

## Interfaces Feature Guide



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#### *Interfaces Feature Guide*

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## Documentation and Release Notes

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

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

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## Using the Examples in This Manual

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

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

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

## Merging a Full Example

To merge a full example, follow these steps:

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

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

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

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

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

## Merging a Snippet

To merge a snippet, follow these steps:

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

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

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

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

```
[edit]
```

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

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

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

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

## Documentation Conventions

Table 1 on page 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
<b>Bold text like this</b>	Represents text that you type.	To enter configuration mode, type the <b>configure</b> command:  user@host> <b>configure</b>

Table 2: Text and Syntax Conventions (continued)

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



Table 2: Text and Syntax Conventions (continued)

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

## Documentation Feedback

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

- Online feedback rating system—On any page of the Juniper Networks TechLibrary site at <https://www.juniper.net/documentation/index.html>, simply click the stars to rate the content, and use the pop-up form to provide us with information about your experience. Alternately, you can use the online feedback form at <https://www.juniper.net/documentation/feedback/>.
- E-mail—Send your comments to [techpubs-comments@juniper.net](mailto:techpubs-comments@juniper.net). Include the document or topic name, URL or page number, and software version (if applicable).

## Requesting Technical Support

Technical product support is available through the Juniper Networks Technical Assistance Center (JTAC). If you are a customer with an active 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 <https://www.juniper.net/us/en/local/pdf/resource-guides/7100059-en.pdf>.
- Product warranties—For product warranty information, visit <https://www.juniper.net/support/warranty/>.
- JTAC hours of operation—The JTAC centers have resources available 24 hours a day, 7 days a week, 365 days a year.

## Self-Help Online Tools and Resources

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

- Find CSC offerings: <https://www.juniper.net/customers/support/>
- Search for known bugs: <https://prsearch.juniper.net/>
- Find product documentation: <https://www.juniper.net/documentation/>
- Find solutions and answer questions using our Knowledge Base: <https://kb.juniper.net/>

- Download the latest versions of software and review release notes:  
<https://www.juniper.net/customers/csc/software/>
- Search technical bulletins for relevant hardware and software notifications:  
<https://kb.juniper.net/InfoCenter/>
- Join and participate in the Juniper Networks Community Forum:  
<https://www.juniper.net/company/communities/>
- Open a case online in the CSC Case Management tool: <https://www.juniper.net/cm/>

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

## 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 <https://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 <https://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 on page 3](#)
- [Configuring Ethernet OAM Link Fault Management \(CLI Procedure\) on page 4](#)

## Understanding Ethernet OAM Link Fault Management

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Juniper Networks Junos operating system (Junos OS) for Juniper Networks 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:

- 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 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*

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## Configuring Ethernet OAM Link Fault Management (CLI Procedure)

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



## PART 2

# Interfaces

- [Understanding Interfaces on page 11](#)



## CHAPTER 2

# Understanding Interfaces

- [Interfaces Overview for Switches on page 11](#)
- [Understanding Interface Naming Conventions on page 16](#)
- [Understanding Interface Ranges for Switches on page 29](#)
- [Understanding Management Interfaces on page 31](#)
- [Understanding Port Ranges and System Modes on page 33](#)
- [Configuring the Interface Address on page 59](#)
- [Configuring Gigabit and 10-Gigabit Ethernet Interfaces for EX4600 and QFX Series Switches on page 61](#)
- [Configuring Ethernet Loopback Capability on page 67](#)
- [Monitoring Interface Status and Traffic on page 67](#)
- [Troubleshooting Network Interfaces on page 67](#)

## Interfaces Overview for Switches

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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 for EX Series on page 11](#)
- [Special Interfaces for EX Series on page 12](#)
- [Network Interfaces for EX4600, NFX Series, QFX Series, QFabric System on page 14](#)
- [Special Interfaces for EX4600, NFX Series, QFX Series, QFabric System on page 15](#)
- [Network Interfaces for OCX Series on page 15](#)
- [Special Interfaces for OCX Series on page 16](#)

## Network Interfaces for EX Series

Network interfaces connect to the network and carry network traffic. [Table 3 on page 12](#) lists the types of network interfaces supported on EX Series switches.

**Table 3: Network Interfaces Types and Purposes for EX Series**

Type	Purpose
Aggregated Ethernet interfaces	<p>All EX Series switches allow you to 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.</p> <p>See <a href="#">“Understanding Aggregated Ethernet Interfaces and LACP for Switches”</a> on page 77.</p>
LAN access interfaces	<p>Use these EX Series switch interfaces to connect a personal computer, laptop, file server, or printer to the network. When you power on an EX Series switch and use the factory-default configuration, the software automatically configures interfaces in access mode for each of the network ports. The default configuration also enables autonegotiation for both speed and link mode.</p>
Power over Ethernet (PoE) interfaces	<p>EX Series switches provide PoE network ports with various switch models. These ports can be used to connect voice over IP (VoIP) telephones, wireless access points, video cameras, and point-of-sale devices to safely receive power from the same access ports that are used to connect personal computers to the network. PoE interfaces are enabled by default in the factory configuration.</p> <p>See <a href="#">Understanding PoE on EX Series Switches</a>.</p>
Trunk interfaces	<p>EX Series access switches can be connected to a distribution switch or customer-edge (CE) switches or routers. To use a port for this type of connection, you must explicitly configure the network interface for trunk mode. The interfaces from the distribution switch or CE switch to the access switches must also be configured for trunk mode.</p>

## Special Interfaces for EX Series

Table 4 on page 12 lists the types of special interfaces supported on EX Series switches.

**Table 4: Special Interfaces Types and Purposes for EX Series**

Type	Purpose
Console port	<p>Each EX Series switch has a serial port, labeled <b>CON</b> or <b>CONSOLE</b>, for connecting tty-type terminals to the switch using standard PC-type tty cables. The console port does not have a physical address or IP address associated with it. However, it is an interface since it provides access to the switch. On an EX3300 Virtual Chassis, an EX4200 Virtual Chassis, or an EX4500 Virtual Chassis, you can access the master and configure all members of the Virtual Chassis through any member's console port. For more information about the console port in a Virtual Chassis, see <a href="#">Understanding Global Management of a Virtual Chassis</a>.</p>
Loopback	<p>All EX Series switches have this software-only virtual interface that is always up. The loopback interface provides a stable and consistent interface and IP address on the switch.</p>
Management interface	<p>The Juniper Networks Junos operating system (Junos OS) for EX Series switches automatically creates the switch's management Ethernet interface, me0. The management Ethernet interface provides an out-of-band method for connecting to the switch. To use me0 as a management port, you must configure its logical port, me0.0, with a valid IP address. You can connect to the management interface over the network using utilities such as SSH or Telnet. SNMP can use the management interface to gather statistics from the switch. (The management interface me0 is analogous to the fxp0 interfaces on routers running Junos OS.)</p> <p>See <a href="#">“Understanding Management Interfaces”</a> on page 31.</p>

Table 4: Special Interfaces Types and Purposes for EX Series (continued)

Type	Purpose
Integrated Routing and Bridging (IRB) Interface or Routed VLAN Interface (RVI)	<p>EX Series switches use an integrated routing and bridging (IRB) interface or Routed VLAN Interface (RVI) to route traffic from one broadcast domain to another and to 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 IRB interface or RVI functions as a logical router, eliminating the need for having both a switch and a router. These interfaces must be configured as part of a broadcast domain or virtual private LAN service (VPLS) routing instance for Layer 3 traffic to be routed from.</p> <p>See <i>Understanding Integrated Routing and Bridging</i>.</p>
Virtual Chassis port (VCP) interfaces	<p>Virtual Chassis ports (VCPs) are used to interconnect switches in a Virtual Chassis:</p> <ul style="list-style-type: none"> <li>EX3300 switches—Port 2 and port 3 of the SFP+ uplink ports are preconfigured as VCPs and can be used to interconnect up to six EX3300 switches in an EX3300 Virtual Chassis. See <i>Setting an Uplink Port on an EX Series or QFX Series Switch as a Virtual Chassis Port</i>.</li> <li>EX4200 and EX4500 switches—Each EX4200 switch or each EX4500 switch with a Virtual Chassis module installed has two dedicated VCPs on its rear panel. These ports can be used to interconnect up to ten EX4200 switches in an EX4200 Virtual Chassis, up to ten EX4500 switches in an EX4500 Virtual Chassis, and up to ten switches in a mixed EX4200 and EX4500 Virtual Chassis. When you power on switches that are interconnected in this manner, the software automatically configures the VCP interfaces for the dedicated ports that have been interconnected. These VCP interfaces are not configurable or modifiable.</li> </ul> <p>You can also interconnect EX4200 and EX4500 switches by using uplink module ports. Using uplink ports allows you to connect switches over longer distances than you can by using the dedicated VCPs. To use the uplink ports as VCPs, you must explicitly configure the uplink module ports on the members you want to connect as VCPs. See <i>Setting an Uplink Port on an EX Series or QFX Series Switch as a Virtual Chassis Port</i>.</p> <ul style="list-style-type: none"> <li>EX4300 switches—All QSFP+ ports are configured as VCPs, by default. See <i>Understanding EX4300 Virtual Chassis</i>.</li> </ul> <p>You can also interconnect EX4300 switches into a Virtual Chassis by using SFP+ uplink module ports as VCPs. Using uplink ports as VCPs allows you to connect switches over longer distances than you can by using the QSFP+ ports as VCPs. To use the uplink ports as VCPs, you must explicitly configure the uplink module ports on the members you want to connect as VCPs. See <i>Setting an Uplink Port on an EX Series or QFX Series Switch as a Virtual Chassis Port</i>.</p> <ul style="list-style-type: none"> <li>EX8200 switches—EX8200 switches can be connected to an XRE200 External Routing Engine to create an EX8200 Virtual Chassis. The XRE200 External Routing Engine has dedicated VCPs that connect to ports on the internal Routing Engines of the EX8200 switches and can connect to another XRE200 External Routing Engine for redundancy. These ports require no configuration. See <i>XRE200 External Routing Engine Hardware Overview</i>.</li> </ul> <p>You can also connect two members of an EX8200 Virtual Chassis so that they can exchange Virtual Chassis Control Protocol (VCCP) traffic. To do so, you explicitly configure network ports on the EX8200 switches as VCPs.</p>
Virtual management Ethernet (VME) interface	<p>EX3300, EX4200, EX4300, and EX4500 switches have a VME interface. This is a logical interface that is used for Virtual Chassis configurations and allows you to manage all the members of the Virtual Chassis through the master. For more information about the VME interface, see <i>Understanding Global Management of a Virtual Chassis</i>.</p> <p>EX8200 switches do not use a VME interface. An EX8200 Virtual Chassis is managed through the management Ethernet (me0) interface on the XRE200 External Routing Engine.</p>

## Network Interfaces for EX4600, NFX Series, QFX Series, QFabric System

Network interfaces connect to the network and carry network traffic. [Table 5 on page 14](#) lists the types of network interfaces supported.

**Table 5: Network Interfaces Types and Purposes for EX4600, NFX Series, QFX Series, QFabric System**

Type	Purpose
Aggregated Ethernet interfaces	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.
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"> <li>10-Gigabit Ethernet interfaces (<i>xe</i>)</li> <li>40-Gigabit Ethernet interfaces (<i>et</i> and <i>xle</i>)</li> <li>40-Gigabit data plane uplink interfaces (<i>fte</i>)</li> </ul> <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><b>NOTE:</b> You cannot configure channelized interfaces to operate as Virtual Chassis ports.</p>
Ethernet Interfaces	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	<p>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.</p> <p>See <i>Overview of Fibre Channel</i>.</p>
LAN access interfaces	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	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	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	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.



**Table 5: Network Interfaces Types and Purposes for EX4600, NFX Series, QFX Series, QFabric System (continued)**

Type	Purpose
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, QFX5110, QFX5200, 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 <b>request virtual-chassis-vc-port-set</b> CLI command. QFX5110 switches also support configuring 100-Gigabit QSFP28 ports as VCPs.

## Special Interfaces for EX4600, NFX Series, QFX Series, QFabric System

Table 6 on page 15 lists the types of special interfaces supported.

**Table 6: Special Interfaces Types and Purposes supported on EX4600, NFX Series, QFX Series, QFabric System**

Type	Purpose
Console port	Each device has a serial console port, labeled <b>CON</b> or <b>CONSOLE</b> , 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><b>NOTE:</b> On OCX Series switches, the em0 management interface always has the status <b>up</b> in <b>show</b> 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>

## Network Interfaces for OCX Series

Network interfaces connect to the network and carry network traffic. Table 7 on page 15 lists the types of network interfaces supported.

**Table 7: Network Interfaces Types and Purposes for OCX Series**

Type	Purpose
Aggregated Ethernet interfaces	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.
Ethernet Interfaces	Configure Gigabit Ethernet, 10-Gigabit Ethernet, 40-Gigabit Ethernet interfaces to connect to other servers, storage, and switches.

## Special Interfaces for OCX Series

Table 8 on page 16 lists the types of special interfaces supported.

**Table 8: Special Interfaces Types and Purposes for OCX Series**

Type	Purpose
Console port	Each device has a serial console port, labeled <b>CON</b> or <b>CONSOLE</b> , 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><b>NOTE:</b> On OCX Series switches, the em0 management interface always has the status <b>up</b> in <b>show</b> 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>

### Related Documentation

- [EX2200 Switches Hardware Overview](#)
- [EX3200 Switches Hardware Overview](#)
- [EX3300 Switches Hardware Overview](#)
- [EX4200 Switches Hardware Overview](#)
- [EX4300 Switches Hardware Overview](#)
- [EX4500 Switches Hardware Overview](#)
- [EX6210 Switch Hardware Overview](#)
- [EX8208 Switch Hardware Overview](#)
- [EX8216 Switch Hardware Overview](#)
- [Understanding Interface Naming Conventions on page 16](#)
- [Understanding Layer 3 Logical Interfaces on page 71](#)
- [Understanding Layer 3 Subinterfaces](#)

## Understanding Interface Naming Conventions

The EX Series, QFX Series, NFX Series, OCX1100, QFabric System, and EX4600 devices use a naming convention for defining the interfaces that are 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 for EX Series on page 17](#)
- [Logical Part of an Interface Name for EX Series on page 18](#)
- [Wildcard Characters in Interface Names for EX Series on page 19](#)
- [Physical Part of an Interface Name for QFX series, NFX Series, EX4600, QFabric System on page 19](#)
- [Logical Part of an Interface Name on a Switch Running QFabric Software Package for QFX series, NFX Series, EX4600, QFabric System on page 27](#)
- [Logical Part of a Channelized Interface Name on a Switch Running Enhanced Layer 2 Software for QFX series, NFX Series, EX4600, QFabric System on page 27](#)
- [Wildcard Characters in Interface Names for QFX series, NFX Series, EX4600, QFabric System on page 28](#)
- [Physical Part of an Interface Name for OCX1100 on page 28](#)
- [Wildcard Characters in Interface Names for OCX1100 on page 28](#)

## Physical Part of an Interface Name for EX Series

Network interfaces in Junos OS are specified as follows:

*type-fpc / pic / port*

EX Series switches apply this convention as follows:

- *type*—EX Series interfaces use the following media types:
  - *ge*—Gigabit Ethernet interface
  - *xe*—10 Gigabit Ethernet interface
  - *et*—40 Gigabit Ethernet interface
- *fpc*—Flexible PIC Concentrator. EX Series interfaces use the following convention for the FPC number in interface names:
  - On an EX2200 switch, an EX3200 switch, a standalone EX3300 switch, a standalone EX4200 switch, a standalone EX4300 switch, a standalone EX4500, and a standalone EX4550 switch, FPC refers to the switch itself. The FPC number is **0** by default on these switches.
  - On an EX3300 Virtual Chassis, an EX4200 Virtual Chassis, an EX4300 Virtual Chassis, an EX4500 Virtual Chassis, an EX4550 Virtual Chassis, or a mixed Virtual Chassis, the FPC number indicates the member ID of the switch in the Virtual Chassis.
  - On an EX6200 switch and a standalone EX8200 switch, the FPC number indicates the slot number of the line card that contains the physical interface. On an EX6200 switch, the FPC number also indicates the slot number of the Switch Fabric and Routing Engine (SRE) module that contains the uplink port.
  - On an EX8200 Virtual Chassis, the FPC number indicates the slot number of the line card on the Virtual Chassis. The line card slots on Virtual Chassis member 0 are numbered 0 through 15; on member 1, they are numbered 16 through 31, and so on.

- *pic*—EX Series interfaces use the following convention for the PIC (Physical Interface Card) number in interface names:
  - On EX2200, EX3200, EX3300, EX4200, EX4500 switch, and EX4550 switches, the PIC number is **0** for all built-in interfaces (interfaces that are not uplink ports).
  - On EX2200, EX3200, EX3300, and EX4200 switches, the PIC number is **1** for uplink ports.
  - On EX4300 switches, the PIC number is **0** for built-in network ports, **1** for built-in QSFP+ ports (located on the rear panel of the switch), and **2** for uplink module ports.
  - On EX4500 switches, the PIC number is **1** for ports on the left-hand uplink module and **2** for ports on the right-hand uplink module.
  - On EX4550 switches, the PIC number is **1** for ports in the expansion module or Virtual Chassis module installed in the module slot on the front panel of the switch and **2** for those in the expansion module or Virtual Chassis module installed in the module slot on the rear panel of the switch.
  - On EX6200 and EX8200 switches, the PIC number is always **0**.
- *port*—EX Series interfaces use the following convention for port numbers:
  - On EX2200, EX3200, EX3300, EX4200, EX4300, EX4500, and EX4550 switches, built-in network ports are numbered from left to right. On models that have two rows of ports, the ports on the top row start with **0** followed by the remaining even-numbered ports, and the ports on the bottom row start with **1** followed by the remaining odd-numbered ports.
  - Uplink ports in EX2200, EX3200, EX3300, EX4200, EX4300, EX4500, and EX4550 switches are labeled from left to right, starting with **0**.
  - On EX6200 and EX8200 switches, the network ports are numbered from left to right on each line card. On line cards that have two rows of ports, the ports on the top row start with **0** followed by the remaining even-numbered ports, and the ports on the bottom row start with **1** followed by the remaining odd-numbered ports.
  - Uplink ports on an SRE module in an EX6200 switch are labeled from left to right, starting with **0**.

## Logical Part of an Interface Name for EX Series

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: *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
ge-0/0/0.0	down	remote-analyzer	unblocked
ge-0/0/1.0	down	default	unblocked
ge-0/0/10.0	down	default	unblocked

## Wildcard Characters in Interface Names for EX Series

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 (" ").

## Physical Part of an Interface Name for QFX series, NFX Series, EX4600, QFabric System

Interfaces in Junos OS are specified as follows:

*device-name:type-fpc/pic/port*

The convention is as follows (and platform support depends on the Junos OS release in your installation):

- *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, QFX5200, QFX10000, and EX4600 switches running Enhanced Layer 2 Software)
  - **et**—100-Gigabit Ethernet interface (QFX5200 and QFX10000 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, QFX5100 devices running a QFabric software package, and QFX10002 switches, 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, QFX5200, EX4600, QFX10002, QFX10008, and QFX10016 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, EX4600, and QFX10002 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:

**Table 9: Naming Conventions for PICs**

Device with Software Package	Convention
QFX3500 switch with 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.
QFX3500 switch with 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.
QFX3500 Node device with a QFabric software package	PIC 0 can support 48 ports and PIC 1 can support four 40-Gigabit data plane uplink ports.
QFX3600 switch with a QFabric software package	PIC 0 can support 64 10-Gigabit Ethernet ports, and PIC 1 can support 16 40-Gigabit Ethernet ports.
QFX3600 switch with Enhanced Layer 2 software	PIC 0 can support 64 10-Gigabit Ethernet ports and can also support 16 40-Gigabit Ethernet ports.
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.
QFX5100-48S switch with Enhanced Layer 2 software	PIC 0 provides six 40-Gbps QSFP+ ports and 48 10-Gigabit Ethernet interfaces.
EX4600 device with 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 provides 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.
QFX5100-48S switch with a QFabric software package	PIC 1 provides six 40-Gbps QSFP+ ports, and PIC 0 provides 48 10-Gigabit Ethernet interfaces.
QFX5100-24Q switch with 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.
QFX5100-96S switch with Enhanced Layer 2 software	PIC 0 provides 96 10-Gigabit Ethernet interfaces and 8 40-Gbps QSFP+ ports.

Table 9: Naming Conventions for PICs (continued)

Device with Software Package	Convention
QFX5110-48S switch with Enhanced Layer 2 software	PIC 0 can support 48 10-Gigabit Ethernet ports labeled 0 through 47, and 4 QSFP28 ports labeled 48 through 51. Ports 0 through 47 support either 1-Gbps small form-factor pluggable (SFP) or 10-Gbps small form-factor pluggable plus (SFP+) transceivers. You can also use SFP+ DAC cables and 10-Gbps active optical cables (AOC) in any access port. The default 100-Gigabit Ethernet ports can be configured as 40-Gigabit Ethernet, and in this configuration can either operate as dedicated 40-Gigabit Ethernet ports or can be channelized to 4 independent 10-Gigabit Ethernet ports using copper or fiber breakout cables.
QFX5200-32C switch with Enhanced Layer 2 software	PIC 0 provides 32 QSFP28 ports. The 100-Gigabit Ethernet ports can be channelized to two 50-Gigabit Ethernet or four 25-Gigabit Ethernet ports. The default 100-Gigabit Ethernet ports can be configured as 40-Gigabit Ethernet and operate as 40-Gigabit Ethernet or be channelized to four 10-Gigabit Ethernet ports.
QFX10002-36Q switch with Enhanced Layer 2 software	PIC 0 provides 144 10-Gigabit Ethernet interfaces, and 36 40-Gbps QSFP+ ports, and 12 100-Gigabit Ethernet interfaces.
QFX10002-72Q switch with Enhanced Layer 2 software	PIC 0 provides 288 10-Gigabit Ethernet interfaces, and 72 40-Gbps QSFP+ ports, and 24 100-Gigabit Ethernet interfaces.
QFX10008 switch with Enhanced Layer 2 software	PIC 0 provides one-thousand, one-hundred fifty two 10-Gigabit Ethernet interfaces, two-hundred eighty-eight 40-Gbps QSFP+ ports, or two-hundred forty 100-Gigabit Ethernet interfaces.
QFX10016 switch with Enhanced Layer 2 software	PIC 0 provides two-thousand, three-hundred and four 10-Gigabit Ethernet interfaces, five-hundred seventy-six 40-Gbps QSFP+ ports, or four-hundred eighty 100-Gigabit Ethernet interfaces.

- *port*—Interfaces use the following convention for port numbers:

Table 10: Naming Conventions for PORTs

Device with Software Package	Convention
QFX3500 switch with a QFabric software package	<p>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.</p> <p>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 <i>Configuring the QSFP+ Port Type on QFX3500 Standalone Switches</i>).</p>
QFX3500 switch with 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 <i>Channelizing Interfaces Overview</i> for information on how to configure and channelize the 40-Gbps QSFP+ ports.

