Platforms** EX4600, OCX1100, QFabric System, QFX Series standalone switches

**Syntax** The following statements and their associated substatements are not supported on OCX Series switches: **auto-negotiation**, **speed**, **ethernet-switching**, **fcoe-lag**, **fibre-channel**, **fibrechannel-options**, **mc-ae**, **vlan**, **vlan-id**, and **vlan-tagging**.

```
interfaces {
 aex {
 disable;
 aggregated-ether-options {
 configured-flow-control {
 rx-buffers (on | off);
 tx-buffers (on | off);
 }
 (fcoe-lag | no-fcoe-lag);
 (flow-control | no-flow-control);
 lacp mode {
 admin-key key;
 force-up;
 periodic interval;
 system-id mac-address;
 }
 link-speed speed;
 local-bias;
 loopback;
 no-loopback;
 minimum-links number;
 }
 mc-ae {
 chassis-id chassis-id;
 mc-ae-id mc-ae-id;
 mode (active-active);
 status-control (active | standby);
 }
 description text;
 gratuitous-arp-reply | no-gratuitous-arp-reply)
 hold-time down milliseconds up milliseconds;
 mtu bytes;
 no-gratuitous-arp-request;
 traceoptions;
 (traps | no traps);
 unit logical-unit-number {
 disable;
 description text;
 family {
 ethernet-switching {
 filter input filter-name;
 filter output filter-name;
 native-vlan-id vlan-id;
 port-mode mode;
 reflective-relay;
 vlan {
```

```

 members [(all | names | vlan-ids)];
 }
}
inet {
 address address {
 primary;
 }
 filter input filter-name;
 filter output filter-name;
 primary;
 targeted-broadcast;
}
(traps | no traps);
vlan-id vlan-id-number;
}
vlan-tagging;
}
interface-range interface-range-name {
 disable;
 description text;
 ether-options {
 802.3ad aex {
 lacp {
 force-up;
 }
 }
 }
 (auto-negotiation | no-auto-negotiation);
 configured-flow-control {
 rx-buffers (on | off);
 tx-buffers (on | off);
 }
 (flow-control | no-flow-control);
 link-mode mode;
 speed (auto-negotiation | speed);
}
hold-time milliseconds down milliseconds;
member interface-name;
member-range starting-interface-name to ending-interface-name;
mtu bytes;
unit logical-unit-number {
 disable;
 description text;
 family family-name {...}
 (traps | no traps);
 vlan-id vlan-id-number;
}
}
lo0 {
 disable;
 description text;
 hold-time milliseconds down milliseconds;
 traceoptions;
 (traps | no traps);
 unit logical-unit-number {
 disable;
 description text;
 }
}

```

```

family {
 inet {
 address address {
 primary;
 }
 filter input filter-name;
 filter output filter-name;
 primary;
 targeted-broadcast;
 }
 (traps | no traps);
}
}
mex {
 disable;
 description text;
 hold-time milliseconds down milliseconds;
 (gratuitous-arp-reply | no-gratuitous-arp-reply);
 no-gratuitous-arp-request;
 traceoptions;
 traps;
 unit logical-unit-number {
 disable;
 description text;
 family {
 ethernet-switching {
 filter input filter-name;
 filter output filter-name;
 native-vlan-id vlan-id;
 port-mode mode;
 reflective-relay;
 vlan {
 members [(all | names | vlan-ids)];
 }
 }
 inet {
 address address {
 primary;
 filter input filter-name;
 filter output filter-name;
 primary;
 targeted-broadcast;
 }
 }
 }
 }
 traps;
 vlan-id vlan-id-number;
}
vlan-tagging;
vlan {
 disable;
 description text;
 (gratuitous-arp-reply | no-gratuitous-arp-reply);
 hold-time milliseconds down milliseconds;
 mtu bytes;
 no-gratuitous-arp-request;
 traceoptions;
}

```

```

(traps | no traps);
unit logical-unit-number {
 description text;
 disable;
 family {
 inet {
 address address {
 primary;
 }
 filter input filter-name;
 filter output filter-name;
 primary;
 targeted-broadcast;
 }
 }
 (traps | no traps);
}
}
fc-0/0/port {
 fibrechannel-options {
 bb-sc-n;
 (loopback | no-loopback);
 speed (auto-negotiation | 2g | 4g | 8g);
 }
 unit logical-unit-number {
 disable;
 description text;
 family {
 fibre-channel {
 port-mode np-port;
 }
 }
 (traps | no traps);
 }
}
ge-0/0/port {
 disable;
 description text;
 ether-options {
 802.3ad aex {
 lacp {
 force-up;
 primary;
 }
 }
 }
 (auto-negotiation | no-auto-negotiation);
 configured-flow-control {
 rx-buffers (on | off);
 tx-buffers (on | off);
 }
 (flow-control | no-flow-control);
 link-mode mode;
 loopback;
 no-loopback;
 speed (auto-negotiation | speed);
}
gratuitous-arp-reply| no-gratuitous-arp-reply);
hold-time milliseconds down milliseconds;
mac

```

```

mtu bytes;
no-gratuitous-arp-request;
traceoptions;
(traps | no traps);
unit logical-unit-number {
 description text;
 disable;
 family {
 ethernet-switching {
 filter input filter-name;
 filter output filter-name;
 native-vlan-id vlan-id;
 port-mode mode;
 reflective-relay;
 vlan {
 members [(all | names | vlan-ids)];
 }
 }
 inet {
 address address {
 primary;
 }
 filter input filter-name;
 filter output filter-name;
 primary;
 targeted-broadcast;
 }
 }
 (traps | no traps);
 vlan-id vlan-id-number;
}
vlan-tagging;
}
vrrp-group group-id {
 (accept-data | no-accept-data);
 advertise-interval seconds;
 authentication-key key;
 authentication-type authentication;
 fast-interval milliseconds;
 (preempt | no-preempt) {
 hold-time seconds;
 }
 priority number;
 track {
 interface interface-name {
 bandwidth-threshold bits-per-second priority-cost priority;
 priority-cost priority;
 }
 priority-hold-time seconds;
 route prefix/prefix-length routing-instance instance-name priority-cost priority;
 }
}
virtual-address [addresses];
}
xe-0/0/port {
 disable;
 description text;

```



```

ether-options {
 802.3ad aex {
 lACP {
 force-up;
 (primary | backup);
 }
 }
 configured-flow-control {
 rx-buffers (on | off);
 tx-buffers (on | off);
 }
 (flow-control | no-flow-control);
 loopback;
 no-loopback;
}
(gratuitous-arp-reply | no-gratuitous-arp-reply)
hold-time milliseconds down milliseconds;
mac
mtu bytes;
no-gratuitous-arp-request;
traceoptions;
(traps | no traps);
unit logical-unit-number {
 disable;
 description text;
 family {
 ethernet-switching {
 filter input filter-name;
 filter output filter-name;
 native-vlan-id vlan-id;
 port-mode mode;
 reflective-relay;
 vlan {
 members [(all | names | vlan-ids)];
 }
 }
 fibre-channel {
 port-mode (f-port | np-port);
 }
 }
 inet {
 address address {
 primary;
 }
 filter input filter-name;
 filter output filter-name;
 primary;
 targeted-broadcast;
 }
 (traps | no traps);
 vlan-id vlan-id-number;
}
vlan-tagging;
}
}

```

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Hierarchy Level</b>          | [edit]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Description</b>              | <p>Configure the interfaces on the QFX Series and OCX Series.</p> <p>The following statements and their associated substatements are not supported on OCX Series switches: <b>auto-negotiation</b>, <b>ethernet-switching</b>, <b>fcoe-lag</b>, <b>fibre-channel</b>, <b>fibrechannel-options</b>, <b>mc-ae</b>, <b>speed</b>, <b>vlan</b>, <b>vlan-id</b>, and <b>vlan-tagging</b></p> <p>Most standard Junos OS configuration statements are available in the Junos OS for a switch. This topic lists Junos OS statements that you commonly use when configuring a switch as well as statements added to support switches only.</p> |
| <b>Options</b>                  | <p><b>aex</b>—Configure an aggregated Ethernet interface.</p> <p><b>xe-0/0/</b><i>port</i><b>/</b>—Configure a 10-Gigabit Ethernet interface.</p> <p><b>ge-0/0/</b><i>port</i><b>/</b>—Configure a Gigabit Ethernet interface.</p> <p><b>fc-0/0/</b><i>port</i><b>/</b>—Configure a Fibre Channel interface.</p> <p><b>meX</b>/—Configure a management interface.</p> <p><b>mc-ae</b>—Configure a multichassis aggregated Ethernet (MC-AE) interface.</p> <p>The remaining statements are explained separately.</p>                                                                                                                   |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Interfaces Overview on page 9</a></li><li>• <a href="#">Understanding Interface Ranges on page 17</a></li><li>• <a href="#">Configuring Gigabit and 10-Gigabit Ethernet Interfaces on page 48</a></li><li>• <a href="#">Configuring Gigabit and 10-Gigabit Ethernet Interfaces</a></li><li>• <a href="#">Configuring Link Aggregation on page 67</a></li><li>• <a href="#">Configuring a Layer 3 Logical Interface on page 57</a></li></ul>                                                                                                                                       |

## link-down

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supported Platforms</b>      | EX4600, OCX1100, QFabric System, QFX Series standalone switches                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Syntax</b>                   | link-down (red   yellow   ignore);                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Hierarchy Level</b>          | [edit chassis <b>alarm ethernet</b> ],<br>[edit chassis <b>alarm fibre-channel</b> ],<br>[edit chassis interconnect-device <i>name</i> <b>alarm ethernet</b> ],<br>[edit chassis node-group <i>name</i> <b>alarm fibre-channel</b> ]                                                                                                                                                                                                                                                       |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.3 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                                                                                                                                                                              |
| <b>Description</b>              | Specify either red, yellow, or ignore to display when the link is down.                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Options</b>                  | <p><b>red</b>—Indicates that one or more hardware components have failed or exceeded temperature thresholds, or an alarm condition configured on an interface has triggered a critical warning.</p> <p><b>yellow</b>—Indicates a noncritical condition on the device that, if left unchecked, might cause an interruption in service or degradation in performance. A yellow alarm condition requires monitoring or maintenance.</p> <p><b>ignore</b>—Suppresses or ignores the alarm.</p> |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                             |

## link-mode

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|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supported Platforms</b>      | EX4600, OCX1100, QFabric System, QFX Series standalone switches                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Syntax</b>                   | link-mode <i>mode</i> ;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit <a href="#">interfaces</a> <i>interface-name</i> <a href="#">ether-options</a> ]                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Description</b>              | Set the device's link-connection characteristic.                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Default</b>                  | The <b>full-duplex</b> mode is enabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Options</b>                  | <p><b>mode</b> —Link characteristic:</p> <ul style="list-style-type: none"><li>• <b>full-duplex</b>—Connection is full duplex.</li><li>• <b>half-duplex</b>—Connection is half duplex.</li><li>• <b>automatic</b>—Link mode is negotiated.</li></ul> <p>If <b>no-auto-negotiation</b> is specified in the <b>ether-options</b> option, you can select only <b>full-duplex</b> or <b>half-duplex</b>. If <b>auto-negotiation</b> is specified in the <b>ether-options</b> option, you can select any mode.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Gigabit and 10-Gigabit Ethernet Interfaces on page 48</a></li><li>• <a href="#">Configuring Gigabit and 10-Gigabit Ethernet Interfaces</a></li><li>• <a href="#">Junos OS Network Interfaces Library for Routing Devices</a></li></ul>                                                                                                                                                                                                        |

## link-speed

**Supported Platforms** EX4600, OCX1100, QFabric System, QFX Series standalone switches

**Syntax** link-speed *speed*;

**Hierarchy Level** [edit interfaces aex [aggregated-ether-options](#)]

**Release Information** Statement introduced in Junos OS Release 11.1 for the QFX Series.  
Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

**Description** For aggregated Ethernet interfaces only, set the required link speed.

**Options** *speed*—For aggregated Ethernet links, you can specify the speed in bits per second either as a complete decimal number or as a decimal number followed by the abbreviation **k** (1000), **m** (1,000,000), or **g** (1,000,000,000).

On QFX5100 standalone switches, you can configure **mixed** as the link speed. The **mixed** option allows you to configure mixed rate aggregated Ethernet bundles on a QFX5100 standalone switch with link speeds of 40G and 10G only. Load balancing will not work if you configure link speeds that are not supported.

Aggregated Ethernet links on the QFX Series can have one of the following speed values:



**NOTE:** OCX Series switches only support 10g and 40g interfaces. Mixed rate aggregated Ethernet interfaces are not support on the OCX Series.

- **100g**—Links are 100 Gbps.
- **100m**—Links are 100 Mbps.
- **10g**—Links are 10 Gbps.
- **1g**—Links are 1 Gbps.
- **40g**—Links are 40 Gbps.
- **50g**—Links are 50 Gbps.
- **80g**—Links are 80 Gbps.
- **8g**—Links are 8 Gbps.
- **0c192**—Links are OC-192.
- **mixed**—Links are 10 Gbps and 40Gbps.

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

**Related Documentation** • [Configuring Link Aggregation on page 67](#)

## loopback (Aggregated Ethernet, Gigabit Ethernet, and 10-Gigabit Ethernet)

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|                                 |                                                                                                                                               |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supported Platforms</b>      | EX4600, OCX1100, QFabric System, QFX Series standalone switches                                                                               |
| <b>Syntax</b>                   | (loopback   no-loopback);                                                                                                                     |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> aggregated-ether-options],<br>[edit interfaces <i>interface-name</i> ether-options]                    |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series. |
| <b>Description</b>              | For aggregated Ethernet, Gigabit Ethernet, and 10-Gigabit Ethernet interfaces, enable or disable loopback mode.                               |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Ethernet Loopback Capability on page 53</a></li></ul>                         |

## mac

---

|                                 |                                                                                                                                                                                                                           |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supported Platforms</b>      | M Series, MX Series, PTX Series, QFX Series standalone switches, SRX Series, T Series                                                                                                                                     |
| <b>Syntax</b>                   | mac <i>mac-address</i> ;                                                                                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ]                                                                                                                                                                                  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.                                                                                                                                                                         |
| <b>Description</b>              | Set the MAC address of the interface. You can configure the MAC address on the management Ethernet interface (fxp0 or em0) only.                                                                                          |
| <b>Options</b>                  | <i>mac-address</i> —MAC address. Specify the MAC address as six hexadecimal bytes in one of the following formats: <i>nnnn.nnnn.nnnn</i> or <i>nn:nn:nn:nn:nn:nn</i> . For example, 0011.2233.4455 or 00:11:22:33:44:55.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the MAC Address on the Management Ethernet Interface</a></li><li>• <a href="#">Configuring a Pseudowire Subscriber Logical Interface Device</a></li></ul> |

## management-ethernet (Alarm)

**Supported Platforms** EX4600, OCX1100, QFabric System, QFX Series standalone switches

**Syntax** management-ethernet {  
     link-down (red | yellow | ignore);  
 }

**Hierarchy Level** [edit chassis alarm],  
 [edit chassis interconnect-device *name* alarm],  
 [edit chassis node-group *name* alarm]

**Release Information** Statement introduced in Junos OS Release 12.2 for the QFX Series.  
 Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

**Description** Configure alarms for a management Ethernet interface.



**NOTE:** If you configure a yellow alarm on the Interconnect device, it will be handled as a red alarm.

**Options** The remaining statement is explained separately.—

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

**Related Documentation**

- *Understanding Alarms*
- *Interface Alarm Messages*

## member

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supported Platforms</b>      | EX4600, OCX1100, QFabric System, QFX Series standalone switches                                                                                                                                                                                                                                                                                                                   |
| <b>Syntax</b>                   | member <i>interface-name</i> ;                                                                                                                                                                                                                                                                                                                                                    |
| <b>Hierarchy Level</b>          | [edit <a href="#">interfaces interface-range</a> <i>interface-range-name</i> ]                                                                                                                                                                                                                                                                                                    |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                                                                     |
| <b>Description</b>              | Specify the name of the member interface belonging to an interface range on the QFX Series switch.                                                                                                                                                                                                                                                                                |
| <b>Options</b>                  | <i>interface-name</i> —Name of the interface.                                                                                                                                                                                                                                                                                                                                     |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Gigabit and 10-Gigabit Ethernet Interfaces on page 48</a></li><li>• <i>Configuring Gigabit and 10-Gigabit Ethernet Interfaces</i></li><li>• <a href="#">Interfaces Overview on page 9</a></li><li>• <i>Interfaces Overview</i></li><li>• <i>Junos OS Network Interfaces Library for Routing Devices</i></li></ul> |



## member-range

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supported Platforms</b>      | EX4600, OCX1100, QFabric System, QFX Series standalone switches                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Syntax</b>                   | member-range <i>starting-interface-name ending-interface-name</i> ;                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>          | [edit <a href="#">interfaces</a> interface-range <i>interface-range-name</i> ]                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                                                                                                                                                |
| <b>Description</b>              | Specify the names of the first and last members of a sequence of interfaces belonging to an interface range.                                                                                                                                                                                                                                                                                                                                                 |
| <b>Options</b>                  | <i>starting interface-name ending interface-name</i> —Name of the first member and the name of the last member in the interface sequence.                                                                                                                                                                                                                                                                                                                    |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Understanding Interface Ranges on page 17</a></li> <li>• <a href="#">Configuring Gigabit and 10-Gigabit Ethernet Interfaces on page 48</a></li> <li>• <i>Configuring Gigabit and 10-Gigabit Ethernet Interfaces</i></li> <li>• <a href="#">Interfaces Overview on page 9</a></li> <li>• <i>Interfaces Overview</i></li> <li>• <i>Junos OS Network Interfaces Library for Routing Devices</i></li> </ul> |

## mtu

**Supported Platforms** EX4600, OCX1100, QFabric System, QFX Series standalone switches

**Syntax** `mtu bytes;`

**Hierarchy Level** [edit `interfaces interface-name`],  
[edit `interfaces interface-range interface-name`]

**Release Information** Statement introduced in Junos OS Release 11.1 for the QFX Series.  
Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

**Description** Specify the maximum transmission unit (MTU) size for the media. Changing the media MTU size causes an interface to be deleted and added again. On QFX3500, QFX3600, QFX5100, and OCX Series switches, either standalone or as part of the QFabric system, the maximum MTU value on an untagged packet transiting through an ingress Gigabit Ethernet interface must be no more than the currently configured MTU value plus four, whereas the maximum MTU value on a tagged packet transiting through an ingress Gigabit Ethernet interface must be no more than the currently configured MTU value plus eight. The maximum MTU value on an untagged or tagged packet transiting through an ingress 10-Gigabit Ethernet interface must be no more than the currently configured MTU value plus eight.

Keep the following points in mind if you are configuring MTU size for jumbo frames on these special types of interfaces:

- **For LAG interfaces**—Configuring the jumbo MTU size on a link aggregation group (LAG) interface (`aex`) automatically configures the jumbo MTU size on the member links.
- **For RVIs**—Jumbo frames of up to 9216 bytes are supported on the routed VLAN interface (RVI), which is named `vlan`. The RVI functions as a logical router. To route jumbo data packets on the RVI, you must configure the jumbo MTU size on the member physical interfaces of the RVI and not on the RVI itself (the `vlan` interface). However, for jumbo control packets—for example, to ping the RVI with a packet size of 6000 bytes or more—you must explicitly configure the jumbo MTU size on the interface named `vlan` (the RVI). On a QFX5100 switch jumbo frames on the RVI are configured on the basis of the interface MTU.



**NOTE:** RVIs are not supported on OCX Series switches.



**CAUTION:** Setting or deleting the jumbo MTU size on the RVI (the `vlan` interface) while the switch is transmitting packets might result in dropped packets.

**Options** `bytes` —MTU size.

**Range:** 64 through 9216 bytes

**Default:** 1514 bytes

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

**Related Documentation**

- [Configuring Gigabit and 10-Gigabit Ethernet Interfaces on page 48](#)
- *Configuring Gigabit and 10-Gigabit Ethernet Interfaces*
- *Junos OS Network Interfaces Library for Routing Devices*

## no-gratuitous-arp-request

**Supported Platforms** EX4600, QFabric System, QFX Series standalone switches

**Syntax** no-gratuitous-arp-request;

**Hierarchy Level** [edit [interfaces interface-name](#)],  
[edit [interfaces interface-range interface-name](#)]

**Release Information** Statement introduced in Junos OS Release 11.1 for the QFX Series.

**Description** Configure the switch not to respond to gratuitous ARP requests. You can disable responses to gratuitous ARP requests on both Layer 2 Ethernet switching interfaces and routed VLAN interfaces (RVIs).

**Default** Gratuitous ARP responses are enabled on all Ethernet switching interfaces and RVIs.

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

**Related Documentation**

- *Configuring IRB Interfaces*

## pic

**Supported Platforms** EX4600, OCX1100, QFX Series standalone switches

**Syntax**

```
pic pic-number{
 tunnel-port port-number tunnel-services;
 port port-number{
 channel-speed (speed|disable-auto-speed-detection) ;
 }
 port-range port-range-low port-range-high {
 channel-speed (speed|disable-auto-speed-detection) ;
 }
}
```

**Hierarchy Level** [edit chassis fpc *slot*]

**Release Information** Option **channel-speed** introduced in Junos OS Release 13.2 for the QFX Series.



**NOTE:** This statement is not supported on the OCX Series.

**Description** (QFX3500, QFX3600, and QFX5100 standalone switches running Enhanced Layer 2 Software only)—Configure a specific port or a range of ports to operate as 10-Gigabit Ethernet ports or 40-Gigabit Ethernet ports.

**Options**

**pic *pic-number***—(QFX3500 standalone switch only) Number of the physical interface card (PIC) on which you want to configure port types. Specify **1** to configure 10-Gigabit Ethernet or 40-Gigabit Ethernet type ports.

(QFX3600 standalone switch only) Number of the physical interface card (PIC) on which you want to configure port types. Specify **0** to configure 10-Gigabit Ethernet or 40-Gigabit Ethernet type ports.

**port *physical-port-number***—Port number on which you want to configure the port type.

**port-range-low**—Lowest-numbered port in the range of ports.

**port-range-high**—Highest-numbered port in the range of ports.

**channel-speed (*speed* |disable-auto-speed-detection)** —Configure *10g* for 10-Gigabit Ethernet type ports, and configure *disable-auto-speed-detection* to disable auto-channelization.

**Required Privilege Level**


interface—To view this statement in the configuration.

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

**Related Documentation**

- *Channelizing Interfaces*

## rx-buffers

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supported Platforms</b>      | EX4600, QFabric System, QFX Series standalone switches                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Syntax</b>                   | rx-buffers (on   off);                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Hierarchy Level</b>          | [edit <b>interfaces</b> <i>interface-name</i> <b>ether-options</b> <b>configured-flow-control</b> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 12.1 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Description</b>              | <p>Enable or disable an interface to generate and send Ethernet PAUSE messages. If you enable the receive buffers to generate and send PAUSE messages, when the receive buffers reach a certain level of fullness, the interface sends a PAUSE message to the connected peer. If the connected peer is properly configured, it stops transmitting frames to the interface on the entire link. When the interface receive buffer empties below a certain threshold, the interface sends a message to the connected peer to resume sending frames.</p> <p>Ethernet PAUSE prevents buffers from overflowing and dropping packets during periods of network congestion. If the other devices in the network are also configured to support PAUSE, PAUSE supports lossless operation. Use the <b>rx-buffers</b> statement with the <b>tx-buffers</b> statement to configure asymmetric Ethernet PAUSE on an interface. (Use the <b>flow-control</b> statement to enable symmetric PAUSE and the <b>no-flow-control</b> statement to disable symmetric PAUSE on an interface. Symmetric flow control and asymmetric flow control are mutually exclusive features. If you attempt to configure both, the switch returns a commit error.)</p> <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <p> <b>NOTE:</b> Ethernet PAUSE temporarily stops transmitting all traffic on a link when the buffers fill to a certain threshold. To temporarily pause traffic on individual “lanes” of traffic (each lane contains the traffic associated with a particular IEEE 802.1p code point, so there can be eight lanes of traffic on a link), use priority-based flow control (PFC).</p> <p>Ethernet PAUSE and PFC are mutually exclusive features, so you cannot configure both of them on the same interface. If you attempt to configure both Ethernet PAUSE and PFC on an interface, the switch returns a commit error.</p> </div> |
| <b>Default</b>                  | Flow control is disabled. You must explicitly configure Ethernet PAUSE flow control on interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Options</b>                  | <b>on   off</b> —Enable or disable an interface to generate and send Ethernet PAUSE messages.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

- Related Documentation**
- [flow-control on page 148](#)
  - [tx-buffers on page 184](#)
  - *Configuring CoS Asymmetric Ethernet PAUSE Flow Control*
  - *Enabling and Disabling CoS Symmetric Ethernet PAUSE Flow Control*
  - *Understanding CoS Flow Control (Ethernet PAUSE and PFC)*

---

## source

|                                 |                                                                                                                                                                                                                                                                             |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supported Platforms</b>      | EX Series, M Series, OCX1100, QFX Series standalone switches, T Series                                                                                                                                                                                                      |
| <b>Syntax</b>                   | source <i>source-address</i> ;                                                                                                                                                                                                                                              |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> tunnel]                                                                                                                                                                                              |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.1 for EX Series switches.<br>Statement introduced in Junos OS Release 13.2 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series. |
| <b>Description</b>              | Specify the source address of the tunnel.                                                                                                                                                                                                                                   |
| <b>Default</b>                  | If you do not specify a source address, the tunnel uses the unit's primary address as the source address of the tunnel.                                                                                                                                                     |
| <b>Options</b>                  | <i>source-address</i> —Address of the local side of the tunnel. This is the address that is placed in the outer IP header's source field.                                                                                                                                   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Tunnel Services Overview</i></li></ul>                                                                                                                                                                                           |

## speed

**Supported Platforms** [EX4600](#), [OCX1100](#), [QFabric System](#)

**Syntax** (speed 100m | 1g);

**Hierarchy Level** [edit [interfaces](#) *interface-name*]

**Release Information** Statement introduced in Junos OS Release 11.1 for the QFX Series.

**Description** Configure the speed of the interface. On QFX5100 devices using 1-Gigabit Ethernet Copper SFP interfaces, you can configure the speed to be 100 Mbps. To return to the default speed of 1 Gbps, delete the **100m**. statement at the [edit [interfaces](#) *interface-name* speed] CLI hierarchy.



**NOTE:** Only 10g and 40g interfaces are supported on OCX Series switches.

**Default** The speed for 1-Gigabit Ethernet Copper SFP interfaces is set to 1 Gbps by default, but you can configure the speed to be 100 Mbps. The speed for 10-Gigabit Ethernet interfaces is set to 10 Gbps by default and cannot be configured to operate in a different speed.

**Options**

- **100m**—100 Mbps
- **1g**—1 Gbps

**Required Privilege Level**

interface—To view this statement in the configuration.

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

**Related Documentation**

- [auto-negotiation on page 130](#)
- [Configuring Gigabit and 10-Gigabit Ethernet Interfaces on page 48](#)
- *Configuring Gigabit and 10-Gigabit Ethernet Interfaces*
- *Junos OS Network Interfaces Library for Routing Devices*

## targeted-broadcast

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supported Platforms</b>      | EX4600, OCX1100, QFabric System, QFX Series standalone switches                                                                                                                                                                                                                                                                                                                                                             |
| <b>Syntax</b>                   | targeted-broadcast;                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Hierarchy Level</b>          | [edit <a href="#">interfaces</a> <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> family inet],<br>[edit <a href="#">interfaces</a> <a href="#">interface-range</a> <i>interface-range-name</i> <a href="#">unit</a> <i>logical-unit-number</i> family inet]                                                                                                                                           |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                                                                                                               |
| <b>Description</b>              | Specify whether the IP packets destined for a Layer 3 broadcast need to be forwarded to both an egress interface and the Routing Engine, or to an egress interface only. The packets are broadcast only if the egress interface is a LAN interface.                                                                                                                                                                         |
| <b>Default</b>                  | When this statement is not included, broadcast packets are sent to the Routing Engine only.                                                                                                                                                                                                                                                                                                                                 |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Example: Configuring IP Directed Broadcast on a Switch</i></li><li>• <i>Configuring IP Directed Broadcast (CLI Procedure)</i></li><li>• <i>Understanding IP Directed Broadcast</i></li><li>• <i>Understanding IP Directed Broadcast</i></li><li>• <i>Configuring IP Directed Broadcast (CLI Procedure)</i></li><li>• <i>Example: Configuring IP Directed Broadcast</i></li></ul> |



## traceoptions (Individual Interfaces)

**Supported Platforms** EX4600, OCX1100, QFabric System, QFX Series standalone switches

**Syntax**

```
traceoptions {
 flag flag;
}
```

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

**Release Information** Statement introduced in Junos OS Release 11.1 for the QFX Series.  
Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

**Description** Define tracing operations for individual interfaces.

To specify more than one tracing operation, include multiple **flag** statements.

The **traceoptions** statement for interfaces does not support a trace file. The logging is done by the kernel, so the tracing information is placed in the system **syslog** file in the directory **/var/log**.



**NOTE:** The **traceoptions** statement is not supported on the QFX3000 QFabric system.

**Default** If you do not include this statement, no interface-specific tracing operations are performed.


**Options** **flag**—Tracing operation to perform. To specify more than one tracing operation, include multiple **flag** statements. The following are the interface-specific tracing options.

- **all**—All interface tracing operations
- **event**—Interface events
- **ipc**—Interface interprocess communication (IPC) messages
- **media**—Interface media changes
- **q921**—ISDN Q.921 frames
- **q931**—ISDN Q.931 frames

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

**Related Documentation** • *Tracing Operations of an Individual Router or Switch Interface*

## tx-buffers

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supported Platforms</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | EX4600, QFabric System, QFX Series standalone switches                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Syntax</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | tx-buffers (on   off);                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Hierarchy Level</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | [edit <a href="#">interfaces interface-name ether-options configured-flow-control</a> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Release Information</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Statement introduced in Junos OS Release 12.1 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Description</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <p>Enable or disable an interface to respond to received Ethernet PAUSE messages. If you enable the transmit buffers to respond to PAUSE messages, when the interface receives a PAUSE message from the connected peer, the interface stops transmitting frames on the entire link. When the receive buffer on the connected peer empties below a certain threshold, the peer interface sends a message to the paused interface to resume sending frames.</p> <p>Ethernet PAUSE prevents buffers from overflowing and dropping packets during periods of network congestion. If the other devices in the network are also configured to support PAUSE, PAUSE supports lossless operation. Use the <b>tx-buffers</b> statement with the <b>rx-buffers</b> statement to configure asymmetric Ethernet PAUSE on an interface. (Use the <b>flow-control</b> statement to enable symmetric PAUSE and the <b>no-flow-control</b> statement to disable symmetric PAUSE on an interface. Symmetric flow control and asymmetric flow control are mutually exclusive features. If you attempt to configure both, the switch returns a commit error.)</p> |
| <div>  <p><b>NOTE:</b> Ethernet PAUSE temporarily stops transmitting all traffic on a link when the buffers fill to a certain threshold. To temporarily pause traffic on individual “lanes” of traffic (each lane contains the traffic associated with a particular IEEE 802.1p code point, so there can be eight lanes of traffic on a link), use priority-based flow control (PFC).</p> <p>Ethernet PAUSE and PFC are mutually exclusive features, so you cannot configure both of them on the same interface. If you attempt to configure both Ethernet PAUSE and PFC on an interface, the switch returns a commit error.</p> </div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Default</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Flow control is disabled. You must explicitly configure Ethernet PAUSE flow control on interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Options</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | on   off—Enable or disable an interface to respond to an Ethernet PAUSE message.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Required Privilege Level</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Related Documentation</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li><a href="#">flow-control on page 148</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

- [rx-buffers on page 179](#)
- *Configuring CoS Asymmetric Ethernet PAUSE Flow Control*
- *Enabling and Disabling CoS Symmetric Ethernet PAUSE Flow Control*
- *Understanding CoS Flow Control (Ethernet PAUSE and PFC)*

## unit

**Supported Platforms** EX4600, OCX1100, QFabric System, QFX Series standalone switches

**Syntax** The **ethernet-switching** and **fibre-channel** statements and all of their substatements are not supported on OCX Series switches.

```
unit logical-unit-number {
 family {
 ethernet-switching {
 filter input filter-name;
 filter output filter-name;
 native-vlan-id vlan-id;
 port-mode mode;
 vlan {
 members [(all | names | vlan-ids)];
 }
 }
 fibre-channel {
 port-mode (f-port | np-port);
 }
 inet {
 address address {
 primary;
 }
 filter input filter-name;
 filter output filter-name;
 primary;
 targeted-broadcast;
 }
 }
}
```

**Hierarchy Level** [edit **interfaces** *interface-name*],  
[edit **interfaces** **interface-range** *interface-range-name*]

**Release Information** Statement introduced in Junos OS Release 11.1 for the QFX Series.  
Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

**Description**



**NOTE:** The **ethernet-switching** and **fibre-channel** statements and all of their substatements are not supported on OCX Series switches.

Configure a logical interface on the physical device. You must configure a logical interface to be able to use the physical device.

**Default** You must configure a logical interface to be able to use the physical device.


**Options** *logical-unit-number*—Number of the logical unit.

**Range:** 0 through 16,384

The remaining statements are explained separately.

|                                 |                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Gigabit and 10-Gigabit Ethernet Interfaces on page 48</a></li> <li>• <i>Configuring Gigabit and 10-Gigabit Ethernet Interfaces</i></li> <li>• <a href="#">Configuring Link Aggregation on page 67</a></li> <li>• <i>Junos OS Network Interfaces Library for Routing Devices</i></li> </ul> |

## vlan-id

|                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supported Platforms</b>                                                                                                                                                                                                                                                                                               | EX4600, QFX Series standalone switches                                                                                                                                                                                                                                                                                                            |
| <b>Syntax</b>                                                                                                                                                                                                                                                                                                            | vlan-id <i>vlan-id-number</i> ;                                                                                                                                                                                                                                                                                                                   |
| <b>Hierarchy Level</b>                                                                                                                                                                                                                                                                                                   | [edit <a href="#">interfaces</a> <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> ]                                                                                                                                                                                                                                          |
| <b>Release Information</b>                                                                                                                                                                                                                                                                                               | Statement introduced in Junos OS Release 11.1 for the QFX Series.                                                                                                                                                                                                                                                                                 |
| <b>Description</b>                                                                                                                                                                                                                                                                                                       | For 10-Gigabit Ethernet and aggregated Ethernet interfaces only, bind an 802.1Q VLAN tag ID to a logical interface.                                                                                                                                                                                                                               |
| <div style="display: flex; align-items: center;">  <div> <p><b>NOTE:</b> The VLAN tag ID cannot be configured on logical interface unit 0. The logical unit number must be 1 or higher.</p> </div> </div> |                                                                                                                                                                                                                                                                                                                                                   |
| <b>Options</b>                                                                                                                                                                                                                                                                                                           | <p><i>vlan-id-number</i>—Valid VLAN identifier.</p> <p><b>Range:</b> 1 through 4094</p>                                                                                                                                                                                                                                                           |
| <b>Required Privilege Level</b>                                                                                                                                                                                                                                                                                          | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                           |
| <b>Related Documentation</b>                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>• <a href="#">vlan-tagging on page 188</a></li> <li>• <a href="#">Configuring Gigabit and 10-Gigabit Ethernet Interfaces on page 48</a></li> <li>• <a href="#">Configuring a Layer 3 Logical Interface on page 57</a></li> <li>• <i>Junos OS Network Interfaces Library for Routing Devices</i></li> </ul> |

## vlan-tagging

---

|                                 |                                                                                                                                                                    |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supported Platforms</b>      | EX4600, QFX Series standalone switches                                                                                                                             |
| <b>Syntax</b>                   | vlan-tagging;                                                                                                                                                      |
| <b>Hierarchy Level</b>          | [edit <a href="#">interfaces</a> <i>interface-name</i> ]<br>[edit <a href="#">interfaces</a> <a href="#">interface-range</a> <i>interface-range-name</i> ]         |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                  |
| <b>Description</b>              | Enable VLAN tagging. The platform receives and forwards single-tag frames with 802.1Q VLAN tags.                                                                   |
| <b>Default</b>                  | VLAN tagging is disabled by default.                                                                                                                               |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">vlan-id on page 187</a></li><li>• <a href="#">Configuring a Layer 3 Logical Interface on page 57</a></li></ul> |

## CHAPTER 10

# LAGs and LACP Configuration Statements

- [aggregated-devices on page 190](#)
- [aggregated-ether-options on page 191](#)
- [chassis on page 193](#)
- [802.3ad on page 194](#)
- [device-count on page 195](#)
- [ethernet on page 196](#)
- [force-up on page 197](#)
- [lacp \(802.3ad\) on page 198](#)
- [lacp \(Aggregated Ethernet\) on page 199](#)
- [link-protection on page 200](#)
- [periodic on page 201](#)

## aggregated-devices

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|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supported Platforms</b>      | EX Series, EX4600, MX Series, OCX1100, QFabric System, QFX Series standalone switches                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Syntax</b>                   | <pre>aggregated-devices {<br/>  ethernet {<br/>    device-count number;<br/>  }<br/>}</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit <a href="#">chassis</a> ],                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.<br>Statement introduced in Junos OS Release 14.2R3                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>              | Configure properties for aggregated devices on the switch.<br><br>The remaining statements are explained separately.                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Default</b>                  | Aggregated devices are disabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Understanding Link Aggregation and Link Aggregation Control Protocol in a Junos Fusion</i></li><li>• <a href="#">Understanding Aggregated Ethernet Interfaces and LACP on page 63</a></li><li>• <a href="#">Configuring Link Aggregation on page 67</a></li><li>• <i>Configuring Link Aggregation</i></li><li>• <i>Example: Configuring Link Aggregation Between a QFX Series Product and an Aggregation Switch</i></li><li>• <i>Junos OS Network Interfaces Library for Routing Devices</i></li></ul> |



## aggregated-ether-options

**Supported Platforms** EX4600, OCX1100, QFabric System, QFX Series standalone switches

**Syntax** The **fcoe-lag** and **mc-ae** statements are not supported on OCX Series switches.

```
aggregated-ether-options {
 configured-flow-control {
 rx-buffers (on | off);
 tx-buffers (on | off);
 }
 ethernet-switch-profile {
 tag-protocol-id;
 (fcoe-lag | no-fcoe-lag);
 (flow-control | no-flow-control);
 lacp mode {
 admin-key key;
 periodic interval;
 system-id mac-address;
 force-up;
 }
 }
 (link-protection | no-link-protection);
 link-speed speed;
 local-bias;
 (loopback | no-loopback);
 mc-ae {
 chassis-id chassis-id;
 mc-ae-id mc-ae-id;
 mode (active-active);
 status-control (active | standby);
 }
 minimum-links number;
 rebalance-periodic;
 resilient-hash;
 source-address-filter filter;
 (source-filtering | no-source-filtering);
}
```

**Hierarchy Level** [edit [interfaces aex](#)]

**Release Information** Statement introduced in Junos OS Release 11.1 for the QFX Series.  
Statements **fcoe-lag** and **no-fcoe-lag** introduced in Junos OS Release 13.2X52-D10 for the QFX Series.  
Statements **force-up**, **lacp**, and **resilient-hash** introduced in Junos OS Release 14.1X53-D10 for the QFX Series.  
Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

**Description** Configure properties specific to a specific aggregated Ethernet interface.



**NOTE:** The **fcoe-lag** and **mc-ae** statements are not supported on OCX Series switches.



NOTE: The **force-up** statement is not supported on QFX10002 switches.