Table 10: Naming Conventions for PORTs (continued)

Device with Software Package	Convention
QFX3600 switch with a QFabric software package	<p>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.</p> <p>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 <i>Configuring the Port Type on QFX3600 Standalone Switches</i>) and use QSFP+ to four SFP+ copper breakout cables to connect the 10-Gigabit Ethernet ports to other servers, storage, and switches.</p>
QFX3600 Node device with a QFabric software package	<p>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.</p> <p>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 <i>Configuring the Port Type on QFX3600 Node Devices</i>).</p>
QFX3600 switch with 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 <i>Channelizing Interfaces Overview</i> for information on how to configure and channelize the 40-Gbps QSFP+ ports.
QFX5100-48S switch with 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 <i>Channelizing Interfaces Overview</i> for information on how to configure and channelize the 40-Gbps QSFP+ ports.
EX4600 switch with 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 <i>Channelizing Interfaces Overview</i> for information on how to configure and channelize the 40-Gbps QSFP+ ports.
QFX5100-48S switch with 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 <i>Configuring the QSFP+ Port Type on QFX5100 Devices</i> for information on how to configure the port mode of 40-Gbps QSFP+ ports.



Table 10: Naming Conventions for PORTs (continued)

Device with Software Package	Convention
QFX5100-24Q switch with Enhanced Layer 2 software	<p>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 <i>Channelizing Interfaces Overview</i> for information on how to configure and channelize the 40-Gbps QSFP+ ports.</p> <p><b>NOTE:</b> 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.</p> <p>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 <i>Configuring the System Mode</i> for information on how to configure the system mode.</p>
QFX5100-96S switch with Enhanced Layer 2 software	<p>PIC 0 can support 96 10-Gigabit Ethernet ports labeled 0 through 95, and 8 40-Gbps QSFP+ ports labeled 96 through 103. See <i>Channelizing Interfaces Overview</i> for information on how to configure and channelize the 40-Gbps QSFP+ ports.</p> <p><b>NOTE:</b> You can only channelize the 40-Gbps QSFP+ ports provided in ports 96 and 100, because only 104 logical ports can be channelized.</p> <p>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 <i>Configuring the System Mode</i> for information on how to configure the system mode.</p>
QFX5110-48S switch with Enhanced Layer 2 software	<p>PIC 0 can support 48 10-Gigabit Ethernet ports labeled 0 through 47, and 4 QSFP28 ports labeled 48 through 51. These data ports (0 through 47) support either 1-Gbps small form-factor pluggable (SFP) or 10-Gbps small form-factor pluggable plus (SFP+) transceivers. You can also use SFP+ DAC cables and 10-Gbps active optical cables (AOC) in any access port. The default 100-Gigabit Ethernet ports can be configured as 40-Gigabit Ethernet, and in this configuration can either operate as dedicated 40-Gigabit Ethernet ports or can be channelized to 4 independent 10-Gigabit Ethernet ports using copper or fiber breakout cables.</p>
QFX5200-32C switch with Enhanced Layer 2 software	<p>There is support for both quad small-form-factor pluggable (QSFP+) and 28-Gbps QSFP+ (QSFP28) transceivers in the 32 QSFP28 sockets. The QSFP28 ports are configured as 100-Gigabit Ethernet ports by default, but can also be configured to speeds of 50, 40, 25, or 10 Gigabit Ethernet.</p> <p>The 100 Gigabit Ethernet ports can be channelized using breakout cables either to 2 independent downstream 50 Gigabit Ethernet or to 4 independent 25 Gigabit Ethernet ports. The default 100 Gigabit Ethernet ports can also be configured as 40 Gigabit Ethernet and in this configuration can either operate as dedicated 40 Gigabit Ethernet ports or can be channelized to 4 independent 10 Gigabit Ethernet ports using breakout cables. See <i>Channelizing Interfaces on QFX5200 Switches</i> for information on how to configure and channelize the interfaces.</p> <p><b>NOTE:</b> Autochannelization is not supported.</p>

Table 10: Naming Conventions for PORTs (continued)

Device with Software Package	Convention
QFX10002-36Q switch with Enhanced Layer 2 software	<p>There are 36 quad small-form factor pluggable plus (QSFP+) ports that support 40-Gigabit Ethernet optical transceivers. Out of these 36 ports, 12 ports are QSFP28 capable, which are dual speed 40- or 100-Gigabit Ethernet optical transceivers.</p> <p>Each QSFP28 socket can be configured to support:</p> <ul style="list-style-type: none"> <li>• 100-Gigabit Ethernet using 28-Gbps QSFP28 optical transceivers. When a QSFP28 transceiver is inserted into the ports marked with a fine black line underneath the socket and the port is configured for 100-Gigabit Ethernet, the two adjacent ports are disabled and the QSFP28 is enabled for 100-Gigabit Ethernet.</li> <li>• 40-Gigabit Ethernet using QSFP+ optical transceivers.</li> <li>• 10-Gigabit Ethernet using breakout cables. When configured for channelization, a breakout cable converts the 40-Gigabit Ethernet port into 4 independent 10-Gigabit Ethernet ports.</li> </ul> <p>Any of the 36 ports 0 through 35 can be configured as either uplink or access ports. See <i>Channelizing Interfaces Overview</i> for information on how to configure and channelize the 40-Gbps QSFP+ ports.</p> <p>Each of the 12 QSFP28 ports support:</p> <ul style="list-style-type: none"> <li>• 100-Gigabit Ethernet QSFP28 transceivers</li> <li>• 40-Gigabit Ethernet QSFP+ transceivers</li> </ul> <p>Each of the 36 QSFP+ ports support:</p> <ul style="list-style-type: none"> <li>• 40-Gigabit Ethernet QSFP+ transceivers</li> <li>• Access ports</li> </ul>
QFX10002-72Q switch with Enhanced Layer 2 software	<p>There are 72 quad small-form factor pluggable plus (QSFP+) ports that support 40-Gigabit Ethernet optical transceivers. Out of these 72 ports, 24 ports are QSFP28 capable, which are dual speed 40- or 100-Gigabit Ethernet optical transceivers.</p> <p>Each QSFP28 socket can be configured to support:</p> <ul style="list-style-type: none"> <li>• 100-Gigabit Ethernet using 28-Gbps QSFP28 optical transceivers. When a QSFP28 transceiver is inserted into the ports marked with a fine black line underneath the socket and the port is configured for 100-Gigabit Ethernet, the two adjacent ports are disabled and the QSFP28 is enabled for 100-Gigabit Ethernet.</li> <li>• 40-Gigabit Ethernet using QSFP+ optical transceivers.</li> <li>• 10-Gigabit Ethernet using breakout cables. When configured for channelization, a breakout cable converts the 40-Gigabit Ethernet port into 4 independent 10-Gigabit Ethernet ports.</li> </ul> <p>Any of the 72 ports 0 through 71 can be configured as either uplink or access ports. See <i>Channelizing Interfaces Overview</i> for information on how to configure and channelize the 40-Gbps QSFP+ ports.</p> <p>Each of the 24 QSFP28 ports support:</p> <ul style="list-style-type: none"> <li>• 100-Gigabit Ethernet QSFP28 transceivers</li> </ul> <p>Each of the 72 QSFP+ ports support:</p> <ul style="list-style-type: none"> <li>• 40-Gigabit Ethernet QSFP+ transceivers</li> </ul> <p>Each of the 36 QSFP+ ports support:</p> <ul style="list-style-type: none"> <li>• 40-Gigabit Ethernet QSFP+ transceivers</li> <li>• Access ports</li> <li>• Uplink ports</li> </ul>

Table 10: Naming Conventions for PORTs (continued)

Device with Software Package	Convention
On a QFX10008 switch with Enhanced Layer 2 software, there are two line cards available:	QFX10000-36Q, a 36-port 40-Gigabit Ethernet quad small form-factor pluggable plus transceiver (QSFP+) or 12-port 100GbE QSFP28 line card
QFX10008 with Line Card QFX10000-36Q (ELS)	<p>The QFX10000-36Q line cards supports</p> <p>Each QSFP28 socket can be configured to support:</p> <ul style="list-style-type: none"> <li>100-Gigabit Ethernet using QSFP28 optical transceivers. When a QSFP28 transceiver is inserted into the ports marked with a fine black line underneath the socket and the port is configured for 100-Gigabit Ethernet, the two adjacent ports are disabled and the QSFP28 socket is enabled for 100-Gigabit Ethernet.</li> <li>40-Gigabit Ethernet using QSFP+ optical transceivers.</li> <li>10-Gigabit Ethernet using breakout cabling and attached optical transceivers. When configured for channelization, the system converts the 40-Gigabit Ethernet port into 4 independent 10-Gigabit Ethernet ports.</li> </ul> <p>Any of the 36 ports 0 through 35 can be configured as either uplink or access ports. See <i>Channelizing Interfaces Overview</i> for information on how to configure and channelize the 40-Gbps QSFP+ ports.</p> <p>Each of the 12 QSFP28 ports supports:</p> <ul style="list-style-type: none"> <li>100-Gigabit Ethernet QSFP28 transceivers</li> <li>40-Gigabit Ethernet QSFP+ transceivers</li> </ul> <p>Each of the 12 QSFP28 ports supports:</p> <ul style="list-style-type: none"> <li>100-Gigabit Ethernet QSFP28 transceivers</li> <li>40-Gigabit Ethernet QSFP+ transceivers</li> </ul> <p>Each of the 36 QSFP+ ports support:</p> <ul style="list-style-type: none"> <li>40-Gigabit Ethernet QSFP+ transceivers</li> <li>Access ports</li> <li>Uplink ports</li> </ul>
QFX10008 with Line Card QFX10000-30C and QFX10000-30C-M (ELS)	<p>QFX10000-30C and QFX10000-30C-M, a 30-port 100-Gigabit or 40-Gigabit Ethernet QSFP28 line card</p> <ul style="list-style-type: none"> <li>The QFX10000-30C and QFX10000-30C-M line cards support:           <p>Thirty 28-Gbps QSFP+ Pluggable Solution (QSFP28) cages that support either 40-Gigabit Ethernet or 100-Gigabit Ethernet optical transceivers. The QFX10000-30C and QFX10000-30C-M ports auto detect the type of transceiver installed and set the configuration to the appropriate speed.</p> <p>Each QSFP28 socket can be configured to support:</p> <ul style="list-style-type: none"> <li>100-Gigabit Ethernet using QSFP28 optical transceivers. When a QSFP28 transceiver is inserted into the ports marked with a fine black line underneath the socket and the port is configured for 100-Gigabit Ethernet, the two adjacent ports are disabled and the QSFP28 socket is enabled for 100-Gigabit Ethernet.</li> <li>40-Gigabit Ethernet using QSFP+ optical transceivers.</li> </ul> <p>See <i>Channelizing Interfaces Overview</i> for information on how to configure and channelize the 40-Gbps QSFP+ ports.</p> <p>Each of the 30 QSFP28 ports supports:</p> <ul style="list-style-type: none"> <li>100-Gigabit Ethernet QSFP28 transceivers</li> <li>40-Gigabit Ethernet QSFP+ transceivers</li> <li>Access ports</li> <li>Uplink ports</li> </ul> </li> </ul>

Table 10: Naming Conventions for PORTs (continued)

Device with Software Package	Convention
On a QFX10016 switch running Enhanced Layer 2 software, there are 16 slots, which you can populate with two types line cards:  QFX10016 with Line Card QFX10000-36Q (ELS)	<ul style="list-style-type: none"> <li>QFX10000-36Q, a 36-port 40-Gigabit Ethernet quad small form-factor pluggable plus transceiver (QSFP+) or 12-port 100GbE QSFP28 line card</li> </ul> <p>The QFX10000-36Q line card consists of 36 quad small form-factor pluggable plus (QSFP+) ports that support 40-Gigabit Ethernet optical transceivers. Out of these 36 ports, 12 ports are QSFP28 capable. The QSFP+ ports are dual speed and can support either 40-Gigabit or 100-Gigabit Ethernet optical transceivers. The line card can support 10-Gigabit Ethernet by channelizing the 40-Gigabit ports. Channelization is supported on fiber break-out cable using standard structured cabling techniques.</p> <p>With 100-Gigabit Ethernet using QSFP28 optical transceivers, when a QSFP28 transceiver is inserted into the ports marked with a fine black line underneath the socket and the port is configured for 100-Gigabit Ethernet, the two adjacent ports are disabled and the QSFP28 socket is enabled for 100-Gigabit Ethernet.</p> <p>You can use 40-Gigabit Ethernet using QSFP+ optical transceivers.</p> <p>With 10-Gigabit Ethernet using breakout cabling and attached optical transceivers, when configured for channelization, the system converts the 40-Gigabit Ethernet port into 4 independent 10-Gigabit Ethernet ports.</p> <p>Any of the 36 ports 0 through 35 can be configured as either uplink or access ports.</p> <p>Each of the 12 QSFP28 ports supports:</p> <ul style="list-style-type: none"> <li>100-Gigabit Ethernet QSFP28 transceivers</li> <li>40-Gigabit Ethernet QSFP+ transceivers</li> </ul> <p>Each of the 36 QSFP+ ports supports:</p> <ul style="list-style-type: none"> <li>40-Gigabit Ethernet QSFP+ transceivers</li> <li>Access ports           <p>You can use 40-Gigabit Ethernet QSFP+ transceivers in any downstream port.</p> </li> <li>Uplink ports           <p>You can configure all the QSFP+ ports as uplinks.</p> </li> </ul> <p>Every second and sixth port in a 6XQSFP cage on a QFX10000-36Q supports 100-Gigabit Ethernet using QSFP28 transceivers. These 100-Gigabit Ethernet ports work either as 100-Gigabit Ethernet or as 40-Gigabit Ethernet, but are recognized as 40-Gigabit Ethernet by default. When a 40-Gigabit Ethernet transceiver is inserted into a 100-Gigabit Ethernet port, the port recognizes the 40-Gigabit Ethernet port speed. When a 100-Gigabit Ethernet transceiver is inserted into the port and enabled in the CLI, the port recognizes the 100-Gigabit Ethernet speed and disables two adjacent 40-Gigabit Ethernet ports. You can also use an 100-Gigabit Ethernet transceiver and run it at 40-Gigabit Ethernet by using the CLI to set the port speed to 40-Gigabit Ethernet.</p> <p>The 40-Gigabit Ethernet ports can operate independently, be channelized into four 10-Gigabit Ethernet ports, or bundled with the next two consecutive ports and channelized into twelve 10-Gigabit Ethernet ports as a port range. Only the first and fourth port in each 6XQSFP cage are available to channelize a port range. The port range must be configured using the <code>set chassis fpc 0 pic 0 port 1 channel-speed 10g</code> command.</p>

Table 10: Naming Conventions for PORTs (continued)

Device with Software Package	Convention
QFX10016 with Line Card QFX10000-30C and QFX10000-30C-M (ELS)	<p>The QFX10000-30C and QFX10000-30C-M line cards consist of thirty 28-Gbps QSFP+ Pluggable Solution (QSFP28) cages that support either 40-Gigabit Ethernet or 100-Gigabit Ethernet optical transceivers. The QFX10000-30C and QFX10000-30C-M ports auto detect the type of transceiver installed and set the configuration to the appropriate speed.</p> <p>Each QSFP28 socket supports:</p> <ul style="list-style-type: none"> <li>• 100-Gigabit Ethernet using QSFP28 optical transceivers. When a QSFP28 transceiver is inserted into any of the ports, the QSFP28 socket is enabled for 100-Gigabit Ethernet.</li> <li>• 40-Gigabit Ethernet using QSFP+ optical transceivers. When a QSFP+ transceiver is inserted into any of the ports, the QSFP+ socket is enabled for 40-Gigabit.</li> </ul> <p>Any of the 30 ports 0 through 29 can be configured as either uplink or access ports, and of the 30 QSFP28 ports supports:</p> <ul style="list-style-type: none"> <li>• 100-Gigabit Ethernet QSFP28 transceivers</li> <li>• 40-Gigabit Ethernet QSFP+ transceivers</li> </ul>

### Logical Part of an Interface Name on a Switch Running QFabric Software Package for QFX series, NFX Series, EX4600, QFabric System

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 for QFX series, NFX Series, EX4600, QFabric System

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 for QFX series, NFX Series, EX4600, QFabric System

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 (" ").

## Physical Part of an Interface Name for OCX1100

Interfaces in Junos OS are specified as follows:

*type-fpc/pic/port*

The convention is as follows:

- *type*—The OCX Series device interfaces use the following media types:
  - **xe**—10-Gigabit Ethernet interface
  - **et**—40-Gigabit Ethernet interface
  - **em**—Management interface
- *fpc*—Flexible PIC Concentrator. OCX Series interfaces use the following convention for the FPC number in interface names:
  - On standalone OCX Series switches, the FPC number is always **0**.  
The FPC number indicates the slot number of the line card that contains the physical interface.
- *pic*—The OCX Series interfaces use the following convention for the PIC (Physical Interface Card) number in interface names:
  - PIC **0** provides six 40-Gbps QSFP+ ports and 48 10-Gigabit Ethernet interfaces.
- *port*—Interfaces use the following convention for port numbers:
  - PIC **0** can support 48 network access ports (10-Gigabit Ethernet ports) labeled 1 through 48 and 6 40-Gbps QSFP+ ports labeled 49 through 54.

## Wildcard Characters in Interface Names for OCX1100

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 for Switches on page 11](#)
- [Channelizing Interfaces Overview](#)
- [Configuring the System Mode](#)

- [Understanding Management Interfaces on page 31](#)
- [Understanding Port Ranges and System Modes on page 33](#)
- *Rear Panel of a QFX3500 Device*
- *Front Panel of a QFX3600 Device*
- *Junos OS Network Interfaces Library for Routing Devices*
- [Interfaces Overview for Switches on page 11](#)
- *Configuring Gigabit Ethernet Interfaces (CLI Procedure)*
- *Configuring Gigabit Ethernet Interfaces (CLI Procedure) for EX Series Switches with ELS support*
- [Interfaces Overview for Switches on page 11](#)
- [Understanding Management Interfaces on page 31](#)
- *Junos OS Network Interfaces Library for Routing Devices*

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## Understanding Interface Ranges for 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 on Juniper Networks EX Series Ethernet switches. 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, 10-Gigabit, and Fast Ethernet 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 node is used in the following configuration hierarchies:

[Table 11 on page 30](#) lists the configuration hierarchies for the EX Series, NFX, OCX, QFX Series, and QFabric Series.

Table 11: Configuration hierarchies for EX Series

Configuration Hierarchies for EX Series	Configuration Hierarchies for EX4600, NFX, QFX Series, and QFabric Systems	Configuration Hierarchies for EX Series with ELS
<ul style="list-style-type: none"> <li>• ethernet-switching-options analyzer <i>name</i> input egress interface</li> <li>• ethernet-switching-options analyzer <i>name</i> input ingress interface</li> <li>• ethernet-switching-options analyzer output interface</li> <li>• ethernet-switching-options bpdu-block interface</li> <li>• ethernet-switching-options interfaces</li> <li>• ethernet-switching-options redundant-trunk-group group-name interface</li> <li>• ethernet-switching-options secure-access-port interface</li> <li>• ethernet-switching-options voip interface</li> <li>• poe interface</li> <li>• protocols dot1x authentication interface</li> <li>• protocols gvrp interface</li> <li>• protocols igmp interface</li> <li>• protocols igmp-snooping vlan <i>vlan-name</i> interface</li> <li>• protocols isis interface</li> <li>• protocols link-management peer lmp-control-channel interface</li> <li>• protocols link-management te-link <i>name</i> interface</li> <li>• protocols lldp interface</li> <li>• protocols lldp-med interface</li> <li>• protocols mpls interface</li> <li>• protocols mstp interface</li> <li>• protocols mstp msti-<i>id</i> interface</li> <li>• protocols mstp msti-<i>id</i> vlan <i>vlan-id</i> interface</li> <li>• protocols oam ethernet link-fault-management interface</li> <li>• protocols ospf area</li> <li>• protocols pim interface</li> <li>• protocols rip group <i>group-name</i> neighbor</li> <li>• protocols ripng group <i>group-name</i> neighbor</li> <li>• protocols router-advertisement interface</li> <li>• protocols router-discovery interface</li> <li>• protocols rsvp interface</li> <li>• protocols sflow interfaces</li> <li>• protocols stp interface</li> <li>• protocols vstp vlan <i>vlan-id</i> interface</li> <li>• vlans <i>vlan-name</i> interface</li> </ul>	<ul style="list-style-type: none"> <li>• protocols isis interface</li> <li>• protocols sflow interfaces</li> </ul> <p>NOTE: These statements are not supported on OCX Series switches.</p>	<ul style="list-style-type: none"> <li>• forwarding-options analyzer <i>name</i> input egress interface</li> <li>• forwarding-options analyzer <i>name</i> input ingress interface</li> <li>• poe interface</li> <li>• protocols dot1x authenticator interface</li> <li>• protocols igmp interface</li> <li>• protocols isis interface</li> <li>• protocols layer2-control bpdu-block interface</li> <li>• protocols link-management peer <i>name</i> lmp-control-channel</li> <li>• protocols link-management te-link <i>name</i> interface</li> <li>• protocols lldp interface</li> <li>• protocols lldp-med interface</li> <li>• protocols mstp interface</li> <li>• protocols oam ethernet link-fault-management interface</li> <li>• protocols ospf area <i>area-id</i> interface</li> <li>• protocols pim interface</li> <li>• protocols router-advertisement interface</li> <li>• protocols router-discovery interface</li> <li>• protocols rsvp interface</li> <li>• protocols sflow interfaces</li> <li>• protocols vstp vlan <i>vlan-id</i> interface</li> <li>• switch-options redundant-trunk-group <i>group-name</i> interface</li> <li>• switch-options voip interface</li> </ul> <p>For ELS details, see <i>Getting Started with Enhanced Layer 2 Software</i>.</p>



### Related Documentation

- [Interfaces Overview for Switches on page 11](#)
- [Configuring Interface Ranges](#)
- [Interfaces Overview for Switches on page 11](#)
- [Configuring Gigabit Ethernet Interfaces \(CLI Procedure\)](#)
- [Configuring Aggregated Ethernet Links \(CLI Procedure\)](#)
- [Configuring a Layer 3 Subinterface \(CLI Procedure\)](#)
- [interface-range](#)
- [Configuring Gigabit and 10-Gigabit Ethernet Interfaces for EX4600 and QFX Series Switches on page 61](#)
- [Configuring Gigabit and 10-Gigabit Ethernet Interfaces for OCX Series Switches](#)
- [Configuring Link Aggregation on page 83](#)
- [Configuring a Layer 3 Logical Interface on page 72](#)
- [Junos OS Network Interfaces Library for Routing Devices](#)

## Understanding Management Interfaces

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 (and platform support depends on the Junos OS release in your installation):

- 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.

For information on how to use management interfaces on a QFabric system, see *Performing the QFabric System Initial Setup on a QFX3100 Director Group* and *Gaining Access to the QFabric System Through the Default Partition*.

#### Related Documentation

- [Interfaces Overview for Switches on page 11](#)

## Understanding Port Ranges and System Modes

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 33](#)
- [Supported System Modes on page 56](#)

### 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 14 on page 42](#) 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 15 on page 45](#) 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 17 on page 50](#) 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 17 on page 50](#) 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 18 on page 53](#) for physical port to logical port mappings.