NOTE: The **resilient-hash** statement is not supported on QFX10002 switches.

The statements are explained separately.

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Default</b>                  | Options are not enabled.                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Understanding Aggregated Ethernet Interfaces and LACP on page 63</a></li> <li>• <a href="#">Configuring Aggregated Ethernet LACP on page 66</a></li> <li>• <i>Example: Configuring Link Aggregation with LACP Between a QFX Series Product and an Aggregation Switch</i></li> <li>• <i>Junos OS Network Interfaces Library for Routing Devices</i></li> </ul> |

## chassis

**Supported Platforms** EX4600, OCX1100, QFabric System, QFX Series standalone switches

**Syntax**

```
chassis {
 routing-engine
 redundancy {
 failover {
 on-disk-failure {
 disk-failure-action (halt | reboot);
 }
 on-loss-of-keepalives;
 }
 graceful-switchover;
 }
 aggregated-devices {
 ethernet {
 device-count number;
 }
 alarm {
 interface-type {
 alarm-name (red | yellow | ignore);
 }
 }
 }
 forwarding-options profile-name {
 num-65-127-prefix value
 }
 fpc slot {
 auto-speed-detection disable
 pic pic-number {
 port port-number {
 tunnel-port port-number tunnel-services;
 channel-speed speed;
 }
 port-range port-range-low port-range-high {
 channel-speed speed;
 }
 }
 }
 maximum-ecmp next-hops;
}
```

**Hierarchy Level** [edit]

**Release Information** Statement introduced in Junos OS Release 11.1 for the QFX Series.  
Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.  
Statement introduced in Junos OS Release 14.2R3

**Description** Configure chassis-specific properties for the switch.  
  
The remaining statements are explained separately.

|                                 |                                                                                                                                                                                                                                                                                       |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Understanding Link Aggregation and Link Aggregation Control Protocol in a Junos Fusion</a></li> <li>• <a href="#">Configuring Link Aggregation</a></li> <li>• <a href="#">Configuring Link Aggregation on page 67</a></li> </ul> |

## 802.3ad

|                            |                                                                                                                                               |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supported Platforms</b> | EX4600, OCX1100, QFabric System, QFX Series standalone switches                                                                               |
| <b>Syntax</b>              | <pre>802.3ad aex;     lacp {         force-up;         (primary   backup);     }     port-priority; }</pre>                                   |
| <b>Hierarchy Level</b>     | [edit <a href="#">interfaces</a> <i>interface-name</i> <a href="#">ether-options</a> ]                                                        |
| <b>Release Information</b> | Statement introduced in Junos OS Release 11.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series. |
| <b>Description</b>         | Specify the aggregated Ethernet logical interface number.                                                                                     |



**NOTE:** The port-priority statement is not supported on QFabric systems.



**NOTE:** The force-up statement is not supported on QFX10002 switches.

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Options</b>                  | aex—Aggregated Ethernet logical interface number.                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Link Aggregation on page 67</a></li> <li>• <a href="#">Configuring Aggregated Ethernet LACP on page 66</a></li> <li>• <a href="#">Understanding Aggregated Ethernet Interfaces and LACP on page 63</a></li> <li>• <a href="#">Troubleshooting an Aggregated Ethernet Interface on page 75</a></li> <li>• <a href="#">Junos OS Network Interfaces Library for Routing Devices</a></li> </ul> |

## device-count

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supported Platforms</b>      | EX4600, OCX1100, QFabric System, QFX Series standalone switches                                                                                                                                                                                                                                                                                                                    |
| <b>Syntax</b>                   | device-count <i>number</i> ;                                                                                                                                                                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit <a href="#">chassis aggregated-devices ethernet</a> ],<br>[edit <a href="#">chassis</a> node-group <i>name</i> <a href="#">aggregated-devices ethernet</a> ]                                                                                                                                                                                                                 |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.<br>Statement introduced in Junos OS Release 14.2R3                                                                                                                                                                                   |
| <b>Description</b>              | Configure the number of aggregated Ethernet logical devices available to the switch.                                                                                                                                                                                                                                                                                               |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Understanding Link Aggregation and Link Aggregation Control Protocol in a Junos Fusion</i></li> <li>• <i>Configuring Link Aggregation</i></li> <li>• <a href="#">Configuring Link Aggregation on page 67</a></li> <li>• <i>Example: Configuring Link Aggregation Between a QFX Series Product and an Aggregation Switch</i></li> </ul> |

## ethernet

---

|                                 |                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supported Platforms</b>      | EX4600, OCX1100, QFabric System, QFX Series standalone switches                                                                                                                                                                                                                                                                          |
| <b>Syntax</b>                   | <pre>ethernet {<br/>    device-count <i>number</i>;<br/>}</pre>                                                                                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>          | [edit <a href="#">chassis aggregated-devices</a> ],<br>[edit chassis node-group <a href="#">aggregated-devices</a> ]                                                                                                                                                                                                                     |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.<br>Statement introduced in Junos OS Release 14.2R3                                                                                                                                         |
| <b>Description</b>              | Configure properties for aggregated Ethernet devices on the switch.<br><br>The remaining statement is explained separately.                                                                                                                                                                                                              |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Understanding Link Aggregation and Link Aggregation Control Protocol in a Junos Fusion</i></li><li>• <i>Configuring Link Aggregation</i></li><li>• <a href="#">Configuring Link Aggregation on page 67</a></li><li>• <i>Junos OS Network Interfaces Library for Routing Devices</i></li></ul> |

## force-up

---

**Supported Platforms** [EX4600](#), [OCX1100](#), [QFabric System](#), [QFX Series standalone switches](#)

**Syntax** `force-up;`

**Hierarchy Level** `[edit interfaces interface-name ether-options 802.3ad lacp;`  
`[edit interfaces interface-name aggregated-ether-options lacp;`

**Release Information** Statement introduced in Junos OS Release 11.1 for the QFX Series.  
Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

**Description** Configure the state of the interface as up when the peer has limited LACP capability. You can also configure the peer interface (in MC-LAG) to remain up even with limited LACP capability.



**NOTE:** The `force-up` option is not supported on QFX10002 switches.

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

- Related Documentation**
- [Configuring Link Aggregation](#)
  - [Understanding Aggregated Ethernet Interfaces and LACP on page 63](#)
  - [Configuring Aggregated Ethernet LACP on page 66](#)
  - [Example: Configuring Link Aggregation with LACP Between a QFX Series Product and an Aggregation Switch](#)
  - [Junos OS Network Interfaces Library for Routing Devices](#)
  -

## lacp (802.3ad)

**Supported Platforms** [EX4600](#), [OCX1100](#), [QFabric System](#), [QFX Series standalone switches](#)

**Syntax** `lacp {  
 force-up;  
 (primary | backup);  
 port-priority;  
}`

**Hierarchy Level** [edit [interfaces interface-name ether-options 802.3ad](#)]

**Release Information** Statement introduced in Junos OS Release 11.1 for the QFX Series.  
Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

**Description** Configure the Link Aggregation Control Protocol (LACP) parameters for interfaces. The remaining statement is explained separately.



**NOTE:** The port-priority statement is not supported on QFabric systems.



**NOTE:** The force-up statement is not supported on QFX10002 switches.

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

- Related Documentation**
- [Configuring Link Aggregation](#)
  - [Configuring Link Aggregation on page 67](#)
  - [Configuring Aggregated Ethernet LACP on page 66](#)
  - [Understanding Aggregated Ethernet Interfaces and LACP on page 63](#)



## lACP (Aggregated Ethernet)

**Syntax**    lACP (active | passive) {  
               admin-key *key*;  
               fast-failover;  
               link-protection {  
                   disable;  
                   (revertive | non-revertive);  
               }  
               periodic *interval*  
               system-ID *mac-address*;  
               system-priority *priority*;  
               force-up;  
           }

**Hierarchy Level**    [edit [interfaces interface-name](#)[aggregated-ether-options](#)]

**Release Information**    Statement introduced in Junos OS Release 11.1 for the QFX Series.  
                               Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

**Description**    Configure the Link Aggregation Control Protocol (LACP) parameters for interfaces. The remaining statement is explained separately.



**NOTE:** The force-up statement is not supported on QFX10002 switches.

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

**Related Documentation**

- [Configuring Link Aggregation](#)
- [Configuring Link Aggregation on page 67](#)
- [Configuring Aggregated Ethernet LACP on page 66](#)
- [Configuring LACP Link Protection of Aggregated Ethernet Interfaces \(CLI Procedure\) on page 69](#)
- [Understanding Aggregated Ethernet Interfaces and LACP on page 63](#)

## link-protection

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supported Platforms</b>      | EX Series, M120, MX240, MX480, MX960, SRX210, T1600, T4000, T640                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Syntax</b>                   | <pre>link-protection {   disable;   (revertive  non-revertive); }</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit interfaces aex aggregated-ether-options]<br>[edit interfaces aex aggregated-ether-options <i>lcp</i> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.3.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Support for <b>disable</b> , <b>revertive</b> , and <b>non-revertive</b> statements added in Junos OS Release 9.3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Description</b>              | <p>On the router, for aggregated Ethernet interfaces only, configure link protection. In addition to enabling link protection, a primary and a secondary (backup) link must be configured to specify what links egress traffic should traverse. To configure primary and secondary links on the router, include the <b>primary</b> and <b>backup</b> statements at the [edit interfaces <i>ge-fpc/pic/port</i> <b>gigether-options 802.3ad aex</b>] hierarchy level or the [edit interfaces <i>fe-fpc/pic/port</i> <b>fastether-options 802.3ad aex</b>] hierarchy level.</p> <p>On the switch, you can configure either Junos OS link protection for aggregated Ethernet interfaces or the LACP standards link protection for aggregated Ethernet interfaces.</p> <p>For Junos OS link protection, specify <b>link-protection</b> at the following hierarchy levels:</p> <ul style="list-style-type: none"> <li>[edit interfaces <i>ge-fpc/pic/port</i> <b>ether-options 802.3ad aex</b>]</li> <li>[edit interfaces <i>xe-fpc/pic/port</i> <b>ether-options 802.3ad aex</b>] hierarchy level or at the [edit interfaces <i>xe-fpc/pic/port</i> <b>ether-options 802.3ad aex</b>] hierarchy level.</li> </ul> <p>To disable link protection, use the <b>delete interface ae aggregate-ether-options link-protection</b> statement at the [edit interfaces aex aggregated-ether-options] hierarchy level or the [edit interfaces aex aggregated-ether-options <i>lcp</i>] hierarchy level.</p> |
| <b>Options</b>                  | The statements are explained separately.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><i>Configuring Aggregated Ethernet Link Protection</i></li> <li><i>Configuring LACP Link Protection of Aggregated Ethernet Interfaces (CLI Procedure)</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

## periodic

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|                                 |                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supported Platforms</b>      | EX4600, OCX1100, QFabric System, QFX Series standalone switches                                                                                                                                                                                                                                                                          |
| <b>Syntax</b>                   | periodic (fast   slow);                                                                                                                                                                                                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit <a href="#">interfaces</a> aex <a href="#">aggregated-ether-options</a> lacp]                                                                                                                                                                                                                                                      |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                            |
| <b>Description</b>              | Configure the interval for periodic transmission of LACP packets.                                                                                                                                                                                                                                                                        |
| <b>Default</b>                  | fast                                                                                                                                                                                                                                                                                                                                     |
| <b>Options</b>                  | <b>interval</b> —Interval at which to periodically transmit LACP packets: <ul style="list-style-type: none"> <li>• <b>fast</b>—Receive packets every second. This is the default.</li> <li>• <b>slow</b>—Receive packets every 30 seconds.</li> </ul>                                                                                    |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                                                                                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Link Aggregation</i></li> <li>• <a href="#">Configuring Aggregated Ethernet LACP on page 66</a></li> <li>• <a href="#">Understanding Aggregated Ethernet Interfaces and LACP on page 63</a></li> <li>• <i>Junos OS Network Interfaces Library for Routing Devices</i></li> </ul> |



## CHAPTER 11

# Redundant Trunk Groups Configuration Statements

- [group \(Redundant Trunk Groups\) on page 204](#)
- [interface \(Redundant Trunk Groups\) on page 205](#)
- [preempt-cutover-timer on page 206](#)
- [redundant-trunk-group on page 207](#)

## group (Redundant Trunk Groups)

---

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Supported Platforms      | EX Series, QFX Series standalone switches                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Syntax                   | <pre>group name {<br/>  interface interface-name &lt;primary&gt;;<br/>  interface interface-name;<br/>  preempt-cutover-timer seconds;<br/>}</pre>                                                                                                                                                                                                                                                                                                                  |
| Hierarchy Level          | <ul style="list-style-type: none"><li>For platforms with ELS:<br/>[edit switch-options <b>redundant-trunk-group</b>]</li><li>For platforms without ELS:<br/>[edit ethernet-switching-options <b>redundant-trunk-group</b>]</li></ul>                                                                                                                                                                                                                                |
| Release Information      | <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Hierarchy level <b>[edit switch-options]</b> introduced in Junos OS Release 13.2X50-D10 (ELS). (See <i>Getting Started with Enhanced Layer 2 Software</i> for information about ELS.)</p> <p>Statement introduced in Junos OS Release 13.2X50-D15 for the QFX Series.</p>                                                                                                            |
| Description              | Create a redundant trunk group.                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Options                  | <p><b>name</b>—The name of the redundant trunk group.</p> <ul style="list-style-type: none"><li>For platforms with ELS:<br/>The group name must be a string “rtg<i>n</i>” where <i>n</i> is a number from 0 through 15, such as “rtg2” or “rtg10”.</li><li>For platforms without ELS:<br/>The group name must start with a letter and can consist of letters, numbers, dashes, and underscores.</li></ul> <p>The remaining statements are explained separately.</p> |
| Required Privilege Level | <p>system—To view this statement in the configuration.</p> <p>system—control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                        |
| Related Documentation    | <ul style="list-style-type: none"><li><i>Example: Configuring Redundant Trunk Links for Faster Recovery</i></li><li><a href="#">Example: Configuring Redundant Trunk Links for Faster Recovery on page 91</a></li><li><a href="#">Understanding Redundant Trunk Links on page 89</a></li></ul>                                                                                                                                                                      |

## interface (Redundant Trunk Groups)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supported Platforms</b>      | EX Series, QFX Series standalone switches, SRX210                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Syntax</b>                   | <pre>interface <i>interface-name</i> &lt;primary&gt;; interface <i>interface-name</i>;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Hierarchy Level</b>          | <p>For platforms with ELS:</p> <pre>[edit switch-options <b>redundant-trunk-group</b> <i>group name</i>]</pre> <p>For platforms without ELS:</p> <pre>[edit ethernet-switching-options <b>redundant-trunk-group</b> <i>group name</i>]</pre>                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Hierarchy level <b>[edit switch-options]</b> introduced in Junos OS Release 13.2X50-D10 (ELS). (See <i>Getting Started with Enhanced Layer 2 Software</i> for information about ELS.)</p> <p>Statement introduced in Junos OS Release 13.2X50-D15 for the QFX Series.</p>                                                                                                                                                                                                                                                        |
| <b>Description</b>              | Configure a primary link and secondary link on trunk ports. If the primary link fails, the secondary link automatically takes over as the primary link without waiting for normal STP convergence.                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Options</b>                  | <p><b>interface <i>interface-name</i></b>—A logical interface or an aggregated interface containing multiple ports.</p> <p><b>primary</b>—(Optional) Specify one of the interfaces in the redundant group as the primary link. The interface without this option is the secondary link in the redundant group. If a link is not specified as <b>primary</b>, the software compares the two links and selects the link with the highest port number as the active link. For example, if the two interfaces are <b>ge-0/1/0</b> and <b>ge-0/1/1</b>, the software assigns <b>ge-0/1/1</b> as the active link.</p> |
| <b>Required Privilege Level</b> | <p>system—To view this statement in the configuration.</p> <p>system—control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Example: Configuring Redundant Trunk Links for Faster Recovery</a></li> <li>• <a href="#">Example: Configuring Redundant Trunk Links for Faster Recovery on page 91</a></li> <li>• <a href="#">Understanding Redundant Trunk Links on page 89</a></li> </ul>                                                                                                                                                                                                                                                                                               |

## preempt-cutover-timer

---

|                          |                                                                                                                                                                                                                                                                                                                                        |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Supported Platforms      | EX Series, QFX Series standalone switches                                                                                                                                                                                                                                                                                              |
| Syntax                   | preempt-cutover-timer seconds;                                                                                                                                                                                                                                                                                                         |
| Hierarchy Level          | <ul style="list-style-type: none"><li>For platforms with ELS:<br/>[edit switch-options <b>redundant-trunk-group</b> group name]</li><li>For platforms without ELS:<br/>[edit ethernet-switching-options <b>redundant-trunk-group</b> group name]</li></ul>                                                                             |
| Release Information      | Statement introduced in Junos OS Release 11.1 for EX Series switches.<br>Hierarchy level [edit switch-options] introduced in Junos OS Release 13.2X50-D10 (ELS).<br>(See <i>Getting Started with Enhanced Layer 2 Software</i> for information about ELS.)<br>Statement introduced in Junos OS Release 13.2X50-D15 for the QFX Series. |
| Description              | Change the length of time that a re-enabled primary link waits to take over from an active secondary link in a redundant trunk group.                                                                                                                                                                                                  |
| Default                  | If you do not change the time with the <b>preempt-cutover-timer</b> statement, a re-enabled primary link takes over from the active secondary link after 1 second.                                                                                                                                                                     |
| Options                  | <b>seconds</b> —Number of seconds that the primary link waits to take over from the active secondary link.<br><b>Range:</b> 1 through 600 seconds                                                                                                                                                                                      |
| Required Privilege Level | admin—To view this statement in the configuration.<br>admin-control—To add this statement to the configuration.                                                                                                                                                                                                                        |
| Related Documentation    | <ul style="list-style-type: none"><li>Example: Configuring Redundant Trunk Links for Faster Recovery</li><li>Example: Configuring Redundant Trunk Links for Faster Recovery on page 91</li><li>Understanding Redundant Trunk Links on page 89</li></ul>                                                                                |



## redundant-trunk-group

|                                 |                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supported Platforms</b>      | EX Series, QFX Series standalone switches                                                                                                                                                                                                                                                                                                                |
| <b>Syntax</b>                   | <pre> redundant-trunk-group {   group name {     interface interface-name &lt;primary&gt;;     interface interface-name;     preempt-cutover-timer seconds;   } } </pre>                                                                                                                                                                                 |
| <b>Hierarchy Level</b>          | <ul style="list-style-type: none"> <li>For platforms with ELS:<br/>[edit switch-options]</li> <li>For platforms without ELS:<br/>[edit ethernet-switching-options]</li> </ul>                                                                                                                                                                            |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Hierarchy level <b>[edit switch-options]</b> introduced in Junos OS Release 13.2X50-D10 (ELS). (See <i>Getting Started with Enhanced Layer 2 Software</i> for information about ELS.)</p> <p>Statement introduced in Junos OS Release 13.2X50-D15 for the QFX Series.</p> |
| <b>Description</b>              | <p>Configure a primary link and secondary link on trunk ports. If the primary link fails, the secondary link automatically takes over without waiting for normal spanning-tree protocol convergence.</p> <p>The remaining statements are explained separately.</p>                                                                                       |
| <b>Required Privilege Level</b> | <p>system—To view this statement in the configuration.</p> <p>system-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><i>Example: Configuring Redundant Trunk Links for Faster Recovery</i></li> <li><a href="#">Example: Configuring Redundant Trunk Links for Faster Recovery on page 91</a></li> <li><a href="#">Understanding Redundant Trunk Links on page 89</a></li> </ul>                                                       |



## CHAPTER 12

# Ethernet OAM Link Fault Management Operational Command

- `show oam ethernet link-fault-management`

## show oam ethernet link-fault-management

**Supported Platforms** [EX Series](#)

**Syntax** show oam ethernet link-fault-management  
<brief | detail>  
<interface-name>

**Release Information** Command introduced in Junos OS Release 9.4 for EX Series switches.

**Description** Displays Operation, Administration, and Maintenance (OAM) link fault management (LFM) information for Ethernet interfaces.

**Options** **brief | detail**—(Optional) Display the specified level of output.

**interface-name** —(Optional) Display link fault management information for the specified Ethernet interface only.

**Required Privilege Level** view

**Related Documentation**

- [Example: Configuring Ethernet OAM Link Fault Management on EX Series Switches](#)
- [Configuring Ethernet OAM Link Fault Management \(CLI Procedure\) on page 4](#)

**List of Sample Output** [show oam ethernet link-fault-management brief on page 214](#)  
[show oam ethernet link-fault-management detail on page 214](#)

**Output Fields** [Table 14 on page 210](#) lists the output fields for the **show oam ethernet link-fault-management** command. Output fields are listed in the approximate order in which they appear.

**Table 14: show oam ethernet link-fault-management Output Fields**

| Field Name             | Field Description                                                                                                                                                                                               | Level of Output |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Status</b>          | Indicates the status of the established link. <ul style="list-style-type: none"> <li>• <b>Fail</b>—A link fault condition exists.</li> <li>• <b>Running</b>—A link fault condition does not exist.</li> </ul>   | All levels      |
| <b>Discovery state</b> | State of the discovery mechanism: <ul style="list-style-type: none"> <li>• <b>Passive Wait</b></li> <li>• <b>Send Any</b></li> <li>• <b>Send Local Remote</b></li> <li>• <b>Send Local Remote Ok</b></li> </ul> | All levels      |
| <b>Peer address</b>    | Address of the OAM peer.                                                                                                                                                                                        | All levels      |

Table 14: show oam ethernet link-fault-management Output Fields (*continued*)

| Field Name                       | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Level of Output |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Flags</b>                     | Information about the interface. <ul style="list-style-type: none"> <li>• <b>Remote-Stable</b>—Indicates remote OAM client acknowledgment of, and satisfaction with local OAM state information. <b>False</b> indicates that remote DTE has either not seen or is unsatisfied with local state information. <b>True</b> indicates that remote DTE has seen and is satisfied with local state information.</li> <li>• <b>Local-Stable</b>—Indicates local OAM client acknowledgment of, and satisfaction with remote OAM state information. <b>False</b> indicates that local DTE either has not seen or is unsatisfied with remote state information. <b>True</b> indicates that local DTE has seen and is satisfied with remote state information.</li> <li>• <b>Remote-State-Valid</b>—Indicates the OAM client has received remote state information found within Local Information TLVs of received Information OAM PDUs. <b>False</b> indicates that OAM client has not seen remote state information. <b>True</b> indicates that the OAM client has seen remote state information.</li> </ul>                                                                              | All levels      |
| <b>Remote loopback status</b>    | Indicates the remote loopback status. An OAM entity can put its remote peer into loopback mode using the Loopback control OAM PDU. In loopback mode, every frame received is transmitted back on the same port (except for OAM PDUs, which are needed to maintain the OAM session).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | All levels      |
| <b>Remote entity information</b> | Remote entity information. <ul style="list-style-type: none"> <li>• <b>Remote MUX action</b>—Indicates the state of the multiplexer functions of the OAM sublayer. Device is forwarding non-OAM PDUs to the lower sublayer or discarding non-OAM PDUs.</li> <li>• <b>Remote parser action</b>—Indicates the state of the parser function of the OAM sublayer. Device is forwarding non-OAM PDUs to higher sublayer, looping back non-OAM PDUs to the lower sublayer, or discarding non-OAM PDUs.</li> <li>• <b>Discovery mode</b>—Indicates whether discovery mode is active or inactive.</li> <li>• <b>Unidirectional mode</b>—Indicates the ability to operate a link in a unidirectional mode for diagnostic purposes.</li> <li>• <b>Remote loopback mode</b>—Indicates whether remote loopback is supported or not supported.</li> <li>• <b>Link events</b>—Indicates whether interpreting link events is supported or not supported on the remote peer.</li> <li>• <b>Variable requests</b>—Indicates whether variable requests are supported or not supported. The Variable Request OAM PDU, is used to request one or more MIB variables from the remote peer.</li> </ul> | All levels      |
| <b>OAM Receive Statistics</b>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                 |
| <b>Information</b>               | The number of information PDUs received.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>detail</b>   |
| <b>Event</b>                     | The number of loopback control PDUs received.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail</b>   |
| <b>Variable request</b>          | The number of variable request PDUs received.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail</b>   |
| <b>Variable response</b>         | The number of variable response PDUs received.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>detail</b>   |
| <b>Loopback control</b>          | The number of loopback control PDUs received.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail</b>   |

Table 14: show oam ethernet link-fault-management Output Fields (*continued*)

| Field Name                                         | Field Description                                                                                                                                                                  | Level of Output |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Organization specific</b>                       | The number of vendor organization specific PDUs received.                                                                                                                          | <b>detail</b>   |
| <b>OAM Transmit Statistics</b>                     |                                                                                                                                                                                    |                 |
| <b>Information</b>                                 | The number of information PDUs transmitted.                                                                                                                                        | <b>detail</b>   |
| <b>Event</b>                                       | The number of event notification PDUs transmitted.                                                                                                                                 | <b>detail</b>   |
| <b>Variable request</b>                            | The number of variable request PDUs transmitted.                                                                                                                                   | <b>detail</b>   |
| <b>Variable response</b>                           | The number of variable response PDUs transmitted.                                                                                                                                  | <b>detail</b>   |
| <b>Loopback control</b>                            | The number of loopback control PDUs transmitted.                                                                                                                                   | <b>detail</b>   |
| <b>Organization specific</b>                       | The number of vendor organization specific PDUs transmitted.                                                                                                                       | <b>detail</b>   |
| <b>OAM Received Symbol Error Event information</b> |                                                                                                                                                                                    |                 |
| <b>Events</b>                                      | The number of symbol error event TLVs that have been received after the OAM sublayer was reset.                                                                                    | <b>detail</b>   |
| <b>Window</b>                                      | The symbol error event window in the received PDU.<br><br>The protocol default value is the number of symbols that can be received in one second on the underlying physical layer. | <b>detail</b>   |
| <b>Threshold</b>                                   | The number of errored symbols in the period required for the event to be generated.                                                                                                | <b>detail</b>   |
| <b>Errors in period</b>                            | The number of symbol errors in the period reported in the received event PDU.                                                                                                      | <b>detail</b>   |
| <b>Total errors</b>                                | The number of errored symbols that have been reported in received event TLVs after the OAM sublayer was reset.<br><br>Symbol errors are coding symbol errors.                      | <b>detail</b>   |
| <b>OAM Received Frame Error Event Information</b>  |                                                                                                                                                                                    |                 |
| <b>Events</b>                                      | The number of errored frame event TLVs that have been received after the OAM sublayer was reset.                                                                                   | <b>detail</b>   |
| <b>Window</b>                                      | The duration of the window in terms of the number of 100 ms period intervals.                                                                                                      | <b>detail</b>   |
| <b>Threshold</b>                                   | The number of detected errored frames required for the event to be generated.                                                                                                      | <b>detail</b>   |
| <b>Errors in period</b>                            | The number of detected errored frames in the period.                                                                                                                               | <b>detail</b>   |

Table 14: show oam ethernet link-fault-management Output Fields (*continued*)

| Field Name                                               | Field Description                                                                                                                                                                       | Level of Output |
|----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Total errors</b>                                      | The number of errored frames that have been reported in received event TLVs after the OAM sublayer was reset.<br><br>A frame error is any frame error on the underlying physical layer. | <b>detail</b>   |
| <b>OAM Received Frame Period Error Event Information</b> |                                                                                                                                                                                         |                 |
| <b>Events</b>                                            | The number of frame seconds errors event TLVs that have been received after the OAM sublayer was reset.                                                                                 | <b>detail</b>   |
| <b>Window</b>                                            | The duration of the frame seconds window.                                                                                                                                               | <b>detail</b>   |
| <b>Threshold</b>                                         | The number of frame seconds errors in the period.                                                                                                                                       | <b>detail</b>   |
| <b>Errors in period</b>                                  | The number of frame seconds errors in the period.                                                                                                                                       | <b>detail</b>   |
| <b>Total errors</b>                                      | The number of frame seconds errors that have been reported in received event TLVs after the OAM sublayer was reset.                                                                     | <b>detail</b>   |
| <b>OAM Transmitted Symbol Error Event Information</b>    |                                                                                                                                                                                         |                 |
| <b>Events</b>                                            | The number of symbol error event TLVs that have been transmitted after the OAM sublayer was reset.                                                                                      | <b>detail</b>   |
| <b>Window</b>                                            | The symbol error event window in the transmitted PDU.                                                                                                                                   | <b>detail</b>   |
| <b>Threshold</b>                                         | The number of errored symbols in the period required for the event to be generated.                                                                                                     | <b>detail</b>   |
| <b>Errors in period</b>                                  | The number of symbol errors in the period reported in the transmitted event PDU.                                                                                                        | <b>detail</b>   |
| <b>Total errors</b>                                      | The number of errored symbols reported in event TLVs that have been transmitted after the OAM sublayer was reset.                                                                       | <b>detail</b>   |
| <b>OAM Transmitted Frame Error Event Information</b>     |                                                                                                                                                                                         |                 |
| <b>Events</b>                                            | The number of errored frame event TLVs that have been transmitted after the OAM sublayer was reset.                                                                                     | <b>detail</b>   |
| <b>Window</b>                                            | The duration of the window in terms of the number of 100 ms period intervals.                                                                                                           | <b>detail</b>   |
| <b>Threshold</b>                                         | The number of detected errored frames required for the event to be generated.                                                                                                           | <b>detail</b>   |
| <b>Errors in period</b>                                  | The number of detected errored frames in the period.                                                                                                                                    | <b>detail</b>   |
| <b>Total errors</b>                                      | The number of errored frames that have been detected after the OAM sublayer was reset.                                                                                                  | <b>detail</b>   |

## Sample Output

### show oam ethernet link-fault-management brief

```
user@host> show oam ethernet link-fault-management brief
Interface: ge-0/0/1
Status: Running, Discovery state: Send Any
Peer address: 00:90:69:72:2c:83
Flags:Remote-Stable Remote-State-Valid Local-Stable 0x50
Remote loopback status: Disabled on local port, Enabled on peer port
Remote entity information:
 Remote MUX action: discarding, Remote parser action: loopback
 Discovery mode: active, Unidirectional mode: unsupported
 Remote loopback mode: supported, Link events: supported
 Variable requests: unsupported
```

### show oam ethernet link-fault-management detail

```
user@host> show oam ethernet link-fault-management detail
Interface: ge-0/0/1
Status: Running, Discovery state: Send Any
Peer address: 00:90:69:0a:07:14
Flags:Remote-Stable Remote-State-Valid Local-Stable 0x50
OAM receive statistics:
 Information: 186365, Event: 0, Variable request: 0, Variable response: 0
 Loopback control: 0, Organization specific: 0
OAM transmit statistics:
 Information: 186347, Event: 0, Variable request: 0, Variable response: 0
 Loopback control: 0, Organization specific: 0
OAM received symbol error event information:
 Events: 0, Window: 0, Threshold: 0
 Errors in period: 0, Total errors: 0
OAM received frame error event information:
 Events: 0, Window: 0, Threshold: 0
 Errors in period: 0, Total errors: 0
OAM received frame period error event information:
 Events: 0, Window: 0, Threshold: 0
 Errors in period: 0, Total errors: 0
OAM transmitted symbol error event information:
 Events: 0, Window: 0, Threshold: 1
 Errors in period: 0, Total errors: 0
OAM transmitted frame error event information:
 Events: 0, Window: 0, Threshold: 1
 Errors in period: 0, Total errors: 0
Remote entity information:
 Remote MUX action: forwarding, Remote parser action: forwarding
 Discovery mode: active, Unidirectional mode: unsupported
 Remote loopback mode: supported, Link events: supported
 Variable requests: unsupported
```



## CHAPTER 13

# Interfaces Operational Commands

- `monitor interface`
- `show interfaces diagnostics optics`
- `show interfaces ge`
- `show interfaces irb`
- `show interfaces queue`
- `show interfaces xe`

## monitor interface

**Supported Platforms** [EX Series](#), [M Series](#), [MX Series](#), [PTX Series](#), [QFX Series](#), [T Series](#), [vSRX](#)

**Syntax** `monitor interface`  
`<interface-name> | traffic <detail> >`

**Release Information** Command introduced before Junos OS Release 7.4.  
 Command introduced in Junos OS Release 9.0 for EX Series switches.  
 Command introduced in Junos OS Release 11.1 for the QFX Series.  
 Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

**Description** Display real-time statistics about interfaces, updating the statistics every second. Check for and display common interface failures, such as SONET/SDH and T3 alarms, loopbacks detected, and increases in framing errors.



**NOTE:** This command is not supported on the QFX3000 QFabric switch.

**Options** **none**—Display real-time statistics for all interfaces.

**detail**—(Optional) With traffic option only, display detailed output.

**interface-name**—(Optional) Display real-time statistics for the specified interface. In a TX Matrix or TX Matrix Plus router, display real-time statistics for the physical interfaces on the specified line-card chassis (LCC) only.

**traffic**—(Optional) Display traffic data for all active interfaces. In a TX Matrix or TX Matrix Plus router, display real-time statistics for the physical interfaces on the specified LCC only.

**Additional Information** The output of this command shows how much each field has changed since you started the command or since you cleared the counters by pressing the **c** key. For a description of the statistical information provided in the output of this command, see the **show interfaces extensive** command for a particular interface type in the [CLI Explorer](#). To control the output of the **monitor interface** command while it is running, use the keys listed in [Table 15 on page 216](#). The keys are not case-sensitive.

**Table 15: Output Control Keys for the monitor interface interface-name Command**

| Key | Action                                                                                                                                                                                                                     |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c   | Clears (returns to zero) the delta counters since <b>monitor interface</b> was started. This does not clear the accumulative counter. To clear the accumulative counter, use the <b>clear interfaces interval</b> command. |
| f   | Freezes the display, halting the display of updated statistics and delta counters.                                                                                                                                         |

**Table 15: Output Control Keys for the monitor interface interface-name Command** (*continued*)

| Key      | Action                                                                                                                                                                                         |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| i        | Displays information about a different interface. The command prompts you for the name of a specific interface.                                                                                |
| n        | Displays information about the next interface. The <b>monitor interface</b> command displays the physical or logical interfaces in the same order as the <b>show interfaces terse</b> command. |
| q or Esc | Quits the command and returns to the command prompt.                                                                                                                                           |
| t        | Thaws the display, resuming the update of the statistics and delta counters.                                                                                                                   |

To control the output of the **monitor interface traffic** command while it is running, use the keys listed in [Table 16 on page 217](#). The keys are not case-sensitive.