- For QFX5100-24Q and QFX5100-96S switches running Enhanced Layer 2 Software, see [Table 19 on page 57](#) for physical port to logical port mappings for different system modes.

**Table 12: 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
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

Table 12: 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)
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
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

Table 12: 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)
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
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

Table 12: 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)
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
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



Table 12: 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)
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 13: 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

Table 13: 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)
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
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

Table 13: 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)
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
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

**Table 13: 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)
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 14: 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 xe-0/0/1 xe-0/0/2 xe-0/0/3	xle-0/1/0
Q1	xe-0/0/4 xe-0/0/5 xe-0/0/6 xe-0/0/7	xle-0/1/1
Q2	xe-0/0/8 xe-0/0/9 xe-0/0/10 xe-0/0/11	xle-0/1/2
Q3	xe-0/0/12 xe-0/0/13 xe-0/0/14 xe-0/0/15	xle-0/1/3

Table 14: 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)
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	
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	

Table 14: 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)
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	
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 15: 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	
Q1	xe-0/0/1:0	et-0/0/1
	xe-0/0/1:1	
	xe-0/0/1:2	
	xe-0/0/1:3	
Q2	xe-0/0/2:0	et-0/0/2
	xe-0/0/2:1	
	xe-0/0/2:2	
	xe-0/0/2:3	
Q3	xe-0/0/3:0	et-0/0/3
	xe-0/0/3:1	
	xe-0/0/3:2	
	xe-0/0/3:3	
Q4	xe-0/0/4:0	et-0/0/4
	xe-0/0/4:1	
	xe-0/0/4:2	
	xe-0/0/4:3	
Q5	xe-0/0/5:0	et-0/0/5
	xe-0/0/5:1	
	xe-0/0/5:2	
	xe-0/0/5:3	

Table 15: 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)
Q6	xe-0/0/6:0	et-0/0/6
	xe-0/0/6:1	
	xe-0/0/6:2	
	xe-0/0/6:3	
Q7	xe-0/0/7:0	et-0/0/7
	xe-0/0/7:1	
	xe-0/0/7:2	
	xe-0/0/7:3	
Q8	xe-0/0/8:0	et-0/0/8
	xe-0/0/8:1	
	xe-0/0/8:2	
	xe-0/0/8:3	
Q9	xe-0/0/9:0	et-0/0/9
	xe-0/0/9:1	
	xe-0/0/9:2	
	xe-0/0/9:3	
Q10	xe-0/0/10:0	et-0/0/10
	xe-0/0/10:1	
	xe-0/0/10:2	
	xe-0/0/10:3	
Q11	xe-0/0/11:0	et-0/0/11
	xe-0/0/11:1	
	xe-0/0/11:2	
	xe-0/0/11:3	



**Table 15: 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)
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
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 16: 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

Table 16: 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)
Q3	xe-0/0/12	fte-0/1/3	xle-0/1/3
	xe-0/0/13		
	xe-0/0/14		
	xe-0/0/15		
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		

Table 16: 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)
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		
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		

**Table 16: 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)
Q15	xe-0/0/60 xe-0/0/61 xe-0/0/62 xe-0/0/63	Not supported on this port	xle-0/1/15

**Table 17: 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

**Table 17: 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)
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
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

**Table 17: 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)
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
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

**Table 17: 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)
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
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 18: 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

**Table 18: 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)
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
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



**Table 18: 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)
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
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  <b>NOTE:</b> 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  <b>NOTE:</b> This interface is a fixed fte interface and cannot be changed to xle.

**Table 18: 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)
50	Not supported on this port	xle-0/1/2	fte-0/1/2  <i>NOTE:</i> 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  <i>NOTE:</i> By default, this interface is an fte interface but can be configured as an xle interface.
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 19 on page 57](#) 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 19 on page 57](#) for more information regarding the supported system modes for your switch.

**Table 19: 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 for Switches on page 11](#)
  - *Channelizing Interfaces Overview*
  - *Configuring the System Mode*
  - [Understanding Interface Naming Conventions on page 16](#)
  - *Rear Panel of a QFX3500 Device*
  - *Front Panel of a QFX3600 Device*

## Configuring the Interface Address

---

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 **vppls** 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 for EX4600 and QFX Series 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

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, and EX4600 Switches on page 62](#)
- [Configuring the Link Settings for Gigabit Ethernet Interfaces on QFX5100-48S, QFX5100-96S, and EX4600 Switches on page 63](#)
- [Configuring Gigabit Ethernet Interfaces on QFX5100-48T Switches on page 63](#)
- [Configuring the Link Settings for 10-Gigabit Ethernet Interfaces on QFX5100-48S, QFX5100-24Q, QFX5100-96S, and EX4600 Switches on page 65](#)
- [Configuring the Link Settings for 10-Gigabit Ethernet Interfaces on QFX5100-48T Switches on page 65](#)
- [Configuring the IP Options on QFX5100-48S, QFX5100-48T, QFX5100-24Q, and EX4600 Switches on page 66](#)

## Configuring Port Mode on QFX5100-48S, QFX5100-48T, QFX5100-24Q, and EX4600 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 Enhanced Layer 2 software (ELS):

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

**See Also** • [Monitoring Interface Status and Traffic on page 67](#)



## Configuring the Link Settings for Gigabit Ethernet Interfaces on QFX5100-48S, QFX5100-96S, 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.

On QFX5100-48S and QFX5100-96S devices using 1-Gigabit Ethernet SFP interfaces, the speed is set to 1 Gbps by default and cannot be configured to operate in a different speed.

- On QFX5100 devices, the interface naming for Gigabit Ethernet interfaces changes automatically to `xe-0/0/0`, `ge-0/0/0`, or `et-0/0/0` when the appropriate SFP is inserted.
- Gigabit Ethernet interfaces operate in full-duplex mode.
- Autonegotiation is supported by default. 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 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 interfaces *name* ether-options no-auto-negotiate** command to remove the autonegotiation configuration.

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

## Configuring 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.
- Gigabit Ethernet interfaces must be configured as `xe-fpc/pic/port`, and not `ge-fpc/pic/port`.
- 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.

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



.....

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

.....

You can reenable autonegotiation it by issuing the `set interfaces name ether-options auto-negotiate` command.

Issue the `show interfaces name 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, QFX5100-96S, 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.

On QFX5100-48S, QFX5100-96S, and QFX5100-24Q devices using 10-Gigabit Ethernet SFP interfaces, the speed is set to 10 Gbps by default and cannot be configured to operate in a different speed.

- On QFX5100 devices, the interface naming for Gigabit Ethernet interfaces changes automatically to xe-0/0/0, ge-0/0/0, or et-0/0/0 when the appropriate SFP is inserted.
- 10-Gigabit Ethernet interfaces operate in full-duplex mode by default.
- 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 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 interfaces *name* ether-options no-auto-negotiate** command to remove the autonegotiation configuration.

Issue the **show interfaces *name* 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.
- 10-Gigabit Ethernet interfaces operate in full-duplex mode by default.
- 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.



**NOTE:** In Junos OS Release 14.1X53-D35 on QFX5100-48T-6Q devices using 10-Gigabit Ethernet Copper interfaces, autonegotiation is disabled by default on the copper ports, and the interfaces operate at a speed of 100M. You can, however, enable auto-negotiation by issuing the `set interface name ether-options auto-negotiation` command on the interface for which you want to change the interface speed. With autonegotiation enabled, the interface auto-detects the speed in which to operate.

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 interfaces name 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, and EX4600 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`

### Release History Table

Release	Description
14.1X53-D35	In Junos OS Release 14.1X53-D35 on QFX5100-48T-6Q devices using 10-Gigabit Ethernet Copper interfaces, autonegotiation is disabled by default on the copper ports, and the interfaces operate at a speed of 100M.

### Related Documentation

- [Monitoring Interface Status and Traffic on page 67](#)
- [show interfaces xe on page 355](#)
- [show interfaces ge on page 293](#)
- [speed on page 215](#)
- [Understanding Interface Naming Conventions on page 16](#)

## Configuring Ethernet Loopback Capability

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 for EX4600 and QFX Series Switches on page 61](#)

## Monitoring Interface Status and Traffic

**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

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

**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 71](#)





## CHAPTER 3

# Understanding Layer 3 Logical Interfaces

- [Understanding Layer 3 Logical Interfaces on page 71](#)
- [Configuring a Layer 3 Logical Interface on page 72](#)
- [Verifying That Layer 3 Logical Interfaces Are Working on page 72](#)

## Understanding Layer 3 Logical Interfaces

---

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. .



**NOTE:** You can also use Layer 3 logical interfaces to provide alternative gateway addresses for smart DHCP relay. The logical tunnel (lt) and virtual loopback tunnel (vt) interfaces are not supported in logical interfaces.

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 for Switches on page 11](#)
- [Configuring a Layer 3 Logical Interface on page 72](#)
- [Configuring DHCP and BOOTP Relay](#)

- *Junos OS Network Interfaces Library for Routing Devices*

## Configuring a Layer 3 Logical Interface

---

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 on Switches*.

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 71](#)
- [Verifying That Layer 3 Logical Interfaces Are Working on page 72](#)

## Verifying That Layer 3 Logical Interfaces Are Working

---

**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	10.0.0.1/8	
ge-0/0/0.1	up	up	inet	10.0.0.2/8	
ge-0/0/0.2	up	up	inet	10.0.0.3/8	
ge-0/0/0.3	up	up	inet	10.0.0.4/8	
ge-0/0/0.4	up	up	inet	10.0.0.5/8	
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 10.1.1.1 (1.1.1.1): 56 data bytes
64 bytes from 10.1.1.1: icmp_seq=0 ttl=64 time=0.157 ms
64 bytes from 10.1.1.1: icmp_seq=1 ttl=64 time=0.238 ms
64 bytes from 10.1.1.1: icmp_seq=2 ttl=64 time=0.255 ms
64 bytes from 10.1.1.1: icmp_seq=3 ttl=64 time=0.128 ms
--- 10.1.1.1 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 72](#)



## PART 4

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

- [Understanding LAGs and LACP on page 77](#)



## CHAPTER 4

# Understanding LAGs and LACP

- Understanding Aggregated Ethernet Interfaces and LACP for Switches on page 77
- Configuring Aggregated Ethernet LACP (CLI Procedure) on page 81
- Configuring Link Aggregation on page 83
- Configuring LACP Link Protection of Aggregated Ethernet Interfaces for Switches on page 87
- Configuring Periodic Rebalancing of Subscribers in an Aggregated Ethernet Interface on page 92
- Verifying the Status of a LAG Interface on page 92
- Verifying That LACP Is Configured Correctly and Bundle Members Are Exchanging LACP Protocol Packets on page 93
- Troubleshooting an Aggregated Ethernet Interface on page 94

### Understanding Aggregated Ethernet Interfaces and LACP for Switches

---

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

Aggregating multiple links between physical interfaces creates a single logical point-to-point trunk link or a LAG. The LAG balances traffic across the member links within an aggregated Ethernet bundle and effectively increases the uplink bandwidth. Another advantage of link aggregation is increased availability, because the LAG is composed of multiple member links. If one member link fails, the LAG continues to carry traffic over the remaining links.



**NOTE:** On QFX5100, EX4600, QFX10002 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 78](#)
- [Link Aggregation Control Protocol \(LACP\) on page 80](#)

## Link Aggregation Group

You configure a LAG by specifying the link number as a physical device and then associating a set of interfaces (ports) with the link. All the interfaces must have the same speed and be in full-duplex mode. Juniper Networks Junos operating system (Junos OS) for EX Series Ethernet Switches assigns a unique ID and port priority to each interface. The ID and priority are not configurable.

The number of interfaces that can be grouped into a LAG and the total number of LAGs supported on a switch varies according to switch model. [Table 20 on page 78](#) lists the EX Series switches and the maximum number of interfaces per LAG and the maximum number of LAGs they support. [Table 20 on page 78](#) lists the MX Series routers and the maximum number of interfaces per LAG and the maximum number of LAG groups they support.

**Table 20: Maximum Interfaces per LAG and Maximum LAGs per Switch**

Switch	Maximum Interfaces per LAG	Maximum LAGs
EX2200	8	32
EX3200	8	32
EX3300 and EX3300 Virtual Chassis	8	32
EX4200 and EX4200 Virtual Chassis	8	111
EX4300 and EX4300 Virtual Chassis	16	128
EX4500, EX4500 Virtual Chassis, EX4550, and EX4550 Virtual Chassis	8	111



*Table 20: Maximum Interfaces per LAG and Maximum LAGs per Switch (continued)*

Switch	Maximum Interfaces per LAG	Maximum LAGs
EX6200	8	111
EX8200	12	255
EX8200 Virtual Chassis	12	239

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, QFX5200, QFX5110, QFX10002, QFX10008, and QFX10016 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 In a Junos Fusion, up to 1,000 LAGs are supported on QFX10002 switches acting as aggregation devices.
- 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:** 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. By default, Ethernet links do not exchange LACP protocol data units (PDUs), which contain information about the state of the link. You can configure Ethernet links to actively transmit LACP PDUs, or you can configure the links to passively transmit them, sending out LACP PDUs only when the Ethernet link receives them from the remote end. 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 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.

In a scenario where 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 might 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

PDU are not received, 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.

When LACP is configured, it detects misconfigurations on the local end or the remote end of the link. Thus, LACP can help prevent communication failure:

- When LACP is not enabled, a local LAG might attempt to transmit packets to a remote single interface, which causes the communication to fail.
- When LACP is enabled, a local LAG cannot transmit packets unless a LAG with LACP is also configured on the remote end of the link.

#### Related Documentation

- [Configuring Link Aggregation on page 83](#)
- *Example: Configuring Link Aggregation Between a QFX Series Product and an Aggregation Switch*
- [Verifying the Status of a LAG Interface on page 92](#)
- *Junos OS Network Interfaces Library for Routing Devices*

## Configuring Aggregated Ethernet LACP (CLI Procedure)

For aggregated Ethernet interfaces on EX Series switches, 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 interfaces with or without LACP enabled.

LACP was designed to achieve the following:

- Automatic addition and deletion of individual links to the bundle without user intervention
- Link monitoring to check whether both ends of the bundle are connected to the correct group



**NOTE:** You can also configure LACP link protection on aggregated Ethernet interfaces. For information, see [“Configuring LACP Link Protection of Aggregated Ethernet Interfaces for Switches” on page 87](#).

The Junos OS implementation of LACP provides link monitoring but not automatic addition and deletion of links.

Before you configure LACP for EX Series, be sure you have:

- Configured the aggregated Ethernet bundles—also known as link aggregation groups (LAGs). See *Configuring Aggregated Ethernet Links (CLI Procedure)*

When LACP is enabled, the local and remote sides of the aggregated Ethernet links exchange protocol data units (PDUs), which contain 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
```



**NOTE:** LACP decides active and back up state of links. When configuring LACP, state of the backup link should not be configured manually as down. The following command is not supported if LACP is configured: `set interfaces ae0 aggregated-ether-options link-protection backup-state down`

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
```



**NOTE:** The LACP process exists in the system only if you configure the system in either active or passive LACP mode.

#### Related Documentation

- *Configuring Aggregated Ethernet Links (CLI Procedure)*

- [Configuring LACP Link Protection of Aggregated Ethernet Interfaces for Switches on page 87](#)
- [Configuring Aggregated Ethernet Interfaces \(J-Web Procedure\)](#)
- [Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch](#)
- [Example: Configuring Aggregated Ethernet High-Speed Uplinks Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch](#)
- [Verifying the Status of a LAG Interface](#)
- [Understanding Aggregated Ethernet Interfaces and LACP](#)

## Configuring Link Aggregation

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. (Platform support depends on the Junos OS release in your installation.)

1. [Creating an Aggregated Ethernet Interface on page 84](#)
2. [Configuring the VLAN Name and VLAN ID Number on page 84](#)
3. [Configuring Aggregated Ethernet LACP \(CLI Procedure\) on page 85](#)

## Creating an Aggregated Ethernet Interface

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



**NOTE:** VLANs are not supported on OCX Series switches.

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

For example, 100.



**NOTE:** When you add or remove a vlan from a LAG interface, the interface goes down and comes back (flaps). The flapping happens when a low speed SFP is plugged into a relatively high speed port. To avoid flapping, configure the port speed to match the speed of the SFP.

## Configuring Aggregated Ethernet LACP (CLI Procedure)

For aggregated Ethernet interfaces on EX Series switches, 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 interfaces with or without LACP enabled.

LACP was designed to achieve the following:

- Automatic addition and deletion of individual links to the bundle without user intervention
- Link monitoring to check whether both ends of the bundle are connected to the correct group



**NOTE:** You can also configure LACP link protection on aggregated Ethernet interfaces. For information, see [“Configuring LACP Link Protection of Aggregated Ethernet Interfaces for Switches” on page 87](#).

The Junos OS implementation of LACP provides link monitoring but not automatic addition and deletion of links.

Before you configure LACP for EX Series, be sure you have:

- Configured the aggregated Ethernet bundles—also known as link aggregation groups (LAGs). See *Configuring Aggregated Ethernet Links (CLI Procedure)*

When LACP is enabled, the local and remote sides of the aggregated Ethernet links exchange protocol data units (PDUs), which contain 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
```



**NOTE:** LACP decides active and back up state of links. When configuring LACP, state of the backup link should not be configured manually as down. The following command is not supported if LACP is configured: `set interfaces ae0 aggregated-ether-options link-protection backup-state down`

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
```



**NOTE:** The LACP process exists in the system only if you configure the system in either active or passive LACP mode.

- See Also**
- *Configuring Aggregated Ethernet Links (CLI Procedure)*
  - *Configuring LACP Link Protection of Aggregated Ethernet Interfaces for Switches on page 87*
  - *Configuring Aggregated Ethernet Interfaces (J-Web Procedure)*
  - *Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch*
  - *Example: Configuring Aggregated Ethernet High-Speed Uplinks Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch*
  - *Verifying the Status of a LAG Interface*
  - *Understanding Aggregated Ethernet Interfaces and LACP*



- Related Documentation**
- [Understanding Interface Naming Conventions on page 16](#)
  - [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 92](#)
  - [Verifying That LACP Is Configured Correctly and Bundle Members Are Exchanging LACP Protocol Packets on page 93](#)
  - [show lacp statistics interfaces \(View\) on page 381](#)

## Configuring LACP Link Protection of Aggregated Ethernet Interfaces for Switches

You can configure LACP link protection and system priority at the global level on the switch or 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). For EX Series, see *Configuring Aggregated Ethernet Links (CLI Procedure)*.
- Configured LACP for the interface. For Ex Series, see “[Configuring Aggregated Ethernet LACP \(CLI Procedure\)](#)” on page 81.

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 89](#)
- [Configuring LACP Link Protection for a Single Link at the Aggregated Interface Level on page 89](#)
- [Configuring Subgroup Bundles to Provide LACP Link Protection to Multiple Links in an Aggregated Ethernet Interface on page 90](#)

## 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
```



**NOTE:** The LACP decides active and back up state of links. When configuring LACP, the state of the backup link should not be configured manually as down. The following command is not supported if LACP is configured: `set interfaces ae0 aggregated-ether-options link-protection backup-state down`

**Related Documentation**

- [Understanding Aggregated Ethernet Interfaces and LACP for Switches on page 77](#)
- [lACP \(Aggregated Ethernet\) on page 247](#)

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

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

**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	10.10.10.2/8	

**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 83](#)
  - [Verifying That LACP Is Configured Correctly and Bundle Members Are Exchanging LACP Protocol Packets on page 93](#)
  - *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 381](#)

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

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 93](#)
2. [Verifying That LACP Packets Are Being Exchanged on page 94](#)

### Verifying the LACP Setup

**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:
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

**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 83](#)
  - [Verifying the Status of a LAG Interface on page 92](#)
  - *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 381](#)

---

## Troubleshooting an Aggregated Ethernet Interface

**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 92](#)
  - *Example: Configuring Link Aggregation Between a QFX Series Product and an Aggregation Switch*



## PART 5

# Load Balancing

- [Understanding Load Balancing on page 99](#)



## CHAPTER 5

# Understanding Load Balancing

- [Configuring Load Balancing Based on MAC Addresses on page 99](#)

### Configuring Load Balancing Based on MAC Addresses

---

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 103](#)





## CHAPTER 6

# Understanding Local Link Bias

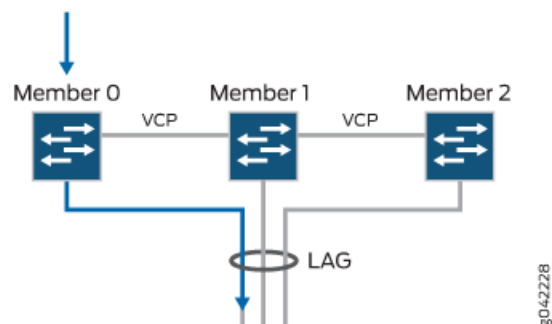
- [Understanding Local Link Bias on page 103](#)
- [Configuring Local Link Bias \(CLI Procedure\) on page 105](#)

### Understanding Local Link Bias

---

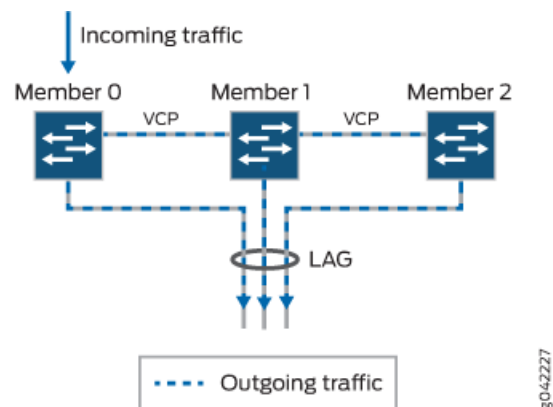
Local link bias conserves bandwidth on Virtual Chassis ports (VCPs) by using local links to forward unicast traffic exiting a Virtual Chassis or Virtual Chassis Fabric (VCF) that has a Link Aggregation group (LAG) bundle composed of member links on different member switches in the same Virtual Chassis 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 103](#).

*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 104](#).

Figure 2: Egress Traffic Flow without Local Link Bias



Starting in Junos OS Release 14.1X53-D25, local link bias can be enabled globally for all LAG bundles in a Virtual Chassis or VCF, or individually per LAG bundle in a Virtual Chassis. In prior Junos OS releases, local link bias could be enabled individually per LAG bundle only.

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.

## Release History Table

Release	Description
14.1X53-D25	Starting in Junos OS Release 14.1X53-D25, local link bias can be enabled globally for all LAG bundles in a Virtual Chassis or VCF, or individually per LAG bundle in a Virtual Chassis.

## Related Documentation

- [Configuring Local Link Bias \(CLI Procedure\) on page 105](#)

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## Configuring Local Link Bias (CLI Procedure)

---

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.

Local link bias can be enabled or disabled globally or per LAG bundle on a Virtual Chassis or VCF. In cases where local link bias is enabled at both the global and per LAG bundle levels, the per LAG bundle configuration takes precedence. For instance, if local link bias is enabled globally but disabled on a LAG bundle named **ae1**, local link bias is disabled on the LAG bundle named **ae1**.

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 103](#)



## PART 7

# Redundant Trunk Groups

- [Understanding Redundant Trunk Groups on page 109](#)



## CHAPTER 7

# Understanding Redundant Trunk Groups

- [Understanding Redundant Trunk Links \(Legacy RTG Configuration\) on page 110](#)
- [Example: Configuring Redundant Trunk Links for Faster Recovery on Devices with ELS Support on page 112](#)

## Understanding Redundant Trunk Links (Legacy RTG Configuration)

---

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.



**NOTE:** For information on redundant trunk link configurations that include Q-in-Q support and use LAGs with link protection, see *Q-in-Q Support on Redundant Trunk Links Using LAGs with Link Protection*.

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 111](#), 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 111](#) 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

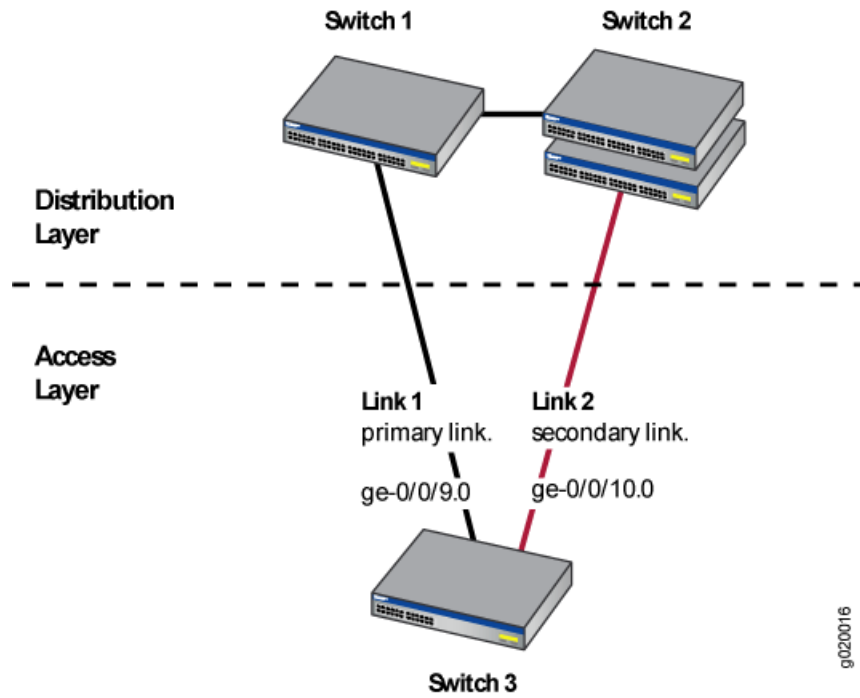
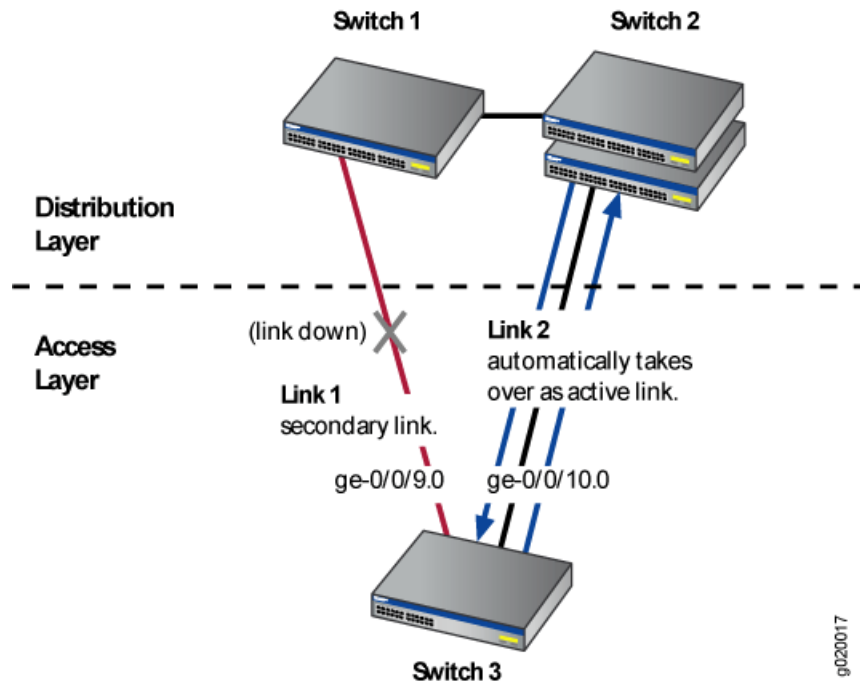


Figure 4 on page 111 illustrates how the redundant trunk link topology works when the primary link goes down.

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 3 and Switch 2.

**Related  
Documentation**

- [Example: Configuring Redundant Trunk Links for Faster Recovery](#)
- [Example: Configuring Redundant Trunk Links for Faster Recovery on Devices with ELS Support on page 112](#)

---

## Example: Configuring Redundant Trunk Links for Faster Recovery on Devices with ELS Support

---



**NOTE:** This example uses Junos OS for EX Series switches or QFX Series with support for the Enhanced Layer 2 Software (ELS) configuration style.. 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 112](#)
- [Overview and Topology on page 113](#)
- [Disabling RSTP on Switches 1 and 2 on page 115](#)
- [Configuring Redundant Trunk Links on Switch 3 on page 115](#)
- [Verification on page 116](#)

## 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 114](#)).

## 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 114 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 21 on page 115 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

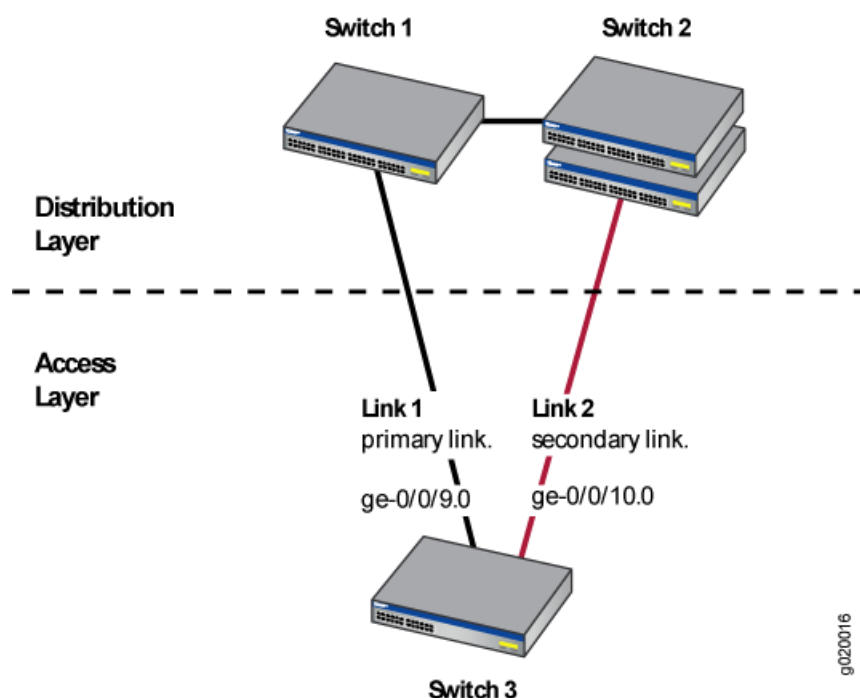


Table 21: Components of the Redundant Trunk Link Topology

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 116](#)

### 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 \(Legacy RTG Configuration\) on page 110](#)





## PART 8

# Configuration Statements and Operational Commands

- [Ethernet OAM Link Fault Management Configuration Statements on page 121](#)
- [Interfaces Configuration Statements on page 155](#)
- [LAGs and LACP Configuration Statements on page 233](#)
- [Redundant Trunk Groups Configuration Statements on page 253](#)
- [Ethernet OAM Link Fault Management Operational Command on page 259](#)
- [Interfaces Operational Commands on page 265](#)
- [LAGs and LACP Operational Commands on page 375](#)
- [Redundant Trunk Group Operational Command on page 383](#)



## CHAPTER 8

# Ethernet OAM Link Fault Management Configuration Statements

- [action \(OAM LFM\) on page 122](#)
- [action-profile on page 123](#)
- [allow-remote-loopback on page 124](#)
- [ethernet \(Protocols OAM\) on page 125](#)
- [event-thresholds on page 130](#)
- [event \(LFM\) on page 131](#)
- [frame-error on page 132](#)
- [frame-period on page 133](#)
- [frame-period-summary on page 134](#)
- [oam on page 135](#)
- [interface \(OAM Link-Fault Management\) on page 138](#)
- [link-adjacency-loss on page 139](#)
- [link-discovery on page 140](#)
- [link-down on page 140](#)
- [link-event-rate on page 141](#)
- [link-fault-management on page 142](#)
- [negotiation-options on page 143](#)
- [no-allow-link-events on page 143](#)
- [pdu-interval on page 144](#)
- [pdu-threshold on page 145](#)
- [remote-loopback on page 146](#)
- [symbol-period on page 146](#)
- [syslog \(OAM Action\) on page 147](#)
- [traceoptions \(Individual Interfaces\) on page 148](#)

## action (OAM LFM)

---

<b>Syntax</b>	<pre>action {     syslog;     link-down; }</pre>
<b>Hierarchy Level</b>	[edit protocols <a href="#">oam ethernet link-fault-management</a> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 9.4 for EX Series switches.
<b>Description</b>	<p>Define the action or actions to be taken when the OAM link fault management (LFM) fault event occurs.</p> <p>The remaining statements are explained separately. See <a href="#">CLI Explorer</a>.</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>

## action-profile

<b>List of Syntax</b>	<p>Syntax: T, M, MX and ACX Series Routers, SRX Series Firewalls and EX Series Switches on page 123</p> <p>Syntax: EX Series Switches and NFX Series Devices on page 123</p>
<p><b>Syntax: T, M, MX and ACX Series Routers, SRX Series Firewalls and EX Series Switches</b></p>	<pre> action-profile <i>profile-name</i> {   action {     link-down;     send-critical-event;     syslog;   }   event {     link-adjacency-loss;     link-event-rate {       frame-error <i>count</i>;       frame-period <i>count</i>;       frame-period-summary <i>count</i>;       symbol-period <i>count</i>;     }     protocol-down;   } }</pre>
<p><b>Syntax: EX Series Switches and NFX Series Devices</b></p>	<pre> action-profile <i>profile-name</i>;   action {     syslog;     link-down;   }   event {     link-adjacency-loss;     link-event-rate {       frame-error <i>count</i>;       frame-period <i>count</i>;       frame-period-summary <i>count</i>;       symbol-period <i>count</i>;     }   } }</pre>
<b>Hierarchy Level</b>	[edit protocols oam <a href="#">ethernet</a> link-fault-management]
<b>Release Information</b>	<p>Statement introduced in Junos OS Release 8.5 for T, M, MX and ACX Series Routers, SRX Series Firewalls, and EX Series Switches, .</p> <p>Statement introduced in Junos OS Release 9.4 for EX Series switches and NFX Series devices.</p>
<b>Description</b>	<p>Configure an Ethernet OAM link fault management (LFM) action profile by specifying a profile name.</p> <p>The remaining statements are explained separately. See <a href="#">CLI Explorer</a>.</p>

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

The remaining statements are explained separately. See [CLI Explorer](#).

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

**Related Documentation**

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

---

## allow-remote-loopback

---

**Syntax** allow-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** 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.



.....

**WARNING:** If you disable this statement on a peer interface, LFM loopback enable and disable commands will not work. Before disabling this configuration, please make sure the remote-loopback interface is disabled.

.....

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

## ethernet (Protocols OAM)

**List of Syntax**    [Syntax: MX, T, ACX Series Routers, SRX Firewalls, M320 and EX Series Switches on page 125](#)  
[Syntax: EX Series Switches and NFX Series Devices on page 128](#)

**Syntax: MX, T, ACX Series Routers, SRX Firewalls, M320 and EX Series Switches**

```
ethernet {
  connectivity-fault-management {
    action-profile profile-name {
      default-actions {
        interface-down;
      }
    }
  }
  performance-monitoring {
    delegate-server-processing;
    hardware-assisted-timestamping;
    hardware-assisted-keepalives;
    sla-iterator-profiles {
      profile-name {
        avg-fd-twoway-threshold;
        avg-ifdv-twoway-threshold;
        avg-flr-forward-threshold;
        avg-flr-backward-threshold;
        disable;
        calculation-weight {
          delay delay-weight;
          delay-variation delay-variation-weight;
        }
        cycle-time milliseconds;
        iteration-period connections;
        measurement-type (loss | statistical-frame-loss | two-way-delay);
      }
    }
  }
  linktrace {
    age (30m | 10m | 1m | 30s | 10s);
    path-database-size path-database-size;
  }
  maintenance-domain domain-name {
    level number;
    name-format (character-string | none | dns | mac+2octet);
    maintenance-association ma-name {
      short-name-format (character-string | vlan | 2octet | rfc-2685-vpn-id);
      protect-maintenance-association protect-ma-name;
      remote-maintenance-association remote-ma-name;
      continuity-check {
        convey-loss-threshold;
        hold-interval minutes;
        interface-status-tlv;
        interval (10m | 10s | 1m | 1s | 100ms);
        loss-threshold number;
        port-status-tlv;
      }
    }
    mep mep-id {
```

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```
        allow-remote-loopback;
        no-allow-link-events;
    }
}
lmi {
    status-counter count;
    polling-verification-timer value;
    interface name {
        uni-id uni-name;
        status-counter number;
        polling-verification-timer value;
        evc-map-type (all-to-one-bundling | bundling | service-multiplexing);
        evc evc-name {
            default-evc;
            vlan-list vlan-id-list;
        }
    }
}
```

**Syntax: EX Series  
Switches and NFX  
Series Devices**

```
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 oam]
<b>Release Information</b>	<p>Statement introduced in Junos OS Release 8.2 for MX, T, ACX Series routers, SRX firewalls, M320 and EX Series switches.</p> <p>Statement introduced in Junos OS Release 9.4 for EX Series switches and NFX Series devices.</p> <p><b>connectivity-fault-management</b> introduced in Junos OS Release 10.2 for EX Series switches.</p>
<b>Description</b>	<p>Provide IEEE 802.3ah Operation, Administration, and Maintenance (OAM) support for Ethernet interfaces or configure connectivity fault management (CFM) for IEEE 802.1ag Operation, Administration, and Management (OAM) support.</p> <p>The remaining statements are explained separately. See <a href="#">CLI Explorer</a>.</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> <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>• <i>Enabling IEEE 802.3ah OAM Support</i></li><li>• <i>Example: Configuring Ethernet OAM Link Fault Management</i></li></ul>

---

## event-thresholds

---

<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 <b>oam ethernet link-fault-management interface</b> <i>interface-name</i> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 9.4 for EX Series switches.
<b>Description</b>	<p>Configure threshold limit values for link events in periodic OAM PDUs.</p> <p>The remaining statements are explained separately. See <a href="#">CLI Explorer</a>.</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) on page 4</a></li></ul>

## event (LFM)

<b>List of Syntax</b>	<a href="#">Syntax: MX, M, T, ACX Series Routers, SRX Firewalls and EX Series Switches on page 131</a> <a href="#">Syntax: EX Series Switches and NFX Series Devices on page 131</a>
<b>Syntax: MX, M, T, ACX Series Routers, SRX Firewalls and EX Series Switches</b>	<pre> event {   link-adjacency-loss;   link-event-rate {     frame-error count;     frame-period count;     frame-period-summary count;     symbol-period count;   }   protocol-down; } </pre>
<b>Syntax: EX Series Switches and NFX Series Devices</b>	<pre> event {   link-adjacency-loss;   link-event-rate {     frame-error count;     frame-period count;     frame-period-summary count;     symbol-period count;   } } </pre>
<b>Hierarchy Level</b>	[edit protocols oam <a href="#">ethernet</a> link-fault-management <a href="#">action-profile</a> ]
<b>Release Information</b>	<p>Statement introduced in Junos OS Release 8.5 for MX, M, T, ACX Series routers, SRX Series firewalls and EX Series switches.</p> <p>Statement introduced in Junos OS Release 9.4 for EX Series switches and NFX devices.</p>
<b>Description</b>	<p>Configure link events in an action profile for Ethernet OAM link fault management (LFM).</p> <p>The remaining statements are explained separately. See <a href="#">CLI Explorer</a>.</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> <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="#">Monitoring Protocol Status</a></li> <li><a href="#">Configuring Ethernet OAM Link Fault Management (CLI Procedure) on page 4</a></li> </ul>

## frame-error

---

<b>Syntax</b>	<code>frame-error count;</code>
<b>Hierarchy Level</b>	[edit protocols <a href="#">oam ethernet link-fault-management event link-event-rate</a> ], [edit protocols <a href="#">oam ethernet link-fault-management interface interface-name 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 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>
<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> <p><b>Default:</b> 1 second</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) on page 4</a></li></ul>

## frame-period

---

<b>Syntax</b>	<code>frame-period count;</code>
<b>Hierarchy Level</b>	[edit protocols <a href="#">oam ethernet link-fault-management event link-event-rate</a> ], [edit protocols <a href="#">oam ethernet link-fault-management interface interface-name 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) on page 4</a></li></ul>

## frame-period-summary

---

<b>Syntax</b>	<code>frame-period-summary count;</code>
<b>Hierarchy Level</b>	[edit protocols <a href="#">oam ethernet link-fault-management event link-event-rate</a> ], [edit protocols <a href="#">oam ethernet link-fault-management interface interface-name 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 threshold value for sending frame period summary error events or taking the action specified in the action profile.</p> <p>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.</p>
<b>Options</b>	<p><i>count</i>—Threshold count in seconds for frame period summary 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) on page 4</a></li></ul>



## oam

```

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. <b>connectivity-fault-management</b> introduced in Junos OS Release 10.2 for EX Series switches.
Description	<p>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.</p> <p>The remaining statements are explained separately. See <a href="#">CLI Explorer</a>.</p>
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>

- Related Documentation**
- *Example: Configuring Ethernet OAM Link Fault Management*
  - *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 Link-Fault Management)

---

<b>List of Syntax</b>	<a href="#">Syntax: T, M, MX and ACX Series Routers, SRX Series Firewalls and EX Series Switches on page 138</a> <a href="#">Syntax: EX Series Switches and NFX Series Devices on page 138</a>
<b>Syntax: T, M, MX and ACX Series Routers, SRX Series Firewalls and EX Series Switches</b>	<pre>interface <i>interface-name</i> {   apply-action-profile <i>profile-name</i>;   link-discovery (active   passive);   pdu-interval <i>interval</i>;   pdu-threshold <i>threshold-value</i>;   remote-loopback;   event-thresholds {     frame-error <i>count</i>;     frame-period <i>count</i>;     frame-period-summary <i>count</i>;     symbol-period <i>count</i>;   }   negotiation-options {     allow-remote-loopback;     no-allow-link-events;   } }</pre>
<b>Syntax: EX Series Switches and NFX Series Devices</b>	<pre>interface <i>interface-name</i> {   link-discovery (active   passive);   pdu-interval <i>interval</i>;   pdu-threshold <i>threshold-value</i>;   remote-loopback;   event-thresholds {     frame-error <i>count</i>;     frame-period <i>count</i>;     frame-period-summary <i>count</i>;     symbol-period <i>count</i>;   }   negotiation-options {     allow-remote-loopback;     no-allow-link-events;   } }</pre>
<b>Hierarchy Level</b>	[edit protocols oam <a href="#">ethernet</a> link-fault-management]
<b>Release Information</b>	Statement introduced in Junos OS Release 8.2 for T, M, MX and ACX Series Routers, SRX Series firewalls and EX Series switches. Statement introduced in Junos OS Release 9.4 for EX Series switches and NFX Series devices.
<b>Description</b>	Configure Ethernet OAM link fault management (LFM) for all interfaces or for specific interfaces.

For Ethernet interfaces on M320, MX Series, and T Series routers, configure IEEE 802.3ah Operation, Administration, and Management (OAM) support.

**Options**    **interface *interface-name***—Interface to be enabled for IEEE 802.3ah link fault management OAM support.

The remaining statements are described separately.