**Table 16: Output Control Keys for the monitor interface traffic Command**

| Key      | Action                                                                                                               |
|----------|----------------------------------------------------------------------------------------------------------------------|
| b        | Displays the statistics in units of bytes and bytes per second (bps).                                                |
| c        | Clears (return to 0) the delta counters in the <b>Current Delta</b> column. The statistics counters are not cleared. |
| d        | Displays the <b>Current Delta</b> column (instead of the rate column) in bps or packets per second (pps).            |
| p        | Displays the statistics in units of packets and packets per second (pps).                                            |
| q or Esc | Quits the command and returns to the command prompt.                                                                 |
| r        | Displays the rate column (instead of the <b>Current Delta</b> column) in bps and pps.                                |

**Required Privilege Level** trace

**List of Sample Output** [monitor interface \(Physical\) on page 219](#)  
[monitor interface \(OTN Interface\) on page 220](#)  
[monitor interface \(MX480 Router with MPC5E and 10-Gigabit Ethernet OTN Interface\) on page 221](#)  
[monitor interface \(MX480 Router with MPC5E and 100-Gigabit Ethernet Interface\) on page 222](#)  
[monitor interface \(MX2010 Router with MPC6E and 10-Gigabit Ethernet OTN Interface\) on page 223](#)  
[monitor interface \(MX2010 Router with MPC6E and 100-Gigabit Ethernet OTN Interface\) on page 223](#)

[monitor interface \(MX2020 Router with MPC6E and 10-Gigabit Ethernet OTN Interface\) on page 224](#)

[monitor interface \(Logical\) on page 225](#)

[monitor interface \(QFX3500 Switch\) on page 225](#)

[monitor interface traffic on page 226](#)

[monitor interface traffic \(QFX3500 Switch\) on page 226](#)

[monitor interface traffic detail \(QFX3500 Switch\) on page 227](#)

**Output Fields** [Table 17 on page 218](#) describes the output fields for the **monitor interface** command. Output fields are listed in the approximate order in which they appear.

**Table 17: monitor interface Output Fields**

| Field Name              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Level of Output |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>routerl</b>          | Hostname of the router.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | All levels      |
| <b>Seconds</b>          | How long the monitor interface command has been running or how long since you last cleared the counters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | All levels      |
| <b>Time</b>             | Current time (UTC).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | All levels      |
| <b>Delay x/y/z</b>      | Time difference between when the statistics were displayed and the actual clock time. <ul style="list-style-type: none"> <li><b>x</b>—Time taken for the last polling (in milliseconds).</li> <li><b>y</b>—Minimum time taken across all pollings (in milliseconds).</li> <li><b>z</b>—Maximum time taken across all pollings (in milliseconds).</li> </ul>                                                                                                                                                                                                                                                                                                                      | All levels      |
| <b>Interface</b>        | Short description of the interface, including its name, status, and encapsulation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | All levels      |
| <b>Link</b>             | State of the link: <b>Up</b> , <b>Down</b> , or <b>Test</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | All levels      |
| <b>Current delta</b>    | Cumulative number for the counter in question since the time shown in the Seconds field, which is the time since you started the command or last cleared the counters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | All levels      |
| <b>Local Statistics</b> | (Logical interfaces only) Number and rate of bytes and packets destined to the router or switch through the specified interface. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It usually takes less than 1 second for this counter to stabilize. <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> | All levels      |

Table 17: monitor interface Output Fields (*continued*)

| Field Name         | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Level of Output |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Remote Statistics  | <p>(Logical interfaces only) Statistics for traffic transiting the router or switch. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It usually takes less than 1 second for this counter to stabilize.</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>                                                             | All levels      |
| Traffic statistics | <p>Total number of bytes and packets received and transmitted on the interface. These statistics are the sum of the local and remote statistics. When a burst of traffic is received, the value in the output packet rate field might briefly exceed the peak cell rate. It usually takes less than 1 second for this counter to stabilize.</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> | All levels      |
| Description        | With the <b>traffic</b> option, displays the interface description configured at the <b>[edit interfaces <i>interface-name</i>]</b> hierarchy level.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | detail          |

## Sample Output

### monitor interface (Physical)

```

user@host> monitor interface so-0/0/0
router1 Seconds: 19 Time: 15:46:29

Interface: so-0/0/0, Enabled, Link is Up
Encapsulation: PPP, Keepalives, Speed: 0C48
Traffic statistics:
 Input packets: 6045 (0 pps) Current Delta [11]
 Input bytes: 6290065 (0 bps) [13882]
 Output packets: 10376 (0 pps) [10]
 Output bytes: 10365540 (0 bps) [9418]
Encapsulation statistics:
 Input keepalives: 1901 [2]
 Output keepalives: 1901 [2]
 NCP state: Opened
 LCP state: Opened
Error statistics:
 Input errors: 0 [0]
 Input drops: 0 [0]
 Input framing errors: 0 [0]
 Policed discards: 0 [0]
 L3 incompletes: 0 [0]
 L2 channel errors: 0 [0]
 L2 mismatch timeouts: 0 [0]
 Carrier transitions: 1 [0]
 Output errors: 0 [0]
 Output drops: 0 [0]

```

```

 Aged packets: 0 [0]
Active alarms : None
Active defects: None
SONET error counts/seconds:
 LOS count 1 [0]
 LOF count 1 [0]
 SEF count 1 [0]
 ES-S 0 [0]
 SES-S 0 [0]
SONET statistics:
 BIP-B1 458871 [0]
 BIP-B2 460072 [0]
 REI-L 465610 [0]
 BIP-B3 458978 [0]
 REI-P 458773 [0]
Received SONET overhead:
 F1 : 0x00 J0 : 0x00 K1 : 0x00
 K2 : 0x00 S1 : 0x00 C2 : 0x00
 C2(cmp) : 0x00 F2 : 0x00 Z3 : 0x00
 Z4 : 0x00 S1(cmp) : 0x00
Transmitted SONET overhead:
 F1 : 0x00 J0 : 0x01 K1 : 0x00
 K2 : 0x00 S1 : 0x00 C2 : 0xcf
 F2 : 0x00 Z3 : 0x00 Z4 : 0x00

Next='n', Quit='q' or ESC, Freeze='f', Thaw='t', Clear='c', Interface='i'

```

### monitor interface (OTN Interface)

```
user@host> monitor interface ge-7/0/0
```

```

Interface: ge-7/0/0, Enabled, Link is Up
Encapsulation: Ethernet, Speed: 10000mbps
Traffic statistics:
 Input bytes: 0 (0 bps)
 Output bytes: 0 (0 bps)
 Input packets: 0 (0 pps)
 Output packets: 0 (0 pps)
Error statistics:
 Input errors: 0
 Input drops: 0
 Input framing errors: 0
 Policed discards: 0
 L3 incompletes: 0
 L2 channel errors: 0
 L2 mismatch timeouts: 0
 Carrier transitions: 5
 Output errors: 0
 Output drops: 0
 Aged packets: 0
Active alarms : None
Active defects: None
Input MAC/Filter statistics:
 Unicast packets 0
 Broadcast packets 0
 Multicast packets 0
 Oversized frames 0
 Packet reject count 0
 DA rejects 0
 SA rejects 0

```

```

Output MAC/Filter Statistics:
 Unicast packets 0
 Broadcast packets 0
 Multicast packets 0
 Packet pad count 0
 Packet error count 0
OTN Link 0
 OTN Alarms: OTU_BDI, OTU_TTIM, ODU_BDI
 OTN Defects: OTU_BDI, OTU_TTIM, ODU_BDI, ODU_TTIM
 OTN OC - Seconds
 LOS 2
 LOF 9
 OTN OTU - FEC Statistics
 Corr err ratio N/A
 Corr bytes 0
 Uncorr words 0
 OTN OTU - Counters
 BIP 0
 BBE 0
 ES 0
 SES 0
 UAS 422
 OTN ODU - Counters
 BIP 0
 BBE 0
 ES 0
 SES 0
 UAS 422
 OTN ODU - Received Overhead APSPCC 0-3: 0

```

#### monitor interface (MX480 Router with MPC5E and 10-Gigabit Ethernet OTN Interface)

```

user@host> monitor interface xe-0/0/3
Interface: xe-0/0/3, Enabled, Link is Up
Encapsulation: Ethernet, Speed: 10000mbps
Traffic statistics:
 Input bytes: 0 (0 bps)
 Output bytes: 0 (0 bps)
 Input packets: 0 (0 pps)
 Output packets: 0 (0 pps)
Error statistics:
 Input errors: 0
 Input drops: 0
 Input framing errors: 0
 Policed discards: 0
 L3 incompletes: 0
 L2 channel errors: 0
 L2 mismatch timeouts: 0
 Carrier transitions: 5
 Output errors: 0
 Output drops: 0
 Aged packets: 0
Active alarms : None
Active defects: None
PCS statistics:
 Bit Errors 0
 Errored blocks 4
Input MAC/Filter statistics:
 Unicast packets 0
 Broadcast packets 0
 Multicast packets 0

```

|                               |   |     |
|-------------------------------|---|-----|
| Oversized frames              | 0 | [0] |
| Packet reject count           | 0 | [0] |
| DA rejects                    | 0 | [0] |
| SA rejects                    | 0 | [0] |
| Output MAC/Filter Statistics: |   |     |
| Unicast packets               | 0 | [0] |
| Broadcast packets             | 0 | [0] |
| Multicast packets             | 0 | [0] |
| Packet pad count              | 0 | [0] |
| Packet error count            | 0 | [0] |

Next='n', Quit='q' or ESC, Freeze='f', Thaw='t', Clear='c', Interface='i'

#### monitor interface (MX480 Router with MPC5E and 100-Gigabit Ethernet Interface)

```

user@host> monitor interface et-2/1/0
Interface: et-2/1/0, Enabled, Link is Up
Encapsulation: Ethernet, Speed: 100000mbps
Traffic statistics:
Input bytes: 0 (0 bps)
Output bytes: 0 (0 bps)
Input packets: 0 (0 pps)
Output packets: 0 (0 pps)
Error statistics:
Input errors: 0
Input drops: 0
Input framing errors: 0
Policed discards: 0
L3 incompletes: 0
L2 channel errors: 0
L2 mismatch timeouts: 0
Carrier transitions: 263
Output errors: 0
Output drops: 0
Aged packets: 0
OTN Link 0
OTN Alarms:
OTN Defects:
OTN OC - Seconds
LOS 129
LOF 2
OTN OTU - FEC Statistics
Corr err ratio <8E-5
Corr bytes 169828399453
Uncorr words 28939961456
OTN OTU - Counters
BIP 0
BBE 0
ES 24
SES 0
UAS 1255
OTN ODU - Counters
BIP 0
BBE 0
ES 24
SES 0
UAS 1256
OTN ODU - Received Overhead
APSPCC 0-3: 00 00 00 00

```



Next='n', Quit='q' or ESC, Freeze='f', Thaw='t', Clear='c', Interface='i'

#### monitor interface (MX2010 Router with MPC6E and 10-Gigabit Ethernet OTN Interface)

```

user@host> monitor interface xe-6/1/0
Interface: xe-6/1/0, Enabled, Link is Up
Encapsulation: Ethernet, Speed: 10000mbps
Traffic statistics:
Input bytes: 0 (0 bps) Current delta [0]
Output bytes: 0 (0 bps) [0]
Input packets: 0 (0 pps) [0]
Output packets: 0 (0 pps) [0]
Error statistics:
Input errors: 0 [0]
Input drops: 0 [0]
Input framing errors: 0 [0]
Policed discards: 0 [0]
L3 incompletes: 0 [0]
L2 channel errors: 0 [0]
L2 mismatch timeouts: 0 [0]
Carrier transitions: 1 [0]
Output errors: 0 [0]
Output drops: 0 [0]
Aged packets: 0 [0]
Active alarms : None
Active defects: None
PCS statistics:
Bit Errors 0 [0]
Errored blocks 1 [0]
Input MAC/Filter statistics:
Unicast packets 0 [0]
Broadcast packets 0 [0]
Multicast packets 0 [0]
Oversized frames 0 [0]
Packet reject count 0 [0]
DA rejects 0 [0]
SA rejects 0 [0]
Output MAC/Filter Statistics:
Unicast packets 0 [0]
Broadcast packets 0 [0]
Multicast packets 0 [0]
Packet pad count 0 [0]
Packet error count 0 [0]

```

Next='n', Quit='q' or ESC, Freeze='f', Thaw='t', Clear='c', Interface='i'

#### monitor interface (MX2010 Router with MPC6E and 100-Gigabit Ethernet OTN Interface)

```

user@host> monitor interface et-9/0/0
Interface: et-9/0/0, Enabled, Link is Up
Encapsulation: Ethernet, Speed: 100000mbps
Traffic statistics:
Input bytes: 0 (0 bps) Current delta [0]
Output bytes: 0 (0 bps) [0]
Input packets: 0 (0 pps) [0]
Output packets: 0 (0 pps) [0]
Error statistics:

```

|                       |   |     |
|-----------------------|---|-----|
| Input errors:         | 0 | [0] |
| Input drops:          | 0 | [0] |
| Input framing errors: | 0 | [0] |
| Policed discards:     | 0 | [0] |
| L3 incompletes:       | 0 | [0] |
| L2 channel errors:    | 0 | [0] |
| L2 mismatch timeouts: | 0 | [0] |
| Carrier transitions:  | 1 | [0] |
| Output errors:        | 0 | [0] |
| Output drops:         | 0 | [0] |
| Aged packets:         | 0 | [0] |

Next='n', Quit='q' or ESC, Freeze='f', Thaw='t', Clear='c', Interface='i'

#### monitor interface (MX2020 Router with MPC6E and 10-Gigabit Ethernet OTN Interface)

```

user@host> monitor interface xe-3/0/0
host name Seconds: 67 Time: 23:46:46
 Delay: 0/0/13

Interface: xe-3/0/0, Enabled, Link is Up
Encapsulation: Ethernet, Speed: 10000mbps
Traffic statistics: Current delta
 Input bytes: 0 (0 bps) [0]
 Output bytes: 0 (0 bps) [0]
 Input packets: 0 (0 pps) [0]
 Output packets: 0 (0 pps) [0]
Error statistics:
 Input errors: 0 [0]
 Input drops: 0 [0]
 Input framing errors: 0 [0]
 Policed discards: 0 [0]
 L3 incompletes: 0 [0]
 L2 channel errors: 0 [0]
 L2 mismatch timeouts: 0 [0]
 Carrier transitions: 3 [0]
 Output errors: 0 [0]
 Output drops: 0 [0]
 Aged packets: 0 [0]
OTN Link 0
OTN Alarms:
OTN Defects:
OTN OC - Seconds
 LOS 0 [0]
 LOF 0 [0]
OTN OTU - FEC Statistics
 Corr err ratio N/A
 Corr bytes 0 [0]
 Uncorr words 0 [0]
OTN OTU - Counters
 BIP 0 [0]
 BBE 0 [0]
 ES 0 [0]
 SES 0 [0]
 UAS 0 [0]
OTN ODU - Counters
 BIP 0 [0]
 BBE 0 [0]
 ES 0 [0]

```

```

SES 0 [0]
UAS 0 [0]
OTN ODU - Received Overhead [0]
APSPCC 0-3: 00 00 00 00

```

Next='n', Quit='q' or ESC, Freeze='f', Thaw='t', Clear='c', Interface='i'

#### monitor interface (Logical)

```

user@host> monitor interface so-1/0/0.0
host name Seconds: 16 Time: 15:33:39
 Delay: 0/0/1

Interface: so-1/0/0.0, Enabled, Link is Down
Flags: Hardware-Down Point-To-Point SNMP-Traps
Encapsulation: PPP
Local statistics:
Input bytes: 0 [0]
Output bytes: 0 [0]
Input packets: 0 [0]
Output packets: 0 [0]
Remote statistics:
Input bytes: 0 (0 bps) [0]
Output bytes: 0 (0 bps) [0]
Input packets: 0 (0 pps) [0]
Output packets: 0 (0 pps) [0]
Traffic statistics:
Destination address: 192.168.8.193, Local: 192.168.8.21

Next='n', Quit='q' or ESC, Freeze='f', Thaw='t', Clear='c', Interface='i'

```

#### monitor interface (QFX3500 Switch)

```

user@switch> monitor interface ge-0/0/0
Interface: ge-0/0/0, Enabled, Link is Down
Encapsulation: Ethernet, Speed: Unspecified
Traffic statistics:
Input bytes: 0 (0 bps) [0]
Output bytes: 0 (0 bps) [0]
Input packets: 0 (0 pps) [0]
Output packets: 0 (0 pps) [0]
Error statistics:
Input errors: 0 [0]
Input drops: 0 [0]
Input framing errors: 0 [0]
Policed discards: 0 [0]
L3 incompletes: 0 [0]
L2 channel errors: 0 [0]
L2 mismatch timeouts: 0 [0]
Carrier transitions: 0 [0]
Output errors: 0 [0]
Output drops: 0 [0]
Aged packets: 0 [0]
Active alarms : LINK
Active defects: LINK
Input MAC/Filter statistics:
Unicast packets 0 [0]
Broadcast packets 0 Multicast packet [0]

Interface warnings:
o Outstanding LINK alarm

```

## monitor interface traffic

```

user@host> monitor interface traffic
host name Seconds: 15 Time: 12:31:09

Interface Link Input packets (pps) Output packets (pps)
so-1/0/0 Down 0 (0) 0 (0)
so-1/1/0 Down 0 (0) 0 (0)
so-1/1/1 Down 0 (0) 0 (0)
so-1/1/2 Down 0 (0) 0 (0)
so-1/1/3 Down 0 (0) 0 (0)
t3-1/2/0 Down 0 (0) 0 (0)
t3-1/2/1 Down 0 (0) 0 (0)
t3-1/2/2 Down 0 (0) 0 (0)
t3-1/2/3 Down 0 (0) 0 (0)
so-2/0/0 Up 211035 (1) 36778 (0)
so-2/0/1 Up 192753 (1) 36782 (0)
so-2/0/2 Up 211020 (1) 36779 (0)
so-2/0/3 Up 211029 (1) 36776 (0)
so-2/1/0 Up 189378 (1) 36349 (0)
so-2/1/1 Down 0 (0) 18747 (0)
so-2/1/2 Down 0 (0) 16078 (0)
so-2/1/3 Up 0 (0) 80338 (0)
at-2/3/0 Up 0 (0) 0 (0)
at-2/3/1 Down 0 (0) 0 (0)

```

Bytes=b, Clear=c, Delta=d, Packets=p, Quit=q or ESC, Rate=r, Up=^U, Down=^D

## monitor interface traffic (QFX3500 Switch)

```

user@switch> monitor interface traffic
switch Seconds: 7 Time: 16:04:37

Interface Link Input packets (pps) Output packets (pps)
ge-0/0/0 Down 0 (0) 0 (0)
ge-0/0/1 Up 392187 (0) 392170 (0)
ge-0/0/2 Down 0 (0) 0 (0)
ge-0/0/3 Down 0 (0) 0 (0)
ge-0/0/4 Down 0 (0) 0 (0)
ge-0/0/5 Down 0 (0) 0 (0)
ge-0/0/6 Down 0 (0) 0 (0)
ge-0/0/7 Down 0 (0) 0 (0)
ge-0/0/8 Down 0 (0) 0 (0)
ge-0/0/9 Up 392184 (0) 392171 (0)
ge-0/0/10 Down 0 (0) 0 (0)
ge-0/0/11 Down 0 (0) 0 (0)
ge-0/0/12 Down 0 (0) 0 (0)
ge-0/0/13 Down 0 (0) 0 (0)
ge-0/0/14 Down 0 (0) 0 (0)
ge-0/0/15 Down 0 (0) 0 (0)
ge-0/0/16 Down 0 (0) 0 (0)
ge-0/0/17 Down 0 (0) 0 (0)
ge-0/0/18 Down 0 (0) 0 (0)
ge-0/0/19 Down 0 (0) 0 (0)
ge-0/0/20 Down 0 (0) 0 (0)
ge-0/0/21 Down 0 (0) 0 (0)
ge-0/0/22 Up 392172 (0) 392187 (0)
ge-0/0/23 Up 392185 (0) 392173 (0)
vcp-0 Down 0 (0) 0 (0)
vcp-1 Down 0 (0) 0 (0)

```

|      |      |   |     |         |     |
|------|------|---|-----|---------|-----|
| ae0  | Down | 0 | (0) | 0       | (0) |
| bme0 | Up   | 0 |     | 1568706 |     |

### monitor interface traffic detail (QFX3500 Switch)

```
user@switch> monitor interface traffic detail
switch
```

Seconds: 74

Time: 16:03:02

| Interface<br>Description | Link | Input packets | (pps) | Output packets | (pps) |
|--------------------------|------|---------------|-------|----------------|-------|
| ge-0/0/0                 | Down | 0             | (0)   | 0              | (0)   |
| ge-0/0/1                 | Up   | 392183        | (0)   | 392166         | (0)   |
| ge-0/0/2                 | Down | 0             | (0)   | 0              | (0)   |
| ge-0/0/3                 | Down | 0             | (0)   | 0              | (0)   |
| ge-0/0/4                 | Down | 0             | (0)   | 0              | (0)   |
| ge-0/0/5                 | Down | 0             | (0)   | 0              | (0)   |
| ge-0/0/6                 | Down | 0             | (0)   | 0              | (0)   |
| ge-0/0/7                 | Down | 0             | (0)   | 0              | (0)   |
| ge-0/0/8                 | Down | 0             | (0)   | 0              | (0)   |
| ge-0/0/9                 | Up   | 392181        | (0)   | 392168         | (0)   |
| ge-0/0/10                | Down | 0             | (0)   | 0              | (0)   |
| ge-0/0/11                | Down | 0             | (0)   | 0              | (0)   |
| ge-0/0/12                | Down | 0             | (0)   | 0              | (0)   |
| ge-0/0/13                | Down | 0             | (0)   | 0              | (0)   |
| ge-0/0/14                | Down | 0             | (0)   | 0              | (0)   |
| ge-0/0/15                | Down | 0             | (0)   | 0              | (0)   |
| ge-0/0/16                | Down | 0             | (0)   | 0              | (0)   |
| ge-0/0/17                | Down | 0             | (0)   | 0              | (0)   |
| ge-0/0/18                | Down | 0             | (0)   | 0              | (0)   |
| ge-0/0/19                | Down | 0             | (0)   | 0              | (0)   |
| ge-0/0/20                | Down | 0             | (0)   | 0              | (0)   |
| ge-0/0/21                | Down | 0             | (0)   | 0              | (0)   |
| ge-0/0/22                | Up   | 392169        | (0)   | 392184         | (1)   |
| ge-0/0/23                | Up   | 392182        | (0)   | 392170         | (0)   |
| vcp-0                    | Down | 0             |       | 0              |       |
| vcp-1                    | Down | 0             |       | 0              |       |
| ae0                      | Down | 0             | (0)   | 0              | (0)   |
| bme0                     | Up   | 0             |       | 1568693        |       |

## show interfaces diagnostics optics

**Supported Platforms** [EX Series](#), [OCX1100](#), [QFX Series standalone switches](#)

**Syntax** `show interfaces diagnostics optics interface-name`

**Release Information** Command introduced in Junos OS Release 10.0 for EX Series switches.  
Command introduced in Junos OS Release 13.2X50-D15 for the QFX Series.  
Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

**Description** Display diagnostics data and alarms for Gigabit Ethernet optical transceivers (SFP, SFP+, XFP, QSFP+, or CFP) installed in EX Series or QFX Series switches. The information provided by this command is known as digital optical monitoring (DOM) information. For a list of transceivers supported on EX Series switches and their specifications, including DOM support, see *Pluggable Transceivers Supported on EX Series Switches*.

Thresholds that trigger a high alarm, low alarm, high warning, or low warning are set by the transponder vendors. Generally, a high alarm or low alarm indicates that the optics module is not operating properly. This information can be used to diagnose why a transceiver is not working.

**Options** *interface-name*—Name of the interface associated with the port in which the transceiver is installed: *ge-fpc/pic/port*, *xe-fpc/pic/port*, or *et-fpc/pic/port*.

**Required Privilege Level** view

**Related Documentation**

- *Monitoring Interface Status and Traffic*
- [Monitoring Interface Status and Traffic on page 53](#)
- *Installing a Transceiver in a Switch*
- *Installing a Transceiver in a QFX Series Device*
- *Removing a Transceiver from a Switch*
- *Removing a Transceiver from a QFX Series Device*
- [Junos OS Ethernet Interfaces Configuration Guide](#)

**List of Sample Output** [show interfaces diagnostics optics ge-0/1/0 \(SFP Transceiver\) on page 235](#)  
[show interfaces diagnostics optics xe-0/1/0 \(SFP+ Transceiver\) on page 236](#)  
[show interfaces diagnostics optics xe-0/1/0 \(XFP Transceiver\) on page 237](#)  
[show interfaces diagnostics optics et-3/0/0 \(QSFP+ Transceiver\) on page 238](#)  
[show interfaces diagnostics optics et-4/1/0 \(CFP Transceiver\) on page 239](#)

**Output Fields** [Table 18 on page 229](#) lists the output fields for the **show interfaces diagnostics optics** command. Output fields are listed in the approximate order in which they appear.

Table 18: show interfaces diagnostics optics Output Fields

| Field Name                                                                                           | Field Description                                                                                                                                                  |
|------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Physical interface</b>                                                                            | Displays the name of the physical interface.                                                                                                                       |
| <b>Laser bias current</b>                                                                            | Displays the magnitude of the laser bias power setting current, in milliamperes. The laser bias provides direct modulation of laser diodes and modulates currents. |
| <b>Laser output power</b><br>(Not available for QSFP+ transceivers)                                  | Displays the laser output power, in milliwatts (mW) and decibels referred to 1.0 mW (dBm).                                                                         |
| <b>Laser temperature</b><br>(Not available for SFP, SFP+, XFP, and QSFP+ transceivers)               | Displays the laser temperature, in Celsius and Fahrenheit.                                                                                                         |
| <b>Module temperature</b>                                                                            | Displays the temperature, in Celsius and Fahrenheit.                                                                                                               |
| <b>Module voltage</b><br>(Not available for XFP transceivers)                                        | Displays the voltage, in Volts.                                                                                                                                    |
| <b>Laser rx power</b><br>(Not available for SFP, SFP+, QSFP+, and CFP transceivers)                  | Displays the laser received optical power, in milliwatts (mW) and decibels referred to 1.0 mW (dBm).                                                               |
| <b>Receiver signal average optical power</b><br>(Not available for XFP, QSFP+, and CFP transceivers) | Displays the receiver signal average optical power, in milliwatts (mW) and decibels referred to 1.0 mW (dBm).                                                      |
| <b>Laser bias current high alarm</b>                                                                 | Displays whether the laser bias power setting high alarm is <b>On</b> or <b>Off</b> .                                                                              |
| <b>Laser bias current low alarm</b>                                                                  | Displays whether the laser bias power setting low alarm is <b>On</b> or <b>Off</b> .                                                                               |
| <b>Laser bias current high warning</b>                                                               | Displays whether the laser bias power setting high warning is <b>On</b> or <b>Off</b> .                                                                            |
| <b>Laser bias current low warning</b>                                                                | Displays whether the laser bias power setting low warning is <b>On</b> or <b>Off</b> .                                                                             |
| <b>Laser output power high alarm</b><br>(Not available for QSFP+ transceivers)                       | Displays whether the laser output power high alarm is <b>On</b> or <b>Off</b> .                                                                                    |
| <b>Laser output power low alarm</b><br>(Not available for QSFP+ transceivers)                        | Displays whether the laser output power low alarm is <b>On</b> or <b>Off</b> .                                                                                     |
| <b>Laser output power high warning</b><br>(Not available for QSFP+ transceivers)                     | Displays whether the laser output power high warning is <b>On</b> or <b>Off</b> .                                                                                  |

Table 18: show interfaces diagnostics optics Output Fields (*continued*)

| Field Name                                                                                          | Field Description                                                                 |
|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| <b>Laser output power low warning</b><br>(Not available for QSFP+ transceivers)                     | Displays whether the laser output power low warning is <b>On</b> or <b>Off</b> .  |
| <b>Laser temperature high alarm</b><br>(Not available for SFP, SFP+, XFP, and QSFP+ transceivers)   | Displays whether the laser temperature high alarm is <b>On</b> or <b>Off</b> .    |
| <b>Laser temperature low alarm</b><br>(Not available for SFP, SFP+, XFP, and QSFP+ transceivers)    | Displays whether the laser temperature low alarm is <b>On</b> or <b>Off</b> .     |
| <b>Laser temperature high warning</b><br>(Not available for SFP, SFP+, XFP, and QSFP+ transceivers) | Displays whether the laser temperature high warning is <b>On</b> or <b>Off</b> .  |
| <b>Laser temperature low warning</b><br>(Not available for SFP, SFP+, XFP, and QSFP+ transceivers)  | Displays whether the laser temperature low warning is <b>On</b> or <b>Off</b> .   |
| <b>Module temperature high alarm</b><br>(Not available for QSFP+ transceivers)                      | Displays whether the module temperature high alarm is <b>On</b> or <b>Off</b> .   |
| <b>Module temperature low alarm</b><br>(Not available for QSFP+ transceivers)                       | Displays whether the module temperature low alarm is <b>On</b> or <b>Off</b> .    |
| <b>Module temperature high warning</b><br>(Not available for QSFP+ transceivers)                    | Displays whether the module temperature high warning is <b>On</b> or <b>Off</b> . |
| <b>Module temperature low warning</b><br>(Not available for QSFP+ transceivers)                     | Displays whether the module temperature low warning is <b>On</b> or <b>Off</b> .  |
| <b>Module voltage high alarm</b><br>(Not available for XFP and QSFP+ transceivers)                  | Displays whether the module voltage high alarm is <b>On</b> or <b>Off</b> .       |
| <b>Module voltage low alarm</b><br>(Not available for XFP and QSFP+ transceivers)                   | Displays whether the module voltage low alarm is <b>On</b> or <b>Off</b> .        |
| <b>Module voltage high warning</b><br>(Not available for XFP and QSFP+ transceivers)                | Displays whether the module voltage high warning is <b>On</b> or <b>Off</b> .     |
| <b>Module voltage low warning</b><br>(Not available for XFP and QSFP+ transceivers)                 | Displays whether the module voltage low warning is <b>On</b> or <b>Off</b> .      |



Table 18: show interfaces diagnostics optics Output Fields (*continued*)

| Field Name                                                                                                  | Field Description                                                                                                                            |
|-------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Laser rx power high alarm</b><br>(Not available for QSFP+ and CFP transceivers)                          | Displays whether the receive laser power high alarm is <b>On</b> or <b>Off</b> .                                                             |
| <b>Laser rx power low alarm</b><br>(Not available for QSFP+ and CFP transceivers)                           | Displays whether the receive laser power low alarm is <b>On</b> or <b>Off</b> .                                                              |
| <b>Laser rx power high warning</b><br>(Not available for QSFP+ and CFP transceivers)                        | Displays whether the receive laser power high warning is <b>On</b> or <b>Off</b> .                                                           |
| <b>Laser rx power low warning</b><br>(Not available for QSFP+ and CFP transceivers)                         | Displays whether the receive laser power low warning is <b>On</b> or <b>Off</b> .                                                            |
| <b>Laser bias current high alarm threshold</b><br>(Not available for QSFP+ transceivers)                    | Displays the vendor-specified threshold for the laser bias current high alarm.                                                               |
| <b>Module not ready alarm</b><br>(Not available for SFP, SFP+, and QSFP+ transceivers)                      | Displays whether the module not ready alarm is <b>On</b> or <b>Off</b> . When the output is <b>On</b> , the module has an operational fault. |
| <b>Module low power alarm</b><br>(Not available for SFP, SFP+, XFP, and QSFP+ transceivers)                 | Displays whether the module low power alarm is <b>On</b> or <b>Off</b> .                                                                     |
| <b>Module initialization incomplete alarm</b><br>(Not available for SFP, SFP+, XFP, and QSFP+ transceivers) | Displays whether the module initialization incomplete alarm is <b>On</b> or <b>Off</b> .                                                     |
| <b>Module fault alarm</b><br>(Not available for SFP, SFP+, XFP, and QSFP+ transceivers)                     | Displays whether the module fault alarm is <b>On</b> or <b>Off</b> .                                                                         |
| <b>PLD Flash initialization fault alarm</b><br>(Not available for SFP, SFP+, XFP, and QSFP+ transceivers)   | Displays whether the PLD Flash initialization fault alarm is <b>On</b> or <b>Off</b> .                                                       |
| <b>Power supply fault alarm</b><br>(Not available for SFP, SFP+, XFP, and QSFP+ transceivers)               | Displays whether the power supply fault alarm is <b>On</b> or <b>Off</b> .                                                                   |
| <b>Checksum fault alarm</b><br>(Not available for SFP, SFP+, XFP, and QSFP+ transceivers)                   | Displays whether the checksum fault alarm is <b>On</b> or <b>Off</b> .                                                                       |
| <b>Tx laser disabled alarm</b><br>(Not available for SFP, SFP+, XFP, and QSFP+ transceivers)                | Displays whether the Tx laser disabled alarm is <b>On</b> or <b>Off</b> .                                                                    |

Table 18: show interfaces diagnostics optics Output Fields (*continued*)

| Field Name                                                                                   | Field Description                                                                                                                                                                                |
|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module power down alarm</b><br>(Not available for SFP, SFP+, QSFP+, and CFP transceivers) | Displays whether the module power down alarm is <b>On</b> or <b>Off</b> . When the output is <b>On</b> , module is in a limited power mode, low for normal operation.                            |
| <b>Tx data not ready alarm</b><br>(Not available for SFP, SFP+, QSFP+, and CFP transceivers) | Any condition leading to invalid data on the transmit path. Displays whether the Tx data not ready alarm is <b>On</b> or <b>Off</b> .                                                            |
| <b>Tx not ready alarm</b><br>(Not available for SFP, SFP+, QSFP+, and CFP transceivers)      | Any condition leading to invalid data on the transmit path. Displays whether the Tx not ready alarm is <b>On</b> or <b>Off</b> .                                                                 |
| <b>Tx laser fault alarm</b><br>(Not available for SFP, SFP+, QSFP+, and CFP transceivers)    | Laser fault condition. Displays whether the Tx laser fault alarm is <b>On</b> or <b>Off</b> .                                                                                                    |
| <b>Tx CDR loss of lock alarm</b><br>(Not available for SFP, SFP+, and QSFP+ transceivers)    | Transmit clock and data recovery (CDR) loss of lock. Loss of lock on the transmit side of the CDR. Displays whether the Tx CDR loss of lock alarm is <b>On</b> or <b>Off</b> .                   |
| <b>Rx not ready alarm</b><br>(Not available for SFP, SFP+, QSFP+, and CFP transceivers)      | Any condition leading to invalid data on the receive path. Displays whether the Rx not ready alarm is <b>On</b> or <b>Off</b> .                                                                  |
| <b>Rx loss of signal alarm</b><br>(Not available for SFP and SFP+ transceivers)              | Receive loss of signal alarm. When the output is <b>On</b> , indicates insufficient optical input power to the module. Displays whether the Rx loss of signal alarm is <b>On</b> or <b>Off</b> . |
| <b>Rx CDR loss of lock alarm</b><br>(Not available for SFP, SFP+, and QSFP+ transceivers)    | Receive CDR loss of lock. Loss of lock on the receive side of the CDR. Displays whether the Rx CDR loss of lock alarm is <b>On</b> or <b>Off</b> .                                               |
| <b>Laser bias current low alarm threshold</b><br>(Not available for QSFP+ transceivers)      | Displays the vendor-specified threshold for the laser bias current low alarm.                                                                                                                    |
| <b>Laser bias current high warning threshold</b><br>(Not available for QSFP+ transceivers)   | Displays the vendor-specified threshold for the laser bias current high warning.                                                                                                                 |
| <b>Laser bias current low warning threshold</b><br>(Not available for QSFP+ transceivers)    | Displays the vendor-specified threshold for the laser bias current low warning.                                                                                                                  |
| <b>Laser output power high alarm threshold</b><br>(Not available for QSFP+ transceivers)     | Displays the vendor-specified threshold for the laser output power high alarm.                                                                                                                   |
| <b>Laser output power low alarm threshold</b><br>(Not available for QSFP+ transceivers)      | Displays the vendor-specified threshold for the laser output power low alarm.                                                                                                                    |