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

**Related Documentation**

- *Enabling IEEE 802.3ah OAM Support*
- *Example: Configuring Ethernet OAM Link Fault Management*
- [Configuring Ethernet OAM Link Fault Management \(CLI Procedure\) on page 4](#)

---

## link-adjacency-loss

---

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

## link-discovery

---

<b>Syntax</b>	link-discovery (active   passive);
<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>	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.
<b>Options</b>	<p><i>active</i>—In active mode, the interface discovers and monitors the peer on the link if the peer also supports IEEE 802.3ah OAM functionality.</p> <p><i>passive</i>—In passive mode, the peer initiates the discovery process.</p> <p>Once the discovery process is initiated, both sides participate in discovery.</p>
<b>Required Privilege Level</b>	routing—To view this statement in the configuration. 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-down

---

<b>Syntax</b>	link-down;
<b>Hierarchy Level</b>	[edit protocols <a href="#">oam ethernet link-fault-management action-profile</a> <i>action</i> ]
<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. 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

---

<b>Syntax</b>	<pre>link-event-rate {     frame-error <i>count</i>;     frame-period <i>count</i>;     frame-period-summary <i>count</i>;     symbol-period <i>count</i>; }</pre>
<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>	<p>Configure the number of link fault management (LFM) events per second.</p> <p>The remaining statements are explained separately. See <a href="#">CLI Explorer</a>.</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) on page 4</a></li></ul>

## link-fault-management

```
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. See [CLI Explorer](#).

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



## negotiation-options

---

<b>Syntax</b>	<pre>negotiation-options {   allow-remote-loopback;   no-allow-link-events; }</pre>
<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>	<p>Enable and disable IEEE 802.3ah Operation, Administration, and Maintenance (OAM) link fault management (LFM) features for Ethernet interfaces.</p> <p>The remaining statements are explained separately. See <a href="#">CLI Explorer</a>.</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) on page 4</a></li></ul>

## no-allow-link-events

---

<b>Syntax</b>	<pre>no-allow-link-events;</pre>
<b>Hierarchy Level</b>	[edit protocols <a href="#">oam ethernet link-fault-management interface</a> <i>interface-name</i> <a href="#">negotiation-options</a> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 9.4 for EX Series switches.
<b>Description</b>	Disable the sending of link event TLVs.
<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) on page 4</a></li></ul>

## pdu-interval

---

<b>Syntax</b>	<code>pdu-interval <i>interval</i>;</code>
<b>Hierarchy Level</b>	[edit protocols oam <a href="#">ethernet</a> link-fault-management <a href="#">interface</a> <i>interface-name</i> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 8.2 for MX, M, T, ACX, Series routers, SRX Series firewalls, and EX Series Switches. Statement introduced in Junos OS Release 9.4 for EX Series switches.
<b>Description</b>	For Ethernet interfaces on EX Series switches and M320, M120, MX Series, and T Series routers, specify the periodic OAM PDU sending interval for fault detection. Used for IEEE 802.3ah Operation, Administration, and Management (OAM) support.
<b>Options</b>	<b>interval</b> —Periodic OAM PDU sending interval. <b>Range:</b> For MX, M, T, ACX, Series routers, SRX Series firewalls and EX Series switches – 100 through 1000 milliseconds <b>Default:</b> For EX Series switches –1000 milliseconds
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration. routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <i>Configuring the OAM PDU Interval</i></li><li>• <i>Example: Configuring Ethernet OAM Link Fault Management</i></li><li>• <a href="#">Configuring Ethernet OAM Link Fault Management (CLI Procedure)</a> on page 4</li></ul>

## pdu-threshold

---

<b>Syntax</b>	<code>pdu-threshold <i>threshold-value</i>;</code>
<b>Hierarchy Level</b>	[edit protocols oam <b>ethernet</b> link-fault-management <b>interface</b> <i>interface-name</i> ]
<b>Release Information</b>	<p>Statement introduced in Junos OS Release 8.2 for T, M, MX and ACX Series routers, SRX Series firewalls and EX Series switches.</p> <p>Statement introduced in Junos OS Release 9.4 for EX Series switches and NFX Series devices.</p>
<b>Description</b>	<p>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.</p> <p>For Ethernet interfaces on EX Series switches and M320, M120, MX Series, and T Series routers, specify the number of OAM PDUs to miss before an error is logged. Used for IEEE 802.3ah Operation, Administration, and Management (OAM) support.</p>
<b>Options</b>	<p><b><i>threshold-value</i></b>—The number of PDUs missed before declaring the peer lost.</p> <p><b>Range:</b> 3 through 10 PDUs</p> <p><b>Default:</b> 3 PDUs</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>Configuring the OAM PDU Threshold</i></li><li>• <a href="#">Configuring Ethernet OAM Link Fault Management (CLI Procedure) on page 4</a></li></ul>

## remote-loopback

---

<b>Syntax</b>	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>	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.
<b>Required Privilege Level</b>	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <a href="#">Example: Configuring Ethernet OAM Link Fault Management</a></li><li>• <a href="#">Configuring Ethernet OAM Link Fault Management (CLI Procedure) on page 4</a></li></ul>

## symbol-period

---

<b>Syntax</b>	symbol-period <i>count</i> ;
<b>Hierarchy Level</b>	[edit protocols <a href="#">oam ethernet link-fault-management action-profile</a> ; <a href="#">event link-event-rate</a> ] , [edit protocols <a href="#">oam ethernet link-fault-management interface</a> <i>interface-name</i> <a href="#">event-thresholds</a> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 9.4 for EX Series switches.
<b>Description</b>	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.
<b>Options</b>	<i>count</i> —Threshold count in seconds for symbol period events. <b>Range:</b> 1 through 100 seconds
<b>Required Privilege Level</b>	routing—To view this statement in the configuration. 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>

## syslog (OAM Action)

---

<b>Syntax</b>	syslog;
<b>Hierarchy Level</b>	[edit protocols oam <b>ethernet</b> link-fault-management <b>action-profile</b> action]
<b>Release Information</b>	<p>Statement introduced in Junos OS Release 8.5 for T, M, MX and ACX Series routers, SRX Series firewalls and EX Series switches.</p> <p>Statement introduced in Junos OS Release 9.4 for EX Series switches and NFX Series devices.</p>
<b>Description</b>	<p>Generate a syslog message for the Ethernet Operation, Administration, and Management (OAM) event.</p> <p>Generate a system log message for the Ethernet Operation, Administration, and Maintenance (OAM) link fault management (LFM) event.</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> <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>• <i>Specifying the Actions to Be Taken for Link-Fault Management Events</i></li><li>• <a href="#">Configuring Ethernet OAM Link Fault Management (CLI Procedure) on page 4</a></li></ul>

## traceoptions (Individual Interfaces)

<b>List of Syntax</b>	<p>Syntax (Individual interfaces with PTX Series, EX Series, ACX Series) on page 148</p> <p>Syntax (Individual interfaces with QFX Series, OCX1100, EX4600, NFX Series) on page 148</p> <p>Syntax (OAMLFM with EX Series, QFX Series, NFX Series) on page 148</p> <p>Syntax (Interface process with ACX Series, SRX Series, MX Series, M Series, T Series) on page 148</p>
<b>Syntax (Individual interfaces with PTX Series, EX Series, ACX Series)</b>	<pre>traceoptions {   file <i>filename</i> &lt;files <i>name</i>&gt; &lt;size <i>size</i>&gt; &lt;world-readable   no-world-readable&gt;;   flag <i>flag</i>;   match; }</pre>
<b>Syntax (Individual interfaces with QFX Series, OCX1100, EX4600, NFX Series)</b>	<pre>traceoptions {   flag <i>flag</i>; }</pre>
<b>Syntax (OAMLFM with EX Series, QFX Series, NFX Series)</b>	<pre>traceoptions {   file <i>filename</i> &lt;files <i>number</i>&gt; &lt;match <i>regex</i>&gt; &lt;size <i>size</i>&gt; &lt;world-readable       no-world-readable&gt;;   flag <i>flag</i> ;   no-remote-trace; }</pre>
<b>Syntax (Interface process with ACX Series, SRX Series, MX Series, M Series, T Series)</b>	<pre>traceoptions {   file &lt;<i>filename</i>&gt; &lt;files <i>number</i>&gt; &lt;match <i>regular-expression</i>&gt; &lt;size <i>size</i>&gt; &lt;world-readable       no-world-readable&gt;;   flag <i>flag</i> &lt;disable&gt;;   no-remote-trace; }</pre>
<b>Hierarchy Level (Individual interfaces with PTX Series, EX Series, ACX Series, QFX Series, OCX1100, EX4600, NFX Series)</b>	[edit interfaces <i>interface-name</i> ]
<b>Hierarchy Level (Interface process with ACX Series, SRX Series, MX Series, M Series, T Series)</b>	[edit interfaces]
<b>Release Information</b>	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Metro Routers.</p>

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

Statement introduced in JUNOS Release 10.2 for EX Series switches.

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 interfaces **traceoptions** statement 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/dcd*.

On EX Series, QFX Series, and NFX Series platforms, configure tracing options the link fault management.

On ACX Series, SRX Series, MX Series, M Series, and T Series platforms define tracing operations for the interface process (dcd).

**Default** If you do not include this statement, no interface-specific tracing operations are performed.

**Options** [Table 22 on page 151](#) lists options for traceoption command for the following platforms:



Table 22: Options for `traceoptions`

Option	Individual interfaces with PTX Series, ACX Series, EX Series	Individual interfaces with QFX Series, QFabric System, OCX1100, EX4600, NFX Series	Interface Process with OAMLFM with EX Series, QFX Series, NFX Series	Interface process with ACX Series, SRX Series, MX Series, M Series, T Series
<b>file filename</b>	—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 <code>/var/log/dcd</code> . By default, interface process tracing output is placed in the file.		—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 <code>/var/log/dcd</code> .	—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 <code>/var/log/dcd</code> . By default, interface process tracing output is placed in the file <code>dcd</code> .
<b>files number</b>	—(Optional) Maximum number of trace files. When a trace file named <code>trace-file</code> reaches its maximum size, it is renamed <b>trace-file.0</b> , then <b>trace-file.1</b> , and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten.		—(Optional) Maximum number of trace files. When a trace file named <code>trace-file</code> reaches its maximum size, it is renamed <code>trace-file.0</code> , then <code>trace-file.1</code> , and so on, until the maximum <code>xk</code> to specify KB, <code>xm</code> to specify MB, or <code>xg</code> 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 <code>size</code> option.	—(Optional) Maximum number of trace files. When a trace file named <b>trace-file</b> reaches its maximum size, it is renamed <b>trace-file.0</b> , then <b>trace-file.1</b> , 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 <code>size</code> option.  <i>Range: 2 through 1000</i>  <i>Default: 3 files</i>
<b>flag</b>	—Tracing operation to perform. To specify more than one tracing operation, include multiple <b>flag</b> statements. The following are the interface-specific tracing options. <ul style="list-style-type: none"> <li><b>all</b>—All interface tracing operations</li> <li><b>event</b>—Interface events</li> <li><b>ipc</b>—Interface interprocess</li> </ul>	—Tracing operation to perform. To specify more than one tracing operation, include multiple <b>flag</b> statements. The following are the interface-specific tracing options. <ul style="list-style-type: none"> <li><b>all</b>—All interface tracing operations</li> <li><b>event</b>—Interface events</li> <li><b>ipc</b>—Interface interprocess</li> </ul>	—Tracing operation to perform. To specify more than one tracing operation, include multiple <b>flag</b> statements. You can include the following flags: <ul style="list-style-type: none"> <li><b>action-profile</b>—Trace action profile invocation events.</li> <li><b>all</b>—Trace all events.</li> <li><b>configuration</b>—Trace configuration events.</li> <li><b>protocol</b>—Trace</li> </ul>	—Tracing operation to perform. To specify more than one tracing operation, include multiple <b>flag</b> statements. You can include the following flags: <ul style="list-style-type: none"> <li><b>all</b></li> <li><b>change-events</b>—Log changes that produce configuration events</li> <li><b>config-states</b>—Log the configuration</li> </ul>

Table 22: Options for traceoptions (continued)

Option	Individual interfaces with PTX Series, ACX Series, EX Series	Individual interfaces with QFX Series, QFabric System, OCX1100, EX4600, NFX Series	Interface Process with OAMLFM with EX Series, QFX Series, NFX Series	Interface process with ACX Series, SRX Series, MX Series, M Series, T Series
	<p>communication (IPC) messages</p> <ul style="list-style-type: none"> <li>• <b>media</b>—Interface media changes</li> <li>• <b>q921</b>—Trace ISDN Q.921 frames</li> <li>• <b>q931</b>—Trace ISDN Q.931 frames</li> </ul>	<p>communication (IPC) messages</p> <ul style="list-style-type: none"> <li>• <b>media</b>—Interface media changes</li> <li>• <b>q921</b>—Trace ISDN Q.921 frames</li> <li>• <b>q931</b>—Trace ISDN Q.931 frames</li> </ul>	<p>protocol processing events.</p> <ul style="list-style-type: none"> <li>• <b>routing socket</b>—Trace routing socket events.</li> </ul>	<p>state machine changes</p> <ul style="list-style-type: none"> <li>• <b>kernel</b>—Log configuration IPC messages to kernel</li> <li>• <b>kernel-detail</b>—Log details of configuration messages to kernel</li> </ul>
<b>match</b>	—(Optional) Regular expression for lines to be traced.		—(Optional) Refine the output to log only those lines that match the given regular expression.	
<b>size size</b>	<p>—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named <b>trace-file</b> reaches this size, it is renamed <b>trace-file.0</b>. When the <b>trace-file</b> again reaches its maximum size, <b>trace-file.0</b> is renamed <b>trace-file.1</b> and <b>trace-file</b> is renamed <b>trace-file.0</b>. This renaming scheme continues until the maximum number of trace files is reached. Then, the oldest trace file is overwritten.</p>		<p>—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named <b>trace-file</b> reaches its maximum size, it is renamed <b>trace-file.0</b>, then <b>trace-file.1</b>, 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 <b>files</b> option.</p> <p><i>Syntax:</i> <b>xk</b> to specify KB, <b>xm</b> to specify MB, or <b>xg</b> to specify GB</p> <p><i>Range:</i> 10 KB through 1 GB</p> <p><i>Default:</i> 128 KB</p> <p><i>Default:</i> If you do not include this option, tracing output is appended to an existing trace file.</p>	

Table 22: Options for traceoptions (continued)

Option	Individual interfaces with PTX Series, ACX Series, EX Series	Individual interfaces with QFX Series, QFabric System, OCX1100, EX4600, NFX Series	Interface Process with OAMLFM with EX Series, QFX Series, NFX Series	Interface process with ACX Series, SRX Series, MX Series, M Series, T Series
				<p>—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named <b>trace-file</b> reaches this size, it is renamed <b>trace-file.0</b>. When the <b>trace-file</b> again reaches its maximum size, <b>trace-file.0</b> is renamed <b>trace-file.1</b> and <b>trace-file</b> is renamed <b>trace-file.0</b>. This renaming scheme continues until the maximum number of trace files is reached. Then, the oldest trace file is overwritten. If you specify a maximum file size, you also must specify a maximum number of trace files with the <b>files</b> option.</p> <p><i>Syntax:</i> <b>xk</b> to specify kilobytes, <b>xm</b> to specify megabytes, or <b>xg</b> to specify gigabytes</p> <p><i>Range:</i> 10 KB through the maximum file size supported on your router</p> <p><i>Default:</i> 1 MB</p>
<b>no-world-readable</b>	—(Optional) Prevent any user from reading the log file.		—(Optional) Restrict file access to the user who created the file.	—(Optional) Disallow any user to read the log file.
<b>world-readable</b>	—(Optional) Allow any user to read the log file.		—(Optional) Enable unrestricted file access.	—(Optional) Allow any user to read the log file.
<b>disable</b>				

Table 22: Options for traceoptions (continued)

Option	Individual interfaces with PTX Series, ACX Series, EX Series	Individual interfaces with QFX Series, QFabric System, OCX1100, EX4600, NFX Series	Interface Process with OAMLFM with EX Series, QFX Series, NFX Series	Interface process with ACX Series, SRX Series, MX Series, M Series, T Series
				—(Optional) Disable the tracing operation. You can use this option to disable a single operation when you have defined a broad group of tracing operations, such as <b>all</b> .
no-remote-trace			—(Optional) Disable the remote trace.	-
match <i>regex</i>				—(Optional) Refine the output to include only those lines that match the given regular expression.

**Required Privilege Level**

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

- Related Documentation**
- *Tracing Operations of an Individual Router Interface*
  - *Tracing Operations of an Individual Router or Switch Interface*
  - *Example: Configuring Ethernet OAM Link Fault Management*
  - [Configuring Ethernet OAM Link Fault Management \(CLI Procedure\) on page 4](#)
  - *Tracing Operations of the Interface Process*

## CHAPTER 9

# Interfaces Configuration Statements

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## address

```

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 dlcidlcid-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;
        virtual-gateway-address
        (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.

**Description** Configure the interface address.



**NOTE:** If you configure the same address on multiple interfaces in the same routing instance, Junos OS uses only the first configuration, and 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 192.168.1.1/8;
      }
    }
  }
  xe-0/0/1 {
    unit 0 {
      family inet {
        address 192.168.1.1/8;
      }
    }
  }
}
```

For more information on configuring the same address on multiple interfaces, see [“Configuring the Interface Address” on page 59](#).

- 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.

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

The remaining statements are explained separately. Search for a statement in [CLI Explorer](#) or click a linked statement in the Syntax section for details.



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



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

**Related Documentation**


- *Configuring the Protocol Family*
- *Junos OS Administration Library*
- *family*
- *negotiate-address*
- *unnumbered-address (Ethernet)*

## alarm (chassis)

---

Syntax	<pre>alarm {     interface-type {         alarm-name (ignore   red   yellow);     } }</pre>
Hierarchy Level	[edit chassis], [edit chassis interconnect-device <i>name</i> ], [edit chassis node-group <i>name</i> ]
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 12.2 for the ACX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	<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>
Options	<p><i>alarm-name</i>—Alarm condition. For a list of conditions, see <i>Configurable PIC Alarm Conditions</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>
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
Related Documentation	<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

<b>Syntax</b>	(auto-negotiation   no-auto-negotiation);
<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. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
<b>Description</b>	Explicitly enable or disable autonegotiation. 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.
	<div>  <p><b>NOTE:</b> In Junos OS Release 14.1X53-D35 on QFX5100-48T-6Q devices using 10-Gigabit Ethernet Copper interfaces, autonegotiation is disabled by default on the copper ports, and the interfaces operate at a speed of 100M. You can, however, enable auto-negotiation by issuing the <code>set interface <i>name</i> ether-options auto-negotiation</code> command on the interface for which you want to change the interface speed. With autonegotiation enabled, the interface auto-detects the speed in which to operate.</p> </div>
	<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>
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">speed on page 215</a></li> <li>• <a href="#">Configuring Gigabit and 10-Gigabit Ethernet Interfaces for EX4600 and QFX Series Switches on page 61</a></li> <li>• <i>Junos OS Network Interfaces Library for Routing Devices</i></li> </ul>

## channel-speed

---

<b>Syntax</b>	<code>channel-speed (10g   25g   50g;   100g   disable-auto-speed-detection) ;</code>
<b>Hierarchy Level</b>	<code>[edit chassis fpc slot-number pic pic-number (port port-number   port-range port-range-low port-range-high)]</code>
<b>Release Information</b>	Statement introduced in Junos OS Release 13.2 for the QFX Series. 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>	<b>40g</b> (40-Gigabit Ethernet).
<b>Options</b>	<b>10g</b> —Set the channel speed to 10g (10-Gigabit Ethernet). <b>25g</b> —Set the channel speed to 25g (25-Gigabit Ethernet). <b>50g</b> —Set the channel speed to 50g (50-Gigabit Ethernet). <b>100g</b> —Set the channel speed to 100g (100-Gigabit Ethernet). <b>disable-auto-speed-detection</b> —Disable auto-speed detection.
<b>Required Privilege Level</b>	<b>interface</b> —To view this statement in the configuration. <b>interface-control</b> —To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <i>Channelizing Interfaces Overview</i></li><li>• <i>Channelizing Interfaces on QFX5200 Switches</i></li></ul>

## configured-flow-control

**Syntax** `configured-flow-control {  
    rx-buffers (on | off);  
    tx-buffers (on | off);  
}`

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

**Release Information** Statement introduced in Junos OS Release 12.1 for the QFX Series.

**Description** 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 **rx-buffers** and the **tx-buffers** values when you configure asymmetric flow control.

Use the **flow-control** and **no-flow-control** 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.



**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) by applying a congestion notification profile to the interface.

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.

**Default** Flow control is disabled. You must explicitly configure Ethernet PAUSE flow control on interfaces.

**Options** The remaining statements are explained separately. See [CLI Explorer](#).

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

**Related Documentation**

- [congestion-notification-profile](#)
- [flow-control 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)*

## **craft-lockout**

---

**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 Level** interface—To view this statement in the configuration.  
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 (Interfaces)

<b>Syntax</b>	<code>description text;</code>
<b>Hierarchy Level</b>	<code>[edit <a href="#">interfaces</a> interface-name],</code> <code>[edit <a href="#">interfaces</a> interface-name unit logical-unit-number],</code> <code>[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number]</code>
<b>Release Information</b>	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Metro Routers.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
<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>	<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>Configuring Interface Description</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>Configuring Gigabit and 10-Gigabit Ethernet Interfaces for OCX Series Switches</i></li> <li>• <i>Configuring Gigabit Ethernet Interfaces (CLI Procedure) for EX Series Switches with ELS support</i></li> <li>• <a href="#">Configuring Gigabit and 10-Gigabit Ethernet Interfaces for EX4600 and QFX Series Switches on page 61</a></li> <li>• <i>Using DHCP Relay Agent Option 82 Information</i></li> <li>• <i>Junos OS Network Interfaces Library for Routing Devices</i></li> <li>• <i>Example: Connecting Access Switches to a Distribution Switch</i></li> </ul>

## ethernet (Alarm)

---

<b>Syntax</b>	<pre>ethernet {     link-down (red   yellow   ignore); }</pre>
<b>Hierarchy Level</b>	[edit chassis <a href="#">alarm</a> ], [edit chassis interconnect-device <i>name</i> <a href="#">alarm</a> ], [edit chassis node-group <i>name</i> <a href="#">alarm</a> ]
<b>Release Information</b>	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.
<b>Description</b>	Configure alarms for an Ethernet interface.
<b>Options</b>	The remaining statements are explained separately. Search for a statement in <a href="#">CLI Explorer</a> or click a linked statement in the Syntax section for details.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.



## ethernet-switch-profile

**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;
    }
  }
  storm-control storm-control-profile;
  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 Metro 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. See [CLI Explorer](#).



**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 <b>ethernet-switch-profile</b> 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. 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

```
Syntax 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);
    }
}
```

**Hierarchy Level** [edit [interfaces](#) *ge-chassis/slot/port unit logical-unit-number*] family

**Release Information** Statement introduced in Junos OS Release 11.1 for the QFX Series.

**Description** Configure Ethernet switching protocol family information for the logical interface.

The remaining statements are explained separately. See [CLI Explorer](#).

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

**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 for EX4600 and QFX Series Switches on page 61](#)
- [JUNOS Software Network Interfaces Configuration Guide](#)

## ether-options

**Syntax** The **auto-negotiation** and **speed** statements are not supported on the OCX Series.

```
ether-options {
  802.3ad aex {
    lacp {
      force-up;
      (primary | backup);
    }
  }
  (auto-negotiation | no-auto-negotiation);
  autostate-exclude
  configured-flow-control {
    rx-buffers (on | off);
    tx-buffers (on | off);
  }
  ethernet-switch-profile
    storm-control storm-control-profile;
  }
  (flow-control | no-flow-control);
  link-mode mode;
  (loopback | no-loopback);
  speed (auto-negotiation | no-auto-negotiation);
}
```

**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.  
**autostate-exclude** option introduced in Junos OS Release 14.1x53-D40 for QFX5100 switches only.

**Description** Configure **ether-options** properties for a Gigabit Ethernet or 10-Gigabit Ethernet interface.



**NOTE:** The **auto-negotiation** and **speed** statements are not supported on the OCX Series.

The remaining statements are explained separately. See [CLI Explorer](#).

**Default** Enabled.

**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 for EX4600 and QFX Series Switches on page 61](#)

- *Junos OS Network Interfaces Library for Routing Devices*

## eui-64

---

<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. Statement introduced in Junos OS Release 9.3 for EX Series switches. 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.
<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. 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 59</a></li></ul>

## family

---

**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);
    }
  }
  fibre-channel {
    port-mode (f-port | np-port);
  }
  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;
}
}
```

Hierarchy Level	[edit <a href="#">interfaces interface-name unit logical-unit-number</a> ], [edit <a href="#">interfaces interface-range interface-name unit logical-unit-number family</a> ]
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 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 for EX4600 and QFX Series Switches on page 61](#)
- [Configuring Link Aggregation on page 83](#)
- [Configuring IRB Interfaces on Switches](#)
- [Junos OS Network Interfaces Library for Routing Devices](#)

## fibre-channel (Alarm)

---


<b>Syntax</b>	<code>fibre-channel {     link-down (red   yellow   ignore); }</code>
<b>Hierarchy Level</b>	[edit chassis <code>alarm</code> ], [edit chassis interconnect-device <i>name</i> <code>alarm</code> ], [edit chassis node-group <i>name</i> <code>alarm</code> ]
<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. interface-control—To add this statement to the configuration.