Table 18: show interfaces diagnostics optics Output Fields (*continued*)

| Field Name                                                                                     | Field Description                                                                |
|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| <b>Laser output power high warning threshold</b><br>(Not available for QSFP+ transceivers)     | Displays the vendor-specified threshold for the laser output power high warning. |
| <b>Laser output power low warning threshold</b><br>(Not available for QSFP+ transceivers)      | Displays the vendor-specified threshold for the laser output power low warning.  |
| <b>Module temperature high alarm threshold</b><br>(Not available for QSFP+ transceivers)       | Displays the vendor-specified threshold for the module temperature high alarm.   |
| <b>Module temperature low alarm threshold</b><br>(Not available for QSFP+ transceivers)        | Displays the vendor-specified threshold for the module temperature low alarm.    |
| <b>Module temperature high warning threshold</b><br>(Not available for QSFP+ transceivers)     | Displays the vendor-specified threshold for the module temperature high warning. |
| <b>Module temperature low warning threshold</b><br>(Not available for QSFP+ transceivers)      | Displays the vendor-specified threshold for the module temperature low warning.  |
| <b>Module voltage high alarm threshold</b><br>(Not available for XFP and QSFP+ transceivers)   | Displays the vendor-specified threshold for the module voltage high alarm.       |
| <b>Module voltage low alarm threshold</b><br>(Not available for XFP and QSFP+ transceivers)    | Displays the vendor-specified threshold for the module voltage low alarm.        |
| <b>Module voltage high warning threshold</b><br>(Not available for XFP and QSFP+ transceivers) | Displays the vendor-specified threshold for the module voltage high warning.     |
| <b>Module voltage low warning threshold</b><br>(Not available for XFP and QSFP+ transceivers)  | Displays the vendor-specified threshold for the module voltage low warning.      |
| <b>Laser rx power high alarm threshold</b><br>(Not available for QSFP+ transceivers)           | Displays the vendor-specified threshold for the laser rx power high alarm.       |
| <b>Laser rx power low alarm threshold</b><br>(Not available for QSFP+ transceivers)            | Displays the vendor-specified threshold for the laser rx power low alarm.        |
| <b>Laser rx power high warning threshold</b><br>(Not available for QSFP+ transceivers)         | Displays the vendor-specified threshold for the laser rx power high warning.     |

Table 18: show interfaces diagnostics optics Output Fields (*continued*)

| Field Name                                                                                                    | Field Description                                                                                          |
|---------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| <b>Laser rx power low warning threshold</b><br>(Not available for QSFP+ transceivers)                         | Displays the vendor-specified threshold for the laser rx power low warning.                                |
| <b>Laser temperature high alarm threshold</b><br>(Not available for SFP, SFP+, XFP, and QSFP+ transceivers)   | Displays the vendor-specified threshold for the laser temperature high alarm, in Celsius and Fahrenheit.   |
| <b>Laser temperature low alarm threshold</b><br>(Not available for SFP, SFP+, XFP, and QSFP+ transceivers)    | Displays the vendor-specified threshold for the laser temperature low alarm, in Celsius and Fahrenheit.    |
| <b>Laser temperature high warning threshold</b><br>(Not available for SFP, SFP+, XFP, and QSFP+ transceivers) | Displays the vendor-specified threshold for the laser temperature high warning, in Celsius and Fahrenheit. |
| <b>Laser temperature low warning threshold</b><br>(Not available for SFP, SFP+, XFP, and QSFP+ transceivers)  | Displays the vendor-specified threshold for the laser temperature low warning, in Celsius and Fahrenheit.  |
| <b>SOA bias current high alarm threshold</b><br>(Not available for SFP, SFP+, XFP, and QSFP+ transceivers)    | Displays the vendor-specified threshold for SOA bias current high alarm.                                   |
| <b>SOA bias current low alarm threshold</b><br>(Not available for SFP, SFP+, XFP, and QSFP+ transceivers)     | Displays the vendor-specified threshold for SOA bias current low alarm.                                    |
| <b>SOA bias current high warning threshold</b><br>(Not available for SFP, SFP+, XFP, and QSFP+ transceivers)  | Displays the vendor-specified threshold for SOA bias current high warning.                                 |
| <b>SOA bias current low warning threshold</b><br>(Not available for SFP, SFP+, XFP, and QSFP+ transceivers)   | Displays the vendor-specified threshold for SOA bias current low warning.                                  |
| <b>Laser receiver power high alarm</b><br>(Not available for SFP, SFP+, and XFP transceivers)                 | Displays whether the laser receiver power high alarm is <b>On</b> or <b>Off</b> .                          |
| <b>Laser receiver power low alarm</b><br>(Not available for SFP, SFP+, and XFP transceivers)                  | Displays whether the laser receiver power low alarm is <b>On</b> or <b>Off</b> .                           |
| <b>Laser receiver power high warning</b><br>(Not available for SFP, SFP+, and XFP transceivers)               | Displays whether the laser receiver power high warning is <b>On</b> or <b>Off</b> .                        |
| <b>Laser receiver power low warning</b><br>(Not available for SFP, SFP+, and XFP transceivers)                | Displays whether the laser receiver power low warning is <b>On</b> or <b>Off</b> .                         |

Table 18: show interfaces diagnostics optics Output Fields (*continued*)

| Field Name                                                                                          | Field Description                                                                            |
|-----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| <b>Laser receiver power</b><br>(Not available for SFP, SFP+, and XFP transceivers)                  | Displays the laser receiver power, in milliwatts (mW) and decibels referred to 1.0 mW (dBm). |
| <b>Tx loss of signal functionality alarm</b><br>(Not available for SFP, SFP+, and XFP transceivers) | Displays whether the Tx loss of signal functionality alarm is <b>On</b> or <b>Off</b> .      |
| <b>APD supply fault alarm</b><br>(Not available for SFP, SFP+, XFP, and QSFP+ transceivers)         | Displays whether the APD supply fault alarm is <b>On</b> or <b>Off</b> .                     |
| <b>TEC fault alarm</b><br>(Not available for SFP, SFP+, XFP, and QSFP+ transceivers)                | Displays whether the TEC fault alarm is <b>On</b> or <b>Off</b> .                            |
| <b>Wavelength unlocked alarm</b><br>(Not available for SFP, SFP+, XFP, and QSFP+ transceivers)      | Displays whether the Wavelength unlocked alarm is <b>On</b> or <b>Off</b> .                  |

## Sample Output

### show interfaces diagnostics optics ge-0/1/0 (SFP Transceiver)

```

user@switch> show interfaces diagnostics optics ge-0/1/0
Physical interface: ge-0/1/0
 Laser bias current : 5.444 mA
 Laser output power : 0.3130 mW / -5.04 dBm
 Module temperature : 36 degrees C / 97 degrees F
 Module voltage : 3.2120 V
 Receiver signal average optical power : 0.3840 mW / -4.16 dBm
 Laser bias current high alarm : Off
 Laser bias current low alarm : Off
 Laser bias current high warning : Off
 Laser bias current low warning : Off
 Laser output power high alarm : Off
 Laser output power low alarm : Off
 Laser output power high warning : Off
 Laser output power low warning : Off
 Module temperature high alarm : Off
 Module temperature low alarm : Off
 Module temperature high warning : Off
 Module temperature low warning : Off
 Module voltage high alarm : Off
 Module voltage low alarm : Off
 Module voltage high warning : Off
 Module voltage low warning : Off
 Laser rx power high alarm : Off
 Laser rx power low alarm : Off
 Laser rx power high warning : Off
 Laser rx power low warning : Off
 Laser bias current high alarm threshold : 15.000 mA
 Laser bias current low alarm threshold : 1.000 mA
 Laser bias current high warning threshold : 12.000 mA

```

```

Laser bias current low warning threshold : 2.000 mA
Laser output power high alarm threshold : 0.6300 mW / -2.01 dBm
Laser output power low alarm threshold : 0.0660 mW / -11.80 dBm
Laser output power high warning threshold : 0.6300 mW / -2.01 dBm
Laser output power low warning threshold : 0.0780 mW / -11.08 dBm
Module temperature high alarm threshold : 109 degrees C / 228 degrees F
Module temperature low alarm threshold : -29 degrees C / -20 degrees F
Module temperature high warning threshold : 103 degrees C / 217 degrees F
Module temperature low warning threshold : -13 degrees C / 9 degrees F
Module voltage high alarm threshold : 3.900 V
Module voltage low alarm threshold : 2.700 V
Module voltage high warning threshold : 3.700 V
Module voltage low warning threshold : 2.900 V
Laser rx power high alarm threshold : 1.2589 mW / 1.00 dBm
Laser rx power low alarm threshold : 0.0100 mW / -20.00 dBm
Laser rx power high warning threshold : 0.7939 mW / -1.00 dBm
Laser rx power low warning threshold : 0.0157 mW / -18.04 dBm

```

## Sample Output

### show interfaces diagnostics optics xe-0/1/0 (SFP+ Transceiver)

```

user@switch> show interfaces diagnostics optics xe-0/1/0
Physical interface: xe-0/1/0
Laser bias current : 4.968 mA
Laser output power : 0.4940 mW / -3.06 dBm
Module temperature : 27 degrees C / 81 degrees F
Module voltage : 3.2310 V
Receiver signal average optical power : 0.0000
Laser bias current high alarm : Off
Laser bias current low alarm : Off
Laser bias current high warning : Off
Laser bias current low warning : Off
Laser output power high alarm : Off
Laser output power low alarm : Off
Laser output power high warning : Off
Laser output power low warning : Off
Module temperature high alarm : Off
Module temperature low alarm : Off
Module temperature high warning : Off
Module temperature low warning : Off
Module voltage high alarm : Off
Module voltage low alarm : Off
Module voltage high warning : Off
Module voltage low warning : Off
Laser rx power high alarm : Off
Laser rx power low alarm : On
Laser rx power high warning : Off
Laser rx power low warning : On
Laser bias current high alarm threshold : 10.500 mA
Laser bias current low alarm threshold : 2.000 mA
Laser bias current high warning threshold : 9.000 mA
Laser bias current low warning threshold : 2.500 mA
Laser output power high alarm threshold : 1.4120 mW / 1.50 dBm
Laser output power low alarm threshold : 0.0740 mW / -11.31 dBm
Laser output power high warning threshold : 0.7070 mW / -1.51 dBm
Laser output power low warning threshold : 0.1860 mW / -7.30 dBm
Module temperature high alarm threshold : 75 degrees C / 167 degrees F
Module temperature low alarm threshold : -5 degrees C / 23 degrees F
Module temperature high warning threshold : 70 degrees C / 158 degrees F
Module temperature low warning threshold : 0 degrees C / 32 degrees F

```

```

Module voltage high alarm threshold : 3.630 V
Module voltage low alarm threshold : 2.970 V
Module voltage high warning threshold : 3.465 V
Module voltage low warning threshold : 3.135 V
Laser rx power high alarm threshold : 1.5849 mW / 2.00 dBm
Laser rx power low alarm threshold : 0.0407 mW / -13.90 dBm
Laser rx power high warning threshold : 0.7943 mW / -1.00 dBm
Laser rx power low warning threshold : 0.1023 mW / -9.90 dBm

```

## Sample Output

### show interfaces diagnostics optics xe-0/1/0 (XFP Transceiver)

```

user@switch> show interfaces diagnostics optics xe-0/1/0
Physical interface: xe-0/1/0
Laser bias current : 8.029 mA
Laser output power : 0.6430 mW / -1.92 dBm
Module temperature : 4 degrees C / 39 degrees F
Laser rx power : 0.0012 mW / -29.21 dBm
Laser bias current high alarm : Off
Laser bias current low alarm : Off
Laser bias current high warning : Off
Laser bias current low warning : Off
Laser output power high alarm : Off
Laser output power low alarm : Off
Laser output power high warning : Off
Laser output power low warning : Off
Module temperature high alarm : Off
Module temperature low alarm : Off
Module temperature high warning : Off
Module temperature low warning : Off
Laser rx power high alarm : Off
Laser rx power low alarm : On
Laser rx power high warning : Off
Laser rx power low warning : On
Module not ready alarm : On
Module power down alarm : Off
Tx data not ready alarm : Off
Tx not ready alarm : Off
Tx laser fault alarm : Off
Tx CDR loss of lock alarm : Off
Rx not ready alarm : On
Rx loss of signal alarm : On
Rx CDR loss of lock alarm : On
Laser bias current high alarm threshold : 13.000 mA
Laser bias current low alarm threshold : 2.000 mA
Laser bias current high warning threshold : 12.000 mA
Laser bias current low warning threshold : 3.000 mA
Laser output power high alarm threshold : 0.8310 mW / -0.80 dBm
Laser output power low alarm threshold : 0.1650 mW / -7.83 dBm
Laser output power high warning threshold : 0.7410 mW / -1.30 dBm
Laser output power low warning threshold : 0.1860 mW / -7.30 dBm
Module temperature high alarm threshold : 90 degrees C / 194 degrees F
Module temperature low alarm threshold : 0 degrees C / 32 degrees F
Module temperature high warning threshold : 85 degrees C / 185 degrees F
Module temperature low warning threshold : 0 degrees C / 32 degrees F
Laser rx power high alarm threshold : 0.8912 mW / -0.50 dBm
Laser rx power low alarm threshold : 0.0912 mW / -10.40 dBm
Laser rx power high warning threshold : 0.7943 mW / -1.00 dBm
Laser rx power low warning threshold : 0.1023 mW / -9.90 dBm

```

## Sample Output

### show interfaces diagnostics optics et-3/0/0 (QSFP+ Transceiver)

```

user@switch> show interfaces diagnostics optics et-3/0/0
Physical interface: et-3/0/0
 Module temperature : 33 degrees C / 92 degrees F
 Module voltage : 3.3060 V
Lane 0
 Laser bias current : 7.182 mA
 Laser receiver power : 0.743 mW / -1.29 dBm
 Laser bias current high alarm : Off
 Laser bias current low alarm : Off
 Laser bias current high warning : Off
 Laser bias current low warning : Off
 Laser receiver power high alarm : Off
 Laser receiver power low alarm : Off
 Laser receiver power high warning : Off
 Laser receiver power low warning : Off
 Tx loss of signal functionality alarm : Off
 Rx loss of signal alarm : Off
Lane 1
 Laser bias current : 7.326 mA
 Laser receiver power : 0.752 mW / -1.24 dBm
 Laser bias current high alarm : Off
 Laser bias current low alarm : Off
 Laser bias current high warning : Off
 Laser bias current low warning : Off
 Laser receiver power high alarm : Off
 Laser receiver power low alarm : Off
 Laser receiver power high warning : Off
 Laser receiver power low warning : Off
 Tx loss of signal functionality alarm : Off
 Rx loss of signal alarm : Off
Lane 2
 Laser bias current : 7.447 mA
 Laser receiver power : 0.790 mW / -1.03 dBm
 Laser bias current high alarm : Off
 Laser bias current low alarm : Off
 Laser bias current high warning : Off
 Laser bias current low warning : Off
 Laser receiver power high alarm : Off
 Laser receiver power low alarm : Off
 Laser receiver power high warning : Off
 Laser receiver power low warning : Off
 Tx loss of signal functionality alarm : Off
 Rx loss of signal alarm : Off
Lane 3
 Laser bias current : 7.734 mA
 Laser receiver power : 0.768 mW / -1.15 dBm
 Laser bias current high alarm : Off
 Laser bias current low alarm : Off
 Laser bias current high warning : Off
 Laser bias current low warning : Off
 Laser receiver power high alarm : Off
 Laser receiver power low alarm : Off
 Laser receiver power high warning : Off
 Laser receiver power low warning : Off
 Tx loss of signal functionality alarm : Off
 Rx loss of signal alarm : Off

```



## Sample Output

### show interfaces diagnostics optics et-4/1/0 (CFP Transceiver)

```

user@switch> show interfaces diagnostics optics et-4/1/0
Physical interface: et-4/1/0
 Module temperature : 38 degrees C / 101 degrees F
 Module voltage : 3.2500 V
 Module temperature high alarm : Off
 Module temperature low alarm : Off
 Module temperature high warning : Off
 Module temperature low warning : Off
 Module voltage high alarm : Off
 Module voltage low alarm : Off
 Module voltage high warning : Off
 Module voltage low warning : Off
 Module not ready alarm : Off
 Module low power alarm : Off
 Module initialization incomplete alarm : Off
 Module fault alarm : Off
 PLD Flash initialization fault alarm : Off
 Power supply fault alarm : Off
 Checksum fault alarm : Off
 Tx laser disabled alarm : Off
 Tx loss of signal functionality alarm : Off
 Tx CDR loss of lock alarm : Off
 Rx loss of signal alarm : Off
 Rx CDR loss of lock alarm : Off
 Module temperature high alarm threshold : 75 degrees C / 167 degrees F
 Module temperature low alarm threshold : -5 degrees C / 23 degrees F
 Module temperature high warning threshold : 70 degrees C / 158 degrees F
 Module temperature low warning threshold : 0 degrees C / 32 degrees F
 Module voltage high alarm threshold : 3.5000 V
 Module voltage low alarm threshold : 3.0990 V
 Module voltage high warning threshold : 3.4000 V
 Module voltage low warning threshold : 3.2000 V
 Laser bias current high alarm threshold : 250.000 mA
 Laser bias current low alarm threshold : 37.500 mA
 Laser bias current high warning threshold : 225.000 mA
 Laser bias current low warning threshold : 50.000 mA
 Laser output power high alarm threshold : 3.9800 mW / 6.00 dBm
 Laser output power low alarm threshold : 0.4670 mW / -3.31 dBm
 Laser output power high warning threshold : 3.5480 mW / 5.50 dBm
 Laser output power low warning threshold : 0.5240 mW / -2.81 dBm
 Laser rx power high alarm threshold : 3.5481 mW / 5.50 dBm
 Laser rx power low alarm threshold : 0.0616 mW / -12.10 dBm
 Laser rx power high warning threshold : 3.1622 mW / 5.00 dBm
 Laser rx power low warning threshold : 0.0691 mW / -11.61 dBm
 Laser temperature high alarm threshold : 67 degrees C / 153 degrees F
 Laser temperature low alarm threshold : 35 degrees C / 95 degrees F
 Laser temperature high warning threshold : 62 degrees C / 144 degrees F
 Laser temperature low warning threshold : 40 degrees C / 104 degrees F
 SOA bias current high alarm threshold : 0.000 mA
 SOA bias current low alarm threshold : 0.000 mA
 SOA bias current high warning threshold : 0.000 mA
 SOA bias current low warning threshold : 0.000 mA
Lane 0
 Laser bias current : 131.684 mA
 Laser output power : 1.002 mW / 0.01 dBm
 Laser temperature : 54 degrees C / 128 degrees F
 Laser receiver power : 0.497 mW / -3.03 dBm

```

```

Laser bias current high alarm : Off
Laser bias current low alarm : Off
Laser bias current high warning : Off
Laser bias current low warning : Off
Laser output power high alarm : Off
Laser output power low alarm : Off
Laser output power high warning : Off
Laser output power low warning : Off
Laser temperature high alarm : Off
Laser temperature low alarm : Off
Laser temperature high warning : Off
Laser temperature low warning : Off
Laser receiver power high alarm : Off
Laser receiver power low alarm : Off
Laser receiver power high warning : Off
Laser receiver power low warning : Off
Tx loss of signal functionality alarm : Off
Rx CDR loss of lock alarm : Off
Rx loss of signal alarm : Off
Rx CDR loss of lock alarm : Off
APD supply fault alarm : Off
TEC fault alarm : Off
Wavelength unlocked alarm : Off

Lane 1
Laser bias current : 122.345 mA
Laser output power : 1.002 mW / 0.01 dBm
Laser temperature : 51 degrees C / 124 degrees F
Laser receiver power : 0.611 mW / -2.14 dBm
Laser bias current high alarm : Off
Laser bias current low alarm : Off
Laser bias current high warning : Off
Laser bias current low warning : Off
Laser output power high alarm : Off
Laser output power low alarm : Off
Laser output power high warning : Off
Laser output power low warning : Off
Laser temperature high alarm : Off
Laser temperature low alarm : Off
Laser temperature high warning : Off
Laser temperature low warning : Off
Laser receiver power high alarm : Off
Laser receiver power low alarm : Off
Laser receiver power high warning : Off
Laser receiver power low warning : Off
Tx loss of signal functionality alarm : Off
Tx CDR loss of lock alarm : Off
Rx loss of signal alarm : Off
Rx CDR loss of lock alarm : Off
APD supply fault alarm : Off
TEC fault alarm : Off
Wavelength unlocked alarm : Off

Lane 2
Laser bias current : 112.819 mA
Laser output power : 1.000 mW / 0.00 dBm
Laser temperature : 50 degrees C / 122 degrees F
Laser receiver power : 0.540 mW / -2.67 dBm
Laser bias current high alarm : Off
Laser bias current low alarm : Off
Laser bias current high warning : Off
Laser bias current low warning : Off
Laser output power high alarm : Off

```

```

Laser output power low alarm : Off
Laser output power high warning : Off
Laser output power low warning : Off
Laser temperature high alarm : Off
Laser temperature low alarm : Off
Laser temperature high warning : Off
Laser temperature low warning : Off
Laser receiver power high alarm : Off
Laser receiver power low alarm : Off
Laser receiver power high warning : Off
Laser receiver power low warning : Off
Tx loss of signal functionality alarm : Off
Tx CDR loss of lock alarm : Off
Rx loss of signal alarm : Off
Rx CDR loss of lock alarm : Off
APD supply fault alarm : Off
TEC fault alarm : Off
Wavelength unlocked alarm : Off

Lane 3
Laser bias current : 100.735 mA
Laser output power : 1.002 mW / 0.01 dBm
Laser temperature : 50 degrees C / 122 degrees F
Laser receiver power : 0.637 mW / -1.96 dBm
Laser bias current high alarm : Off
Laser bias current low alarm : Off
Laser bias current high warning : Off
Laser bias current low warning : Off
Laser output power high alarm : Off
Laser output power low alarm : Off
Laser output power high warning : Off
Laser output power low warning : Off
Laser temperature high alarm : Off
Laser temperature low alarm : Off
Laser temperature high warning : Off
Laser temperature low warning : Off
Laser receiver power high alarm : Off
Laser receiver power low alarm : Off
Laser receiver power high warning : Off
Laser receiver power low warning : Off
Tx loss of signal functionality alarm : Off
Tx CDR loss of lock alarm : Off
Rx loss of signal alarm : Off
Rx CDR loss of lock alarm : Off
APD supply fault alarm : Off
TEC fault alarm : Off
Wavelength unlocked alarm : Off

```

## show interfaces ge

---

**Supported Platforms** [EX4600, OCX1100, QFabric System, QFX Series standalone switches](#)

**Syntax** `show interfaces device-name:type-fpc/pic/port`  
<brief | detail | extensive | terse>  
<descriptions>  
<media>  
<routing-instance (all | *instance-name*)>  
<snmp-index *snmp-index*>  
<statistics>

**Release Information** 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.

**Description** Display status information about the specified Gigabit Ethernet interface. This command does not display statistics for routed VLAN interfaces.

**Options** **brief | detail | extensive | terse**—(Optional) Display the specified level of output.

***device-name:type-fpc/pic/port***—The device name is either the serial number or the alias of the QFabric system component, such as a Node device, Interconnect device, or QFabric infrastructure. The name can contain a maximum of 128 characters and cannot contain any colons.

**descriptions**—(Optional) Display interface description strings.

**media**—(Optional) Display media-specific information about network interfaces.

**routing instance (all | *instance-name*)**—(Optional) Display the name of an individual routing-instance or display all routing-instances.

**snmp-index *snmp-index***—(Optional) Display information for the specified SNMP index of the interface.

**statistics**—(Optional) Display static interface statistics.

**Required Privilege Level** view

**Related Documentation**

- [Monitoring Interface Status and Traffic on page 53](#)
- [Troubleshooting Network Interfaces on page 54](#)
- [Troubleshooting an Aggregated Ethernet Interface on page 75](#)
- [Junos OS Network Interfaces Library for Routing Devices](#)

**List of Sample Output** [show interfaces on page 250](#)  
[show interfaces brief on page 250](#)  
[show interfaces detail \(Symmetric Flow Control and Autonegotiation Enabled\) on page 250](#)

[show interfaces detail \(Asymmetric Flow Control and Autonegotiation Enabled\) on page 251](#)  
[show interfaces extensive \(Symmetric Flow Control and Autonegotiation Enabled\) on page 252](#)  
[show interfaces extensive \(Asymmetric Flow Control and Autonegotiation Enabled\) on page 254](#)  
[show interfaces terse on page 256](#)  
[show interfaces terse \(QFabric Systems\) on page 256](#)

**Output Fields** [Table 19 on page 243](#) lists the output fields for the **show interfaces ge** command. Output fields are listed in the approximate order in which they appear.

**Table 19: show interfaces ge Output Fields**

| Field Name                | Field Description                                                                                                                                       | Level of Output               |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| <b>Physical Interface</b> |                                                                                                                                                         |                               |
| <b>Physical interface</b> | Name of the physical interface.                                                                                                                         | All levels                    |
| <b>Enabled</b>            | State of the interface: <b>Enabled</b> or <b>Disabled</b> .                                                                                             | All levels                    |
| <b>Interface index</b>    | Index number of the physical interface, which reflects its initialization sequence.                                                                     | <b>detail extensive none</b>  |
| <b>SNMP ifIndex</b>       | SNMP index number for the physical interface.                                                                                                           | <b>detail extensive none</b>  |
| <b>Generation</b>         | Unique number for use by Juniper Networks technical support only.                                                                                       | <b>detail extensive</b>       |
| <b>Description</b>        | Optional user-specified description.                                                                                                                    | <b>brief detail extensive</b> |
| <b>Link-level type</b>    | Encapsulation being used on the physical interface.                                                                                                     | All levels                    |
| <b>MTU</b>                | Maximum transmission unit size on the physical interface. The default is 1514.                                                                          | All levels                    |
| <b>Speed</b>              | Speed at which the interface is running.                                                                                                                | All levels                    |
| <b>Loopback</b>           | Loopback status: <b>Enabled</b> or <b>Disabled</b> . If loopback is enabled, type of loopback: <b>Local</b> or <b>Remote</b> .                          | All levels                    |
| <b>Source filtering</b>   | Source filtering status: <b>Enabled</b> or <b>Disabled</b> .                                                                                            | All levels                    |
| <b>Flow control</b>       | Flow control status: <b>Enabled</b> or <b>Disabled</b> .<br><br><b>NOTE:</b> This field is only displayed if asymmetric flow control is not configured. | <b>detail extensive</b>       |

Table 19: show interfaces ge Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Level of Output       |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| <b>Configured-flow-control</b> | <p>Configured flow control for the interface transmit buffers (<b>tx-buffers</b>) and receive buffers (<b>rx-buffers</b>):</p> <ul style="list-style-type: none"> <li><b>tx-buffers</b>—<b>On</b> if the interface is configured to respond to Ethernet PAUSE messages received from the connected peer.<br/><b>Off</b> if the interface is not configured to respond to received PAUSE messages.</li> <li><b>rx-buffers</b>—<b>On</b> if the interface is configured to generate and send Ethernet PAUSE messages to the connected peer.<br/><b>Off</b> if the interface is not configured to generate and send PAUSE messages.</li> </ul> <p><b>NOTE:</b> This field is only displayed if asymmetric flow control is configured.</p> | detail extensive      |
| <b>Auto-negotiation</b>        | Autonegotiation status: <b>Enabled</b> or <b>Disabled</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | All levels            |
| <b>Remote-fault</b>            | <p>Remote fault status:</p> <ul style="list-style-type: none"> <li><b>Online</b>—Autonegotiation is manually configured as online.</li> <li><b>Offline</b>—Autonegotiation is manually configured as offline.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | All levels            |
| <b>Device flags</b>            | Information about the physical device.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | All levels            |
| <b>Interface flags</b>         | Information about the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | All levels            |
| <b>Link flags</b>              | Information about the link.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | All levels            |
| <b>CoS queues</b>              | Number of CoS queues configured.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | detail extensive none |
| <b>Hold-times</b>              | Current interface hold-time up and hold-time down, in milliseconds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | detail extensive      |
| <b>Current address</b>         | Configured MAC address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | detail extensive none |
| <b>Hardware address</b>        | MAC address of the hardware.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | detail extensive 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> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | detail extensive none |
| <b>Statistics last cleared</b> | Time when the statistics for the interface were last set to zero.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | detail extensive      |
| <b>Traffic statistics</b>      | <p>Number and rate of bytes and packets received and transmitted on the physical interface.</p> <ul style="list-style-type: none"> <li><b>Input bytes</b>—Number of bytes received on the interface.</li> <li><b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li><b>Input packets</b>—Number of packets received on the interface</li> <li><b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul> <p><b>NOTE:</b> The bandwidth bps counter is not enabled on the switch.</p>                                                                                                                                                                                                        | detail extensive      |

Table 19: show interfaces ge Output Fields (*continued*)

| Field Name          | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Level of Output  |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <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>Policed discards</b>—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that Junos OS does not handle.</li> <li>• <b>L3 incompletes</b>—Number of incoming packets discarded because they failed Layer 3 sanity checks of the headers. For example, a frame with less than 20 bytes of available IP header is discarded.</li> <li>• <b>L2 channel errors</b>—Number of times the software did not find a valid logical interface for an incoming frame.</li> <li>• <b>L2 mismatch timeouts</b>—Number of malformed or short packets that caused the incoming packet handler to discard the frame as unreadable.</li> <li>• <b>FIFO errors</b>—Number of FIFO errors in the receive direction that are reported by the ASIC on the PIC. If this value is ever nonzero, the PIC is probably malfunctioning.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul> | <b>extensive</b> |

Table 19: show interfaces ge 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>Collisions</b>—Number of Ethernet collisions. The Gigabit Ethernet PIC supports only full-duplex operation, so for Gigabit Ethernet PICs, this number should always remain 0. If it is nonzero, there is a software bug.</li> <li>• <b>Aged packets</b>—Number of packets that remained in shared packet SDRAM so long that the system automatically purged them. The value in this field should never increment. If it does, it is most likely a software bug or possibly malfunctioning hardware.</li> <li>• <b>FIFO errors</b>—Number of FIFO errors in the send direction as reported by the ASIC on the PIC. If this value is ever nonzero, the PIC is probably malfunctioning.</li> <li>• <b>HS link CRC errors</b>—Number of errors on the high-speed links between the ASICs responsible for handling the switch interfaces.</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 (Egress )</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 front of the switch. 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 19: show interfaces ge Output Fields (*continued*)

| Field Name               | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Level of Output  |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>MAC statistics</b>    | <p>Receive and Transmit statistics reported by the PIC's MAC subsystem.</p> <ul style="list-style-type: none"> <li>• <b>Total octets</b> and <b>total packets</b>—Total number of octets and packets. For Gigabit Ethernet IQ PICs, the received octets count varies by interface type.</li> <li>• <b>Unicast packets, Broadcast packets, and 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> | Receive and Transmit statistics reported by the PIC's MAC address filter subsystem.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>extensive</b> |

Table 19: show interfaces ge Output Fields (*continued*)

| Field Name                                    | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Level of Output              |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Autonegotiation information</b>            | <p>Information about link autonegotiation:</p> <ul style="list-style-type: none"> <li>• <b>Negotiation status:</b> <ul style="list-style-type: none"> <li>• <b>Incomplete</b>—Ethernet interface has the speed or link mode configured.</li> <li>• <b>No autonegotiation</b>—Remote Ethernet interface has the speed or link mode configured or does not perform autonegotiation.</li> <li>• <b>Complete</b>—Ethernet interface is connected to a device that performs autonegotiation and the autonegotiation process is successful.</li> </ul> </li> <li>• <b>Link partner status</b>—OK when the Ethernet interface is connected to a device that performs autonegotiation and the autonegotiation process is successful.</li> <li>• <b>Link partner:</b> <ul style="list-style-type: none"> <li>• <b>Link mode</b>—Depending on the capability of the attached Ethernet device, either <b>Full-duplex</b> or <b>Half-duplex</b>.</li> <li>• <b>Flow control</b>—Types of flow control supported by the remote Ethernet device. For Gigabit Ethernet interfaces, types are <b>Symmetric</b> (link partner supports PAUSE on receive and transmit), <b>Asymmetric</b> (link partner supports PAUSE on transmit), and <b>Symmetric/Asymmetric</b> (link partner supports PAUSE on both receive and transmit or PAUSE only on receive).</li> <li>• <b>Remote fault</b>—Remote fault information from the link partner—<b>Failure</b> indicates a receive link error. <b>OK</b> indicates that the link partner is receiving. <b>Negotiation error</b> indicates a negotiation error. <b>Offline</b> indicates that the link partner is going offline.</li> <li>• <b>Link partner speed</b>—Speed of the link partner.</li> </ul> </li> <li>• <b>Local resolution:</b> <ul style="list-style-type: none"> <li>• <b>Flow control</b>—Types of flow control supported by the remote Ethernet device. For Gigabit Ethernet interfaces, types are <b>Symmetric</b> (link partner supports PAUSE on receive and transmit), <b>Asymmetric</b> (link partner supports PAUSE on transmit), and <b>Symmetric/Asymmetric</b> (link partner supports PAUSE on both receive and transmit or PAUSE only on receive). For asymmetric PAUSE, shows if the PAUSE transmit and PAUSE receive states on the interface are <b>enable</b> or <b>disable</b>.</li> <li>• <b>Remote fault</b>—Remote fault information. <b>Link OK</b> (no error detected on receive), <b>Offline</b> (local interface is offline), and <b>Link Failure</b> (link error detected on receive).</li> </ul> </li> </ul> | <b>extensive</b>             |
| <b>Packet Forwarding Engine configuration</b> | <p>Information about the configuration of the Packet Forwarding Engine:</p> <ul style="list-style-type: none"> <li>• <b>Destination slot</b>—FPC slot number.</li> </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                   |

Table 19: show interfaces ge Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                     | Level of Output              |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Encapsulation</b>           | Encapsulation on the logical interface.                                                                                                                                                                                                                                                                                                                                                                               | All levels                   |
| <b>Protocol</b>                | Protocol family.                                                                                                                                                                                                                                                                                                                                                                                                      | <b>detail extensive none</b> |
| <b>Traffic statistics</b>      | Number and rate of bytes and packets received (input) and transmitted (output) on the specified interface.                                                                                                                                                                                                                                                                                                            | <b>detail extensive</b>      |
| <b>IPv6 transit statistics</b> | If IPv6 statistics tracking is enabled, number of IPv6 bytes and packets received and transmitted on the logical interface.                                                                                                                                                                                                                                                                                           | <b>extensive</b>             |
| <b>Local statistics</b>        | Number and rate of bytes and packets destined to and from the switch.                                                                                                                                                                                                                                                                                                                                                 | <b>extensive</b>             |
| <b>Transit statistics</b>      | Number and rate of bytes and packets transiting the switch.                                                                                                                                                                                                                                                                                                                                                           | <b>extensive</b>             |
| <b>Generation</b>              | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                     | <b>detail extensive</b>      |
| <b>Route Table</b>             | Route table in which the logical interface address is located. For example, <b>0</b> refers to the routing table <b>inet.0</b> .                                                                                                                                                                                                                                                                                      | <b>detail extensive none</b> |
| <b>Input Filters</b>           | Names of any input filters applied to this interface.                                                                                                                                                                                                                                                                                                                                                                 | <b>detail extensive</b>      |
| <b>Output Filters</b>          | Names of any output filters applied to this interface.                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive</b>      |
| <b>Flags</b>                   | Information about protocol family flags.<br><br>If unicast reverse-path forwarding (RPF) is explicitly configured on the specified interface, the uRPF flag is displayed. If unicast RPF was configured on a different interface (and therefore is enabled on all switch interfaces) but was not explicitly configured on the specified interface, the uRPF flag is not displayed even though unicast RPF is enabled. | <b>detail extensive</b>      |
| <b><i>protocol-family</i></b>  | Protocol family configured on the logical interface. If the protocol is <b>inet</b> , the IP address of the interface is also displayed.                                                                                                                                                                                                                                                                              | <b>brief</b>                 |
| <b>Flags</b>                   | Information about the address flags.                                                                                                                                                                                                                                                                                                                                                                                  | <b>detail extensive none</b> |
| <b>Destination</b>             | IP address of the remote side of the connection.                                                                                                                                                                                                                                                                                                                                                                      | <b>detail extensive none</b> |
| <b>Local</b>                   | IP address of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                  | <b>detail extensive none</b> |
| <b>Broadcast</b>               | Broadcast address of the logical interlace.                                                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive none</b> |
| <b>Generation</b>              | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                     | <b>detail extensive</b>      |

## Sample Output

### show interfaces

```

user@switch> show interfaces ge-0/0/9
Physical interface: ge-0/0/9, Enabled, Physical link is Down
 Interface index: 129, SNMP ifIndex: 21
 Link-level type: Ethernet, MTU: 1514, Speed: Unspecified, 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
 CoS queues : 8 supported, 8 maximum usable queues
 Hold-times : Up 0 ms, Down 0 ms
 Current address: 00:19:e2:50:3f:41, Hardware address: 00:19:e2:50:3f:41
 Last flapped : 2008-01-16 11:40:53 UTC (4d 02:30 ago)
 Input rate : 0 bps (0 pps)
 Output rate : 0 bps (0 pps)
 Ingress rate at Packet Forwarding Engine : 0 bps (0 pps)
 Ingress drop rate at Packet Forwarding Engine : 0 bps (0 pps)
 Active alarms : None
 Active defects: None

 Logical interface ge-0/0/9.0 (Index 65) (SNMP ifIndex 22)
 Flags: SNMP-Traps
 Encapsulation: ENET2
 Input packets : 0
 Output packets: 0
 Protocol eth-switch
 Flags: None

```

### show interfaces brief

```

user@switch> show interfaces ge-0/0/9 brief
Physical interface: ge-0/0/9, Enabled, Physical link is Down
 Description: voice priority and tcp and icmp traffic rate-limiting filter at i
 ngress port
 Link-level type: Ethernet, MTU: 1514, Speed: Unspecified, 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

 Logical interface ge-0/0/9.0
 Flags: Device-Down SNMP-Traps Encapsulation: ENET2
 eth-switch