## filter

Syntax	<pre>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> ]; }</pre>
Hierarchy Level	<pre>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i>], [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i>]</pre>
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p>
Description	<p> <b>NOTE:</b> On EX Series switches, the <code>group</code>, <code>input-list</code>, <code>output-filter</code> statements are not supported under the <code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet]</code>, <code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet6]</code>, and <code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family mpls]</code> hierarchies.</p> <p>Apply a filter to an interface. You can also use filters for encrypted traffic. When you configure filters, you can configure them under the <b>family ethernet-switching</b>, <b>inet</b>, <b>inet6</b>, <b>mpls</b>, or <b>vpls</b> only.</p>
Options	<p><b>group <i>filter-group-number</i></b>—Define an interface to be part of a filter group. The default filter group number is 0.</p> <p><b>Range:</b> 0 through 255</p> <p><b>input <i>filter-name</i></b>—Name of one filter to evaluate when packets are received on the interface.</p> <p><b>output <i>filter-name</i></b>—Name of one filter to evaluate when packets are transmitted on the interface.</p> <p>The remaining statements are explained separately. See <a href="#">CLI Explorer</a>.</p>
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> <li>• <i>Applying a Filter to an Interface</i></li> <li>• <i>Junos OS Administration Library</i></li> </ul>

- *Configuring Gigabit Ethernet Interfaces (CLI Procedure)*
- *Configuring Firewall Filters (CLI Procedure)*
- *family*

## flow-control

<b>Syntax</b>	(flow-control   no-flow-control);
<b>Hierarchy Level</b>	[edit <b>interfaces</b> <i>interface-name</i> <b>ether-options</b> ]
<b>Release Information</b>	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.
<b>Description</b>	<p>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.</p> <p>You can configure asymmetric flow control by including the <b>configured-flow-control</b> statement at the [edit <b>interfaces</b> <i>interface-name</i> <b>ether-options</b> 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.</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> <p>OCX Series switches do not support PFC.</p> </div> <ul style="list-style-type: none"> <li>• <b>flow-control</b>—Enable flow control; flow control is useful when the remote device is a Gigabit Ethernet switch.</li> <li>• <b>no-flow-control</b>—Disable flow control.</li> </ul>
<b>Default</b>	Flow control is disabled.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

- Related Documentation**
- [configured-flow-control on page 163](#)
  - [Configuring Gigabit and 10-Gigabit Ethernet Interfaces for EX4600 and QFX Series Switches on page 61](#)
  - *Understanding CoS Flow Control (Ethernet PAUSE and PFC)*
  - *Junos OS Network Interfaces Library for Routing Devices*

---

## fpc

**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. See [CLI Explorer](#).

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

**Related Documentation**

- *show chassis fpc*



## gratuitous-arp-reply

---

<b>Syntax</b>	(gratuitous-arp-reply   no-gratuitous-arp-reply);
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> ], [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. <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. interface-control—To add this statement to the configuration.

## hold-time (Physical Interface)

---

<b>Syntax</b>	<code>hold-time up <i>milliseconds</i> down <i>milliseconds</i>;</code>
<b>Hierarchy Level</b>	[edit <a href="#">interfaces interface-name</a> ], [edit <a href="#">interfaces interface-range interface-range-name</a> ]
<b>Release Information</b>	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 Metro Routers. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series. Statement introduced in Junos OS Release 12.1 for the SRX Series.
<b>Description</b>	<p>Specify the <b>hold-time</b> 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.</p>
	<div> <b>NOTE:</b><ul style="list-style-type: none"><li>• 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.</li><li>• The hold-time option is not available for controller interfaces.</li></ul></div>
	<div> <b>NOTE:</b> 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.</div>
<b>Default</b>	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**                • *advertise-interval*  
**Documentation**        • *interfaces (EX Series switches)*  
                              • *Physical Interface Damping Overview*  
                              • *Damping Shorter Physical Interface Transitions*  
                              • *Damping Longer Physical Interface Transitions*

## irb (Interfaces)

---

```
Syntax  irb {
    accounting-profile name;
    arp-l2-validate;
    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];
}
}

```

Hierarchy Level [edit interfaces *interface-name*

<b>Release Information</b>	Statement introduced in Junos OS Release 12.3R2 for EX Series switches. <b>irb</b> 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.  The remaining statements are explained separately. See <a href="#">CLI Explorer</a> .
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

## inet (interfaces)



<b>Syntax</b>	<pre>inet {   address <i>address</i> {     primary;     filter input <i>filter-name</i>;     filter output <i>filter-name</i>;     targeted-broadcast;   } }</pre>
<b>Hierarchy Level</b>	[edit <a href="#">interfaces</a> <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> family], [edit <a href="#">interfaces</a> <i>interface-range</i> <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. 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. See <a href="#">CLI Explorer</a> .
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. 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 for EX4600 and QFX Series Switches on page 61</a></li> </ul>

## inet6 (interfaces)

---

<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</a> <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> family], [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 12.2 for the QFX Series. 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. See <a href="#">CLI Explorer</a> .
<b>Required Privilege Level</b>	interface—To view this statement in the configuration.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 for EX4600 and QFX Series Switches on page 61</a></li><li>• <a href="#">Configuring Gigabit and 10-Gigabit Ethernet Interfaces for OCX Series Switches</a></li></ul>

## interface-mode

<b>Syntax</b>	<code>interface-mode (access   trunk &lt;inter-switch-link&gt;);</code>
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family bridge], [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family ethernet-switching], [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family bridge]
<b>Release Information</b>	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. <b>inter-switch-link</b> option introduced in Junos OS Release 14.2 for MX240, MX480, and MX960 routers in enhanced LAN mode.
<b>Description</b>	<p> <b>NOTE:</b> This statement supports the Enhanced Layer 2 Software (ELS) configuration style. If your switch runs software that does not support ELS, see <i>port-mode</i>. For ELS details, see <i>Getting Started with Enhanced Layer 2 Software</i>.</p> <p>QFX3500 and QFX3600 standalone switches—Determine whether the logical interface accepts or discards packets based on VLAN tags. Specify the <b>trunk</b> option to accept packets with a VLAN ID that matches the list of VLAN IDs specified in the <b>vlan-id</b> or <b>vlan-id-list</b> statement, then forward the packet within the bridge domain or VLAN configured with the matching VLAN ID. Specify the <b>access</b> 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 <b>vlan-id</b> statement.</p> <p> <b>NOTE:</b> On MX Series routers, if you want IGMP snooping to be functional for a bridge domain, then you should not configure <b>interface-mode</b> and <b>irb</b> 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 <i>Configuring a Trunk Interface on a Bridge Network</i>.</p>
<b>Options</b>	<p><b>access</b>—Configure a logical interface to accept untagged packets. Specify the VLAN to which this interface belongs using the <b>vlan-id</b> statement.</p> <p><b>trunk</b>—Configure a single logical interface to accept packets tagged with any VLAN ID specified with the <b>vlan-id</b> or <b>vlan-id-list</b> statement.</p> <p><b>trunk inter-switch-link</b>—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</p>

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.
	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>Tunnel Interface Configuration on MX Series Routers Overview</i></li></ul>



## interface-range

**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.



**NOTE:** The interface range definition is supported only for Gigabit Ethernet, 10-Gigabit Ethernet, and Fibre Channel interfaces. Interface ranges are not supported on channelized interfaces.

Group interfaces that share a common configuration profile.

**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. See [CLI Explorer](#).

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

- Related Documentation**
- [Understanding Interface Ranges for Switches on page 29](#)
  - [Interfaces Overview for Switches on page 11](#)
  - [Configuring Gigabit and 10-Gigabit Ethernet Interfaces for EX4600 and QFX Series Switches on page 61](#)
  - *Junos OS Network Interfaces Library for Routing Devices*

## interfaces (QFX Series)

**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);
      flexible-vlan-tagging;
      (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);
  }
  flexible-vlan-tagging;
  (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);
  }
  flexible-vlan-tagging;
  (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>	<a href="#">[edit]</a>
<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>	<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. See <a href="#">CLI Explorer</a>.</p>
<b>Required Privilege Level</b>	<p><b>interface</b>—To view this statement in the configuration.</p> <p><b>interface-control</b>—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">Interfaces Overview for Switches on page 11</a></li> <li>• <a href="#">Understanding Interface Ranges for Switches on page 29</a></li> <li>• <a href="#">Configuring Gigabit and 10-Gigabit Ethernet Interfaces for EX4600 and QFX Series Switches on page 61</a></li> <li>• <a href="#">Configuring Link Aggregation on page 83</a></li> <li>• <a href="#">Configuring a Layer 3 Logical Interface on page 72</a></li> </ul>

## link-down

---

<b>Syntax</b>	link-down (red   yellow   ignore);
<b>Hierarchy Level</b>	[edit chassis <b>alarm ethernet (Alarm)</b> ], [edit chassis <b>alarm fibre-channel</b> ], [edit chassis interconnect-device <i>name</i> <b>alarm ethernet (Alarm)</b> ], [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. 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>	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.

## link-mode

---

<b>Syntax</b>	<code>link-mode <i>mode</i>;</code>
<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. 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><i>mode</i></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. 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 for EX4600 and QFX Series Switches on page 61</a></li> <li>• <i>Junos OS Network Interfaces Library for Routing Devices</i></li> </ul>

## link-speed

<b>Syntax</b>	<code>link-speed <i>speed</i>;</code>
<b>Hierarchy Level (QFX, NFX, EX Series, QFabric System, OCX1100, EX4600)</b>	[edit interfaces aex <a href="#">aggregated-ether-options</a> ]
<b>Hierarchy Level (EX Series)</b>	[edit interfaces aex aggregated-ether-options], [edit interfaces interface-range <i>name</i> aggregated-ether-options], [edit interfaces interface-range <i>name</i> aggregated-sonet-options]
<b>Release Information</b>	Statement introduced in Junos OS Release 9.0 for EX Series switches. 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.
<b>Description</b>	For aggregated Ethernet interfaces only, set the required link speed.
<b>Options</b>	<p><b><i>speed</i></b>—For aggregated Ethernet links, you can specify <b><i>speed</i></b> in bits per second either as a complete decimal number or as a decimal number followed by the abbreviation <b>k</b> (1000), <b>m</b> (1,000,000), or <b>g</b> (1,000,000,000).</p> <p>Aggregated Ethernet links on the M120 router can have one of the following speeds:</p> <ul style="list-style-type: none"> <li>• <b>100m</b>—Links are 100 Mbps.</li> <li>• <b>10g</b>—Links are 10 Gbps.</li> <li>• <b>1g</b>—Links are 1 Gbps.</li> <li>• <b>oc192</b>—Links are OC192 or STM64c.</li> </ul> <p>Aggregated Ethernet links on EX Series switches can be configured to operate at one of the following speeds:</p> <ul style="list-style-type: none"> <li>• <b>10m</b>—Links are 10 Mbps.</li> <li>• <b>100m</b>—Links are 100 Mbps.</li> <li>• <b>1g</b>—Links are 1 Gbps.</li> <li>• <b>10g</b>—Links are 10 Gbps.</li> </ul> <p><b><i>speed</i></b>—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 <b>k</b> (1000), <b>m</b> (1,000,000), or <b>g</b> (1,000,000,000).</p> <p>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.</p>

Aggregated Ethernet links on T Series, MX Series, PTX Series routers, and QFX5100, QFX10002, QFX10008, and QFX10016 switches can be configured to operate at one of the following speeds:

- **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.
- **mixed**—Links are of various speeds.
- **oc192**—Links are OC192.

**mixed**—Enables bundling of different Ethernet rate links in the same Aggregated Ethernet interface.




**NOTE:** OCX Series switches only support 10g and 40g interfaces. Mixed rate aggregated Ethernet interfaces are not support on the OCX Series.

**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 83](#)
- *Configuring Aggregated Ethernet Links (CLI Procedure)*
- *Example: Configuring Aggregated Ethernet High-Speed Uplinks Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch*

## loopback (Aggregated Ethernet, Fast Ethernet, and Gigabit Ethernet)

<b>Syntax</b>	(loopback   no-loopback);
<b>Hierarchy Level</b>	<p>[edit interfaces <i>interface-name</i> aggregated-ether-options],  [edit interfaces <i>interface-name</i> ether-options],  [edit interfaces <i>interface-name</i> fastether-options],  [edit interfaces <i>interface-name</i> gigether-options],  [edit interfaces interface-range <i>name</i> ether-options]</p> <p>For QFX Series and EX Series:</p> <p>[edit interfaces <i>interface-name</i> aggregated-ether-options],  [edit interfaces <i>interface-name</i> ether-options],</p> <p>For SRX Series Devices and vSRX:</p> <p>[edit interfaces <i>interface-name</i> redundant-ether-options]</p>
<b>Release Information</b>	<p>Statement introduced before Junos OS Release 7.4 for MX Series.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Metro Routers.</p> <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> <p>Statement modified in Junos OS Release 9.2 for the SRX Series.</p>
<b>Description</b>	For aggregated Ethernet, Fast Ethernet, Gigabit Ethernet, and 10-Gigabit Ethernet interfaces, enable or disable loopback mode.
	<div>  <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>By default, local aggregated Ethernet, Fast Ethernet, Tri-Rate Ethernet copper, Gigabit Ethernet, and 10-Gigabit Ethernet interfaces connect to a remote system.</li> <li>IPv6 Neighbor Discovery Protocol (NDP) addresses are not supported on Gigabit Ethernet interfaces when loopback mode is enabled on the interface. That is, if the loopback statement is configured at the [edit interfaces <i>ge-fpc/pic/port</i> gigether-options] hierarchy level, an NDP address cannot be configured at the [edit interfaces <i>ge-fpc/pic/port</i> unit <i>logical-unit-number</i> family inet6 address] hierarchy level.</li> </ul> </div>
<b>Default</b>	By default, loopback is disabled.
<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>

- Related Documentation**
- *Configuring Ethernet Loopback Capability*
  - *Understanding Interfaces*

## mac

---

- Syntax** `mac mac-address;`
- Hierarchy Level** `[edit interfaces interface-name]`
- Release Information** Statement introduced before Junos OS Release 7.4.
- Description** Set the MAC address of the interface.
- Use this statement at the **[edit interfaces ... ps0]** hierarchy level to configure the MAC address for a pseudowire logical device that is used for subscriber interfaces over point-to-point MPLS pseudowires.
- Options** **mac-address**—MAC address. Specify the MAC address as six hexadecimal bytes in one of the following formats: *nnnn.nnnn.nnnn* or *nn:nn:nn:nn:nn:nn*. For example, **0000.5e00.5355** or **00:00:5e:00:53:55**.
- Required Privilege Level** interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.
- Related Documentation**
- *Configuring the MAC Address on the Management Ethernet Interface*
  - *Configuring a Pseudowire Subscriber Logical Interface Device*

## management-ethernet (Alarm)

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<b>Syntax</b>	management-ethernet { link-down (red   yellow   ignore); }
<b>Hierarchy Level</b>	[edit chassis alarm], [edit chassis interconnect-device <i>name</i> alarm], [edit chassis node-group <i>name</i> alarm]
<b>Release Information</b>	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.
<b>Description</b>	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.

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<b>Options</b>	The remaining statement is explained separately.—
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.



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## member

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<b>Syntax</b>	<code>member <i>interface-name</i>;</code>
<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. 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. 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 for EX4600 and QFX Series Switches on page 61</a></li><li>• <i>Configuring Gigabit and 10-Gigabit Ethernet Interfaces for OCX Series Switches</i></li><li>• <a href="#">Interfaces Overview for Switches on page 11</a></li><li>• <i>Junos OS Network Interfaces Library for Routing Devices</i></li></ul>

## member-range

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<b>Syntax</b>	<code>member-range <i>starting-interface-name ending-interface-name</i>;</code>
<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. 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. 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 for Switches on page 29</a></li><li>• <a href="#">Configuring Gigabit and 10-Gigabit Ethernet Interfaces for EX4600 and QFX Series Switches on page 61</a></li><li>• <a href="#">Configuring Gigabit and 10-Gigabit Ethernet Interfaces for OCX Series Switches</a></li><li>• <a href="#">Interfaces Overview for Switches on page 11</a></li><li>• <a href="#">Interfaces Overview for Switches on page 11</a></li><li>• <a href="#">Junos OS Network Interfaces Library for Routing Devices</a></li></ul>

## mtu

<b>Syntax</b>	<code>mtu bytes;</code>
<b>Hierarchy Level</b>	[edit <code>interfaces interface-name</code> ], [edit <code>interfaces interface-range interface-name</code> ]
<b>Release Information</b>	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.
<b>Description</b>	<p>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.</p> <p>Keep the following points in mind if you are configuring MTU size for jumbo frames on these special types of interfaces:</p> <ul style="list-style-type: none"> <li>• <b>For LAG interfaces</b>—Configuring the jumbo MTU size on a link aggregation group (LAG) interface (<code>aex</code>) automatically configures the jumbo MTU size on the member links.</li> <li>• <b>For RVIs</b>—Jumbo frames of up to 9216 bytes are supported on the routed VLAN interface (RVI), which is named <code>vlan</code>. 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 <code>vlan</code> 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 <code>vlan</code> (the RVI). On a QFX5100 switch jumbo frames on the RVI are configured on the basis of the interface MTU.</li> </ul>
	<p> <b>NOTE:</b> RVIs are not supported on OCX Series switches.</p>
	<p> <b>CAUTION:</b> Setting or deleting the jumbo MTU size on the RVI (the <code>vlan</code> interface) while the switch is transmitting packets might result in dropped packets.</p>
<b>Options</b>	<code>bytes</code> —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 for EX4600 and QFX Series Switches on page 61](#)
- *Junos OS Network Interfaces Library for Routing Devices*

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## no-gratuitous-arp-request

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**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 on Switches*

## pic

<b>List of Syntax</b>	<a href="#">Syntax (EX4600, OCX1100, QFX Series, QFabric system with ELS) on page 211</a> <a href="#">Syntax (EX4600, QFX Series, QFabric system) on page 211</a>
<b>Syntax (EX4600, OCX1100, QFX Series, QFabric system with ELS)</b>	<pre> pic <i>pic-number</i> {     tunnel-port <i>port-number</i> tunnel-services;     port <i>port-number</i> {         channel-speed (<i>speed</i> disable-auto-speed-detection) ;     }     port-range <i>port-range-low port-range-high</i> {         channel-speed (<i>speed</i> disable-auto-speed-detection) ;     } } </pre>
<b>Syntax (EX4600, QFX Series, QFabric system)</b>	<pre> pic <i>pic-number</i> {     fibre-channel {         port-range {             <i>port-range-low port-range-high</i>;         }     }     fte {         port <i>port-number</i>;         (<i>port-range port-range-low   port-range-high</i>);     }     xe {         (<i>port port-number   port-range port-range-low port-range-high</i>);     }     xle {         (<i>port port-number   port-range port-range-low port-range-high</i>);     } } </pre>
<b>Hierarchy Level (EX4600, OCX1100, QFX Series, QFabric system with ELS)</b>	[edit chassis (EX Series) <a href="#">fpc slot</a> ]
<b>Hierarchy Level (EX4600, QFX Series, QFabric system)</b>	[edit <a href="#">chassis (QFX Series)</a> fpc slot] [edit <a href="#">chassis (QFX Series)</a> node-group <i>name</i> node-device <i>name</i> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 11.1 for the QFX Series. Options <b>xe</b> and <b>xle</b> introduced in Junos OS 12.2X50-D20 for the QFX Series. Option <b>channel-speed</b> introduced in Junos OS Release 13.2 for the QFX Series.
<b>Description</b>	<p>(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.</p> <p>Enable the specified port on the Physical Interface Card (PIC) to perform in the specified operating mode.</p>

**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** *port-range-low*—Lowest-numbered port in the range of ports.

**port-range** *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.



**NOTE:** This statement is not supported on the OCX Series.

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- On a QFX3500 switch, specify **0** if the port type is **fiber-channel**, and **2** if the port type is **xle**.
- On a QFX3600 switch, specify **0** if the port type is **xe**, and **1** if the port type is **xle**.
- On a QFX5100 switch, specify **0** if the port type is **xe**, and **1** if the port type is **xle** and **fte**.


The remaining statements are explained separately. See [CLI Explorer](#).

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

**Related Documentation**

- *Channelizing Interfaces Overview*
- *Configuring the QSFP+ Port Type on QFX3500 Standalone Switches*
- *Configuring the Port Type on QFX3600 Standalone Switches*
- *Configuring the QSFP+ Port Type on QFX5100 Devices*

## rx-buffers

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

- Related Documentation**
- [flow-control on page 179](#)
  - [tx-buffers on page 227](#)
  - *Configuring CoS Asymmetric Ethernet PAUSE Flow Control*
  - *Enabling and Disabling CoS Symmetric Ethernet PAUSE Flow Control*
  - *Understanding CoS Flow Control (Ethernet PAUSE and PFC)*

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## source

<b>Syntax</b>	<code>source source-address;</code>
<b>Hierarchy Level (EX, NFX, OCX1100 and QFX Series)</b>	[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> tunnel]
<b>Hierarchy Level (M-series and T-series)</b>	[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> tunnel <i>address</i> ], [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> tunnel <i>address</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 12.1 for EX Series switches. Statement introduced in Junos OS Release 13.2 for the QFX Series. 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>	<b><i>source-address</i></b> —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. 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><li>• <i>multicast-only</i></li><li>• <i>primary (Address on Interface)</i></li><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>



## speed (Ethernet)

<b>List of Syntax</b>	<a href="#">Syntax (EX Series) on page 215</a> <a href="#">Syntax (EX2300 and EX4300) on page 215</a> <a href="#">Syntax (EX Series, ACX Series, MX Series) on page 215</a> <a href="#">Syntax (QFX Series, OCX1100, EX4600) on page 215</a>
<b>Syntax (EX Series)</b>	<code>speed (auto-negotiation   <i>speed</i>) ;</code>
<b>Syntax (EX2300 and EX4300)</b>	<code>speed <i>speed</i>;</code>
<b>Syntax (EX Series, ACX Series, MX Series)</b>	<code>speed (10m   10g   100m   1g   2.5g   5g   auto   auto-10m-100m);</code>
<b>Syntax (QFX Series, OCX1100, EX4600)</b>	<code>speed (10g   1g   100m)</code>
<b>Hierarchy Level (EX Series)</b>	[edit interfaces <i>interface-name</i> ether-options]
<b>Hierarchy Level (EX2300 and EX4300)</b>	[edit interfaces <i>interface-name</i> ]
<b>Hierarchy Level (ACX Series, EX Series, MX Series)</b>	[edit interfaces <i>interface-name</i> ], [edit interfaces ge- <i>pim</i> /0/0 switch-options switch-port <i>port-number</i> ]
<b>Hierarchy Level (QFX Series, EX4600, OCX Series)</b>	[edit <a href="#">interfaces</a> <i>interface-name</i> ]
<b>Release Information</b>	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Metro Routers.</p> <p>Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches.</p> <p>Speed option 2.5Gbps introduced in Junos OS Release 18.1R2 for EX2300 switch.</p> <p>Speed option 10Gbps and 5Gbps introduced in Junos OS Release 18.2R1 for EX4300 switch.</p>
<b>Description</b>	<p>Configure the interface speed. This statement applies to the management Ethernet interface (<b>fxp0</b> or <b>em0</b>), Fast Ethernet 12-port and 48-port PICs, the built-in Fast Ethernet port on the FIC (M7i router), Combo Line Rate DPCs and Tri-Rate Ethernet Copper interfaces on MX Series routers, and Gigabit Ethernet interfaces on EX Series switches.</p> <p>When you configure the Tri-Rate Ethernet copper interface to operate at 1 Gbps, autonegotiation must be enabled. When you configure 100BASE-FX SFP, you must set the port speed at 100 Mbps.</p>



**NOTE:** On MX Series routers with Tri-rate Enhanced DPC (DPCE-R-40GE-TX), when you configure the interface speed using the `auto-10m-100m` option, the speed is negotiated to the highest value possible (100 Mbps), if the same value is configured on both sides of the link. However, when you view the interface speed of the DPC, using the `show interfaces` command, the value of the speed is not accurately displayed. For instance, if you configure the speed of the Tri-rate enhanced DPC, as 100Mbps on both sides of the link, the interface speed of the DPC is negotiated to 100 Mbps. However, the interface speed of the DPC displays 1 bps. This is an issue with the `show interfaces` command only. The actual interface speed is 100 Mbps.