```

### show interfaces detail (Symmetric Flow Control and Autonegotiation Enabled)

```

user@switch> show interfaces ge-0/0/9 detail
Physical interface: ge-0/0/9, Enabled, Physical link is Up
 Interface index: 193, SNMP ifIndex: 206, Generation: 196
 Link-level type: Ethernet, MTU: 1514, Speed: Auto, Duplex: Auto,
 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: 0x0
 Link flags : None
 CoS queues : 8 supported, 8 maximum usable queues

```

```

Hold-times : Up 0 ms, Down 0 ms
Current address: 00:1f:12:30:ff:40, Hardware address: 00:1f:12:30:ff:40
Last flapped : 2009-05-05 06:03:05 UTC (00:22:13 ago)
Statistics last cleared: Never
Traffic statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets : 0 0 pps
 Output packets: 0 0 pps
IPv6 transit statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets : 0
 Output packets: 0
Egress queues: 8 supported, 4 in use
Queue counters:
 Queued packets Transmitted packets Dropped packets

 0 best-effort 0 0 0
 1 assured-forw 0 0 0
 5 expedited-fo 0 0 0
 7 network-cont 0 0 0

Active alarms : None
Active defects : None

Logical interface ge-0/0/9.0 (Index 65) (SNMP ifIndex 235) (Generation 130)
Flags: SNMP-Traps Encapsulation: ENET2
Bandwidth: 0
Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets : 0
 Output packets: 0
Local statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets : 0
 Output packets: 0
Transit statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets : 0 0 pps
 Output packets: 0 0 pps
Protocol eth-switch, Generation: 146, Route table: 0
Flags: Is-Primary
Input Filters: f1,
Output Filters: f2,,,

```

#### show interfaces detail (Asymmetric Flow Control and Autonegotiation Enabled)

```

user@switch> show interfaces ge-0/0/9 detail
Physical interface: ge-0/0/9, Enabled, Physical link is Up
Interface index: 193, SNMP ifIndex: 206, Generation: 196
Link-level type: Ethernet, MTU: 1514, Speed: Auto, Duplex: Auto,
BPDU Error: None, MAC-REWRITE Error: None, Loopback: Disabled,
Source filtering: Disabled, Configured-flow-control tx-buffers: off
rx-buffers: on ,
Auto-negotiation: Enabled,

```

```

Remote fault: Online
Device flags : Present Running
Interface flags: SNMP-Traps Internal: 0x0
Link flags : None
CoS queues : 8 supported, 8 maximum usable queues
Hold-times : Up 0 ms, Down 0 ms
Current address: 00:1f:12:30:ff:40, Hardware address: 00:1f:12:30:ff:40
Last flapped : 2009-05-05 06:03:05 UTC (00:22:13 ago)
Statistics last cleared: Never
Traffic statistics:
Input bytes : 0 0 bps
Output bytes : 0 0 bps
Input packets : 0 0 pps
Output packets: 0 0 pps
IPv6 transit statistics:
Input bytes : 0
Output bytes : 0
Input packets : 0
Output packets: 0
Egress queues: 8 supported, 4 in use
Queue counters:

```

|                | Queued packets | Transmitted packets | Dropped packets |
|----------------|----------------|---------------------|-----------------|
| 0 best-effort  | 0              | 0                   | 0               |
| 1 assured-forw | 0              | 0                   | 0               |
| 5 expedited-fo | 0              | 0                   | 0               |
| 7 network-cont | 0              | 0                   | 0               |

```

Active alarms : None
Active defects : None

Logical interface ge-0/0/9.0 (Index 65) (SNMP ifIndex 235) (Generation 130)
Flags: SNMP-Traps Encapsulation: ENET2
Bandwidth: 0
Traffic statistics:
Input bytes : 0
Output bytes : 0
Input packets : 0
Output packets: 0
Local statistics:
Input bytes : 0
Output bytes : 0
Input packets : 0
Output packets: 0
Transit statistics:
Input bytes : 0 0 bps
Output bytes : 0 0 bps
Input packets : 0 0 pps
Output packets: 0 0 pps
Protocol eth-switch, Generation: 146, Route table: 0
Flags: Is-Primary
Input Filters: f1,
Output Filters: f2,,,,

```

#### show interfaces extensive (Symmetric Flow Control and Autonegotiation Enabled)

```

user@switch> show interfaces ge-0/0/12 extensive
interface: ge-0/0/12, Enabled, Physical link is Down
Interface index: 49164, SNMP ifIndex: 574, Generation: 142

```

```

Link-level type: Ethernet, MTU: 1514, Speed: 1000mbps, Duplex: Full-Duplex,
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
Hold-times : Up 0 ms, Down 0 ms
Current address: 00:22:83:2a:d8:dc, Hardware address: 00:22:83:2a:d8:dc
Last flapped : 2011-02-25 00:45:03 UTC (22:42:48 ago)
Statistics last cleared: Never
Traffic statistics:
Input bytes : 0 0 bps
Output bytes : 0 0 bps
Input packets : 0 0 pps
Output packets: 0 0 pps
IPv6 transit statistics:
Input bytes : 0
Output bytes : 0
Input packets : 0
Output packets: 0
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, 8 in use
Queue counters:

```

|                | Queued packets | Transmitted packets | Dropped packets |
|----------------|----------------|---------------------|-----------------|
| 0 best-effort  | 0              | 0                   | 0               |
| 2 no-loss      | 0              | 0                   | 0               |
| 3 fcoe         | 0              | 0                   | 0               |
| 7 network-cont | 0              | 0                   | 0               |

```

Queue number: Mapped forwarding classes
0 best-effort
2 no-loss
3 fcoe
7 network-control
Active alarms : LINK
Active defects : LINK
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
MAC Priority Flow Control Statistics:
 Priority : 0 0 0
 Priority : 1 0 0
 Priority : 2 0 0
 Priority : 3 0 0
 Priority : 4 0 0
 Priority : 5 0 0
 Priority : 6 0 0
 Priority : 7 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: 1, CAM source filters: 0
Autonegotiation information:
 Negotiation status: Incomplete
Packet Forwarding Engine configuration:
 Destination slot: 0
CoS information:
 Direction : Output
 CoS transmit queue Bandwidth Buffer Priority
Limit
 0 best-effort 75 750000000 75 0 low
none
 7 network-control 5 500000000 5 0 low
none
 8 mcast-be 15 1500000000 15 0 low
none
 11 mcast-nc 5 500000000 5 0 low
none

```

#### show interfaces extensive (Asymmetric Flow Control and Autonegotiation Enabled)

```

user@switch> show interfaces ge-0/0/12 extensive
interface: ge-0/0/12, Enabled, Physical link is Down
 Interface index: 49164, SNMP ifIndex: 574, Generation: 142
 Link-level type: Ethernet, MTU: 1514, Speed: 1000mbps, Duplex: Full-Duplex,
 BPDU Error: None, MAC-REWRITE Error: None, Loopback: Disabled,
 Source filtering: Disabled, Configured-flow-control tx-buffers: off
rx-buffers: on
 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
 Hold-times : Up 0 ms, Down 0 ms
 Current address: 00:22:83:2a:d8:dc, Hardware address: 00:22:83:2a:d8:dc
 Last flapped : 2011-02-25 00:45:03 UTC (22:42:48 ago)
 Statistics last cleared: Never
Traffic statistics:
 Input bytes : 0 0 bps
 Output bytes: 0 0 bps
 Input packets: 0 0 pps

```



```

Output packets: 0 0 pps
IPv6 transit statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
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, 8 in use
Queue counters: Queued packets Transmitted packets Dropped packets

 0 best-effort 0 0 0
 2 no-loss 0 0 0
 3 fcoe 0 0 0
 7 network-cont 0 0 0

Queue number: Mapped forwarding classes
 0 best-effort
 2 no-loss
 3 fcoe
 7 network-control
Active alarms : LINK
Active defects : LINK
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
MAC Priority Flow Control Statistics:
 Priority : 0 0 0
 Priority : 1 0 0
 Priority : 2 0 0
 Priority : 3 0 0
 Priority : 4 0 0
 Priority : 5 0 0
 Priority : 6 0 0
 Priority : 7 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: 1, CAM source filters: 0
Autonegotiation information:
Negotiation status: Complete
Link Partner:
 Link mode: Full-duplex, Flow control: None, Remote fault: OK,
 Link partner Speed: 1000 Mbps
Local resolution:
 Flow control: enable PAUSE transmit and Disable PAUSE receive, Remote
 fault: Link OK
Packet Forwarding Engine configuration:
 Destination slot: 0
CoS information:
 Direction : Output
 CoS transmit queue Bandwidth Buffer Priority
Limit
 % bps % usec
0 best-effort 75 750000000 75 0 low
none
7 network-control 5 50000000 5 0 low
none
8 mcast-be 15 150000000 15 0 low
none
11 mcast-nc 5 50000000 5 0 low
none

```

#### show interfaces terse

```

user@switch> show interfaces ge-0/0/12 terse
Interface Admin Link Proto Local Remote
ge-0/0/12 up up

```

#### show interfaces terse (QFabric Systems)

```

user@switch> show interfaces node1:ge-0/0/0 terse
Physical interface: node1:ge-0/0/0, Enabled, Physical link is Down
 Interface index: 129, SNMP ifIndex: 2884086
 Link-level type: Ethernet, MTU: 1514, Speed: 10Gbps, Duplex: Full-Duplex, BPDU
 Error: None, MAC-REWRITE Error: None,
 Loopback: Disabled, Source filtering: Disabled, Flow control: Enabled
 Interface flags: Internal: 0x4000
 CoS queues : 8 supported, 8 maximum usable queues
 Current address: 02:00:09:03:00:00, Hardware address: 02:00:09:03:00:00
 Last flapped : Never
 Input rate : 0 bps (0 pps)
 Output rate : 0 bps (0 pps)

```

## show interfaces irb

**Supported Platforms** [EX Series](#), [MX Series](#), [QFX Series standalone switches](#)

**Syntax** `show interfaces irb`  
`<brief | detail | extensive | terse>`  
`<descriptions>`  
`<media>`  
`<routing-instance instance-name>`  
`<snmp-index snmp-index>`  
`<statistics>`

**Release Information** Command introduced in Junos OS Release 12.3R2.  
 Command introduced in Junos OS Release 12.3R2 for EX Series switches.  
 Command introduced in Junos OS Release 13.2 for the QFX Series

**Description** Display integrated routing and bridging interfaces information.

**Options** `brief | detail | extensive | terse`—(Optional) Display the specified level of output.

`descriptions`—(Optional) Display interface description strings.

`media`—(Optional) Display media-specific information about network interfaces.

`routing-instance instance-name`—(Optional) Display information for the interface with the specified SNMP index.

`snmp-index snmp-index`—(Optional) Display information for the interface with the specified SNMP index.

`statistics`—(Optional) Display static interface statistics.

**Additional Information** Integrated routing and bridging (IRB) provides simultaneous support for Layer 2 bridging and Layer 3 IP routing on the same interface. IRB enables you to route local packets to another routed interface or to another VLAN that has a Layer 3 protocol configured.

**Required Privilege Level** view

**List of Sample Output** [show interfaces irb extensive on page 261](#)  
[show interfaces irb snmp-index on page 262](#)

**Output Fields** [Table 20 on page 257](#) lists the output fields for the `show interfaces irb` command. Output fields are listed in the approximate order in which they appear.

**Table 20: show interfaces irb Output Fields**

| Field Name                | Field Description               | Level of Output |
|---------------------------|---------------------------------|-----------------|
| <b>Physical Interface</b> |                                 |                 |
| Physical interface        | Name of the physical interface. | All levels      |

Table 20: show interfaces irb Output Fields (*continued*)

| Field Name                    | Field Description                                                                                                                                                                                                                                          | Level of Output                    |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| <b>Enabled</b>                | State of the physical interface. Possible values are described in the “Enabled Field” section under <i>Common Output Fields Description</i> .                                                                                                              | All levels                         |
| <b>Proto</b>                  | Protocol configured on the interface.                                                                                                                                                                                                                      | <b>terse</b>                       |
| <b>Interface index</b>        | Physical interface index number, which reflects its initialization sequence.                                                                                                                                                                               | <b>detail extensive none</b>       |
| <b>SNMP ifIndex</b>           | SNMP index number for the physical interface.                                                                                                                                                                                                              | <b>detail extensive none</b>       |
| <b>Type</b>                   | Physical interface type.                                                                                                                                                                                                                                   | <b>detail extensive none</b>       |
| <b>Link-level type</b>        | Encapsulation being used on the physical interface.                                                                                                                                                                                                        | <b>detail extensive brief none</b> |
| <b>MTU</b>                    | MTU size on the physical interface.                                                                                                                                                                                                                        | <b>detail extensive brief none</b> |
| <b>Clocking</b>               | Reference clock source: <b>Internal</b> or <b>External</b> . Always unspecified on IRB interfaces.                                                                                                                                                         | <b>detail extensive brief</b>      |
| <b>Speed</b>                  | Speed at which the interface is running. Always unspecified on IRB interfaces.                                                                                                                                                                             | <b>detail extensive brief</b>      |
| <b>Device flags</b>           | Information about the physical device. Possible values are described in the “Device Flags” section under <i>Common Output Fields Description</i> .                                                                                                         | <b>detail extensive brief none</b> |
| <b>Interface flags</b>        | Information about the interface. Possible values are described in the “Interface Flags” section under <i>Common Output Fields Description</i> .                                                                                                            | <b>detail extensive brief none</b> |
| <b>Link type</b>              | Physical interface link type: <b>full duplex</b> or <b>half duplex</b> .                                                                                                                                                                                   | <b>detail extensive none</b>       |
| <b>Link flags</b>             | Information about the link. Possible values are described in the “Links Flags” section under <i>Common Output Fields Description</i> .                                                                                                                     | <b>detail extensive none</b>       |
| <b>Physical Info</b>          | Physical interface information.                                                                                                                                                                                                                            | All levels                         |
| <b>Hold-times</b>             | Current interface hold-time up and hold-time down, in milliseconds.                                                                                                                                                                                        | <b>detail extensive</b>            |
| <b>Current address</b>        | Configured MAC address.                                                                                                                                                                                                                                    | <b>detail extensive none</b>       |
| <b>Hardware address</b>       | MAC address of the hardware.                                                                                                                                                                                                                               | <b>detail extensive none</b>       |
| <b>Alternate link address</b> | Backup address of the link.                                                                                                                                                                                                                                | <b>detail extensive</b>            |
| <b>Last flapped</b>           | Date, time, and how long ago the interface went from down to up. The format is <b>Last flapped: year-month-day hours:minutes:seconds timezone (hours:minutes:seconds ago)</b> . For example, <b>Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago)</b> . | <b>detail extensive none</b>       |

Table 20: show interfaces irb Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Level of Output         |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Statistics last cleared</b> | Time when the statistics for the interface were last set to zero.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive</b> |
| <b>Traffic statistics</b>      | <p>Number and rate of bytes and packets received and transmitted on the physical interface.</p> <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive</b> |
| <b>IPv6 transit statistics</b> | <p>Number of IPv6 transit bytes and packets received and transmitted on the physical interface if IPv6 statistics tracking is enabled.</p> <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>detail extensive</b> |
| <b>Input errors</b>            | <p>Input errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Errors</b>—Sum of the incoming frame aborts and FCS errors.</li> <li>• <b>Drops</b>—Number of packets dropped by the input queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism.</li> <li>• <b>Framing errors</b>—Number of packets received with an invalid frame checksum (FCS).</li> <li>• <b>Runs</b>—Number of frames received that are smaller than the runt threshold.</li> <li>• <b>Giants</b>—Number of frames received that are larger than the giant threshold.</li> <li>• <b>Policed discards</b>—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul>            | <b>detail extensive</b> |
| <b>Output errors</b>           | <p>Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> <li>• <b>Carrier transitions</b>—Number of times the interface has gone from <b>down</b> to <b>up</b>. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and up, or another problem occurs. If the number of carrier transitions increments quickly (perhaps once every 10 seconds), the cable, the far-end system, or the DPC 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>detail extensive</b> |

Table 20: show interfaces irb Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Level of Output                 |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| <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><br>none |
| <b>SNMP ifIndex</b>            | SNMP interface index number of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive</b><br>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. Possible values are described in the “Logical Interface Flags” section under <i>Common Output Fields Description</i> .                                                                                                                                                                                                                                                                                                                                 | <b>detail extensive</b>         |
| <b>Encapsulation</b>           | Encapsulation on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>detail extensive</b>         |
| <b>Bandwidth</b>               | Speed at which the interface is running.                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>detail extensive</b>         |
| <b>Routing Instance</b>        | Routing instance IRB is configured under.                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail extensive</b>         |
| <b>Bridging Domain</b>         | Bridging domain IRB is participating in.                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>detail extensive</b>         |
| <b>Traffic statistics</b>      | Number and rate of bytes and packets received and transmitted on the logical interface. <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul>                                             | <b>detail extensive</b>         |
| <b>IPv6 transit statistics</b> | Number of IPv6 transit bytes and packets received and transmitted on the logical interface if IPv6 statistics tracking is enabled. <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul> | <b>detail extensive</b>         |
| <b>Local statistics</b>        | Statistics for traffic received from and transmitted to the Routing Engine.                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>detail extensive</b>         |
| <b>Transit statistics</b>      | Statistics for traffic transiting the router.                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>detail extensive</b>         |
| <b>Protocol</b>                | Protocol family configured on the local interface. Possible values are described in the “Protocol Field” section under <i>Common Output Fields Description</i> .                                                                                                                                                                                                                                                                                                                                | <b>detail extensive</b>         |
| <b>MTU</b>                     | Maximum transmission unit size on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>detail extensive</b>         |

Table 20: show interfaces irb Output Fields (*continued*)

| Field Name              | Field Description                                                                                                                                               | Level of Output                 |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| <b>Maximum labels</b>   | Maximum number of MPLS labels configured for the MPLS protocol family on the logical interface.                                                                 | <b>detail extensive</b><br>none |
| <b>Generation</b>       | Unique number for use by Juniper Networks technical support only.                                                                                               | <b>detail extensive</b>         |
| <b>Route table</b>      | Routing table in which the logical interface address is located. For example, 0 refers to the routing table inet.0.                                             | <b>detail extensive</b>         |
| <b>Addresses, Flags</b> | Information about address flags. Possible values are described in the “Addresses Flags” section under <i>Common Output Fields Description</i> .                 | <b>detail extensive</b>         |
| <b>Policer</b>          | The policer that is to be evaluated when packets are received or transmitted on the interface.                                                                  | <b>detail extensive</b>         |
| <b>Flags</b>            | Information about the logical interface. Possible values are described in the “Logical Interface Flags” section under <i>Common Output Fields Description</i> . | <b>detail extensive</b>         |

## Sample Output

### show interfaces irb extensive

```

user@host> show interfaces irb extensive
Physical interface: irb, Enabled, Physical link is Up
 Interface index: 129, SNMP ifIndex: 23, Generation: 130
 Type: Ethernet, Link-level type: Ethernet, MTU: 1514, Clocking: Unspecified,
 Speed: Unspecified
 Device flags : Present Running
 Interface flags: SNMP-Traps
 Link type : Full-Duplex
 Link flags : None
 Physical info : Unspecified
 Hold-times : Up 0 ms, Down 0 ms
 Current address: 02:00:00:00:00:30, Hardware address: 02:00:00:00:00:30
 Alternate link address: Unspecified
 Last flapped : Never
 Statistics last cleared: Never
 Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets : 0
 Output packets: 0
 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

```

```

Logical interface irb.0 (Index 68) (SNMP ifIndex 70) (Generation 143)
Flags: Hardware-Down SNMP-Traps 0x4000 Encapsulation: ENET2
Bandwidth: 1000mbps
Routing Instance: customer_0 Bridging Domain: bd0
Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
IPv6 transit statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Local statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Transit statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets: 0 0 pps
 Output packets: 0 0 pps
IPv6 transit statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Protocol inet, MTU: 1500, Generation: 154, Route table: 0
 Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
 Destination: 10.51.1/24, Local: 10.51.1.2, Broadcast: 10.51.1.255,
 Generation: 155
Protocol multiservice, MTU: 1500, Generation: 155, Route table: 0
 Flags: Is-Primary
 Policer: Input: __default_arp_policer

```

#### show interfaces irb snmp-index

```

user@host> show interfaces irb snmp-index 25
Physical interface: irb, Enabled, Physical link is Up
Interface index: 128, SNMP ifIndex: 25
Type: Ethernet, Link-level type: Ethernet, MTU: 1514
Device flags : Present Running
Interface flags: SNMP-Traps
Link type : Full-Duplex
Link flags : None
Current address: 02:00:00:00:00:30, Hardware address: 02:00:00:00:00:30
Last flapped : Never
 Input packets : 0
 Output packets: 0

Logical interface irb.0 (Index 68) (SNMP ifIndex 70)
Flags: Hardware-Down SNMP-Traps 0x4000 Encapsulation: ENET2
Bandwidth: 1000mbps
Routing Instance: customer_0 Bridging Domain: bd0
Input packets : 0
Output packets: 0
Protocol inet, MTU: 1500
 Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
 Destination: 10.51.1/24, Local: 10.51.1.2, Broadcast: 10.51.1.255

```



```
Protocol multiservice, MTU: 1500
Flags: Is-Primary
```

## show interfaces queue

**Supported Platforms** EX Series, MX Series, OCX1100, OCX1100, PTX Series, QFabric System, QFX Series standalone switches, T Series

**Syntax** show interfaces queue  
 <aggregate | remaining-traffic>  
 <both-ingress-egress>  
 <egress>  
 <forwarding-class *forwarding-class*>  
 <ingress>  
 <interface-name *interface-name*>  
 <l2-statistics>

**Release Information** Command introduced before Junos OS Release 7.4.  
**both-ingress-egress**, **egress**, and **ingress** options introduced in Junos OS Release 7.6.  
 Command introduced in Junos OS Release 11.1 for the QFX Series.  
**l2-statistics** option introduced in Junos OS Release 12.1.  
 Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

**Description** Display class-of-service (CoS) queue information for physical interfaces.

**Options** **none**—Show detailed CoS queue statistics for all physical interfaces.

**aggregate**—(Optional) Display the aggregated queuing statistics of all logical interfaces that have traffic-control profiles configured. (Not on the QFX Series.)

**both-ingress-egress**—(Optional) On Gigabit Ethernet Intelligent Queuing 2 (IQ2) PICs, display both ingress and egress queue statistics. (Not on the QFX Series.)

**egress**—(Optional) Display egress queue statistics.

**forwarding-class *forwarding-class***—(Optional) Forwarding class name for this queue. Shows detailed CoS statistics for the queue associated with the specified forwarding class.

**ingress**—(Optional) On Gigabit Ethernet IQ2 PICs, display ingress queue statistics. (Not on the QFX Series.)

**interface-name *interface-name***—(Optional) Show detailed CoS queue statistics for the specified interface.

**l2-statistics**—(Optional) Display Layer 2 statistics for MLPPP, FRF.15, and FRF.16 bundles

**remaining-traffic**—(Optional) Display the remaining-traffic queue statistics of all logical interfaces that have traffic-control profiles configured.

### Overhead for Layer 2 Statistics

Transmitted packets and transmitted byte counts are displayed for the Layer 2 level with the addition of encapsulation overheads applied for fragmentation, as shown in [Table 21 on page 265](#). Others counters, such as packets and bytes queued (input)

and drop counters, are displayed at the Layer 3 level. In the case of link fragmentation and interleaving (LFI) for which fragmentation is not applied, corresponding Layer 2 overheads are added, as shown in [Table 21 on page 265](#).

**Table 21: Layer 2 Overhead and Transmitted Packets or Byte Counts**

| Protocol       | Fragmentation       |                                   | LFI |
|----------------|---------------------|-----------------------------------|-----|
|                | First fragmentation | Second to <i>n</i> fragmentations |     |
|                | Bytes               | Bytes                             |     |
| MLPPP (Long)   | 13                  | 12                                | 8   |
| MLPPP (short)  | 11                  | 10                                | 8   |
| MLFR (FRF15)   | 12                  | 10                                | 8   |
| MFR (FRF16)    | 10                  | 8                                 | -   |
| MCMLPPP(Long)  | 13                  | 12                                | -   |
| MCMLPPP(Short) | 11                  | 10                                | -   |

#### Layer 2 Statistics—Fragmentation Overhead Calculation

##### MLPPP/MC-MLPPP Overhead details:

=====

##### Fragment 1:

```

Outer PPP header : 4 bytes
Long or short sequence MLPPP header : 4 bytes or 2 bytes
Inner PPP header : 1 byte
HDLC flag and FCS bytes : 4 bytes

```

##### Fragments 2 .. n :

```

Outer PPP header : 4 bytes
Long or short sequence MLPPP header : 4 bytes or 2 bytes
HDLC flag and FCS bytes : 4 bytes

```

##### MLFR (FRF15) Overhead details:

=====

##### Fragment 1:

```

Framereelay header : 2 bytes
Control,NLPID : 2 bytes
Fragmentaion header : 2 bytes
Inner proto : 2 bytes
HDLC flag and FCS : 4 bytes

```

##### Fragments 2 ...n :

```

Framereelay header : 2 bytes
Control,NLPID : 2 bytes
Fragmentaion header : 2 bytes
HDLC flag and FCS : 4 bytes

```

**MFR (FRF16) Overhead details:**

```
=====
Fragment 1:
 Fragmentation header : 2 bytes
 Framereelay header : 2 bytes
 Inner proto : 2 bytes
 HDLC flag and FCS : 4 bytes

Fragments 2 ...n :
 Fragmentation header : 2 bytes
 Framereelay header : 2 bytes
 HDLC flag and FCS : 4 bytes
```

**Overhead with LFI****MLPPP(Long & short sequence):**

```
=====
 Outer PPP header : 4 bytes
 HDLC flag and FCS : 4 bytes
```

**MLFR (FRF15):**

```
=====
 Framereelay header : 2 bytes
 Control,NLPID : 2 bytes
 HDLC flag and FCS : 4 bytes
```

The following examples show overhead for different cases:

- A 1000-byte packet is sent to a mlppp bundle without any fragmentation. At the Layer 2 level, bytes transmitted is 1013 in 1 packet. This overhead is for MLPPP long sequence encap.
- A 1000-byte packet is sent to a mlppp bundle with a fragment threshold of 250byte. At the Layer 2 level, bytes transmitted is 1061 bytes in 5 packets.
- A 1000-byte LFI packet is sent to an mlppp bundle. At the Layer 2 level, bytes transmitted is 1008 in 1 packet.

**remaining-traffic**—(Optional) Display the queuing statistics of all logical interfaces that do not have traffic-control profiles configured. (Not on the QFX Series.)

**Additional Information** For rate-limited interfaces hosted on Modular Interface Cards (MICs), Modular Port Concentrators (MPCs), or Enhanced Queuing DPCs, rate-limit packet-drop operations occur *before* packets are queued for transmission scheduling. For such interfaces, the statistics for queued traffic do not include the packets that have already been dropped due to rate limiting, and consequently the displayed statistics for queued traffic are the same as the displayed statistics for transmitted traffic.



**NOTE:** For rate-limited interfaces hosted on other types of hardware, rate-limit packet-drop operations occur *after* packets are queued for transmission scheduling. For these other interface types, the statistics for queued traffic include the packets that are later dropped due to rate limiting, and consequently the displayed statistics for queued traffic equals the sum of the statistics for transmitted and rate-limited traffic.

On M Series routers (except for the M320 and M120 routers), this command is valid only for a PIC installed on an enhanced Flexible PIC Concentrator (FPC).

Queue statistics for aggregated interfaces are supported on the M Series and T Series routers only. Statistics for an aggregated interface are the summation of the queue statistics of the child links of that aggregated interface. You can view the statistics for a child interface by using the **show interfaces statistics** command for that child interface.

When you configure tricolor marking on a 10-port 1-Gigabit Ethernet PIC, for queues 6 and 7 only, the output does not display the number of queued bytes and packets, or the number of bytes and packets dropped because of RED. If you do not configure tricolor marking on the interface, these statistics are available for all queues.

For the 4-port Channelized OC12 IQE PIC and 1-port Channelized OC48 IQE PIC, the **Packet Forwarding Engine Chassis Queues** field represents traffic bound for a particular physical interface on the PIC. For all other PICs, the **Packet Forwarding Engine Chassis Queues** field represents the total traffic bound for the PIC.

For Gigabit Ethernet IQ2 PICs, the **show interfaces queue** command output does not display the number of tail-dropped packets. This limitation does not apply to Packet Forwarding Engine chassis queues.

When fragmentation occurs on the egress interface, the first set of packet counters shows the postfragmentation values. The second set of packet counters (under the **Packet Forwarding Engine Chassis Queues** field) shows the prefragmentation values.

The behavior of the **egress** queues for the **Routing Engine-Generated Traffic** is not same as the configured queue for MLPPP and MFR configurations.

For information about how to configure CoS, see the *Junos OS Network Interfaces Library for Routing Devices*. For related CoS operational mode commands, see the [CLI Explorer](#).

**Required Privilege Level**

view

**List of Sample Output**

[show interfaces queue \(Rate-Limited Interface on a Gigabit Ethernet MIC in an MPC\) on page 272](#)  
[show interfaces queue \(Aggregated Ethernet on a T320 Router\) on page 273](#)  
[show interfaces queue \(Gigabit Ethernet on a T640 Router\) on page 275](#)  
[show interfaces queue aggregate \(Gigabit Ethernet Enhanced DPC\) on page 275](#)  
[show interfaces queue \(Gigabit Ethernet IQ2 PIC\) on page 279](#)  
[show interfaces queue both-ingress-egress \(Gigabit Ethernet IQ2 PIC\) on page 282](#)

[show interfaces queue ingress \(Gigabit Ethernet IQ2 PIC\) on page 284](#)  
[show interfaces queue egress \(Gigabit Ethernet IQ2 PIC\) on page 285](#)  
[show interfaces queue remaining-traffic \(Gigabit Ethernet Enhanced DPC\) on page 287](#)  
[show interfaces queue \(Channelized OC12 IQE Type 3 PIC in SONET Mode\) on page 289](#)  
[show interfaces queue \(QFX Series\) on page 299](#)  
[show interfaces queue l2-statistics \(lsq interface\) on page 300](#)  
[show interfaces queue lsq \(lsq-ifd\) on page 301](#)

**Output Fields** Table 22 on page 268 lists the output fields for the **show interfaces queue** command. Output fields are listed in the approximate order in which they appear.

**Table 22: show interfaces queue Output Fields**

| Field Name                   | Field Description                                                                                                                                                                                                                                                                                                                                                         |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Physical interface           | Name of the physical interface.                                                                                                                                                                                                                                                                                                                                           |
| Enabled                      | State of the interface. Possible values are described in the “Enabled Field” section under <i>Common Output Fields Description</i> .                                                                                                                                                                                                                                      |
| Interface index              | Physical interface's index number, which reflects its initialization sequence.                                                                                                                                                                                                                                                                                            |
| SNMP ifIndex                 | SNMP index number for the interface.                                                                                                                                                                                                                                                                                                                                      |
| Forwarding classes supported | Total number of forwarding classes supported on the specified interface.                                                                                                                                                                                                                                                                                                  |
| Forwarding classes in use    | Total number of forwarding classes in use on the specified interface.                                                                                                                                                                                                                                                                                                     |
| Ingress queues supported     | On Gigabit Ethernet IQ2 PICs only, total number of ingress queues supported on the specified interface.                                                                                                                                                                                                                                                                   |
| Ingress queues in use        | On Gigabit Ethernet IQ2 PICs only, total number of ingress queues in use on the specified interface.                                                                                                                                                                                                                                                                      |
| Output queues supported      | Total number of output queues supported on the specified interface.                                                                                                                                                                                                                                                                                                       |
| Output queues in use         | Total number of output queues in use on the specified interface.                                                                                                                                                                                                                                                                                                          |
| Egress queues supported      | Total number of egress queues supported on the specified interface.                                                                                                                                                                                                                                                                                                       |
| Egress queues in use         | Total number of egress queues in use on the specified interface.                                                                                                                                                                                                                                                                                                          |
| Queue counters (Ingress)     | CoS queue number and its associated user-configured forwarding class name. Displayed on IQ2 interfaces. <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> |

Table 22: show interfaces queue Output Fields (*continued*)

| Field Name                                                                                                                                          | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Burst size</b>                                                                                                                                   | (Logical interfaces on IQ PICs only) Maximum number of bytes up to which the logical interface can burst. The burst size is based on the shaping rate applied to the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| The following output fields are applicable to both interface component and Packet Forwarding component in the <b>show interfaces queue</b> command: |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Queue</b>                                                                                                                                        | Queue number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Forwarding classes</b>                                                                                                                           | Forwarding class name.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Queued Packets</b>                                                                                                                               | <p>Number of packets queued to this queue.</p> <p><b>NOTE:</b> For Gigabit Ethernet IQ2 interfaces, the Queued Packets count is calculated by the Junos OS interpreting one frame buffer as one packet. If the queued packets are very large or very small, the calculation might not be completely accurate for transit traffic. The count is completely accurate for traffic terminated on the router.</p> <p>For rate-limited interfaces hosted on MICs or MPCs only, this statistic does not include traffic dropped due to rate limiting. For more information, see <a href="#">“Additional Information” on page 266</a>.</p> |
| <b>Queued Bytes</b>                                                                                                                                 | <p>Number of bytes queued to this queue. The byte counts vary by interface hardware. For more information, see <a href="#">Table 23 on page 271</a>.</p> <p>For rate-limited interfaces hosted on MICs or MPCs only, this statistic does not include traffic dropped due to rate limiting. For more information, see <a href="#">“Additional Information” on page 266</a>.</p>                                                                                                                                                                                                                                                     |
| <b>Transmitted Packets</b>                                                                                                                          | <p>Number of packets transmitted by this queue. When fragmentation occurs on the egress interface, the first set of packet counters shows the postfragmentation values. The second set of packet counters (displayed under the <b>Packet Forwarding Engine Chassis Queues</b> field) shows the prefragmentation values.</p> <p><b>NOTE:</b> For Layer 2 statistics, see <a href="#">“Overhead for Layer 2 Statistics” on page 264</a></p>                                                                                                                                                                                          |
| <b>Transmitted Bytes</b>                                                                                                                            | <p>Number of bytes transmitted by this queue. The byte counts vary by interface hardware. For more information, see <a href="#">Table 23 on page 271</a>.</p> <p><b>NOTE:</b> On MX Series routers, this number can be inaccurate when you issue the command for a physical interface repeatedly and in quick succession, because the statistics for the child nodes are collected infrequently. Wait ten seconds between successive iterations to avoid this situation.</p> <p><b>NOTE:</b> For Layer 2 statistics, see <a href="#">“Overhead for Layer 2 Statistics” on page 264</a></p>                                         |
| <b>Tail-dropped packets</b>                                                                                                                         | <p>Number of packets dropped because of tail drop.</p> <p><b>NOTE:</b> The <b>Tail-dropped packets</b> counter is not supported on the PTX Series Packet Transport Routers.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>RL-dropped packets</b>                                                                                                                           | <p>Number of packets dropped due to rate limiting.</p> <p>For rate-limited interfaces hosted on MICs, MPCs, and Enhanced Queuing DPCs only, this statistic is not included in the queued traffic statistics. For more information, see <a href="#">“Additional Information” on page 266</a>.</p> <p><b>NOTE:</b> The <b>RL-dropped packets</b> counter is not supported on the PTX Series Packet Transport Routers, and is omitted from the output.</p>                                                                                                                                                                            |

Table 22: show interfaces queue Output Fields (*continued*)

| Field Name                 | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>RL-dropped bytes</b>    | <p>Number of bytes dropped due to rate limiting.</p> <p>For rate-limited interfaces hosted on MICs, MPCs, and Enhanced Queuing DPCs only, this statistic is not included in the queued traffic statistics. For more information, see <a href="#">“Additional Information” on page 266</a>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>RED-dropped packets</b> | <p>Number of packets dropped because of random early detection (RED).</p> <ul style="list-style-type: none"> <li>• (M Series and T Series routers only) On M320 and M120 routers and the T Series routers, the total number of dropped packets is displayed. On all other M Series routers, the output classifies dropped packets into the following categories: <ul style="list-style-type: none"> <li>• <b>Low, non-TCP</b>—Number of low-loss priority non-TCP packets dropped because of RED.</li> <li>• <b>Low, TCP</b>—Number of low-loss priority TCP packets dropped because of RED.</li> <li>• <b>High, non-TCP</b>—Number of high-loss priority non-TCP packets dropped because of RED.</li> <li>• <b>High, TCP</b>—Number of high-loss priority TCP packets dropped because of RED.</li> </ul> </li> <li>• (MX Series routers with enhanced DPCs, and T Series routers with enhanced FPCs only) The output classifies dropped packets into the following categories: <ul style="list-style-type: none"> <li>• <b>Low</b>—Number of low-loss priority packets dropped because of RED.</li> <li>• <b>Medium-low</b>—Number of medium-low loss priority packets dropped because of RED.</li> <li>• <b>Medium-high</b>—Number of medium-high loss priority packets dropped because of RED.</li> <li>• <b>High</b>—Number of high-loss priority packets dropped because of RED.</li> </ul> </li> </ul> <p><b>NOTE:</b> Due to accounting space limitations on certain Type 3 FPCs (which are supported in M320 and T640 routers), this field does not always display the correct value for queue 6 or queue 7 for interfaces on 10-port 1-Gigabit Ethernet PICs.</p> |
| <b>RED-dropped bytes</b>   | <p>Number of bytes dropped because of RED. The byte counts vary by interface hardware. For more information, see <a href="#">Table 23 on page 271</a>.</p> <ul style="list-style-type: none"> <li>• (M Series and T Series routers only) On M320 and M120 routers and the T Series routers, only the total number of dropped bytes is displayed. On all other M Series routers, the output classifies dropped bytes into the following categories: <ul style="list-style-type: none"> <li>• <b>Low, non-TCP</b>—Number of low-loss priority non-TCP bytes dropped because of RED.</li> <li>• <b>Low, TCP</b>—Number of low-loss priority TCP bytes dropped because of RED.</li> <li>• <b>High, non-TCP</b>—Number of high-loss priority non-TCP bytes dropped because of RED.</li> <li>• <b>High, TCP</b>—Number of high-loss priority TCP bytes dropped because of RED.</li> </ul> </li> </ul> <p><b>NOTE:</b> Due to accounting space limitations on certain Type 3 FPCs (which are supported in M320 and T640 routers), this field does not always display the correct value for queue 6 or queue 7 for interfaces on 10-port 1-Gigabit Ethernet PICs.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

Byte counts vary by interface hardware. [Table 23 on page 271](#) shows how the byte counts on the outbound interfaces vary depending on the interface hardware. [Table 23 on page 271](#) is based on the assumption that outbound interfaces are sending IP traffic with 478 bytes per packet.



Table 23: Byte Count by Interface Hardware

| Interface Hardware               | Output Level                | Byte Count Includes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Comments                                                                                                                                                                                                     |
|----------------------------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Gigabit Ethernet IQ and IQE PICs | Interface                   | <p>Queued: 490 bytes per packet, representing 478 bytes of Layer 3 packet + 12 bytes</p> <p>Transmitted: 490 bytes per packet, representing 478 bytes of Layer 3 packet + 12 bytes</p> <p>RED dropped: 496 bytes per packet representing 478 bytes of Layer 3 packet + 18 bytes</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <p>The 12 additional bytes include 6 bytes for the destination MAC address + 4 bytes for the VLAN + 2 bytes for the Ethernet type.</p> <p>For RED dropped, 6 bytes are added for the source MAC address.</p> |
|                                  | Packet forwarding component | <p>Queued: 478 bytes per packet, representing 478 bytes of Layer 3 packet</p> <p>Transmitted: 478 bytes per packet, representing 478 bytes of Layer 3 packet</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | —                                                                                                                                                                                                            |
| Non-IQ PIC                       | Interface                   | <p>T Series, TX Series, T1600, and MX Series routers:</p> <ul style="list-style-type: none"> <li>Queued: 478 bytes of Layer 3 packet.</li> <li>Transmitted: 478 bytes of Layer 3 packet.</li> </ul> <p>T4000 routers with Type 5 FPCs :</p> <ul style="list-style-type: none"> <li>Queued: 478 bytes of Layer 3 packet + the full Layer 2 overhead including 4 bytes CRC + the full Layer 1 overhead 8 bytes preamble + 12 bytes Inter frame Gap.</li> <li>Transmitted: 478 bytes of Layer 3 packet + the full Layer 2 overhead including 4 bytes CRC + the full Layer 1 overhead 8 bytes preamble + 12 bytes Interframe Gap.</li> </ul> <p>M Series routers:</p> <ul style="list-style-type: none"> <li>Queued: 478 bytes of Layer 3 packet.</li> <li>Transmitted: 478 bytes of Layer 3 packet + the full Layer 2 overhead.</li> </ul> <p>PTX Series Packet Transport Routers:</p> <ul style="list-style-type: none"> <li>Queued: The sum of the transmitted bytes and the RED dropped bytes.</li> <li>Transmitted: Full Layer 2 overhead (including all L2 encapsulation and CRC) + 12 inter-packet gap + 8 for the preamble.</li> <li>RED dropped: Full Layer 2 overhead (including all L2 encapsulation and CRC) + 12 inter-packet gap + 8 for the preamble (does not include the VLAN header or MPLS pushed bytes).</li> </ul> | <p>The Layer 2 overhead is 14 bytes for non-VLAN traffic and 18 bytes for VLAN traffic.</p>                                                                                                                  |

Table 23: Byte Count by Interface Hardware (*continued*)

| Interface Hardware                                   | Output Level                | Byte Count Includes                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Comments                                                                                                                           |
|------------------------------------------------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| IQ and IQE PICs with a SONET/SDH interface           | Interface                   | Queued: 482 bytes per packet, representing 478 bytes of Layer 3 packet + 4 bytes<br><br>Transmitted: 482 bytes per packet, representing 478 bytes of Layer 3 packet + 4 bytes<br><br>RED dropped: 482 bytes per packet, representing 478 bytes of Layer 3 packet + 4 bytes                                                                                                                                                                                                                | The additional 4 bytes are for the Layer 2 Point-to-Point Protocol (PPP) header.                                                   |
|                                                      | Packet forwarding component | Queued: 478 bytes per packet, representing 478 bytes of Layer 3 packet<br><br>Transmitted: 486 bytes per packet, representing 478 bytes of Layer 3 packet + 8 bytes                                                                                                                                                                                                                                                                                                                       | For transmitted packets, the additional 8 bytes includes 4 bytes for the PPP header and 4 bytes for a cookie.                      |
| Non-IQ PIC with a SONET/SDH interface                | Interface                   | T Series, TX Series, T1600, and MX Series routers: <ul style="list-style-type: none"> <li>Queued: 478 bytes of Layer 3 packet.</li> <li>Transmitted: 478 bytes of Layer 3 packet.</li> </ul> M Series routers: <ul style="list-style-type: none"> <li>Queued: 478 bytes of Layer 3 packet.</li> <li>Transmitted: 483 bytes per packet, representing 478 bytes of Layer 3 packet + 5 bytes</li> <li>RED dropped: 478 bytes per packet, representing 478 bytes of Layer 3 packet</li> </ul> | For transmitted packets, the additional 5 bytes includes 4 bytes for the PPP header and 1 byte for the packet loss priority (PLP). |
| Interfaces configured with Frame Relay Encapsulation | Interface                   | The default Frame Relay overhead is 7 bytes. If you configure the Frame Check Sequence (FCS) to 4 bytes, then the overhead increases to 10 bytes.                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                    |
| 1-port 10-Gigabit Ethernet IQ2 and IQ2-E PICs        | Interface                   | Queued: 478 bytes of Layer 3 packet + the full Layer 2 overhead including CRC.<br><br>Transmitted: 478 bytes of Layer 3 packet + the full Layer 2 overhead including CRC.                                                                                                                                                                                                                                                                                                                 | The Layer 2 overhead is 18 bytes for non-VLAN traffic and 22 bytes for VLAN traffic.                                               |
| 4-port 1G IQ2 and IQ2-E PICs                         | Packet forwarding component | Queued: 478 bytes of Layer 3 packet.                                                                                                                                                                                                                                                                                                                                                                                                                                                      | —                                                                                                                                  |
| 8-port 1G IQ2 and IQ2-E PICs                         |                             | Transmitted: 478 bytes of Layer 3 packet.                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                    |

## Sample Output

### show interfaces queue (Rate-Limited Interface on a Gigabit Ethernet MIC in an MPC)

The following example shows queue information for the rate-limited interface ge-4/2/0 on a Gigabit Ethernet MIC in an MPC. For rate-limited queues for interfaces hosted on MICs or MPCs, rate-limit packet drops occur prior to packet output queuing. In the

command output, the nonzero statistics displayed in the **RL-dropped packets** and **RL-dropped bytes** fields quantify the traffic dropped to rate-limit queue 0 output to 10 percent of 1 gigabyte (100 megabits) per second. Because the RL-dropped traffic is not included in the **Queued** statistics, the statistics displayed for queued traffic are the same as the statistics for transmitted traffic.

```
user@host> show interfaces queue ge-4/2/0
Physical interface: ge-4/2/0, Enabled, Physical link is Up
 Interface index: 203, SNMP ifIndex: 1054
Forwarding classes: 16 supported, 4 in use
Egress queues: 8 supported, 4 in use
Queue: 0, Forwarding classes: best-effort
 Queued:
 Packets : 131300649 141751 pps
 Bytes : 11287964840 99793248 bps
 Transmitted:
 Packets : 131300649 141751 pps
 Bytes : 11287964840 99793248 bps
 Tail-dropped packets : 0 0 pps
 RL-dropped packets : 205050862 602295 pps
 RL-dropped bytes : 13595326612 327648832 bps
 RED-dropped packets : 0 0 pps
 Low : 0 0 pps
 Medium-low : 0 0 pps
 Medium-high : 0 0 pps
 High : 0 0 pps
 RED-dropped bytes : 0 0 bps
 Low : 0 0 bps
 Medium-low : 0 0 bps
 Medium-high : 0 0 bps
 High : 0 0 bps
Queue: 1, Forwarding classes: expedited-forwarding
 Queued:
 Packets : 0 0 pps
 Bytes : 0 0 bps
```

#### show interfaces queue (Aggregated Ethernet on a T320 Router)

The following example shows that the aggregated Ethernet interface, **ae1**, has traffic on queues **af1** and **af12**:

```
user@host> show interfaces queue ae1
Physical interface: ae1, Enabled, Physical link is Up
 Interface index: 158, SNMP ifIndex: 33 Forwarding classes: 8 supported, 8 in use
Output queues: 8 supported, 8 in use
Queue: 0, Forwarding classes: be
 Queued:
 Packets : 5 0 pps
 Bytes : 242 0 bps
 Transmitted:
 Packets : 5 0 pps
 Bytes : 242 0 bps
 Tail-dropped packets : 0 0 pps
 RED-dropped packets : 0 0 pps
 RED-dropped bytes : 0 0 bps
Queue: 1, Forwarding classes: af1
 Queued:
 Packets : 42603765 595484 pps
```

```

Bytes : 5453281920 609776496 bps
Transmitted:
Packets : 42603765 595484 pps
Bytes : 5453281920 609776496 bps
Tail-dropped packets : 0 0 pps
RED-dropped packets : 0 0 pps
RED-dropped bytes : 0 0 bps
Queue: 2, Forwarding classes: ef1
Queued:
Packets : 0 0 pps
Bytes : 0 0 bps
Transmitted:
Packets : 0 0 pps
Bytes : 0 0 bps
Tail-dropped packets : 0 0 pps
RED-dropped packets : 0 0 pps
RED-dropped bytes : 0 0 bps
Queue: 3, Forwarding classes: nc
Queued:
Packets : 45 0 pps
Bytes : 3930 0 bps
Transmitted:
Packets : 45 0 pps
Bytes : 3930 0 bps
Tail-dropped packets : 0 0 pps
RED-dropped packets : 0 0 pps
RED-dropped bytes : 0 0 bps
Queue: 4, Forwarding classes: af11
Queued:
Packets : 0 0 pps
Bytes : 0 0 bps
Transmitted:
Packets : 0 0 pps
Bytes : 0 0 bps
Tail-dropped packets : 0 0 pps
RED-dropped packets : 0 0 pps
RED-dropped bytes : 0 0 bps
Queue: 5, Forwarding classes: ef11
Queued:
Packets : 0 0 pps
Bytes : 0 0 bps
Transmitted:
Packets : 0 0 pps
Bytes : 0 0 bps
Tail-dropped packets : 0 0 pps
RED-dropped packets : 0 0 pps
RED-dropped bytes : 0 0 bps
Queue: 6, Forwarding classes: af12
Queued:
Packets : 31296413 437436 pps
Bytes : 4005940864 447935200 bps
Transmitted:
Packets : 31296413 437436 pps
Bytes : 4005940864 447935200 bps
Tail-dropped packets : 0 0 pps
RED-dropped packets : 0 0 pps
RED-dropped bytes : 0 0 bps
Queue: 7, Forwarding classes: nc2
Queued:
Packets : 0 0 pps
Bytes : 0 0 bps

```

```

Transmitted:
Packets : 0 0 pps
Bytes : 0 0 bps
Tail-dropped packets : 0 0 pps
RED-dropped packets : 0 0 pps
RED-dropped bytes : 0 0 bps

```

#### show interfaces queue (Gigabit Ethernet on a T640 Router)

```

user@host> show interfaces queue
Physical interface: ge-7/0/1, Enabled, Physical link is Up
 Interface index: 150, SNMP ifIndex: 42
 Forwarding classes: 8 supported, 8 in use
 Output queues: 8 supported, 8 in use
 Queue: 0, Forwarding classes: be
 Queued:
 Packets : 13 0 pps
 Bytes : 622 0 bps
 Transmitted:
 Packets : 13 0 pps
 Bytes : 622 0 bps
 Tail-dropped packets : 0 0 pps
 RED-dropped packets : 0 0 pps
 RED-dropped bytes : 0 0 bps
 Queue: 1, Forwarding classes: af1
 Queued:
 Packets : 1725947945 372178 pps
 Bytes : 220921336960 381110432 bps
 Transmitted:
 Packets : 1725947945 372178 pps
 Bytes : 220921336960 381110432 bps
 Tail-dropped packets : 0 0 pps
 RED-dropped packets : 0 0 pps
 RED-dropped bytes : 0 0 bps
 Queue: 2, Forwarding classes: ef1
 Queued:
 Packets : 0 0 pps
 Bytes : 0 0 bps
 Transmitted:
 Packets : 0 0 pps
 Bytes : 0 0 bps
 Tail-dropped packets : 0 0 pps
 RED-dropped packets : 0 0 pps
 RED-dropped bytes : 0 0 bps
 Queue: 3, Forwarding classes: nc
 Queued:
 Packets : 571 0 pps
 Bytes : 49318 336 bps
 Transmitted:
 Packets : 571 0 pps
 Bytes : 49318 336 bps
 Tail-dropped packets : 0 0 pps
 RED-dropped packets : 0 0 pps
 RED-dropped bytes : 0 0 bps

```

#### show interfaces queue aggregate (Gigabit Ethernet Enhanced DPC)

```

user@host> show interfaces queue ge-2/2/9 aggregate

```

```

Physical interface: ge-2/2/9, Enabled, Physical link is Up
Interface index: 238, SNMP ifIndex: 71
Forwarding classes: 16 supported, 4 in use
Ingress queues: 4 supported, 4 in use
Queue: 0, Forwarding classes: best-effort
 Queued:
 Packets : 148450735 947295 pps
 Bytes : 8016344944 409228848 bps
 Transmitted:
 Packets : 76397439 487512 pps
 Bytes : 4125461868 210602376 bps
 Tail-dropped packets : Not Available
 RED-dropped packets : 72053285 459783 pps
 Low : 72053285 459783 pps
 Medium-low : 0 0 pps
 Medium-high: 0 0 pps
 High : 0 0 pps
 RED-dropped bytes : 3890877444 198626472 bps
 Low : 3890877444 198626472 bps
 Medium-low : 0 0 bps
 Medium-high: 0 0 bps
 High : 0 0 bps
Queue: 1, Forwarding classes: expedited-forwarding
 Queued:
 Packets : 0 0 pps
 Bytes : 0 0 bps
 Transmitted:
 Packets : 0 0 pps
 Bytes : 0 0 bps
 Tail-dropped packets : Not Available
 RED-dropped packets : 0 0 pps
 Low : 0 0 pps
 Medium-low : 0 0 pps
 Medium-high: 0 0 pps
 High : 0 0 pps
 RED-dropped bytes : 0 0 bps
 Low : 0 0 bps
 Medium-low : 0 0 bps
 Medium-high: 0 0 bps
 High : 0 0 bps
Queue: 2, Forwarding classes: assured-forwarding
 Queued:
 Packets : 410278257 473940 pps
 Bytes : 22156199518 204742296 bps
 Transmitted:
 Packets : 4850003 4033 pps
 Bytes : 261900162 1742256 bps
 Tail-dropped packets : Not Available
 RED-dropped packets : 405425693 469907 pps
 Low : 405425693 469907 pps
 Medium-low : 0 0 pps
 Medium-high: 0 0 pps
 High : 0 0 pps
 RED-dropped bytes : 21892988124 203000040 bps
 Low : 21892988124 203000040 bps
 Medium-low : 0 0 bps
 Medium-high: 0 0 bps
 High : 0 0 bps
Queue: 3, Forwarding classes: network-control
 Queued:
 Packets : 0 0 pps

```

```

Bytes : 0 0 bps
Transmitted:
Packets : 0 0 pps
Bytes : 0 0 bps
Tail-dropped packets : Not Available
RED-dropped packets : 0 0 pps
Low : 0 0 pps
Medium-low : 0 0 pps
Medium-high : 0 0 pps
High : 0 0 pps
RED-dropped bytes : 0 0 bps
Low : 0 0 bps
Medium-low : 0 0 bps
Medium-high : 0 0 bps
High : 0 0 bps
Forwarding classes: 16 supported, 4 in use
Egress queues: 4 supported, 4 in use
Queue: 0, Forwarding classes: best-effort
Queued:
Packets : 76605230 485376 pps
Bytes : 5209211400 264044560 bps
Transmitted:
Packets : 76444631 484336 pps
Bytes : 5198235612 263478800 bps
Tail-dropped packets : Not Available
RED-dropped packets : 160475 1040 pps
Low : 160475 1040 pps
Medium-low : 0 0 pps
Medium-high : 0 0 pps
High : 0 0 pps
RED-dropped bytes : 10912300 565760 bps
Low : 10912300 565760 bps
Medium-low : 0 0 bps
Medium-high : 0 0 bps
High : 0 0 bps
Queue: 1, Forwarding classes: expedited-forwarding
Queued:
Packets : 0 0 pps
Bytes : 0 0 bps
Transmitted:
Packets : 0 0 pps
Bytes : 0 0 bps
Tail-dropped packets : Not Available
RED-dropped packets : 0 0 pps
Low : 0 0 pps
Medium-low : 0 0 pps
Medium-high : 0 0 pps
High : 0 0 pps
RED-dropped bytes : 0 0 bps
Low : 0 0 bps
Medium-low : 0 0 bps
Medium-high : 0 0 bps
High : 0 0 bps
Queue: 2, Forwarding classes: assured-forwarding
Queued:
Packets : 4836136 3912 pps
Bytes : 333402032 2139056 bps
Transmitted:
Packets : 3600866 1459 pps
Bytes : 244858888 793696 bps
Tail-dropped packets : Not Available

```

```

RED-dropped packets : 1225034 2450 pps
 Low : 1225034 2450 pps
 Medium-low : 0 0 pps
 Medium-high : 0 0 pps
 High : 0 0 pps
RED-dropped bytes : 83302312 1333072 bps
 Low : 83302312 1333072 bps
 Medium-low : 0 0 bps
 Medium-high : 0 0 bps
 High : 0 0 bps
Queue: 3, Forwarding classes: network-control
Queued:
 Packets : 0 0 pps
 Bytes : 0 0 bps
Transmitted:
 Packets : 0 0 pps
 Bytes : 0 0 bps
Tail-dropped packets : Not Available
RED-dropped packets : 0 0 pps
 Low : 0 0 pps
 Medium-low : 0 0 pps
 Medium-high : 0 0 pps
 High : 0 0 pps
RED-dropped bytes : 0 0 bps
 Low : 0 0 bps
 Medium-low : 0 0 bps
 Medium-high : 0 0 bps
 High : 0 0 bps

```

#### Packet Forwarding Engine Chassis Queues:

Queues: 4 supported, 4 in use

Queue: 0, Forwarding classes: best-effort

```

Queued:
 Packets : 77059796 486384 pps
 Bytes : 3544750624 178989576 bps
Transmitted:
 Packets : 77059797 486381 pps
 Bytes : 3544750670 178988248 bps
Tail-dropped packets : 0 0 pps
RED-dropped packets : 0 0 pps
 Low : 0 0 pps
 Medium-low : 0 0 pps
 Medium-high : 0 0 pps
 High : 0 0 pps
RED-dropped bytes : 0 0 bps
 Low : 0 0 bps
 Medium-low : 0 0 bps
 Medium-high : 0 0 bps
 High : 0 0 bps

```

Queue: 1, Forwarding classes: expedited-forwarding

```

Queued:
 Packets : 0 0 pps
 Bytes : 0 0 bps
Transmitted:
 Packets : 0 0 pps
 Bytes : 0 0 bps
Tail-dropped packets : 0 0 pps
RED-dropped packets : 0 0 pps
 Low : 0 0 pps
 Medium-low : 0 0 pps
 Medium-high : 0 0 pps

```



```

 High : 0 0 pps
 RED-dropped bytes : 0 0 bps
 Low : 0 0 bps
 Medium-low : 0 0 bps
 Medium-high : 0 0 bps
 High : 0 0 bps
Queue: 2, Forwarding classes: assured-forwarding
 Queued:
 Packets : 4846580 3934 pps
 Bytes : 222942680 1447768 bps
 Transmitted:
 Packets : 4846580 3934 pps
 Bytes : 222942680 1447768 bps
 Tail-dropped packets : 0 0 pps
 RED-dropped packets : 0 0 pps
 Low : 0 0 pps
 Medium-low : 0 0 pps
 Medium-high : 0 0 pps
 High : 0 0 pps
 RED-dropped bytes : 0 0 bps
 Low : 0 0 bps
 Medium-low : 0 0 bps
 Medium-high : 0 0 bps
 High : 0 0 bps
Queue: 3, Forwarding classes: network-control
 Queued:
 Packets : 0 0 pps
 Bytes : 0 0 bps
 Transmitted:
 Packets : 0 0 pps
 Bytes : 0 0 bps
 Tail-dropped packets : 0 0 pps
 RED-dropped packets : 0 0 pps
 Low : 0 0 pps
 Medium-low : 0 0 pps
 Medium-high : 0 0 pps
 High : 0 0 pps
 RED-dropped bytes : 0 0 bps
 Low : 0 0 bps
 Medium-low : 0 0 bps
 Medium-high : 0 0 bps
 High : 0 0 bps

```

#### show interfaces queue (Gigabit Ethernet IQ2 PIC)

```

user@host> show interfaces queue ge-7/1/3
Physical interface: ge-7/1/3, Enabled, Physical link is Up
 Interface index: 170, SNMP ifIndex: 70 Forwarding classes: 16 supported, 4 in
 use Ingress queues: 4 supported, 4 in use
Queue: 0, Forwarding classes: best-effort
 Queued:
 Packets : 418390039 10 pps
 Bytes : 38910269752 7440 bps
 Transmitted:
 Packets : 418390039 10 pps
 Bytes : 38910269752 7440 bps
 Tail-dropped packets : Not Available
 RED-dropped packets : 0 0 pps
 RED-dropped bytes : 0 0 bps
Queue: 1, Forwarding classes: expedited-forwarding

```

```

Queued:
 Packets : 0 0 pps
 Bytes : 0 0 bps
Transmitted:
 Packets : 0 0 pps
 Bytes : 0 0 bps
 Tail-dropped packets : Not Available
 RED-dropped packets : 0 0 pps
 RED-dropped bytes : 0 0 bps
Queue: 2, Forwarding classes: assured-forwarding
Queued:
 Packets : 0 0 pps
 Bytes : 0 0 bps
Transmitted:
 Packets : 0 0 pps
 Bytes : 0 0 bps
 Tail-dropped packets : Not Available
 RED-dropped packets : 0 0 pps
 RED-dropped bytes : 0 0 bps
Queue: 3, Forwarding classes: network-control
Queued:
 Packets : 7055 1 pps
 Bytes : 451552 512 bps
Transmitted:
 Packets : 7055 1 pps
 Bytes : 451552 512 bps
 Tail-dropped packets : Not Available
 RED-dropped packets : 0 0 pps
 RED-dropped bytes : 0 0 bps
Forwarding classes: 16 supported, 4 in use Egress queues: 4 supported, 4 in use
Queue: 0, Forwarding classes: best-effort
Queued:
 Packets : 1031 0 pps
 Bytes : 143292 0 bps
Transmitted:
 Packets : 1031 0 pps
 Bytes : 143292 0 bps
 Tail-dropped packets : Not Available
 RL-dropped packets : 0 0 pps
 RL-dropped bytes : 0 0 bps
 RED-dropped packets : 0 0 pps
 RED-dropped bytes : 0 0 bps
Queue: 1, Forwarding classes: expedited-forwarding
Queued:
 Packets : 0 0 pps
 Bytes : 0 0 bps
Transmitted:
 Packets : 0 0 pps
 Bytes : 0 0 bps
 Tail-dropped packets : Not Available
 RL-dropped packets : 0 0 pps
 RL-dropped bytes : 0 0 bps
 RED-dropped packets : 0 0 pps
 RED-dropped bytes : 0 0 bps
Queue: 2, Forwarding classes: assured-forwarding
Queued:
 Packets : 0 0 pps
 Bytes : 0 0 bps
Transmitted:
 Packets : 0 0 pps
 Bytes : 0 0 bps

```

```

Tail-dropped packets : Not Available
RL-dropped packets : 0 0 pps
RL-dropped bytes : 0 0 bps
RED-dropped packets : 0 0 pps
RED-dropped bytes : 0 0 bps
Queue: 3, Forwarding classes: network-control
Queued:
Packets : 77009 11 pps
Bytes : 6894286 7888 bps
Transmitted:
Packets : 77009 11 pps
Bytes : 6894286 7888 bps
Tail-dropped packets : Not Available
RL-dropped packets : 0 0 pps
RL-dropped bytes : 0 0 bps
RED-dropped packets : 0 0 pps
RED-dropped bytes : 0 0 bps

```

#### Packet Forwarding Engine Chassis Queues:

Queues: 4 supported, 4 in use

Queue: 0, Forwarding classes: best-effort

```

Queued:
Packets : 1031 0 pps
Bytes : 147328 0 bps
Transmitted:
Packets : 1031 0 pps
Bytes : 147328 0 bps
Tail-dropped packets : 0 0 pps
RED-dropped packets : 0 0 pps
Low, non-TCP : 0 0 pps
Low, TCP : 0 0 pps
High, non-TCP : 0 0 pps
High, TCP : 0 0 pps
RED-dropped bytes : 0 0 bps
Low, non-TCP : 0 0 bps
Low, TCP : 0 0 bps
High, non-TCP : 0 0 bps
High, TCP : 0 0 bps

```

Queue: 1, Forwarding classes: expedited-forwarding

```

Queued:
Packets : 0 0 pps
Bytes : 0 0 bps
Transmitted:
Packets : 0 0 pps
Bytes : 0 0 bps
Tail-dropped packets : 0 0 pps
RED-dropped packets : 0 0 pps
Low, non-TCP : 0 0 pps
Low, TCP : 0 0 pps
High, non-TCP : 0 0 pps
High, TCP : 0 0 pps
RED-dropped bytes : 0 0 bps
Low, non-TCP : 0 0 bps
Low, TCP : 0 0 bps
High, non-TCP : 0 0 bps
High, TCP : 0 0 bps

```

Queue: 2, Forwarding classes: assured-forwarding

```

Queued:
Packets : 0 0 pps
Bytes : 0 0 bps
Transmitted:

```

```

Packets : 0 0 pps
Bytes : 0 0 bps
Tail-dropped packets : 0 0 pps
RED-dropped packets : 0 0 pps
 Low, non-TCP : 0 0 pps
 Low, TCP : 0 0 pps
 High, non-TCP : 0 0 pps
 High, TCP : 0 0 pps
RED-dropped bytes : 0 0 bps
 Low, non-TCP : 0 0 bps
 Low, TCP : 0 0 bps
 High, non-TCP : 0 0 bps
 High, TCP : 0 0 bps
Queue: 3, Forwarding classes: network-control
Queued:
 Packets : 94386 12 pps
 Bytes : 13756799 9568 bps
Transmitted:
 Packets : 94386 12 pps
 Bytes : 13756799 9568 bps
 Tail-dropped packets : 0 0 pps
 RED-dropped packets : 0 0 pps
 Low, non-TCP : 0 0 pps
 Low, TCP : 0 0 pps
 High, non-TCP : 0 0 pps
 High, TCP : 0 0 pps
 RED-dropped bytes : 0 0 bps
 Low, non-TCP : 0 0 bps
 Low, TCP : 0 0 bps
 High, non-TCP : 0 0 bps
 High, TCP : 0 0 bps

```

#### show interfaces queue both-ingress-egress (Gigabit Ethernet IQ2 PIC)

```

user@host> show interfaces queue ge-6/2/0 both-ingress-egress
Physical interface: ge-6/2/0, Enabled, Physical link is Up
Interface index: 175, SNMP ifIndex: 121
Forwarding classes: 8 supported, 4 in use
Ingress queues: 4 supported, 4 in use
Queue: 0, Forwarding classes: best-effort
Queued:
 Packets : Not Available
 Bytes : 0 0 bps
Transmitted:
 Packets : 254 0 pps
 Bytes : 16274 0 bps
 Tail-dropped packets : Not Available
 RED-dropped packets : 0 0 pps
 RED-dropped bytes : 0 0 bps
Queue: 1, Forwarding classes: expedited-forwarding
Queued:
 Packets : Not Available
 Bytes : 0 0 bps
Transmitted:
 Packets : 0 0 pps
 Bytes : 0 0 bps
 Tail-dropped packets : Not Available
 RED-dropped packets : 0 0 pps
 RED-dropped bytes : 0 0 bps
Queue: 2, Forwarding classes: assured-forwarding

```

```

Queued:
 Packets : Not Available
 Bytes : 0 0 bps
Transmitted:
 Packets : 0 0 pps
 Bytes : 0 0 bps
 Tail-dropped packets : Not Available
 RED-dropped packets : 0 0 pps
 RED-dropped bytes : 0 0 bps
Queue: 3, Forwarding classes: network-control
Queued:
 Packets : Not Available
 Bytes : 0 0 bps
Transmitted:
 Packets : 0 0 pps
 Bytes : 0 0 bps
 Tail-dropped packets : Not Available
 RED-dropped packets : 0 0 pps
 RED-dropped bytes : 0 0 bps
Forwarding classes: 8 supported, 4 in use
Egress queues: 4 supported, 4 in use
Queue: 0, Forwarding classes: best-effort
Queued:
 Packets : Not Available
 Bytes : 0 0 bps
Transmitted:
 Packets : 3 0 pps
 Bytes : 126 0 bps
 Tail-dropped packets : Not Available
 RED-dropped packets : 0 0 pps
 RED-dropped bytes : 0 0 bps
Queue: 1, Forwarding classes: expedited-forwarding
Queued:
 Packets : Not Available
 Bytes : 0 0 bps
Transmitted:
 Packets : 0 0 pps
 Bytes : 0 0 bps
 Tail-dropped packets : Not Available
 RED-dropped packets : 0 0 pps
 RED-dropped bytes : 0 0 bps
Queue: 2, Forwarding classes: assured-forwarding
Queued:
 Packets : Not Available
 Bytes : 0 0 bps
Transmitted:
 Packets : 0 0 pps
 Bytes : 0 0 bps
 Tail-dropped packets : Not Available
 RED-dropped packets : 0 0 pps
 RED-dropped bytes : 0 0 bps
Queue: 3, Forwarding classes: network-control
Queued:
 Packets : Not Available
 Bytes : 0 0 bps
Transmitted:
 Packets : 0 0 pps
 Bytes : 0 0 bps
 Tail-dropped packets : Not Available
 RED-dropped packets : 0 0 pps
 RED-dropped bytes : 0 0 bps

```

```

Packet Forwarding Engine Chassis Queues:
Queues: 4 supported, 4 in use
Queue: 0, Forwarding classes: best-effort
 Queued:
 Packets : 80564692 0 pps
 Bytes : 3383717100 0 bps
 Transmitted:
 Packets : 80564692 0 pps
 Bytes : 3383717100 0 bps
 Tail-dropped packets : 0 0 pps
 RED-dropped packets : 0 0 pps
 RED-dropped bytes : 0 0 bps
Queue: 1, Forwarding classes: expedited-forwarding
 Queued:
 Packets : 80564685 0 pps
 Bytes : 3383716770 0 bps
 Transmitted:
 Packets : 80564685 0 pps
 Bytes : 3383716770 0 bps
 Tail-dropped packets : 0 0 pps
 RED-dropped packets : 0 0 pps
 RED-dropped bytes : 0 0 bps
Queue: 2, Forwarding classes: assured-forwarding
 Queued:
 Packets : 0 0 pps
 Bytes : 0 0 bps
 Transmitted:
 Packets : 0 0 pps
 Bytes : 0 0 bps
 Tail-dropped packets : 0 0 pps
 RED-dropped packets : 0 0 pps
 RED-dropped bytes : 0 0 bps
Queue: 3, Forwarding classes: network-control
 Queued:
 Packets : 9397 0 pps
 Bytes : 3809052 232 bps
 Transmitted:
 Packets : 9397 0 pps
 Bytes : 3809052 232 bps
 Tail-dropped packets : 0 0 pps
 RED-dropped packets : 0 0 pps
 RED-dropped bytes : 0 0 bps

```

### show interfaces queue ingress (Gigabit Ethernet IQ2 PIC)

```

user@host> show interfaces queue ge-6/2/0 ingress
Physical interface: ge-6/2/0, Enabled, Physical link is Up
 Interface index: 175, SNMP ifIndex: 121
Forwarding classes: 8 supported, 4 in use
Ingress queues: 4 supported, 4 in use
Queue: 0, Forwarding classes: best-effort
 Queued:
 Packets : Not Available
 Bytes : 0 0 bps
 Transmitted:
 Packets : 288 0 pps
 Bytes : 18450 0 bps
 Tail-dropped packets : Not Available
 RED-dropped packets : 0 0 pps
 RED-dropped bytes : 0 0 bps

```

```

Queue: 1, Forwarding classes: expedited-forwarding
 Queued:
 Packets : Not Available
 Bytes : 0 0 bps
 Transmitted:
 Packets : 0 0 pps
 Bytes : 0 0 bps
 Tail-dropped packets : Not Available
 RED-dropped packets : 0 0 pps
 RED-dropped bytes : 0 0 bps
Queue: 2, Forwarding classes: assured-forwarding
 Queued:
 Packets : Not Available
 Bytes : 0 0 bps
 Transmitted:
 Packets : 0 0 pps
 Bytes : 0 0 bps
 Tail-dropped packets : Not Available
 RED-dropped packets : 0 0 pps
 RED-dropped bytes : 0 0 bps
Queue: 3, Forwarding classes: network-control
 Queued:
 Packets : Not Available
 Bytes : 0 0 bps
 Transmitted:
 Packets : 0 0 pps
 Bytes : 0 0 bps
 Tail-dropped packets : Not Available
 RED-dropped packets : 0 0 pps
 RED-dropped bytes : 0 0 bps

```

#### show interfaces queue egress (Gigabit Ethernet IQ2 PIC)

```

user@host> show interfaces queue ge-6/2/0 egress
Physical interface: ge-6/2/0, Enabled, Physical link is Up
 Interface index: 175, SNMP ifIndex: 121
Forwarding classes: 8 supported, 4 in use
Egress queues: 4 supported, 4 in use
Queue: 0, Forwarding classes: best-effort
 Queued:
 Packets : Not Available
 Bytes : 0 0 bps
 Transmitted:
 Packets : 3 0 pps
 Bytes : 126 0 bps
 Tail-dropped packets : Not Available
 RED-dropped packets : 0 0 pps
 RED-dropped bytes : 0 0 bps
Queue: 1, Forwarding classes: expedited-forwarding
 Queued:
 Packets : Not Available
 Bytes : 0 0 bps
 Transmitted:
 Packets : 0 0 pps
 Bytes : 0 0 bps
 Tail-dropped packets : Not Available
 RED-dropped packets : 0 0 pps
 RED-dropped bytes : 0 0 bps
Queue: 2, Forwarding classes: assured-forwarding
 Queued:

```

```

Packets : Not Available
Bytes : 0 0 bps
Transmitted:
Packets : 0 0 pps
Bytes : 0 0 bps
Tail-dropped packets : Not Available
RED-dropped packets : 0 0 pps
RED-dropped bytes : 0 0 bps
Queue: 3, Forwarding classes: network-control
Queued:
Packets : Not Available
Bytes : 0 0 bps
Transmitted:
Packets : 0 0 pps
Bytes : 0 0 bps
Tail-dropped packets : Not Available
RED-dropped packets : 0 0 pps
RED-dropped bytes : 0 0 bps
Packet Forwarding Engine Chassis Queues:
Queues: 4 supported, 4 in use
Queue: 0, Forwarding classes: best-effort
Queued:
Packets : 80564692 0 pps
Bytes : 3383717100 0 bps
Transmitted:
Packets : 80564692 0 pps
Bytes : 3383717100 0 bps
Tail-dropped packets : 0 0 pps
RED-dropped packets : 0 0 pps
RED-dropped bytes : 0 0 bps
Queue: 1, Forwarding classes: expedited-forwarding
Queued:
Packets : 80564685 0 pps
Bytes : 3383716770 0 bps
Transmitted:
Packets : 80564685 0 pps
Bytes : 3383716770 0 bps
Tail-dropped packets : 0 0 pps
RED-dropped packets : 0 0 pps
RED-dropped bytes : 0 0 bps
Queue: 2, Forwarding classes: assured-forwarding
Queued:
Packets : 0 0 pps
Bytes : 0 0 bps
Transmitted:
Packets : 0 0 pps
Bytes : 0 0 bps
Tail-dropped packets : 0 0 pps
RED-dropped packets : 0 0 pps
RED-dropped bytes : 0 0 bps
Queue: 3, Forwarding classes: network-control
Queued:
Packets : 9538 0 pps
Bytes : 3819840 0 bps
Transmitted:
Packets : 9538 0 pps
Bytes : 3819840 0 bps
Tail-dropped packets : 0 0 pps
RED-dropped packets : 0 0 pps
RED-dropped bytes : 0 0 bps