On 10-Gigabit Ethernet SFP interfaces, autonegotiation is enabled by default and auto-detects the speed to be either 1 Gbps or 10 Gbps. On QFX5100-48S, QFX5100-96S, and QFX5100-24Q devices using 10-Gigabit Ethernet SFP interfaces, the speed is set to 10 Gbps by default and cannot be configured to operate in a different speed. On QFX5100-48S and QFX5100-96S devices using 1-Gigabit Ethernet SFP interfaces, the speed is set to 1 Gbps by default and cannot be configured to operate in a different speed.



**NOTE:** In Junos OS Release 14.1X53-D35 on QFX5100-48T-6Q devices using 10-Gigabit Ethernet Copper interfaces, autonegotiation is disabled by default on the copper ports, and the interfaces operate at a speed of 100M. You can, however, enable auto-negotiation by issuing the `set interface name ether-options auto-negotiation` command on the interface for which you want to change the interface speed. With autonegotiation enabled, the interface auto-detects the speed in which to operate.



**NOTE:** Only 10 Gbps and 40 Gbps interfaces are supported on OCX Series switches.



**NOTE:** When displaying interface information with `show interfaces` commands, you might see speed values for 1 Gbps interfaces displayed as 1000mbps.

(For EX2300 only) Starting in Junos OS Release 18.1R2, the multi-rate speed is supported on EX2300-48MP and EX2300-24MP switches. The speed configuration statement is supported on both multi-rate gigabit ethernet interface (mge) and gigabit ethernet (ge) interface. The mge interface is a rate-selectable (multirate) Gigabit Ethernet interface that can support speeds of 10 Gbps, 5 Gbps, and 2.5 Gbps over CAT5e/CAT6/CAT6a cables. In the EX2300, the mge interface supports 100 Mbps, 1 Gbps, and 2.5 Gbps speeds, which can be configured by using the speed configuration statement. Note that 10Mbps speed is supported only on **ge** interfaces of EX2300 switch.

**Default (EX Series)** If the **auto-negotiation** statement at the **[edit interfaces *interface-name* ether-options]** hierarchy level is enabled, the auto-negotiation option is enabled by default.

**Options** You can specify the speed as either **10m** (10 Mbps), **100m** (100 Mbps), and on MX Series routers, **1g** (1 Gbps). You can also specify the **auto** option on MX Series routers.

For Gigabit Ethernet interfaces on EX Series switches, you can specify one of the following options:

*Table 23: Options for speed*

Platforms	Speed Supported	Auto-negotiation
EX Series Switches	100m—100 Mbps 10m—10 Mbps 1g—1 Gbps	auto-negotiation—Automatically negotiate the speed based on the speed of the other end of the link. This option is available only when the <b>auto-negotiation</b> statement at the <b>[edit interfaces <i>interface-name</i> ether-options]</b> hierarchy level is enabled.
ACX, MX Series	100m—100 Mbps 10m—10 Mbps 1g—1 Gbps	<b>auto</b> —Automatically negotiate the speed (10 Mbps, 100 Mbps, or 1 Gbps) based on the speed of the other end of the link.  <b>auto-10m-100m</b> —Automatically negotiate the speed (10 Mbps or 100 Mbps) based on the speed of the other end of the link.
EX4600, QFX Series, QFabric, OCX100, QFX Series	10g—10 Gbps 1g—1 Gbps 100m—100 Mbps	auto-negotiation—Automatically negotiate the speed based on the speed of the other end of the link. This option is available only when the <b>auto-negotiation</b> statement at the <b>[edit interfaces <i>interface-name</i> ether-options]</b> hierarchy level is enabled.
EX2300	10m—10 Mbps (supported on EX series switches and only on <b>ge</b> interfaces of EX2300 switch) 100m—100 Mbps 1g—1 Gbps 2.5g—2.5 Gbps (supported only on <b>mge</b> interfaces of EX2300 switch) 10g—10 Gbps (supported only on <b>mge</b> interfaces for EX4300 switches) 5g—5 Gbps (supported only on <b>mge</b> interfaces for EX4300 switches)	<b>speed</b> —Specify the interface speed. If the <b>auto-negotiation</b> statement at the <b>[edit interfaces <i>interface-name</i> ether-options]</b> hierarchy level is disabled, you must specify a specific value. This value sets the speed that is used on the link. If the <b>auto-negotiation</b> statement is enabled, you might want to configure a specific speed value to advertise the desired speed to the remote end.

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

**Release History Table**

Release	Description
<a href="#">18.2R1</a>	Starting in Junos OS Release 18.1R2, the multi-rate speed is supported on EX2300-48MP and EX2300-24MP switches.

**Related Documentation**

- *Configuring the Interface Speed*
- *Configuring the Interface Speed on Ethernet Interfaces*
- *Configuring Gigabit Ethernet Autonegotiation*
- *Configuring Gigabit Ethernet Interfaces (CLI Procedure) for EX Series Switches with ELS support*
- [auto-negotiation on page 161](#)
- [Configuring Gigabit and 10-Gigabit Ethernet Interfaces for EX4600 and QFX Series Switches on page 61](#)
- *Junos OS Network Interfaces Library for Routing Devices*
- *Configuring Gigabit Ethernet Interfaces (CLI Procedure)*
- *Configuring Gigabit Ethernet Interfaces (J-Web Procedure)*
- [Junos OS Ethernet Interfaces Configuration Guide](#)

## targeted-broadcast

<b>Syntax (EX Series, MX Series, ACX Series)</b>	<pre>targeted-broadcast {     forward-and-send-to-re;     forward-only; }</pre>
<b>Syntax (QFX Series, OCX1100, EX4600, NFX Series)</b>	targeted-broadcast;
<b>Hierarchy Level (EX Series, MX Series, ACX Series)</b>	[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet], [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet]
<b>Hierarchy Level (QFX Series, OCX1100, EX4600, NFX Series)</b>	[edit <b>interfaces</b> <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> family inet], [edit <b>interfaces</b> <b>interface-range</b> <i>interface-range-name</i> <b>unit</b> <i>logical-unit-number</i> family inet]
<b>Release Information</b>	Statement introduced in Junos OS Release 9.4 for EX Series switches. Statement introduced in Junos OS Release 10.2. 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.
<b>Description</b>	<p>Specify the IP packets destined for a Layer 3 broadcast address 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.</p> <p>The remaining statements are explained separately. See <a href="#">CLI Explorer</a>.</p>
<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. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <i>Configuring Targeted Broadcast</i></li> <li>• <i>Understanding Targeted Broadcast</i></li> </ul>

## traceoptions (Individual Interfaces)

<b>List of Syntax</b>	<p>Syntax (Individual interfaces with PTX Series, EX Series, ACX Series) on page 220</p> <p>Syntax (Individual interfaces with QFX Series, OCX1100, EX4600, NFX Series) on page 220</p> <p>Syntax (OAMLFM with EX Series, QFX Series, NFX Series) on page 220</p> <p>Syntax (Interface process with ACX Series, SRX Series, MX Series, M Series, T Series) on page 220</p>
<b>Syntax (Individual interfaces with PTX Series, EX Series, ACX Series)</b>	<pre>traceoptions {   file <i>filename</i> &lt;files <i>name</i>&gt; &lt;size <i>size</i>&gt; &lt;world-readable   no-world-readable&gt;;   flag <i>flag</i>;   match; }</pre>
<b>Syntax (Individual interfaces with QFX Series, OCX1100, EX4600, NFX Series)</b>	<pre>traceoptions {   flag <i>flag</i>; }</pre>
<b>Syntax (OAMLFM with EX Series, QFX Series, NFX Series)</b>	<pre>traceoptions {   file <i>filename</i> &lt;files <i>number</i>&gt; &lt;match <i>regex</i>&gt; &lt;size <i>size</i>&gt; &lt;world-readable       no-world-readable&gt;;   flag <i>flag</i> ;   no-remote-trace; }</pre>
<b>Syntax (Interface process with ACX Series, SRX Series, MX Series, M Series, T Series)</b>	<pre>traceoptions {   file &lt;<i>filename</i>&gt; &lt;files <i>number</i>&gt; &lt;match <i>regular-expression</i>&gt; &lt;size <i>size</i>&gt; &lt;world-readable       no-world-readable&gt;;   flag <i>flag</i> &lt;disable&gt;;   no-remote-trace; }</pre>
<b>Hierarchy Level (Individual interfaces with PTX Series, EX Series, ACX Series, QFX Series, OCX1100, EX4600, NFX Series)</b>	[edit interfaces <i>interface-name</i> ]
<b>Hierarchy Level (Interface process with ACX Series, SRX Series, MX Series, M Series, T Series)</b>	[edit interfaces]
<b>Release Information</b>	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Metro Routers.</p>

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

Statement introduced in JUNOS Release 10.2 for EX Series switches.

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 interfaces **traceoptions** statement 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/dcd*.

On EX Series, QFX Series, and NFX Series platforms, configure tracing options the link fault management.

On ACX Series, SRX Series, MX Series, M Series, and T Series platforms define tracing operations for the interface process (dcd).

**Default** If you do not include this statement, no interface-specific tracing operations are performed.

**Options** [Table 22 on page 151](#) lists options for traceoption command for the following platforms:



Table 24: Options for traceoptions

Option	Individual interfaces with PTX Series, ACX Series, EX Series	Individual interfaces with QFX Series, QFabric System, OCX1100, EX4600, NFX Series	Interface Process with OAMLFM with EX Series, QFX Series, NFX Series	Interface process with ACX Series, SRX Series, MX Series, M Series, T Series
<b>file filename</b>	—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 <code>/var/log/dcd</code> . By default, interface process tracing output is placed in the file.		—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 <code>/var/log/dcd</code> .	—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 <code>/var/log/dcd</code> . By default, interface process tracing output is placed in the file <code>dcd</code> .
<b>files number</b>	—(Optional) Maximum number of trace files. When a trace file named <code>trace-file</code> reaches its maximum size, it is renamed <b>trace-file.0</b> , then <b>trace-file.1</b> , and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten.		—(Optional) Maximum number of trace files. When a trace file named <code>trace-file</code> reaches its maximum size, it is renamed <code>trace-file.0</code> , then <code>trace-file.1</code> , and so on, until the maximum <code>xk</code> to specify KB, <code>xm</code> to specify MB, or <code>xg</code> 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 <code>size</code> option.	—(Optional) Maximum number of trace files. When a trace file named <b>trace-file</b> reaches its maximum size, it is renamed <b>trace-file.0</b> , then <b>trace-file.1</b> , 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 <code>size</code> option.  <i>Range: 2 through 1000</i>  <i>Default: 3 files</i>
<b>flag</b>	—Tracing operation to perform. To specify more than one tracing operation, include multiple <b>flag</b> statements. The following are the interface-specific tracing options. <ul style="list-style-type: none"> <li><b>all</b>—All interface tracing operations</li> <li><b>event</b>—Interface events</li> <li><b>ipc</b>—Interface interprocess</li> </ul>	—Tracing operation to perform. To specify more than one tracing operation, include multiple <b>flag</b> statements. The following are the interface-specific tracing options. <ul style="list-style-type: none"> <li><b>all</b>—All interface tracing operations</li> <li><b>event</b>—Interface events</li> <li><b>ipc</b>—Interface interprocess</li> </ul>	—Tracing operation to perform. To specify more than one tracing operation, include multiple <b>flag</b> statements. You can include the following flags: <ul style="list-style-type: none"> <li><b>action-profile</b>—Trace action profile invocation events.</li> <li><b>all</b>—Trace all events.</li> <li><b>configuration</b>—Trace configuration events.</li> <li><b>protocol</b>—Trace</li> </ul>	—Tracing operation to perform. To specify more than one tracing operation, include multiple <b>flag</b> statements. You can include the following flags: <ul style="list-style-type: none"> <li><b>all</b></li> <li><b>change-events</b>—Log changes that produce configuration events</li> <li><b>config-states</b>—Log the configuration</li> </ul>

Table 24: Options for traceoptions (continued)

Option	Individual interfaces with PTX Series, ACX Series, EX Series	Individual interfaces with QFX Series, QFabric System, OCX1100, EX4600, NFX Series	Interface Process with OAMLFM with EX Series, QFX Series, NFX Series	Interface process with ACX Series, SRX Series, MX Series, M Series, T Series
	communication (IPC) messages <ul style="list-style-type: none"> <li>• <b>media</b>—Interface media changes</li> <li>• <b>q921</b>—Trace ISDN Q.921 frames</li> <li>• <b>q931</b>—Trace ISDN Q.931 frames</li> </ul>	communication (IPC) messages <ul style="list-style-type: none"> <li>• <b>media</b>—Interface media changes</li> <li>• <b>q921</b>—Trace ISDN Q.921 frames</li> <li>• <b>q931</b>—Trace ISDN Q.931 frames</li> </ul>	protocol processing events. <ul style="list-style-type: none"> <li>• <b>routing socket</b>—Trace routing socket events.</li> </ul>	state machine changes <ul style="list-style-type: none"> <li>• <b>kernel</b>—Log configuration IPC messages to kernel</li> <li>• <b>kernel-detail</b>—Log details of configuration messages to kernel</li> </ul>
<b>match</b>	—(Optional) Regular expression for lines to be traced.		—(Optional) Refine the output to log only those lines that match the given regular expression.	
<b>size size</b>	—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named <b>trace-file</b> reaches this size, it is renamed <b>trace-file.0</b> . When the <b>trace-file</b> again reaches its maximum size, <b>trace-file.0</b> is renamed <b>trace-file.1</b> and <b>trace-file</b> is renamed <b>trace-file.0</b> . This renaming scheme continues until the maximum number of trace files is reached. Then, the oldest trace file is overwritten.		—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named <b>trace-file</b> reaches its maximum size, it is renamed <b>trace-file.0</b> , then <b>trace-file.1</b> , 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 <b>files</b> option. <p><i>Syntax:</i> <b>xk</b> to specify KB, <b>xm</b> to specify MB, or <b>xg</b> to specify GB</p> <p><i>Range:</i> 10 KB through 1 GB</p> <p><i>Default:</i> 128 KB</p> <p><i>Default:</i> If you do not include this option, tracing output is appended to an existing trace file.</p>	

Table 24: Options for traceoptions (continued)

Option	Individual interfaces with PTX Series, ACX Series, EX Series	Individual interfaces with QFX Series, QFabric System, OCX1100, EX4600, NFX Series	Interface Process with OAMLFM with EX Series, QFX Series, NFX Series	Interface process with ACX Series, SRX Series, MX Series, M Series, T Series
				<p>—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named <b>trace-file</b> reaches this size, it is renamed <b>trace-file.0</b>. When the <b>trace-file</b> again reaches its maximum size, <b>trace-file.0</b> is renamed <b>trace-file.1</b> and <b>trace-file</b> is renamed <b>trace-file.0</b>. This renaming scheme continues until the maximum number of trace files is reached. Then, the oldest trace file is overwritten. If you specify a maximum file size, you also must specify a maximum number of trace files with the <b>files</b> option.</p> <p><i>Syntax:</i> <b>xk</b> to specify kilobytes, <b>xm</b> to specify megabytes, or <b>xg</b> to specify gigabytes</p> <p><i>Range:</i> 10 KB through the maximum file size supported on your router</p> <p><i>Default:</i> 1 MB</p>
<b>no-world-readable</b>	—(Optional) Prevent any user from reading the log file.		—(Optional) Restrict file access to the user who created the file.	—(Optional) Disallow any user to read the log file.
<b>world-readable</b>	—(Optional) Allow any user to read the log file.		—(Optional) Enable unrestricted file access.	—(Optional) Allow any user to read the log file.
<b>disable</b>				

Table 24: Options for traceoptions (continued)


Option	Individual interfaces with PTX Series, ACX Series, EX Series	Individual interfaces with QFX Series, QFabric System, OCX1100, EX4600, NFX Series	Interface Process with OAMLFM with EX Series, QFX Series, NFX Series	Interface process with ACX Series, SRX Series, MX Series, M Series, T Series
				—(Optional) Disable the tracing operation. You can use this option to disable a single operation when you have defined a broad group of tracing operations, such as <b>all</b> .
no-remote-trace			—(Optional) Disable the remote trace.	-
match <i>regex</i>				—(Optional) Refine the output to include only those lines that match the given regular expression.

**Required Privilege Level**

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

- Related Documentation**
- *Tracing Operations of an Individual Router Interface*
  - *Tracing Operations of an Individual Router or Switch Interface*
  - *Example: Configuring Ethernet OAM Link Fault Management*
  - [Configuring Ethernet OAM Link Fault Management \(CLI Procedure\) on page 4](#)
  - *Tracing Operations of the Interface Process*

## tx-buffers

<b>Syntax</b>	tx-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 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 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 respond to an Ethernet PAUSE message.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.

**Related  
Documentation**

- [flow-control on page 179](#)
- [rx-buffers on page 213](#)
- *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

**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 \(QFX Series\) interface-name](#)],  
[edit [interfaces \(QFX Series\) 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. See [CLI Explorer](#).

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

**Related Documentation**

- [Configuring Gigabit and 10-Gigabit Ethernet Interfaces for EX4600 and QFX Series Switches on page 61](#)
- [Configuring Link Aggregation on page 83](#)
- *Junos OS Network Interfaces Library for Routing Devices*

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## vlan-id

---

**Syntax** `vlan-id vlan-id-number;`

**Hierarchy Level** [edit [interfaces \(QFX Series\)](#) *interface-name* **unit** *logical-unit-number*]

**Release Information** Statement introduced in Junos OS Release 9.2 for EX Series switches.  
Statement introduced in Junos OS Release 11.1 for the QFX Series.

**Description** For 10-Gigabit Ethernet and aggregated Ethernet interfaces only, bind an 802.1Q VLAN tag ID to a logical interface. Statement introduced in Junos OS Release 9.2 for EX Series switches.



**NOTE:** The VLAN tag ID cannot be configured on logical interface unit 0. The logical unit number must be 1 or higher.

**Options** *vlan-id-number*—Valid VLAN identifier.  
**Range:** 1 through 4094


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

**Related Documentation**

- [vlan-tagging on page 231](#)
- [Configuring Gigabit and 10-Gigabit Ethernet Interfaces for EX4600 and QFX Series Switches on page 61](#)
- [Configuring a Layer 3 Logical Interface on page 72](#)
- *Junos OS Network Interfaces Library for Routing Devices*



## vlan-tagging

<b>Syntax</b>	vlan-tagging;
<b>Syntax (QFX Series, NFX Series, and EX4600)</b>	vlan-tagging;
<b>Syntax (SRX Series Interfaces)</b>	vlan-tagging native-vlan-id <i>vlan-id</i> ;
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> ], [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> ]
<b>QFX Series, NFX Series, and EX4600 Interfaces</b>	[edit <a href="#">interfaces (QFX Series)</a> <i>interface-name</i> ] [edit <a href="#">interfaces (QFX Series)</a> <i>interface-range</i> <i>interface-range-name</i> ]
<b>SRX Series Interfaces</b>	[edit interfaces <i>interface</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 9.5. Statement introduced in Junos OS Release 11.3 for the QFX Series. Statement introduced in Junos OS Release 12.2 for ACX Series Universal Metro Routers. Statement introduced in Junos OS Release 13.2 for PTX Series Routers. Statement introduced in Junos OS Release 14.1X53-D10 for the QFX Series.
<b>Description</b>	For Fast Ethernet and Gigabit Ethernet interfaces, aggregated Ethernet interfaces configured for VPLS, and pseudowire subscriber interfaces, enable the reception and transmission of 802.1Q VLAN-tagged frames on the interface.
<div>  <p><b>NOTE:</b> For QFX Series configure VLAN identifier for untagged packets received on the physical interface of a trunk mode interface. Enable VLAN tagging. The platform receives and forwards single-tag frames with 802.1Q VLAN tags.</p> <p>On EX Series switches except for EX4300 and EX9200 switches, the <code>vlan-tagging</code> and <code>family ethernet-switching</code> statements cannot be configured on the same interface. Interfaces on EX2200, EX3200, EX3300, EX4200, and EX4500 switches are set to <code>family ethernet-switching</code> by the default factory configuration. EX6200 and EX8200 switch interfaces do not have a default family setting.</p> </div>	
<b>Default</b>	VLAN tagging is disabled by default.

**Options**    **native-vlan-id**— (SRX Series) Configures a VLAN identifier for untagged packets. Enter a number from 0 through 4094.



**NOTE:** The **native-vlan-id** can be configured only when either **flexible-vlan-tagging** mode or **interface-mode trunk** is configured.

---

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

- Related Documentation**
- *802.1Q VLANs Overview*
  - *Configuring a Layer 3 Subinterface (CLI Procedure)*
  - *Configuring Tagged Aggregated Ethernet Interfaces*
  - *Example: Configuring Layer 3 Subinterfaces for a Distribution Switch and an Access Switch*
  - [vlan-id on page 230](#)
  - [Configuring a Layer 3 Logical Interface on page 72](#)
  - *Configuring VLAN Tagging*

## CHAPTER 10

# LAGs and LACP Configuration Statements

- [aggregated-devices on page 234](#)
- [aggregated-ether-options on page 236](#)
- [chassis \(QFX Series\) on page 239](#)
- [802.3ad on page 241](#)
- [device-count on page 243](#)
- [ethernet on page 244](#)
- [force-up on page 245](#)
- [lacp \(802.3ad\) on page 246](#)
- [lacp \(Aggregated Ethernet\) on page 247](#)
- [link-protection on page 250](#)
- [periodic on page 251](#)

## aggregated-devices

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<b>List of Syntax</b>	<a href="#">Syntax (EX Series) on page 234</a> <a href="#">Syntax (QFX Series, EX4600, OCX1100, NFX Series) on page 234</a>
<b>Syntax (EX Series)</b>	<pre>aggregated-devices {   ethernet (Aggregated Devices) {     device-count number;     lacp   } }</pre>
<b>Syntax (QFX Series, EX4600, OCX1100, NFX Series)</b>	<pre>aggregated-devices {   ethernet {     device-count number;   } }</pre>
<b>Hierarchy Level (EX Series, QFX Series)</b>	[edit chassis (EX Series)]
<b>Release Information</b>	Statement introduced in Junos OS Release 9.0 for EX Series switches. 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
<b>Description</b>	Configure properties for aggregated devices on the switch.  The remaining statements are explained separately. See <a href="#">CLI Explorer</a> .
<b>Default</b>	Aggregated devices are disabled.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. 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 for Switches on page 77</a></li><li>• <a href="#">Configuring Link Aggregation on page 83</a></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><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>Configuring Aggregated Ethernet Links (CLI Procedure)</i></li><li>• <a href="#">Configuring LACP Link Protection of Aggregated Ethernet Interfaces for Switches on page 87</a></li></ul>

- *Understanding Aggregated Ethernet Interfaces and LACP*
- *Junos OS Ethernet Interfaces Configuration Guide*

## aggregated-ether-options

**List of Syntax**    [Syntax \(EX, MX Series\) on page 236](#)  
                           [Syntax \(NFX, QFX Series, EX4600, OCX1100, QFabric\) on page 236](#)

**Syntax (EX, MX Series)**    `aggregated-ether-options {  
                                   ethernet-switch-profile {  
                                     tag-protocol-id;  
                                   }  
                                   (flow-control | no-flow-control);  
                                   lACP {  
                                     (active | passive);  
                                     admin-key key;  
                                     periodic interval;  
                                     system-id mac-address;  
                                   }  
                                   (link-protection | no-link-protection);  
                                   link-speed speed;  
                                   local-bias;  
                                   logical-interface-fpc-redundancy;  
                                   (loopback | no-loopback);  
                                   mc-ae {  
                                     chassis-id chassis-id;  
                                     events {  
                                       iccp-peer-down {  
   force-icl-down;  
   prefer-status-control-active;  
                                       }  
                                     }  
                                     init-delay-time seconds;  
                                     mc-ae-id mc-ae-id;  
                                     mode (active-active | active-standby);  
                                     redundancy-group group-id;  
                                     revert-time revert-time;  
                                     status-control (active | standby);  
                                     switchover-mode (non-revertive | revertive);  
                                   }  
                                   minimum-links number;  
                                   system-priority  
                                 }`

**Syntax (NFX, QFX Series, EX4600, OCX1100, QFabric)**    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;
local-minimum-links-threshold threshold-value;
(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 (EX Series, QFX Series)** [edit interfaces aex]

**Release Information** Statement introduced in Junos OS Release 9.0 for EX Series switches.  
Statement introduced in Junos OS Release 11.1 for the QFX Series.  
Statement introduced in Junos OS Release 12.3R2.  
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 **local-minimum-links-threshold** introduced in Junos OS Release 14.1X53-D40 for the QFX Series.  
Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

**Description** Configure the aggregated Ethernet properties of a specific aggregated Ethernet interface.



**NOTE:**

- The **fcoe-lag** and **mc-ae** statements are not supported on OCX Series switches.
- The **force-up** statement is not supported on QFX10002 switches.
- The **resilient-hash** statement is not supported on QFX10002 switches.