```



## show interfaces queue remaining-traffic (Gigabit Ethernet Enhanced DPC)

```

user@host> show interfaces queue ge-2/2/9 remaining-traffic
Physical interface: ge-2/2/9, Enabled, Physical link is Up
 Interface index: 238, SNMP ifIndex: 71
Forwarding classes: 16 supported, 4 in use
Ingress queues: 4 supported, 4 in use
Queue: 0, Forwarding classes: best-effort
 Queued:
 Packets : 110208969 472875 pps
 Bytes : 5951284434 204282000 bps
 Transmitted:
 Packets : 110208969 472875 pps
 Bytes : 5951284434 204282000 bps
 Tail-dropped packets : Not Available
 RED-dropped packets :
 Low : 0 0 pps
 Medium-low : 0 0 pps
 Medium-high : 0 0 pps
 High : 0 0 pps
 RED-dropped bytes :
 Low : 0 0 bps
 Medium-low : 0 0 bps
 Medium-high : 0 0 bps
 High : 0 0 bps
Queue: 1, Forwarding classes: expedited-forwarding
 Queued:
 Packets : 0 0 pps
 Bytes : 0 0 bps
 Transmitted:
 Packets : 0 0 pps
 Bytes : 0 0 bps
 Tail-dropped packets : Not Available
 RED-dropped packets :
 Low : 0 0 pps
 Medium-low : 0 0 pps
 Medium-high : 0 0 pps
 High : 0 0 pps
 RED-dropped bytes :
 Low : 0 0 bps
 Medium-low : 0 0 bps
 Medium-high : 0 0 bps
 High : 0 0 bps
Queue: 2, Forwarding classes: assured-forwarding
 Queued:
 Packets : 0 0 pps
 Bytes : 0 0 bps
 Transmitted:
 Packets : 0 0 pps
 Bytes : 0 0 bps
 Tail-dropped packets : Not Available
 RED-dropped packets :
 Low : 0 0 pps
 Medium-low : 0 0 pps
 Medium-high : 0 0 pps
 High : 0 0 pps
 RED-dropped bytes :
 Low : 0 0 bps
 Medium-low : 0 0 bps
 Medium-high : 0 0 bps

```

```

 High : 0 0 bps
Queue: 3, Forwarding classes: network-control
Queued:
 Packets : 0 0 pps
 Bytes : 0 0 bps
Transmitted:
 Packets : 0 0 pps
 Bytes : 0 0 bps
Tail-dropped packets : Not Available
RED-dropped packets : 0 0 pps
 Low : 0 0 pps
 Medium-low : 0 0 pps
 Medium-high : 0 0 pps
 High : 0 0 pps
RED-dropped bytes : 0 0 bps
 Low : 0 0 bps
 Medium-low : 0 0 bps
 Medium-high : 0 0 bps
 High : 0 0 bps
Forwarding classes: 16 supported, 4 in use
Egress queues: 4 supported, 4 in use
Queue: 0, Forwarding classes: best-effort
Queued:
 Packets : 109355853 471736 pps
 Bytes : 7436199152 256627968 bps
Transmitted:
 Packets : 109355852 471736 pps
 Bytes : 7436198640 256627968 bps
Tail-dropped packets : Not Available
RED-dropped packets : 0 0 pps
 Low : 0 0 pps
 Medium-low : 0 0 pps
 Medium-high : 0 0 pps
 High : 0 0 pps
RED-dropped bytes : 0 0 bps
 Low : 0 0 bps
 Medium-low : 0 0 bps
 Medium-high : 0 0 bps
 High : 0 0 bps
Queue: 1, Forwarding classes: expedited-forwarding
Queued:
 Packets : 0 0 pps
 Bytes : 0 0 bps
Transmitted:
 Packets : 0 0 pps
 Bytes : 0 0 bps
Tail-dropped packets : Not Available
RED-dropped packets : 0 0 pps
 Low : 0 0 pps
 Medium-low : 0 0 pps
 Medium-high : 0 0 pps
 High : 0 0 pps
RED-dropped bytes : 0 0 bps
 Low : 0 0 bps
 Medium-low : 0 0 bps
 Medium-high : 0 0 bps
 High : 0 0 bps
Queue: 2, Forwarding classes: assured-forwarding
Queued:
 Packets : 0 0 pps
 Bytes : 0 0 bps

```

```

Transmitted:
Packets : 0 0 pps
Bytes : 0 0 bps
Tail-dropped packets : Not Available
RED-dropped packets : 0 0 pps
 Low : 0 0 pps
 Medium-low : 0 0 pps
 Medium-high : 0 0 pps
 High : 0 0 pps
RED-dropped bytes : 0 0 bps
 Low : 0 0 bps
 Medium-low : 0 0 bps
 Medium-high : 0 0 bps
 High : 0 0 bps
Queue: 3, Forwarding classes: network-control
Queued:
Packets : 0 0 pps
Bytes : 0 0 bps
Transmitted:
Packets : 0 0 pps
Bytes : 0 0 bps
Tail-dropped packets : Not Available
RED-dropped packets : 0 0 pps
 Low : 0 0 pps
 Medium-low : 0 0 pps
 Medium-high : 0 0 pps
 High : 0 0 pps
RED-dropped bytes : 0 0 bps
 Low : 0 0 bps
 Medium-low : 0 0 bps
 Medium-high : 0 0 bps
 High : 0 0 bps

```

#### show interfaces queue (Channelized OC12 IQE Type 3 PIC in SONET Mode)

```

user@host> show interfaces queue t3-1/1/0:7
Physical interface: t3-1/1/0:7, Enabled, Physical link is Up

 Interface index: 192, SNMP ifIndex: 1948

 Description: full T3 interface connect to 6ce13 t3-3/1/0:7 for FR testing -
 Lam

 Forwarding classes: 16 supported, 9 in use

 Egress queues: 8 supported, 8 in use

 Queue: 0, Forwarding classes: DEFAULT

 Queued:

 Packets : 214886 13449 pps

 Bytes : 9884756 5164536 bps

 Transmitted:

 Packets : 214886 13449 pps

 Bytes : 9884756 5164536 bps

```

|                        |   |       |
|------------------------|---|-------|
| Tail-dropped packets : | 0 | 0 pps |
| RED-dropped packets :  | 0 | 0 pps |
| Low :                  | 0 | 0 pps |
| Medium-low :           | 0 | 0 pps |
| Medium-high :          | 0 | 0 pps |
| High :                 | 0 | 0 pps |
| RED-dropped bytes :    | 0 | 0 bps |
| Low :                  | 0 | 0 bps |
| Medium-low :           | 0 | 0 bps |
| Medium-high :          | 0 | 0 bps |
| High :                 | 0 | 0 bps |

Queue: 1, Forwarding classes: REALTIME

Queued:

|           |   |       |
|-----------|---|-------|
| Packets : | 0 | 0 pps |
| Bytes :   | 0 | 0 bps |

Transmitted:

|                        |   |       |
|------------------------|---|-------|
| Packets :              | 0 | 0 pps |
| Bytes :                | 0 | 0 bps |
| Tail-dropped packets : | 0 | 0 pps |
| RED-dropped packets :  | 0 | 0 pps |
| Low :                  | 0 | 0 pps |
| Medium-low :           | 0 | 0 pps |
| Medium-high :          | 0 | 0 pps |
| High :                 | 0 | 0 pps |
| RED-dropped bytes :    | 0 | 0 bps |
| Low :                  | 0 | 0 bps |
| Medium-low :           | 0 | 0 bps |
| Medium-high :          | 0 | 0 bps |
| High :                 | 0 | 0 bps |

Queue: 2, Forwarding classes: PRIVATE

## Queued:

|         |   |   |       |
|---------|---|---|-------|
| Packets | : | 0 | 0 pps |
| Bytes   | : | 0 | 0 bps |

## Transmitted:

|                      |   |   |       |
|----------------------|---|---|-------|
| Packets              | : | 0 | 0 pps |
| Bytes                | : | 0 | 0 bps |
| Tail-dropped packets | : | 0 | 0 pps |
| RED-dropped packets  | : | 0 | 0 pps |
| Low                  | : | 0 | 0 pps |
| Medium-low           | : | 0 | 0 pps |
| Medium-high          | : | 0 | 0 pps |
| High                 | : | 0 | 0 pps |
| RED-dropped bytes    | : | 0 | 0 bps |
| Low                  | : | 0 | 0 bps |
| Medium-low           | : | 0 | 0 bps |
| Medium-high          | : | 0 | 0 bps |
| High                 | : | 0 | 0 bps |

## Queue: 3, Forwarding classes: CONTROL

## Queued:

|         |   |      |       |
|---------|---|------|-------|
| Packets | : | 60   | 0 pps |
| Bytes   | : | 4560 | 0 bps |

## Transmitted:

|                      |   |      |       |
|----------------------|---|------|-------|
| Packets              | : | 60   | 0 pps |
| Bytes                | : | 4560 | 0 bps |
| Tail-dropped packets | : | 0    | 0 pps |
| RED-dropped packets  | : | 0    | 0 pps |
| Low                  | : | 0    | 0 pps |
| Medium-low           | : | 0    | 0 pps |
| Medium-high          | : | 0    | 0 pps |
| High                 | : | 0    | 0 pps |
| RED-dropped bytes    | : | 0    | 0 bps |

|             |   |   |       |
|-------------|---|---|-------|
| Low         | : | 0 | 0 bps |
| Medium-low  | : | 0 | 0 bps |
| Medium-high | : | 0 | 0 bps |
| High        | : | 0 | 0 bps |

Queue: 4, Forwarding classes: CLASS\_B\_OUTPUT

Queued:

|         |   |   |       |
|---------|---|---|-------|
| Packets | : | 0 | 0 pps |
| Bytes   | : | 0 | 0 bps |

Transmitted:

|                      |   |   |       |
|----------------------|---|---|-------|
| Packets              | : | 0 | 0 pps |
| Bytes                | : | 0 | 0 bps |
| Tail-dropped packets | : | 0 | 0 pps |
| RED-dropped packets  | : | 0 | 0 pps |
| Low                  | : | 0 | 0 pps |
| Medium-low           | : | 0 | 0 pps |
| Medium-high          | : | 0 | 0 pps |
| High                 | : | 0 | 0 pps |
| RED-dropped bytes    | : | 0 | 0 bps |
| Low                  | : | 0 | 0 bps |
| Medium-low           | : | 0 | 0 bps |
| Medium-high          | : | 0 | 0 bps |
| High                 | : | 0 | 0 bps |

Queue: 5, Forwarding classes: CLASS\_C\_OUTPUT

Queued:

|         |   |   |       |
|---------|---|---|-------|
| Packets | : | 0 | 0 pps |
| Bytes   | : | 0 | 0 bps |

Transmitted:

|                      |   |   |       |
|----------------------|---|---|-------|
| Packets              | : | 0 | 0 pps |
| Bytes                | : | 0 | 0 bps |
| Tail-dropped packets | : | 0 | 0 pps |

|                     |   |   |       |
|---------------------|---|---|-------|
| RED-dropped packets | : | 0 | 0 pps |
| Low                 | : | 0 | 0 pps |
| Medium-low          | : | 0 | 0 pps |
| Medium-high         | : | 0 | 0 pps |
| High                | : | 0 | 0 pps |
| RED-dropped bytes   | : | 0 | 0 bps |
| Low                 | : | 0 | 0 bps |
| Medium-low          | : | 0 | 0 bps |
| Medium-high         | : | 0 | 0 bps |
| High                | : | 0 | 0 bps |

Queue: 6, Forwarding classes: CLASS\_V\_OUTPUT

Queued:

|         |   |   |       |
|---------|---|---|-------|
| Packets | : | 0 | 0 pps |
| Bytes   | : | 0 | 0 bps |

Transmitted:

|                      |   |   |       |
|----------------------|---|---|-------|
| Packets              | : | 0 | 0 pps |
| Bytes                | : | 0 | 0 bps |
| Tail-dropped packets | : | 0 | 0 pps |
| RED-dropped packets  | : | 0 | 0 pps |
| Low                  | : | 0 | 0 pps |
| Medium-low           | : | 0 | 0 pps |
| Medium-high          | : | 0 | 0 pps |
| High                 | : | 0 | 0 pps |
| RED-dropped bytes    | : | 0 | 0 bps |
| Low                  | : | 0 | 0 bps |
| Medium-low           | : | 0 | 0 bps |
| Medium-high          | : | 0 | 0 bps |
| High                 | : | 0 | 0 bps |

Queue: 7, Forwarding classes: CLASS\_S\_OUTPUT, GETS

Queued:

|         |   |   |       |
|---------|---|---|-------|
| Packets | : | 0 | 0 pps |
|---------|---|---|-------|

|                      |   |   |       |
|----------------------|---|---|-------|
| Bytes                | : | 0 | 0 bps |
| Transmitted:         |   |   |       |
| Packets              | : | 0 | 0 pps |
| Bytes                | : | 0 | 0 bps |
| Tail-dropped packets | : | 0 | 0 pps |
| RED-dropped packets  | : | 0 | 0 pps |
| Low                  | : | 0 | 0 pps |
| Medium-low           | : | 0 | 0 pps |
| Medium-high          | : | 0 | 0 pps |
| High                 | : | 0 | 0 pps |
| RED-dropped bytes    | : | 0 | 0 bps |
| Low                  | : | 0 | 0 bps |
| Medium-low           | : | 0 | 0 bps |
| Medium-high          | : | 0 | 0 bps |
| High                 | : | 0 | 0 bps |

Packet Forwarding Engine Chassis Queues:

Queues: 8 supported, 8 in use

Queue: 0, Forwarding classes: DEFAULT

Queued:

|         |   |          |             |
|---------|---|----------|-------------|
| Packets | : | 371365   | 23620 pps   |
| Bytes   | : | 15597330 | 7936368 bps |

Transmitted:

|                      |   |          |             |
|----------------------|---|----------|-------------|
| Packets              | : | 371365   | 23620 pps   |
| Bytes                | : | 15597330 | 7936368 bps |
| Tail-dropped packets | : | 0        | 0 pps       |
| RED-dropped packets  | : | 0        | 0 pps       |
| Low                  | : | 0        | 0 pps       |
| Medium-low           | : | 0        | 0 pps       |
| Medium-high          | : | 0        | 0 pps       |



|                   |   |   |       |
|-------------------|---|---|-------|
| High              | : | 0 | 0 pps |
| RED-dropped bytes | : | 0 | 0 bps |
| Low               | : | 0 | 0 bps |
| Medium-low        | : | 0 | 0 bps |
| Medium-high       | : | 0 | 0 bps |
| High              | : | 0 | 0 bps |

Queue: 1, Forwarding classes: REALTIME

Queued:

|         |   |   |       |
|---------|---|---|-------|
| Packets | : | 0 | 0 pps |
| Bytes   | : | 0 | 0 bps |

Transmitted:

|                      |   |   |       |
|----------------------|---|---|-------|
| Packets              | : | 0 | 0 pps |
| Bytes                | : | 0 | 0 bps |
| Tail-dropped packets | : | 0 | 0 pps |
| RED-dropped packets  | : | 0 | 0 pps |
| Low                  | : | 0 | 0 pps |
| Medium-low           | : | 0 | 0 pps |
| Medium-high          | : | 0 | 0 pps |
| High                 | : | 0 | 0 pps |
| RED-dropped bytes    | : | 0 | 0 bps |
| Low                  | : | 0 | 0 bps |
| Medium-low           | : | 0 | 0 bps |
| Medium-high          | : | 0 | 0 bps |
| High                 | : | 0 | 0 bps |

Queue: 2, Forwarding classes: PRIVATE

Queued:

|         |   |   |       |
|---------|---|---|-------|
| Packets | : | 0 | 0 pps |
| Bytes   | : | 0 | 0 bps |

Transmitted:

|         |   |   |       |
|---------|---|---|-------|
| Packets | : | 0 | 0 pps |
| Bytes   | : | 0 | 0 bps |

|                        |   |       |
|------------------------|---|-------|
| Tail-dropped packets : | 0 | 0 pps |
| RED-dropped packets :  | 0 | 0 pps |
| Low :                  | 0 | 0 pps |
| Medium-low :           | 0 | 0 pps |
| Medium-high :          | 0 | 0 pps |
| High :                 | 0 | 0 pps |
| RED-dropped bytes :    | 0 | 0 bps |
| Low :                  | 0 | 0 bps |
| Medium-low :           | 0 | 0 bps |
| Medium-high :          | 0 | 0 bps |
| High :                 | 0 | 0 bps |

Queue: 3, Forwarding classes: CONTROL

Queued:

|           |         |        |
|-----------|---------|--------|
| Packets : | 32843   | 0 pps  |
| Bytes :   | 2641754 | 56 bps |

Transmitted:

|                        |         |        |
|------------------------|---------|--------|
| Packets :              | 32843   | 0 pps  |
| Bytes :                | 2641754 | 56 bps |
| Tail-dropped packets : | 0       | 0 pps  |
| RED-dropped packets :  | 0       | 0 pps  |
| Low :                  | 0       | 0 pps  |
| Medium-low :           | 0       | 0 pps  |
| Medium-high :          | 0       | 0 pps  |
| High :                 | 0       | 0 pps  |
| RED-dropped bytes :    | 0       | 0 bps  |
| Low :                  | 0       | 0 bps  |
| Medium-low :           | 0       | 0 bps  |
| Medium-high :          | 0       | 0 bps  |
| High :                 | 0       | 0 bps  |

Queue: 4, Forwarding classes: CLASS\_B\_OUTPUT

## Queued:

|         |   |   |       |
|---------|---|---|-------|
| Packets | : | 0 | 0 pps |
| Bytes   | : | 0 | 0 bps |

## Transmitted:

|                      |   |   |       |
|----------------------|---|---|-------|
| Packets              | : | 0 | 0 pps |
| Bytes                | : | 0 | 0 bps |
| Tail-dropped packets | : | 0 | 0 pps |
| RED-dropped packets  | : | 0 | 0 pps |
| Low                  | : | 0 | 0 pps |
| Medium-low           | : | 0 | 0 pps |
| Medium-high          | : | 0 | 0 pps |
| High                 | : | 0 | 0 pps |
| RED-dropped bytes    | : | 0 | 0 bps |
| Low                  | : | 0 | 0 bps |
| Medium-low           | : | 0 | 0 bps |
| Medium-high          | : | 0 | 0 bps |
| High                 | : | 0 | 0 bps |

## Queue: 5, Forwarding classes: CLASS\_C\_OUTPUT

## Queued:

|         |   |   |       |
|---------|---|---|-------|
| Packets | : | 0 | 0 pps |
| Bytes   | : | 0 | 0 bps |

## Transmitted:

|                      |   |   |       |
|----------------------|---|---|-------|
| Packets              | : | 0 | 0 pps |
| Bytes                | : | 0 | 0 bps |
| Tail-dropped packets | : | 0 | 0 pps |
| RED-dropped packets  | : | 0 | 0 pps |
| Low                  | : | 0 | 0 pps |
| Medium-low           | : | 0 | 0 pps |
| Medium-high          | : | 0 | 0 pps |
| High                 | : | 0 | 0 pps |
| RED-dropped bytes    | : | 0 | 0 bps |

|             |   |   |       |
|-------------|---|---|-------|
| Low         | : | 0 | 0 bps |
| Medium-low  | : | 0 | 0 bps |
| Medium-high | : | 0 | 0 bps |
| High        | : | 0 | 0 bps |

Queue: 6, Forwarding classes: CLASS\_V\_OUTPUT

Queued:

|         |   |   |       |
|---------|---|---|-------|
| Packets | : | 0 | 0 pps |
| Bytes   | : | 0 | 0 bps |

Transmitted:

|                      |   |   |       |
|----------------------|---|---|-------|
| Packets              | : | 0 | 0 pps |
| Bytes                | : | 0 | 0 bps |
| Tail-dropped packets | : | 0 | 0 pps |
| RED-dropped packets  | : | 0 | 0 pps |
| Low                  | : | 0 | 0 pps |
| Medium-low           | : | 0 | 0 pps |
| Medium-high          | : | 0 | 0 pps |
| High                 | : | 0 | 0 pps |
| RED-dropped bytes    | : | 0 | 0 bps |
| Low                  | : | 0 | 0 bps |
| Medium-low           | : | 0 | 0 bps |
| Medium-high          | : | 0 | 0 bps |
| High                 | : | 0 | 0 bps |

Queue: 7, Forwarding classes: CLASS\_S\_OUTPUT, GETS

Queued:

|         |   |   |       |
|---------|---|---|-------|
| Packets | : | 0 | 0 pps |
| Bytes   | : | 0 | 0 bps |

Transmitted:

|                      |   |   |       |
|----------------------|---|---|-------|
| Packets              | : | 0 | 0 pps |
| Bytes                | : | 0 | 0 bps |
| Tail-dropped packets | : | 0 | 0 pps |

|                     |   |   |       |
|---------------------|---|---|-------|
| RED-dropped packets | : | 0 | 0 pps |
| Low                 | : | 0 | 0 pps |
| Medium-low          | : | 0 | 0 pps |
| Medium-high         | : | 0 | 0 pps |
| High                | : | 0 | 0 pps |
| RED-dropped bytes   | : | 0 | 0 bps |
| Low                 | : | 0 | 0 bps |
| Medium-low          | : | 0 | 0 bps |
| Medium-high         | : | 0 | 0 bps |
| High                | : | 0 | 0 bps |

### show interfaces queue (QFX Series)

```

user@switch> show interfaces queue xe-0/0/15
Physical interface: xe-0/0/15, Enabled, Physical link is Up
Interface index: 49165, SNMP ifIndex: 539
Forwarding classes: 12 supported, 8 in use
Egress queues: 12 supported, 8 in use
Queue: 0, Forwarding classes: best-effort
 Queued:
 Packets : 0 0 pps
 Bytes : 0 0 bps
 Transmitted:
 Packets : 0 0 pps
 Bytes : 0 0 bps
 Tail-dropped packets : Not Available
 Total-dropped packets: 0 0 pps
 Total-dropped bytes : 0 0 bps
Queue: 3, Forwarding classes: fcoe
 Queued:
 Packets : 0 0 pps
 Bytes : 0 0 bps
 Transmitted:
 Packets : 0 0 pps
 Bytes : 0 0 bps
 Tail-dropped packets : Not Available
 Total-dropped packets: 0 0 pps
 Total-dropped bytes : 0 0 bps
0 bps
Queue: 4, Forwarding classes: no-loss
 Queued:
 Packets : 0 0 pps
 Bytes : 0 0 bps
 Transmitted:
 Packets : 0 0 pps
 Bytes : 0 0 bps
 Tail-dropped packets : Not Available
 Total-dropped packets: 0 0 pps
 Total-dropped bytes : 0 0 bps
Queue: 7, Forwarding classes: network-control

```

```

Queued:
 Packets : 0 0 pps
 Bytes : 0 0 bps
Transmitted:
 Packets : 0 0 pps
 Bytes : 0 0 bps
 Tail-dropped packets : Not Available
 Total-dropped packets: 0 0 pps
 Total-dropped bytes : 0 0 bps
Queue: 8, Forwarding classes: mcast
Queued:
 Packets : 0 0 pps
 Bytes : 0 0 bps
Transmitted:
 Packets : 0 0 pps
 Bytes : 0 0 bps
 Tail-dropped packets : Not Available
 Total-dropped packets: 0 0 pps
 Total-dropped bytes : 0 0 bps

```

#### show interfaces queue l2-statistics (lsq interface)

```

user@switch> show interfaces queue lsq-2/2/0.2 l2-statistics
Logical interface lsq-2/2/0.2 (Index 69) (SNMP ifIndex 1598)
Forwarding classes: 16 supported, 4 in use
Egress queues: 8 supported, 4 in use
Burst size: 0
Queue: 0, Forwarding classes: be
Queued:
 Packets : 1 0 pps
 Bytes : 1001 0 bps
Transmitted:
 Packets : 5 0 pps
 Bytes : 1062 0 bps
 Tail-dropped packets : 0 0 pps
 RED-dropped packets : 0 0 pps
 RED-dropped bytes : 0 0 bps
Queue: 1, Forwarding classes: ef
Queued:
 Packets : 1 0 pps
 Bytes : 1500 0 bps
Transmitted:
 Packets : 6 0 pps
 Bytes : 1573 0 bps
 Tail-dropped packets : 0 0 pps
 RED-dropped packets : 0 0 pps
 RED-dropped bytes : 0 0 bps
Queue: 2, Forwarding classes: af
Queued:
 Packets : 1 0 pps
 Bytes : 512 0 bps
Transmitted:
 Packets : 3 0 pps
 Bytes : 549 0 bps
 Tail-dropped packets : 0 0 pps
 RED-dropped packets : 0 0 pps
 RED-dropped bytes : 0 0 bps
Queue: 3, Forwarding classes: nc
Queued:
 Packets : 0 0 pps

```

```

Bytes : 0 0 bps
Transmitted:
Packets : 0 0 pps
Bytes : 0 0 bps
Tail-dropped packets : 0 0 pps
RED-dropped packets : 0 0 pps
RED-dropped bytes : 0 0 bps
=====

```

### show interfaces queue lsq (lsq-ifd)

```

user@switch> show interfaces queue lsq-1/0/0
Logical interface lsq-1/0/0 (Index 348) (SNMP ifIndex 660)
Forwarding classes: 16 supported, 4 in use
Egress queues: 8 supported, 4 in use
Burst size: 0
Queue: 0, Forwarding classes: be
 Queued:
 Packets : 55576 1206 pps
 Bytes : 29622008 5145472 bps
 Transmitted:
 Packets : 55576 1206 pps
 Bytes : 29622008 5145472 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
 Low : 0 0 pps
 Medium-low : 0 0 pps
 Medium-high : 0 0 pps
 High : 0 0 pps
 RED-dropped bytes : 0 0 bps
 Low : 0 0 bps
 Medium-low : 0 0 bps
 Medium-high : 0 0 bps
 High : 0 0 bps
Queue: 1, Forwarding classes: ef
 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
 Low : 0 0 pps
 Medium-low : 0 0 pps
 Medium-high : 0 0 pps
 High : 0 0 pps
 RED-dropped bytes : 0 0 bps
 Low : 0 0 bps
 Medium-low : 0 0 bps
 Medium-high : 0 0 bps
 High : 0 0 bps
Queue: 2, Forwarding classes: af
 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
 Low : 0 0 pps
 Medium-low : 0 0 pps
 Medium-high : 0 0 pps
 High : 0 0 pps
RED-dropped bytes : 0 0 bps
 Low : 0 0 bps
 Medium-low : 0 0 bps
 Medium-high : 0 0 bps
 High : 0 0 bps
Queue: 3, Forwarding classes: nc
Queued:
Packets : 22231 482 pps
Bytes : 11849123 2057600 bps
Transmitted:
Packets : 22231 482 pps
Bytes : 11849123 2057600 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
 Low : 0 0 pps
 Medium-low : 0 0 pps
 Medium-high : 0 0 pps
 High : 0 0 pps
RED-dropped bytes : 0 0 bps
 Low : 0 0 bps
 Medium-low : 0 0 bps
 Medium-high : 0 0 bps
 High : 0 0 bps
```



## show interfaces xe

**Supported Platforms** [EX4600](#), [OCX1100](#), [QFabric System](#), [QFX Series standalone switches](#)

**Syntax** `show interfaces device-name:type-fpc/pic/port`  
`<brief | detail | extensive | terse>`  
`<descriptions>`  
`<media>`  
`<routing-instance (all | instance-name)>`  
`<snmp-index snmp-index>`  
`<statistics>`

**Release Information** 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.

**Description** Display status information about the specified 10-Gigabit Ethernet interface. This command does not display statistics for routed VLAN interfaces.

**Options** `device-name:type-fpc/pic/port`—(QFabric systems only) The device name is either the serial number or the alias of the QFabric system component, such as a Node device, Interconnect device, or QFabric infrastructure. The name must contain a maximum of 128 characters and not contain any colons.

`brief | detail | extensive | terse`—(Optional) Display the specified level of output.

`descriptions`—(Optional) Display interface description strings.

`media`—(Optional) Display media-specific information about network interfaces.

`routing-instance (all | instance-name)`—(Optional) Display the name of an individual routing instance or display all routing instances.

`snmp-index snmp-index`—(Optional) Display information for the specified SNMP index of the interface.

`statistics`—(Optional) Display static interface statistics.

**Required Privilege Level** view

**Related Documentation**

- [Monitoring Interface Status and Traffic on page 53](#)
- [Troubleshooting Network Interfaces on page 54](#)
- [Troubleshooting an Aggregated Ethernet Interface on page 75](#)
- [Junos OS Network Interfaces Library for Routing Devices](#)

**List of Sample Output** [show interfaces on page 311](#)  
[show interfaces \(Asymmetric Flow Control\) on page 312](#)  
[show interfaces brief on page 312](#)  
[show interfaces detail on page 312](#)  
[show interfaces detail \(Asymmetric Flow Control\) on page 314](#)

[show interfaces extensive on page 315](#)

[show interfaces extensive \(Asymmetric Flow Control\) on page 317](#)

[show interfaces terse on page 319](#)

[show interfaces \(QFabric System\) on page 319](#)

**Output Fields** Table 24 on page 304 lists the output fields for the **show interfaces xe** command. Output fields are listed in the approximate order in which they appear.

**Table 24: show interfaces xe Output Fields**

| Field Name                                                                              | Field Description                                                                                                                                                                             | Level of Output              |
|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Physical Interface</b>                                                               |                                                                                                                                                                                               |                              |
| <b>Physical interface</b>                                                               | Name of the physical interface.                                                                                                                                                               | All levels                   |
| <b>Enabled</b>                                                                          | State of the interface.                                                                                                                                                                       | All levels                   |
| <b>Interface index</b>                                                                  | Index number of the physical interface, which reflects its initialization sequence.                                                                                                           | <b>detail extensive none</b> |
| <b>SNMP ifIndex</b>                                                                     | SNMP index number for the physical interface.                                                                                                                                                 | <b>detail extensive none</b> |
| <b>Generation</b>                                                                       | Unique number for use by Juniper Networks technical support only.                                                                                                                             | <b>detail extensive</b>      |
| <b>Link-level type</b>                                                                  | Encapsulation being used on the physical interface.                                                                                                                                           | All levels                   |
| <b>MTU</b>                                                                              | Maximum transmission unit size on the physical interface.                                                                                                                                     | All levels                   |
| <b>Speed</b>                                                                            | Speed at which the interface is running.                                                                                                                                                      | All levels                   |
| <b>Duplex</b>                                                                           | Duplex mode of the interface, either <b>Full-Duplex</b> or <b>Half-Duplex</b> .                                                                                                               | All levels                   |
| <b>Loopback</b>                                                                         | Loopback status: <b>Enabled</b> or <b>Disabled</b> . If loopback is enabled, type of loopback: <b>Local</b> or <b>Remote</b> .                                                                | All levels                   |
| <b>Source filtering</b>                                                                 | Source filtering status: <b>Enabled</b> or <b>Disabled</b> .                                                                                                                                  | All levels                   |
| <b>LAN-PHY mode</b>                                                                     | 10-Gigabit Ethernet interface operating in Local Area Network Physical Layer Device (LAN PHY) mode. LAN PHY allows 10-Gigabit Ethernet wide area links to use existing Ethernet applications. | All levels                   |
| <b>Unidirectional</b>                                                                   | Unidirectional link mode status for 10-Gigabit Ethernet interface: <b>Enabled</b> or <b>Disabled</b> for parent interface; <b>Rx-only</b> or <b>Tx-only</b> for child interfaces.             | All levels                   |
| <b>Flow control</b>                                                                     | Flow control status: <b>Enabled</b> or <b>Disabled</b> .                                                                                                                                      | All levels                   |
| <b>NOTE:</b> This field is only displayed if asymmetric flow control is not configured. |                                                                                                                                                                                               |                              |

Table 24: show interfaces xe Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Level of Output              |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Configured-flow-control</b> | <p>Configured flow control for the interface transmit buffers (<b>tx-buffers</b>) and receive buffers (<b>rx-buffers</b>):</p> <ul style="list-style-type: none"> <li><b>tx-buffers</b>—<b>On</b> if the interface is configured to respond to Ethernet PAUSE messages received from the connected peer.<br/><b>Off</b> if the interface is not configured to respond to received PAUSE messages.</li> <li><b>rx-buffers</b>—<b>On</b> if the interface is configured to generate and send Ethernet PAUSE messages to the connected peer.<br/><b>Off</b> if the interface is not configured to generate and send PAUSE messages.</li> </ul> <p><b>NOTE:</b> This field is only displayed if asymmetric flow control is configured.</p> | All levels                   |
| <b>Auto-negotiation</b>        | Autonegotiation status: <b>Enabled</b> or <b>Disabled</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | All levels                   |
| <b>Remote-fault</b>            | <p>Remote fault status:</p> <ul style="list-style-type: none"> <li><b>Online</b>—Autonegotiation is manually configured as online.</li> <li><b>Offline</b>—Autonegotiation is manually configured as offline.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | All levels                   |
| <b>Device flags</b>            | Information about the physical device.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | All levels                   |
| <b>Interface flags</b>         | Information about the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | All levels                   |
| <b>Link flags</b>              | Information about the link.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | All levels                   |
| <b>Wavelength</b>              | Configured wavelength, in nanometers (nm).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | All levels                   |
| <b>Frequency</b>               | Frequency associated with the configured wavelength, in terahertz (THz).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | All levels                   |
| <b>CoS queues</b>              | Number of CoS queues configured.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>detail extensive none</b> |
| <b>Schedulers</b>              | Number of CoS schedulers configured.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>extensive</b>             |
| <b>Hold-times</b>              | Current interface hold-time up and hold-time down, in milliseconds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive</b>      |
| <b>Current address</b>         | Configured MAC address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive none</b> |
| <b>Hardware address</b>        | Hardware MAC address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>detail extensive none</b> |
| <b>Last flapped</b>            | Date, time, and how long ago the interface went from down to up. The format is <b>Last flapped: year-month-day hour:minute:second:timezone (hour:minute:second ago)</b> . For example, <b>Last flapped: 2008-01-16 10:52:40 UTC (3d 22:58 ago)</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>detail extensive none</b> |
| <b>Input Rate</b>              | Input rate in bits per second (bps) and packets per second (pps).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | None specified               |
| <b>Output Rate</b>             | Output rate in bps and pps.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | None specified               |
| <b>Statistics last cleared</b> | Time when the statistics for the interface were last set to zero.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>detail extensive</b>      |

Table 24: show interfaces xe Output Fields (*continued*)

| Field Name                | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Level of Output         |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Traffic statistics</b> | <p>Number and rate of bytes and packets received and transmitted on the physical interface.</p> <ul style="list-style-type: none"> <li>• <b>Input bytes</b>—Number of bytes received on the interface.</li> <li>• <b>Output bytes</b>—Number of bytes transmitted on the interface.</li> <li>• <b>Input packets</b>—Number of packets received on the interface.</li> <li>• <b>Output packets</b>—Number of packets transmitted on the interface.</li> </ul> <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>Policed discards</b>—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that Junos OS does not handle.</li> <li>• <b>L3 incompletes</b>—Number of incoming packets discarded because they failed Layer 3 sanity checks of the header. For example, a frame with less than 20 bytes of available IP header is discarded. L3 incomplete errors can be ignored if you configure the <b>ignore-l3-incompletes</b> statement.</li> <li>• <b>L2 channel errors</b>—Number of times the software did not find a valid logical interface for an incoming frame.</li> <li>• <b>L2 mismatch timeouts</b>—Number of malformed or short packets that caused the incoming packet handler to discard the frame as unreadable.</li> <li>• <b>FIFO errors</b>—Number of FIFO errors in the receive direction that are reported by the ASIC on the PIC. If this value is ever nonzero, the PIC is probably malfunctioning.</li> <li>• <b>Resource errors</b>—Sum of transmit drops.</li> </ul> | <b>extensive</b>        |

Table 24: show interfaces xe 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>Collisions</b>—Number of Ethernet collisions. The Gigabit Ethernet PIC supports only full-duplex operation, so for Gigabit Ethernet PICs, this number should always remain 0. If it is nonzero, there is a software bug.</li> <li>• <b>Aged packets</b>—Number of packets that remained in shared packet SDRAM so long that the system automatically purged them. The value in this field should never increment. If it does, it is most likely a software bug or possibly malfunctioning hardware.</li> <li>• <b>FIFO errors</b>—Number of FIFO errors in the send direction as reported by the ASIC on the PIC. If this value is ever nonzero, the PIC is probably malfunctioning.</li> <li>• <b>HS link CRC errors</b>—Number of errors on the high-speed links between the ASICs responsible for handling the router interfaces.</li> <li>• <b>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 (Egress)</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>Ingress queues</b>           | Total number of ingress queues supported on the specified interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>extensive</b>        |
| <b>Queue counters (Ingress)</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>extensive</b>        |

Table 24: show interfaces xe Output Fields (*continued*)

| Field Name                              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Level of Output              |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <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>PCS statistics</b>                   | Physical Coding Sublayer (PCS) fault conditions from the LAN PHY device.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive</b>      |
| <b>MAC statistics</b>                   | <p>Receive and Transmit statistics reported by the PIC's MAC subsystem.</p> <ul style="list-style-type: none"> <li>• <b>Total octets and 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, Broadcast packets, and 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>                | Receive and Transmit statistics reported by the PIC's MAC address filter subsystem.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>extensive</b>             |

Table 24: show interfaces xe Output Fields (*continued*)

| Field Name                  | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Level of Output |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Autonegotiation information | <p>Information about link autonegotiation.</p> <ul style="list-style-type: none"> <li>• <b>Negotiation status:</b> <ul style="list-style-type: none"> <li>• <b>Incomplete</b>—Ethernet interface has the speed or link mode configured.</li> <li>• <b>No autonegotiation</b>—Remote Ethernet interface has the speed or link mode configured, or does not perform autonegotiation.</li> <li>• <b>Complete</b>—Ethernet interface is connected to a device that performs autonegotiation and the autonegotiation process is successful.</li> </ul> </li> <li>• <b>Link partner status</b>—OK when the Ethernet interface is connected to a device that performs autonegotiation and the autonegotiation process is successful.</li> <li>• <b>Link partner:</b> <ul style="list-style-type: none"> <li>• <b>Link mode</b>—Depending on the capability of the attached Ethernet device, either <b>Full-duplex</b> or <b>Half-duplex</b>.</li> <li>• <b>Flow control</b>—Types of flow control supported by the remote Ethernet device. For Fast Ethernet interfaces, the type is <b>None</b>. For Gigabit Ethernet interfaces, types are <b>Symmetric</b> (link partner supports <b>PAUSE</b> on receive and transmit), <b>Asymmetric</b> (link partner supports <b>PAUSE</b> on transmit), and <b>Symmetric/Asymmetric</b> (link partner supports both <b>PAUSE</b> on receive and transmit or only <b>PAUSE</b> receive).</li> <li>• <b>Remote fault</b>—Remote fault information from the link partner—<b>Failure</b> indicates a receive link error. <b>OK</b> indicates that the link partner is receiving. <b>Negotiation error</b> indicates a negotiation error. <b>Offline</b> indicates that the link partner is going offline.</li> </ul> </li> <li>• <b>Local resolution:</b> <ul style="list-style-type: none"> <li>• <b>Flow control</b>—Types of flow control supported by the remote Ethernet device. For Gigabit Ethernet interfaces, types are <b>Symmetric</b> (link partner supports <b>PAUSE</b> on receive and transmit), <b>Asymmetric</b> (link partner supports <b>PAUSE</b> on transmit), and <b>Symmetric/Asymmetric</b> (link partner supports both <b>PAUSE</b> on receive and transmit or only <b>PAUSE</b> receive). For asymmetric <b>PAUSE</b>, shows if the <b>PAUSE</b> transmit and <b>PAUSE</b> receive states on the interface are <b>enable</b> or <b>disable</b>.</li> <li>• <b>Remote fault</b>—Remote fault information. <b>Link OK</b> (no error detected on receive), <b>Offline</b> (local interface is offline), and <b>Link Failure</b> (link error detected on receive).</li> </ul> </li> </ul> | extensive       |

Table 24: show interfaces xe Output Fields (*continued*)

| Field Name                                    | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Level of Output              |
|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Packet Forwarding Engine configuration</b> | Information about the configuration of the Packet Forwarding Engine: <ul style="list-style-type: none"> <li><b>Destination slot</b>—FPC slot number.</li> <li><b>CoS transmit queue</b>—Queue number and its associated user-configured forwarding class name.</li> <li><b>Bandwidth %</b>—Percentage of bandwidth allocated to the queue.</li> <li><b>Bandwidth bps</b>—Bandwidth allocated to the queue (in bps).</li> <li><b>Buffer %</b>—Percentage of buffer space allocated to the queue.</li> <li><b>Buffer usec</b>—Amount of buffer space allocated to the queue, in microseconds. This value is nonzero only if the buffer size is configured in terms of time.</li> <li><b>Priority</b>—Queue priority: <b>low</b> or <b>high</b>.</li> <li><b>Limit</b>—Displayed if rate limiting is configured for the queue. Possible values are <b>none</b> and <b>exact</b>. If <b>exact</b> is configured, the queue transmits only up to the configured bandwidth, even if excess bandwidth is available. If <b>none</b> is configured, the queue transmits beyond the configured bandwidth if bandwidth is available.</li> </ul> | <b>extensive</b>             |
| <b>Logical Interface</b>                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                              |
| <b>Logical interface</b>                      | Name of the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | All levels                   |
| <b>Index</b>                                  | Index number of the logical interface, which reflects its initialization sequence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>detail extensive none</b> |
| <b>SNMP ifIndex</b>                           | SNMP interface index number for the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive none</b> |
| <b>Generation</b>                             | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive</b>      |
| <b>Flags</b>                                  | Information about the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | All levels                   |
| <b>Encapsulation</b>                          | Encapsulation on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | All levels                   |
| <b>Protocol</b>                               | Protocol family.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>detail extensive none</b> |
| <b>Traffic statistics</b>                     | Number and rate of bytes and packets received (input) and transmitted (output) on the specified interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>detail extensive</b>      |
| <b>IPv6 transit statistics</b>                | If IPv6 statics tracking is enabled, number of IPv6 bytes and packets received and transmitted on the logical interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>extensive</b>             |
| <b>Local statistics</b>                       | Number and rate of bytes and packets destined to and from the switch.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>extensive</b>             |
| <b>Transit statistics</b>                     | Number and rate of bytes and packets transiting the switch.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>extensive</b>             |
| <b>Generation</b>                             | Unique number for use by Juniper Networks technical support only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive</b>      |
| <b>Route Table</b>                            | Route table in which the logical interface address is located. For example, <b>0</b> refers to the routing table inet.0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive none</b> |



Table 24: show interfaces xe Output Fields (*continued*)

| Field Name              | Field Description                                                                                                                                                                                                                                                                                                                                                                                  | Level of Output              |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Input Filters</b>    | Names of any input filters applied to this interface.                                                                                                                                                                                                                                                                                                                                              | <b>detail extensive</b>      |
| <b>Output Filters</b>   | Names of any output filters applied to this interface.                                                                                                                                                                                                                                                                                                                                             | <b>detail extensive</b>      |
| <b>Flags</b>            | Information about protocol family flags.<br><br>If unicast Reverse Path Forwarding (uRPF) is explicitly configured on the specified interface, the uRPF flag appears. If uRPF was configured on a different interface (and therefore is enabled on all switch interfaces) but was not explicitly configured on the specified interface, the uRPF flag does not appear even though uRPF is enabled. | <b>detail extensive</b>      |
| <b>Addresses, Flags</b> | Information about the address flags.                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive none</b> |
| <i>protocol-family</i>  | Protocol family configured on the logical interface. If the protocol is <b>inet</b> , the IP address of the interface is also displayed.                                                                                                                                                                                                                                                           | <b>brief</b>                 |
| <b>Flags</b>            | Information about the address flag.                                                                                                                                                                                                                                                                                                                                                                | <b>detail extensive none</b> |
| <b>Destination</b>      | IP address of the remote side of the connection.                                                                                                                                                                                                                                                                                                                                                   | <b>detail extensive none</b> |
| <b>Local</b>            | IP address of the logical interface.                                                                                                                                                                                                                                                                                                                                                               | <b>detail extensive none</b> |
| <b>Broadcast</b>        | Broadcast address of 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>      |

## Sample Output

### show interfaces

```

user@switch> show interfaces xe-0/0/1
Physical interface: xe-0/0/1, Enabled, Physical link is Up
 Interface index: 49195, SNMP ifIndex: 591
 Link-level type: Ethernet, MTU: 1514, Speed: 10Gbps, Duplex: Full-Duplex, BPDU
 Error: None, MAC-REWRITE Error: None, Loopback: Disabled, Source filtering:
 Disabled,
 Flow control: Disabled
 Device flags : Present Running
 Interface flags: SNMP-Traps Internal: 0x0
 Link flags : None
 CoS queues : 12 supported, 12 maximum usable queues
 Current address: 00:1d:b5:f7:4e:e1, Hardware address: 00:1d:b5:f7:4e:e1
 Last flapped : 2011-06-01 00:42:03 PDT (00:02:42 ago)
 Input rate : 0 bps (0 pps)
 Output rate : 0 bps (0 pps)
 Active alarms : None
 Active defects : None

Logical interface xe-0/0/1.0 (Index 73) (SNMP ifIndex 523)
 Flags: SNMP-Traps 0x0 Encapsulation: ENET2
 Input packets : 0

```

```
Output packets: 0
Protocol eth-switch, MTU: 0
Flags: Trunk-Mode
```

### show interfaces (Asymmetric Flow Control)

```
user@switch> show interfaces xe-0/0/1
Physical interface: xe-0/0/1, Enabled, Physical link is Up
 Interface index: 49195, SNMP ifIndex: 591
 Link-level type: Ethernet, MTU: 1514, Speed: 10Gbps, Duplex: Full-Duplex, BPDU
 Error: None, MAC-REWRITE Error: None, Loopback: Disabled, Source filtering:
Disabled,
 Configured-flow-control tx-buffers: off rx-buffers: on
 Device flags : Present Running
 Interface flags: SNMP-Traps Internal: 0x0
 Link flags : None
 CoS queues : 12 supported, 12 maximum usable queues
 Current address: 00:1d:b5:f7:4e:e1, Hardware address: 00:1d:b5:f7:4e:e1
 Last flapped : 2011-06-01 00:42:03 PDT (00:02:42 ago)
 Input rate : 0 bps (0 pps)
 Output rate : 0 bps (0 pps)
 Active alarms : None
 Active defects : None

Logical interface xe-0/0/1.0 (Index 73) (SNMP ifIndex 523)
 Flags: SNMP-Traps 0x0 Encapsulation: ENET2
 Input packets : 0
 Output packets: 0
 Protocol eth-switch, MTU: 0
 Flags: Trunk-Mode
```

### show interfaces brief

```
user@switch> show interfaces xe-0/0/1 brief
Physical interface: xe-0/0/1, Enabled, Physical link is Up
 Link-level type: Ethernet, MTU: 1514, Speed: 1000mbps, Loopback: Disabled,
 Source filtering: Disabled, Flow control: Enabled
 Device flags : Present Running
 Interface flags: SNMP-Traps Internal: 0x0
 Link flags : None

Logical interface xe-0/0/1.0
 Flags: SNMP-Traps Encapsulation: ENET2
 eth-switch
```

### show interfaces detail

```
user@switch> show interfaces xe-0/0/1 detail
Physical interface: xe-0/0/1, Enabled, Physical link is Up
 Interface index: 49195, SNMP ifIndex: 591, Generation: 169
 Link-level type: Ethernet, MTU: 1514, Speed: 10Gbps, Duplex: Full-Duplex, BPDU
 Error: None, MAC-REWRITE Error: None, Loopback: Disabled, Source filtering:
Disabled,
 Flow control: Disabled
 Device flags : Present Running
 Interface flags: SNMP-Traps Internal: 0x0
 Link flags : None
 CoS queues : 12 supported, 12 maximum usable queues
 Hold-times : Up 0 ms, Down 0 ms
 Current address: 00:1d:b5:f7:4e:e1, Hardware address: 00:1d:b5:f7:4e:e1
```

```

Last flapped : 2011-06-01 00:42:03 PDT (00:02:50 ago)
Statistics last cleared: 2011-06-01 00:44:39 PDT (00:00:14 ago)
Traffic statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets: 0 0 pps
 Output packets: 0 0 pps
IPv6 transit statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Egress queues: 12 supported, 9 in use
Queue counters: Queued packets Transmitted packets Dropped packets

 0 best-effort 0 0 0
 1 fc7 0 0 0
 2 no-loss 0 0 0
 3 fcoe 0 0 0
 4 fc4 0 0 0
 5 fc5 0 0 0
 6 fc6 0 0 0
 7 network-cont 0 0 0
 8 mcast 0 0 0

Queue number: Mapped forwarding classes
 0 best-effort
 1 fc7
 2 no-loss
 3 fcoe
 4 fc4
 5 fc5
 6 fc6
 7 network-control
 8 mcast
Active alarms : None
Active defects : None

Logical interface xe-0/0/1.0 (Index 73) (SNMP ifIndex 523) (Generation 143)
Flags: SNMP-Traps 0x0 Encapsulation: ENET2
Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Local statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Transit statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps

```

```

Input packets: 0 0 pps
Output packets: 0 0 pps
Protocol eth-switch, MTU: 0, Generation: 170, Route table: 0
Flags: Trunk-Mode

```

### show interfaces detail (Asymmetric Flow Control)

```

user@switch> show interfaces xe-0/0/1 detail
Physical interface: xe-0/0/1, Enabled, Physical link is Up
 Interface index: 49195, SNMP ifIndex: 591, Generation: 169
 Link-level type: Ethernet, MTU: 1514, Speed: 10Gbps, Duplex: Full-Duplex, BPDU
 Error: None, MAC-REWRITE Error: None, Loopback: Disabled, Source filtering:
 Disabled,
 Configured-flow-control tx-buffers: off rx-buffers: on
 Device flags : Present Running
 Interface flags: SNMP-Traps Internal: 0x0
 Link flags : None
 CoS queues : 12 supported, 12 maximum usable queues
 Hold-times : Up 0 ms, Down 0 ms
 Current address: 00:1d:b5:f7:4e:e1, Hardware address: 00:1d:b5:f7:4e:e1
 Last flapped : 2011-06-01 00:42:03 PDT (00:02:50 ago)
 Statistics last cleared: 2011-06-01 00:44:39 PDT (00:00:14 ago)
 Traffic statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets: 0 0 pps
 Output packets: 0 0 pps
 IPv6 transit statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
 Egress queues: 12 supported, 9 in use
 Queue counters:
 Queued packets Transmitted packets Dropped packets

 0 best-effort 0 0 0
 1 fc7 0 0 0
 2 no-loss 0 0 0
 3 fcoe 0 0 0
 4 fc4 0 0 0
 5 fc5 0 0 0
 6 fc6 0 0 0
 7 network-cont 0 0 0
 8 mcast 0 0 0

 Queue number: Mapped forwarding classes
 0 best-effort
 1 fc7
 2 no-loss
 3 fcoe
 4 fc4
 5 fc5
 6 fc6

```

```

7 network-control
8 mcast
Active alarms : None
Active defects : None

Logical interface xe-0/0/1.0 (Index 73) (SNMP ifIndex 523) (Generation 143)
Flags: SNMP-Traps 0x0 Encapsulation: ENET2
Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Local statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Transit statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets: 0 0 pps
 Output packets: 0 0 pps
Protocol eth-switch, MTU: 0, Generation: 170, Route table: 0
Flags: Trunk-Mode

```

#### show interfaces extensive

```

user@switch> show interfaces xe-0/0/1 extensive
Physical interface: xe-0/0/1, Enabled, Physical link is Up
Interface index: 49195, SNMP ifIndex: 591, Generation: 169
Link-level type: Ethernet, MTU: 1514, Speed: 10Gbps, Duplex: Full-Duplex, BPDU
Error: None, MAC-REWRITE Error: None, Loopback: Disabled, Source filtering:
Disabled,
Flow control: Disabled
Device flags : Present Running
Interface flags: SNMP-Traps Internal: 0x0
Link flags : None
CoS queues : 12 supported, 12 maximum usable queues
Hold-times : Up 0 ms, Down 0 ms
Current address: 00:1d:b5:f7:4e:e1, Hardware address: 00:1d:b5:f7:4e:e1
Last flapped : 2011-06-01 00:42:03 PDT (00:03:08 ago)
Statistics last cleared: 2011-06-01 00:44:39 PDT (00:00:32 ago)
Traffic statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets: 0 0 pps
 Output packets: 0 0 pps
IPv6 transit statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Input errors:
 Errors: 0, Drops: 0, 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: 12 supported, 9 in use
Queue counters: Queued packets Transmitted packets Dropped packets

```

|                |   |   |   |
|----------------|---|---|---|
| 0 best-effort  | 0 | 0 | 0 |
| 1 fc7          | 0 | 0 | 0 |
| 2 no-loss      | 0 | 0 | 0 |
| 3 fcoe         | 0 | 0 | 0 |
| 4 fc4          | 0 | 0 | 0 |
| 5 fc5          | 0 | 0 | 0 |
| 6 fc6          | 0 | 0 | 0 |
| 7 network-cont | 0 | 0 | 0 |
| 8 mcast        | 0 | 0 | 0 |

Queue number:            Mapped forwarding classes

|   |                 |
|---|-----------------|
| 0 | best-effort     |
| 1 | fc7             |
| 2 | no-loss         |
| 3 | fcoe            |
| 4 | fc4             |
| 5 | fc5             |
| 6 | fc6             |
| 7 | network-control |
| 8 | mcast           |

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       |          |

MAC Priority Flow Control Statistics:

|              |   |   |
|--------------|---|---|
| Priority : 0 | 0 | 0 |
| Priority : 1 | 0 | 0 |
| Priority : 2 | 0 | 0 |
| Priority : 3 | 0 | 0 |
| Priority : 4 | 0 | 0 |
| Priority : 5 | 0 | 0 |
| Priority : 6 | 0 | 0 |
| Priority : 7 | 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: 1, CAM source filters: 0
Packet Forwarding Engine configuration:
 Destination slot: 0
CoS information:
 Direction : Output
 CoS transmit queue Bandwidth Buffer Priority
Limit
 % bps % usec
0 best-effort 75 7500000000 75 0 low
none
7 network-control 5 500000000 5 0 low
none
8 mcast 20 2000000000 20 0 low
none

Logical interface xe-0/0/1.0 (Index 73) (SNMP ifIndex 523) (Generation 143)
Flags: SNMP-Traps 0x0 Encapsulation: ENET2
Traffic statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Local statistics:
 Input bytes : 0
 Output bytes : 0
 Input packets: 0
 Output packets: 0
Transit statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets: 0 0 pps
 Output packets: 0 0 pps
Protocol eth-switch, MTU: 0, Generation: 170, Route table: 0
Flags: Trunk-Mode

```

### show interfaces extensive (Asymmetric Flow Control)

```

user@switch> show interfaces xe-0/0/1 extensive
Physical interface: xe-0/0/1, Enabled, Physical link is Up
Interface index: 49195, SNMP ifIndex: 591, Generation: 169
Link-level type: Ethernet, MTU: 1514, Speed: 10Gbps, Duplex: Full-Duplex, BPDU
Error: None, MAC-REWRITE Error: None, Loopback: Disabled, Source filtering:
Disabled,
Configured-flow-control tx-buffers: off rx-buffers: on
Device flags : Present Running
Interface flags: SNMP-Traps Internal: 0x0
Link flags : None
CoS queues : 12 supported, 12 maximum usable queues
Hold-times : Up 0 ms, Down 0 ms
Current address: 00:1d:b5:f7:4e:e1, Hardware address: 00:1d:b5:f7:4e:e1
Last flapped : 2011-06-01 00:42:03 PDT (00:03:08 ago)
Statistics last cleared: 2011-06-01 00:44:39 PDT (00:00:32 ago)
Traffic statistics:
 Input bytes : 0 0 bps
 Output bytes : 0 0 bps
 Input packets: 0 0 pps
 Output packets: 0 0 pps
IPv6 transit statistics:
 Input bytes : 0

```

```

Output bytes : 0
Input packets: 0
Output packets: 0
Input errors:
Errors: 0, Drops: 0, 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: 12 supported, 9 in use
Queue counters: Queued packets Transmitted packets Dropped packets

0 best-effort 0 0 0
1 fc7 0 0 0
2 no-loss 0 0 0
3 fcoe 0 0 0
4 fc4 0 0 0
5 fc5 0 0 0
6 fc6 0 0 0
7 network-cont 0 0 0
8 mcast 0 0 0

Queue number: Mapped forwarding classes
0 best-effort
1 fc7
2 no-loss
3 fcoe
4 fc4
5 fc5
6 fc6
7 network-control
8 mcast

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
MAC Priority Flow Control Statistics:
Priority : 0 0 0
Priority : 1 0 0

```



```

Priority : 2 0 0
Priority : 3 0 0
Priority : 4 0 0
Priority : 5 0 0
Priority : 6 0 0
Priority : 7 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: 1, CAM source filters: 0
Packet Forwarding Engine configuration:
Destination slot: 0
CoS information:
Direction : Output
CoS transmit queue Bandwidth Buffer Priority Limit
 % bps % usec
0 best-effort 75 7500000000 75 0 low none
7 network-control 5 500000000 5 0 low none
8 mcast 20 2000000000 20 0 low none

Logical interface xe-0/0/1.0 (Index 73) (SNMP ifIndex 523) (Generation 143)
Flags: SNMP-Traps 0x0 Encapsulation: ENET2
Traffic statistics:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0
Local statistics:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0
Transit statistics:
Input bytes : 0 0 bps
Output bytes : 0 0 bps
Input packets: 0 0 pps
Output packets: 0 0 pps
Protocol eth-switch, MTU: 0, Generation: 170, Route table: 0
Flags: Trunk-Mode

```

### show interfaces terse

```

user@switch> show interfaces xe-0/0/1 terse
Interface Admin Link Proto Local Remote

xe-0/0/1 up up
xe-0/0/1.0 up up eth-switch

```

### show interfaces (QFabric System)

```

user@switch> show interfaces node1:xe-0/0/0
Physical interface: node1:xe-0/0/0, Enabled, Physical link is Down
Interface index: 129, SNMP ifIndex: 2884086
Link-level type: Ethernet, MTU: 1514, Speed: 10Gbps, Duplex: Full-Duplex, BPDU
Error: None, MAC-REWRITE Error: None,
Loopback: Disabled, Source filtering: Disabled, Flow control: Enabled

```

Interface flags: Internal: 0x4000  
CoS queues : 8 supported, 8 maximum usable queues  
Current address: 02:00:09:03:00:00, Hardware address: 02:00:09:03:00:00  
Last flapped : Never  
Input rate : 0 bps (0 pps)  
Output rate : 0 bps (0 pps)

## CHAPTER 14

# LAGs and LACP Operational Commands

- `show lacp interfaces`
- `show lacp statistics interfaces` (View)

## show lacp interfaces

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supported Platforms</b>      | EX Series, MX Series, OCX1100, QFabric System, QFX Series standalone switches                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Syntax</b>                   | show lacp interfaces<br><interface-name>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b>      | Command introduced in Junos OS Release 10.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.1 for the QFX Series.<br>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.<br>Command introduced in Junos OS Release 14.2R3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Description</b>              | Display Link Aggregation Control Protocol (LACP) information about the specified aggregated Ethernet or Gigabit Ethernet interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Options</b>                  | none—Display LACP information for all interfaces.<br><br><i>interface-name</i> —(Optional) Display LACP information for the specified interface: <ul style="list-style-type: none"> <li>• Aggregated Ethernet—<i>aex</i></li> <li>• Gigabit Ethernet—<i>ge-fpc/pic/port</i></li> <li>• 10-Gigabit Ethernet—<i>xe-fpc/pic/port</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Example: Configuring Aggregated Ethernet High-Speed Uplinks Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch</i></li> <li>• <i>Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch</i></li> <li>• <i>Example: Configuring Link Aggregation Between a QFX Series Product and an Aggregation Switch</i></li> <li>• <i>Configuring Aggregated Ethernet Links (CLI Procedure)</i></li> <li>• <a href="#">Configuring Link Aggregation on page 67</a></li> <li>• <i>Configuring Aggregated Ethernet LACP (CLI Procedure)</i></li> <li>• <a href="#">Configuring Aggregated Ethernet LACP on page 66</a></li> <li>• <i>Configuring LACP Link Protection of Aggregated Ethernet Interfaces (CLI Procedure)</i></li> <li>• <i>Understanding Aggregated Ethernet Interfaces and LACP</i></li> <li>• <a href="#">Understanding Aggregated Ethernet Interfaces and LACP on page 63</a></li> <li>• <a href="#">Junos OS Interfaces Fundamentals Configuration Guide</a></li> </ul> |
| <b>List of Sample Output</b>    | <a href="#">show lacp interfaces (EX Series Switches) on page 324</a><br><a href="#">show lacp interfaces (QFX Series) on page 325</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

**Output Fields** Table 25 on page 323 lists the output fields for the **show lacp interfaces** command. Output fields are listed in the approximate order in which they appear.

**Table 25: show lacp interfaces Output Fields**

| Field Name           | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Aggregated interface | Aggregated Ethernet interface name.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| LACP State           | <p>LACP state information for each aggregated Ethernet interface:</p> <ul style="list-style-type: none"> <li>For a child interface configured with the <b>force-up</b> statement, LACP state displays <b>FUP</b> along with the interface name.</li> <li><b>Role</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 the LACP negotiation.</li> <li><b>Partner</b>—Remote device participating in the LACP negotiation.</li> </ul> </li> <li><b>Exp</b>—Expired state. <b>Yes</b> indicates that the actor or partner is in an expired state. <b>No</b> indicates that the actor or partner is not in an expired state.</li> <li><b>Def</b>—Default. <b>Yes</b> indicates that the actor's receive machine is using the default operational partner information, which is administratively configured for the partner. <b>No</b> indicates that the operational partner information in use has been received in an LACP PDU.</li> <li><b>Dist</b>—Distribution of outgoing frames. <b>No</b> indicates that the distribution of outgoing frames on the link is currently disabled and is not expected to be enabled. Otherwise, the value is <b>Yes</b>.</li> <li><b>Col</b>—Collection of incoming frames. <b>Yes</b> indicates that the collection of incoming frames on the link is currently enabled and is not expected to be disabled. Otherwise, the value is <b>No</b>.</li> <li><b>Syn</b>—Synchronization. If the value is <b>Yes</b>, the link is considered to be synchronized. The link has been allocated to the correct link aggregation group, the group has been associated with a compatible aggregator, and the identity of the link aggregation group is consistent with the system ID and operational key information transmitted. If the value is <b>No</b>, the link is not synchronized. The link is currently not in the right aggregation.</li> <li><b>Aggr</b>—Ability of the aggregation port to aggregate (<b>Yes</b>) or to operate only as an individual link (<b>No</b>).</li> <li><b>Timeout</b>—LACP timeout preference. Periodic transmissions of LACP PDUs occur at either a slow or a fast transmission rate, depending upon the expressed LACP timeout preference (<b>Long Timeout</b> or <b>Short Timeout</b>).</li> <li><b>Activity</b>—Actor's or partner's port activity. <b>Passive</b> indicates the port's preference for not transmitting LAC PDUs unless its partner's control value is <b>Active</b>. <b>Active</b> indicates the port's preference to participate in the protocol regardless of the partner's control value.</li> </ul> |

Table 25: show lacp interfaces Output Fields (*continued*)

| Field Name    | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| LACP Protocol | <p>LACP protocol information for each aggregated interface:</p> <ul style="list-style-type: none"> <li>Link state (active or standby) indicated in parentheses next to the interface when link protection is configured.</li> <li><b>Receive State</b>—One of the following values: <ul style="list-style-type: none"> <li><b>Current</b>—The state machine receives an LACP PDU and enters the <b>Current</b> state.</li> <li><b>Defaulted</b>—If no LACP PDU is received before the timer for the <b>Current</b> state expires a second time, the state machine enters the <b>Defaulted</b> state.</li> <li><b>Expired</b>—If no LACP PDU is received before the timer for the <b>Current</b> state expires once, the state machine enters the <b>Expired</b> state.</li> <li><b>Initialize</b>—When the physical connectivity of a link changes or a Begin event occurs, the state machine enters the <b>Initialize</b> state.</li> <li><b>LACP Disabled</b>—If the port is operating in half duplex, the operation of LACP is disabled on the port, forcing the state to <b>LACP Disabled</b>. This state is similar to the <b>Defaulted</b> state, except that the port is forced to operate as an individual port.</li> <li><b>Port Disabled</b>—If the port becomes inoperable and a Begin event has not occurred, the state machine enters the <b>Port Disabled</b> state.</li> </ul> </li> <li><b>Transmit State</b>—Transmit state of the state machine. The transmit state is one of the following values: <ul style="list-style-type: none"> <li><b>Fast periodic</b>—Periodic transmissions are enabled at a fast transmission rate.</li> <li><b>No periodic</b>—Periodic transmissions are disabled.</li> <li><b>Periodic timer</b>—Transitory state entered when the periodic timer expires.</li> <li><b>Slow periodic</b>—Periodic transmissions are enabled at a slow transmission rate.</li> </ul> </li> <li><b>Mux State</b>—State of the multiplexer state machine for the aggregation port. The state is one of the following values: <ul style="list-style-type: none"> <li><b>Attached</b>—The multiplexer state machine initiates the process of attaching the port to the selected aggregator.</li> <li><b>Collecting</b>—<b>Yes</b> indicates that the receive function of this link is enabled with respect to its participation in an aggregation. Received frames are passed to the aggregator for collection. <b>No</b> indicates the receive function of this link is not enabled.</li> <li><b>Collecting distributing</b>—Collecting and distributing states are merged together to form a combined state (coupled control). Because independent control is not possible, the coupled control state machine does not wait for the partner to signal that collection has started before enabling both collection and distribution.</li> <li><b>Detached</b>—Process of detaching the port from the aggregator is in progress.</li> <li><b>Distributing</b>—<b>Yes</b> indicates that the transmit function of this link is enabled with respect to its participation in an aggregation. Frames can be passed down from the aggregator's distribution function for transmission. <b>No</b> indicates the transmit function of this link is not enabled.</li> <li><b>Waiting</b>—The multiplexer state machine is in a holding process, awaiting an outcome.</li> </ul> </li> </ul> |

## Sample Output

### show lacp interfaces (EX Series Switches)

```

user@switch> show lacp interfaces ae5
Aggregated interface: ae5
 LACP state: Role Exp Def Dist Col Syn Aggr Timeout Activity
 xe-2/0/7 Actor No No Yes Yes Yes Yes Fast Active
 xe-2/0/7 Partner No No Yes Yes Yes Yes Fast Passive

```

|          |         |    |    |    |     |     |     |      |         |
|----------|---------|----|----|----|-----|-----|-----|------|---------|
| xe-4/0/7 | Actor   | No | No | No | No  | No  | Yes | Fast | Active  |
| xe-4/0/7 | Partner | No | No | No | Yes | Yes | Yes | Fast | Passive |

|                    |               |                |                         |
|--------------------|---------------|----------------|-------------------------|
| LACP protocol:     | Receive State | Transmit State | Mux State               |
| xe-2/0/7(Active)   | Current       | Fast periodic  | Collecting distributing |
| xe-34/0/7(Standby) | Current       | Fast periodic  | Waiting                 |

### show lacp interfaces (QFX Series)

```
user@switch> show lacp interfaces nodegroup1:ae0 extensive
```

```
Aggregated interface: nodegroup1:ae0
```

| LACP state:       | Role    | Exp | Def | Dist | Col | Syn | Aggr | Timeout | Activity |
|-------------------|---------|-----|-----|------|-----|-----|------|---------|----------|
| node1:xe-0/0/1FUP | Actor   | No  | Yes | No   | No  | No  | No   | Yes     | Fast     |
| Active            |         |     |     |      |     |     |      |         |          |
| node1xe-0/0/1FUP  | Partner | No  | Yes | No   | No  | No  | No   | Yes     | Fast     |
| Passive           |         |     |     |      |     |     |      |         |          |
| node2:xe-0/0/2    | Actor   | No  | Yes | No   | No  | No  | No   | Yes     | Fast     |
| Active            |         |     |     |      |     |     |      |         |          |
| node2:xe-0/0/2    | Partner | No  | Yes | No   | No  | No  | No   | Yes     | Fast     |
| Passive           |         |     |     |      |     |     |      |         |          |

|              | LACP protocol:           | Receive State | Transmit State | Mux State  |
|--------------|--------------------------|---------------|----------------|------------|
|              | node1:xe-0/0/1FUP        | Current       | Fast periodic  | Collecting |
| distributing | node2:xe-0/0/2           | Current       | Fast periodic  | Collecting |
| distributing | node1:xe-0/0/1 (active)  | Current       | Fast periodic  | Collecting |
| distributing | node2:xe-0/0/2 (standby) | Current       | Fast periodic  | WAITING    |



## show lacp statistics interfaces (View)

**Supported Platforms** [SRX Series](#)

**Syntax** `show lacp statistics interfaces interface-name`

**Release Information** Command modified in Junos OS Release 10.2.

**Description** Display Link Aggregation Control Protocol (LACP) statistics about the specified aggregated Ethernet interface or redundant Ethernet interface. If you do not specify an interface name, LACP statistics for all interfaces are displayed.

**Options** *interface-name*—(Optional) Name of an interface.

**Required Privilege Level** view

**Related Documentation**

- [Verifying LACP on Redundant Ethernet Interfaces](#)
- [Verifying the Status of a LAG Interface on page 74](#)
- [Verifying That LACP Is Configured Correctly and Bundle Members Are Exchanging LACP Protocol Packets on page 74](#)

**List of Sample Output** [show lacp statistics interfaces on page 327](#)

**Output Fields** [Table 26 on page 327](#) lists the output fields for the `show lacp statistics interfaces` command. Output fields are listed in the approximate order in which they appear.

**Table 26: show lacp statistics interfaces Output Fields**

| Field Name           | Field Description                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Aggregated interface | Aggregated interface value.                                                                                                                                                                                                                                                                                                                                                                                  |
| LACP Statistics      | <p>LACP statistics provide 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> |

## Sample Output

### show lacp statistics interfaces

```

user@host> show lacp statistics interfaces ae0
Aggregated interface: ae0
LACP Statistics: LACP Rx LACP Tx Unknown Rx Illegal Rx
ge-2/0/0 1352 2035 0 0
ge-2/0/1 1352 2056 0 0
ge-2/2/0 1352 2045 0 0
ge-2/2/1 1352 2043 0 0

```



## CHAPTER 15

# Redundant Trunk Group Operational Command

- `show redundant-trunk-group`

## show redundant-trunk-group

|                                 |                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supported Platforms</b>      | EX Series, QFX Series standalone switches                                                                                                                                                                                                                                                                         |
| <b>Syntax</b>                   | <code>show redundant-trunk-group &lt;group-name group-name&gt;</code>                                                                                                                                                                                                                                             |
| <b>Release Information</b>      | Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 13.2X50-D15 for the QFX Series.                                                                                                                                                                      |
| <b>Description</b>              | Display information about redundant trunk groups.                                                                                                                                                                                                                                                                 |
| <b>Options</b>                  | <code>group-name group-name</code> —Display information about the specified redundant trunk group.                                                                                                                                                                                                                |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                              |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Example: Configuring Redundant Trunk Links for Faster Recovery</a></li> <li>• <a href="#">Example: Configuring Redundant Trunk Links for Faster Recovery on page 91</a></li> <li>• <a href="#">Understanding Redundant Trunk Links on page 89</a></li> </ul> |

**List of Sample Output** [show redundant-trunk-group group-name Group1 on page 330](#)

**Output Fields** [Table 27 on page 330](#) lists the output fields for the `show redundant-trunk-group` command. Output fields are listed in the approximate order in which they appear.

**Table 27: show redundant-trunk-group Output Fields**

| Field Name        | Field Description                                                                                                                                                                                                                                                                        |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Group name        | Name of the redundant trunk port group.                                                                                                                                                                                                                                                  |
| Interface         | Name of an interface belonging to the trunk port group.                                                                                                                                                                                                                                  |
| State             | Operating state of the interface. <ul style="list-style-type: none"> <li>• <b>Up</b> denotes the interface is up.</li> <li>• <b>Down</b> denotes the interface is down.</li> <li>• <b>Pri</b> denotes a primary interface.</li> <li>• <b>Act</b> denotes an active interface.</li> </ul> |
| Time of last flap | Date and time at which the advertised link became unavailable, and then, available again.                                                                                                                                                                                                |
| Flap count        | Total number of flaps since the last switch reboot.                                                                                                                                                                                                                                      |

## Sample Output

`show redundant-trunk-group group-name Group1`

```
user@switch> show redundant-trunk-group group-name Group1
```

| Group name | Interface   | State      | Time of last flap | Flap Count |
|------------|-------------|------------|-------------------|------------|
| Group1     | ge-0/0/45.0 | UP/Pri/Act | Never             | 0          |
|            | ge-0/0/47.0 | UP         | Never             | 0          |