The remaining statements are explained separately. See [CLI Explorer](#).

<b>Default</b>	Options are not enabled.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. 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 for Switches on page 77</a></li><li>• <a href="#">Configuring Aggregated Ethernet LACP (CLI Procedure) on page 81</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><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>• <a href="#">Configuring Aggregated Ethernet Links (CLI Procedure)</a></li><li>• <a href="#">Configuring Aggregated Ethernet LACP (CLI Procedure) on page 81</a></li><li>• <a href="#">Configuring LACP Link Protection of Aggregated Ethernet Interfaces for Switches on page 87</a></li><li>• <a href="#">Configuring Q-in-Q Tunneling (CLI Procedure)</a></li><li>• <a href="#">Junos OS Ethernet Interfaces Configuration Guide</a></li></ul>



## chassis (QFX Series)

```

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. See [CLI Explorer](#).

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

**Related Documentation**

- *Understanding Link Aggregation and Link Aggregation Control Protocol in a Junos Fusion*
- [Configuring Link Aggregation on page 83](#)

## 802.3ad

Syntax (EX Series)	<pre>802.3ad {     aex;     (backup   primary);     lacp {         force-up;         port-priority     } }</pre>
Syntax (NFX, OCX, and QFX Series)	<pre>802.3ad ae{x;     lacp {         force-up;         (primary   backup);     }     port-priority; }</pre>
Hierarchy Level (EX Series)	[edit interfaces <i>interface-name</i> ether-options]
Hierarchy Level (NFX, OCX, and QFX Series)	[edit <b>interfaces</b> <i>interface-name</i> <b>ether-options</b> ]
Release Information	<p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <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>
Description	Specify the aggregated Ethernet logical interface number.



### NOTE:

- The *port-priority* statement is not supported on QFabric systems.
- The **force-up** statement is not supported on QFX10002 switches.

- Options**
- **aex**—Name of the LAG. Aggregated Ethernet logical interface number.
  - **backup**—Designate the interface as the backup interface for link-protection mode.
  - **primary**—Designate the interface as the primary interface for link-protection mode.

The remaining statements are described separately. See [CLI Explorer](#).

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

**Related  
Documentation**

- *Example: Configuring Aggregated Ethernet High-Speed Uplinks Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch*
- *Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch*
- *Example: Configuring Multicast Load Balancing for Use with Aggregated 10-Gigabit Ethernet Interfaces on EX8200 Switches*
- *Configuring Aggregated Ethernet Links (CLI Procedure)*
- [Configuring Aggregated Ethernet LACP \(CLI Procedure\) on page 81](#)
- [Configuring LACP Link Protection of Aggregated Ethernet Interfaces for Switches on page 87](#)
- [Configuring Link Aggregation on page 83](#)
- [Configuring Aggregated Ethernet LACP \(CLI Procedure\) on page 81](#)
- [Understanding Aggregated Ethernet Interfaces and LACP for Switches on page 77](#)
- [Troubleshooting an Aggregated Ethernet Interface on page 94](#)
- *Junos OS Network Interfaces Library for Routing Devices*

## device-count

<b>Syntax</b> (EX, NFX, QFX Series, EX4600, OCX1100, QFabric System)	device-count <i>number</i> ;
<b>Hierarchy Level</b> (EX Series)	[edit chassis (EX Series) <a href="#">aggregated-devices</a> ethernet (Aggregated Devices)]
<b>Hierarchy Level</b> (EX, NFX, QFX Series, EX4600, OCX1100, QFabric System)	[edit <a href="#">chassis aggregated-devices ethernet</a> ], [edit <a href="#">chassis node-group name aggregated-devices ethernet</a> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 9.0 for EX Series switches. Range updated in Junos OS Release 9.5 for EX Series switches. 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
<b>Description</b>	Configure the number of aggregated Ethernet logical devices available to the switch.
<b>Options</b>	<p><i>number</i>—Maximum number of aggregated Ethernet logical interfaces on the switch.</p> <p><b>Range:</b> 1 through 32 for EX2200, EX3200, and standalone EX3300 switches and for EX3300 Virtual Chassis</p> <p><b>Range:</b> 1 through 64 for standalone EX4200, standalone EX4500, and EX6200 switches and for EX4200 and EX4500 Virtual Chassis</p> <p><b>Range:</b> 1 through 239 for EX8200 Virtual Chassis</p> <p><b>Range:</b> 1 through 255 for standalone EX8200 switches</p>
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. 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="#">Configuring Link Aggregation on page 83</a></li> <li>• <i>Example: Configuring Link Aggregation Between a QFX Series Product and an Aggregation Switch</i></li> <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>Configuring Aggregated Ethernet Links (CLI Procedure)</i></li> <li>• <a href="#">Junos OS Network Interfaces Configuration Guide</a></li> </ul>

## ethernet

---

<b>Syntax</b>	<pre>ethernet {     <b>device-count</b> <i>number</i>; }</pre>
<b>Hierarchy Level</b>	[edit <b>chassis aggregated-devices</b> ], [edit chassis node-group <b>aggregated-devices</b> ]
<b>Release Information</b>	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
<b>Description</b>	Configure properties for aggregated Ethernet devices on the switch.  The remaining statement is explained separately. See <a href="#">CLI Explorer</a> .
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. 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="#">Configuring Link Aggregation on page 83</a></li><li>• <i>Junos OS Network Interfaces Library for Routing Devices</i></li></ul>

## force-up

---

<b>Syntax</b>	force-up;
<b>Hierarchy Level</b>	[edit interfaces <i>interface-name</i> ether-options <a href="#">802.3ad lacp</a> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 10.0 for EX Series switches. 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 16.1 for EX9200 switches.
<b>Description</b>	Set the state of the interface as UP when the peer has limited LACP capability.
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. 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 for Switches on page 77</a></li> <li>• <a href="#">Configuring Aggregated Ethernet LACP (CLI Procedure) on page 81</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> <li>• <i>Configuring Gigabit Ethernet Interfaces (CLI Procedure)</i></li> <li>• <i>Configuring Gigabit Ethernet Interfaces (CLI Procedure) for EX Series Switches with ELS support</i></li> <li>• <i>Configuring Gigabit Ethernet Interfaces (J-Web Procedure)</i></li> <li>• <i>Understanding Aggregated Ethernet Interfaces and LACP</i></li> <li>• <a href="#">Junos OS Ethernet Interfaces Configuration Guide</a></li> </ul>

## lACP (802.3ad)

---

**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 on page 83](#)
- [Configuring Aggregated Ethernet LACP \(CLI Procedure\) on page 81](#)
- [Understanding Aggregated Ethernet Interfaces and LACP for Switches on page 77](#)



## lacp (Aggregated Ethernet)

<b>List of Syntax</b>	<a href="#">Syntax (NFX Series) on page 247</a> <a href="#">Syntax (EX Series) on page 247</a>
<b>Syntax (NFX Series)</b>	<pre>lacp (active   passive) {   admin-key key;   fast-failover;   link-protection {     disable;     (revertive   non-revertive);   }   <a href="#">periodic interval</a>   system-ID mac-address;   system-priority priority;   <a href="#">force-up</a>; }</pre>
<b>Syntax (EX Series)</b>	<pre>lacp {   (active   passive);   admin-key key;   accept-data;   fast-failover;   <a href="#">link-protection</a> {     disable;     (revertive   non-revertive);   }   <a href="#">periodic interval</a>;   system-id mac-address;   system-priority priority; }</pre>
<b>Hierarchy Level (EX Series)</b>	[edit interfaces <i>aex</i> aggregated-ether-options] [edit logical-systems <i>logical-system-name</i> interfaces <i>aeX</i> aggregated-ether-options]
<b>Hierarchy Level (NFX Series)</b>	[edit <a href="#">interfaces interface-name</a> <a href="#">aggregated-ether-options</a> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 9.0 for EX Series switches. 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.
<b>Description</b>	<p>Configure the Link Aggregation Control Protocol (LACP) parameters for interfaces. The remaining statement is explained separately.</p> <p>For EX Series, when you configure the <b>accept-data</b> statement at the [edit interfaces <i>aex</i> aggregated-ether-options <b>lacp</b>] hierarchy level, the router processes packets received on a member link irrespective of the LACP state if the aggregated Ethernet bundle is up.</p>



**NOTE:** When you configure the `accept-data` statement at the `[edit interfaces aeX aggregated-ether-options lacp]` hierarchy level, this behavior occurs:

- By default, the `accept-data` statement is not configured when LACP is enabled.
- You can configure the `accept-data` statement to improve convergence and reduce the number of dropped packets when member links in the bundle are enabled or disabled.
- When LACP is down and a member link receives packets, the router or switch does not process packets as defined in the IEEE 802.1ax standard. According to this standard, the packets should be dropped, but they are processed instead because the `accept-data` statement is configured.



**NOTE:** The `force-up` statement is not supported on QFX10002 switches.

**Default** If you do not specify LACP as either **active** or **passive**, LACP remains passive.

**Options** **active**—Initiate transmission of LACP packets.

**admin-key *number***—Specify an administrative key for the router or switch.



**NOTE:** You must also configure multichassis link aggregation (MC-LAG) when you configure the `admin-key`.

**fast-failover**—Specify to override the IEEE 802.3ad standard and allow the standby link to receive traffic. Overriding the default behavior facilitates subsecond failover.

**passive**—Respond to LACP packets.

The remaining statements are explained separately. See [CLI Explorer](#).

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

- Related Documentation**
- [Configuring Link Aggregation on page 83](#)
  - [Configuring Aggregated Ethernet LACP \(CLI Procedure\) on page 81](#)
  - [Understanding Aggregated Ethernet Interfaces and LACP for Switches on page 77](#)
  - *Configuring LACP for Aggregated Ethernet Interfaces*

## link-protection

---

Syntax	<pre>link-protection {   disable;   (revertive  non-revertive); }</pre>
Hierarchy Level	<pre>[edit interfaces aex aggregated-ether-options] [edit interfaces aex aggregated-ether-options lACP]</pre>
Release Information	<p>Statement introduced in Junos OS Release 8.3.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 15.1F4 for PTX Series routers.</p> <p>Support for <b>disable</b>, <b>revertive</b>, and <b>non-revertive</b> statements added in Junos OS Release 9.3.</p>
Description	<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 <b>[edit interfaces ge-fpc/pic/port gigether-options 802.3ad aex]</b> hierarchy level or the <b>[edit interfaces fe-fpc/pic/port 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>• <b>[edit interfaces ge-fpc/pic/port ether-options 802.3ad aex]</b></li><li>• <b>[edit interfaces xe-fpc/pic/port ether-options 802.3ad aex]</b> hierarchy level or at the <b>[edit interfaces xe-fpc/pic/port 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 <b>[edit interfaces aex aggregated-ether-options]</b> hierarchy level or the <b>[edit interfaces aex aggregated-ether-options lACP]</b> hierarchy level.</p>
Options	The remaining statements are explained separately. See <a href="#">CLI Explorer</a> .
Required Privilege Level	<p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"><li>• <i>Configuring Aggregated Ethernet Link Protection</i></li><li>• <a href="#">Configuring LACP Link Protection of Aggregated Ethernet Interfaces for Switches on page 87</a></li></ul>

## periodic

<b>List of Syntax</b>	<a href="#">Syntax (EX Series) on page 251</a> <a href="#">Syntax (QFX Series) on page 251</a>
<b>Syntax (EX Series)</b>	<code>periodic interval;</code>
<b>Syntax (QFX Series)</b>	<code>periodic (fast   slow);</code>
<b>Hierarchy Level (EX Series)</b>	[edit interfaces aex aggregated-ether-options <a href="#">lACP</a> ], [edit interfaces interface-range <i>name</i> aggregated-ether-options <a href="#">lACP</a> ]
<b>Hierarchy Level (QFX Series)</b>	[edit <a href="#">interfaces</a> aex <a href="#">aggregated-ether-options lACP</a> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. 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 15.1F4 for PTX Series routers.
<b>Description</b>	For aggregated Ethernet interfaces only, configure the interval for periodic transmission of LACP packets.
<b>Options</b>	<p><i>interval</i>—Interval for periodic transmission of LACP packets.</p> <ul style="list-style-type: none"> <li><b>fast</b>—Transmit packets every second.</li> <li><b>slow</b>—Transmit packets every 30 seconds.</li> </ul> <p><b>Default:</b> <b>fast</b></p>
<b>Required Privilege Level</b>	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">Configuring LACP for Aggregated Ethernet Interfaces</a></li> <li>• <a href="#">Configuring Aggregated Ethernet LACP (CLI Procedure) on page 81</a></li> <li>• <a href="#">Example: Configuring Aggregated Ethernet High-Speed Uplinks Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch</a></li> <li>• <a href="#">Configuring Aggregated Ethernet LACP (CLI Procedure) on page 81</a></li> <li>• <a href="#">Understanding Aggregated Ethernet Interfaces and LACP for Switches on page 77</a></li> <li>• <a href="#">Junos OS Network Interfaces Library for Routing Devices</a></li> </ul>



## CHAPTER 11

# Redundant Trunk Groups Configuration Statements

- [group \(Redundant Trunk Groups\) on page 254](#)
- [interface \(Redundant Trunk Groups\) on page 255](#)
- [preempt-cutover-timer on page 256](#)
- [redundant-trunk-group on page 257](#)

## group (Redundant Trunk Groups)

---

<b>Syntax</b>	<pre>group <i>name</i> {     interface <i>interface-name</i> &lt;primary&gt;;     interface <i>interface-name</i>;     preempt-cutover-timer <i>seconds</i>; }</pre>
<b>Hierarchy Level</b>	<ul style="list-style-type: none"><li>For platforms with ELS: [edit switch-options <a href="#">redundant-trunk-group</a>]</li><li>For platforms without ELS: [edit ethernet-switching-options <a href="#">redundant-trunk-group</a>]</li></ul>
<b>Release Information</b>	<p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Hierarchy level [edit switch-options] 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>	Create a redundant trunk group.
<b>Options</b>	<p><b>name</b>—The name of the redundant trunk group.</p> <ul style="list-style-type: none"><li>For platforms with ELS: 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: 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. See <a href="#">CLI Explorer</a>.</p>
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system—control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"><li><a href="#">Example: Configuring Redundant Trunk Links for Faster Recovery</a></li><li><a href="#">Example: Configuring Redundant Trunk Links for Faster Recovery on Devices with ELS Support on page 112</a></li><li><a href="#">Understanding Redundant Trunk Links (Legacy RTG Configuration) on page 110</a></li></ul>



## interface (Redundant Trunk Groups)

<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>	<p>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.</p>
<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 Devices with ELS Support on page 112</a></li> <li>• <a href="#">Understanding Redundant Trunk Links (Legacy RTG Configuration) on page 110</a></li> </ul>

## preempt-cutover-timer

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<b>Syntax</b>	<code>preempt-cutover-timer seconds;</code>
<b>Hierarchy Level</b>	<ul style="list-style-type: none"><li>For platforms with ELS: [edit switch-options <b>redundant-trunk-group</b> <i>group name</i>] [edit interfaces <i>name</i> aggregated-ether-options lacp link-protection rtg-config] [edit interfaces <i>name</i> aggregated-ether-options link-protection rtg-config]</li><li>For platforms without ELS: [edit ethernet-switching-options <b>redundant-trunk-group</b> <i>group name</i>]</li></ul>
<b>Release Information</b>	Statement introduced in Junos OS Release 11.1 for EX Series switches. 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.) Statement introduced in Junos OS Release 13.2X50-D15 for the QFX Series.
<b>Description</b>	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 (RTG).
<b>Default</b>	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.
<b>Options</b>	<b>seconds</b> —Number of seconds that the primary link waits to take over from the active secondary link. <b>Range:</b> 1 through 600 seconds
<b>Required Privilege Level</b>	admin—To view this statement in the configuration. admin-control—To add this statement to the configuration.
<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 Devices with ELS Support on page 112</a></li><li><i>Q-in-Q Support on Redundant Trunk Links Using LAGs with Link Protection</i></li></ul>

## redundant-trunk-group

<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: [edit switch-options]</li> <li>For platforms without ELS: [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. See <a href="#">CLI Explorer</a>.</p>
<b>Required Privilege Level</b>	<p>system—To view this statement in the configuration.</p> <p>system—control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li><a href="#">Example: Configuring Redundant Trunk Links for Faster Recovery</a></li> <li><a href="#">Example: Configuring Redundant Trunk Links for Faster Recovery on Devices with ELS Support on page 112</a></li> <li><a href="#">Understanding Redundant Trunk Links (Legacy RTG Configuration) on page 110</a></li> </ul>



## CHAPTER 12

# Ethernet OAM Link Fault Management Operational Command

- `show oam ethernet link-fault-management`

## show oam ethernet link-fault-management

<b>Syntax</b>	show oam ethernet link-fault-management <brief   detail> <interface-name>
<b>Release Information</b>	Command introduced in Junos OS Release 9.4 for EX Series switches.
<b>Description</b>	Displays Operation, Administration, and Maintenance (OAM) link fault management (LFM) information for Ethernet interfaces.
<b>Options</b>	<b>brief   detail</b> —(Optional) Display the specified level of output.  <b>interface-name</b> —(Optional) Display link fault management information for the specified Ethernet interface only.
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">Example: Configuring Ethernet OAM Link Fault Management</a></li> <li>• <a href="#">Configuring Ethernet OAM Link Fault Management (CLI Procedure) on page 4</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">show oam ethernet link-fault-management brief on page 264</a> <a href="#">show oam ethernet link-fault-management detail on page 264</a>
<b>Output Fields</b>	Table 25 on page 260 lists the output fields for the <b>show oam ethernet link-fault-management</b> command. Output fields are listed in the approximate order in which they appear.

Table 25: 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 25: 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 25: 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.  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.  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 25: 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.  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

**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.  
 Command introduced in Junos OS Release 18.1 for Gigabit interfaces.

**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.

Display the IPv6 interface traffic statistics about the specified Gigabit Ethernet interface for MX series routers. The input and output bytes (bps) and packets (pps) rates are not displayed for IFD and local traffic.

**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 26 on page 266](#). The keys are not case-sensitive.

**Table 26: 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.

**Table 26: Output Control Keys for the monitor interface interface-name Command (continued)**

Key	Action
f	Freezes the display, halting the display of updated statistics and delta counters.
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 27 on page 267](#). The keys are not case-sensitive.

**Table 27: 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 269](#)  
[monitor interface \(OTN Interface\) on page 270](#)  
[monitor interface \(MX480 Router with MPC5E and 10-Gigabit Ethernet OTN Interface\) on page 271](#)  
[monitor interface \(MX480 Router with MPC5E and 100-Gigabit Ethernet Interface\) on page 272](#)  
[monitor interface \(MX2010 Router with MPC6E and 10-Gigabit Ethernet OTN Interface\) on page 273](#)

[monitor interface \(MX2010 Router with MPC6E and 100-Gigabit Ethernet OTN Interface\) on page 273](#)

[monitor interface \(MX2020 Router with MPC6E and 10-Gigabit Ethernet OTN Interface\) on page 274](#)

[monitor interface \(IPv6 Gigabit Ethernet interface traffic statistics for MX series routers\) on page 275](#)

[monitor interface \(Logical\) on page 275](#)

[monitor interface \(QFX3500 Switch\) on page 276](#)

[monitor interface traffic on page 276](#)

[monitor interface traffic \(QFX3500 Switch\) on page 277](#)

[monitor interface traffic detail \(QFX3500 Switch\) on page 277](#)

**Output Fields** [Table 28 on page 268](#) describes the output fields for the **monitor interface** command. Output fields are listed in the approximate order in which they appear.

*Table 28: 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 28: 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:                    Current Delta
  Input packets:                      6045 (0 pps)                [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)
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: 1
Output errors: 0
Output drops: 0
Aged packets: 0
Active alarms : None
Active defects: None
PCS statistics:
Bit Errors 0
Errored blocks 1
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

```

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)
Output bytes: 0 (0 bps)
Input packets: 0 (0 pps)
Output packets: 0 (0 pps)

```

```

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:
  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 (IPv6 Gigabit Ethernet interface traffic statistics for MX series routers)

```

user@host> monitor interface ge-5/2/0.0
host                               Seconds: 2                Time: 09:57:57
                                                                Delay: 16/16/29

Interface: ge-2/0/0.1002, Enabled, Link is Up
Flags: SNMP-Traps 0x4000
Encapsulation: VLAN-CCC
VLAN-Tag [ 0x8100.1 0x8100.102 ]

Local statistics:                                           Current delta
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]

IPv6 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:
Input bytes:                                                0                                [0]
Output bytes:                                               0                                [0]
Input packets:                                              0                                [0]
Output packets:                                             0                                [0]

```

#### 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:                                           Current delta
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)
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: 0
Output errors: 0
Output drops: 0
Aged packets: 0
Active alarms : LINK
Active defects: LINK
Input MAC/Filter statistics:
Unicast packets 0
Broadcast packets 0 Multicast packet
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	
vcp-1	Down	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	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

<b>Syntax</b>	<code>show interfaces diagnostics optics <i>interface-name</i></code>
<b>Release Information</b>	<p>Command introduced in Junos OS Release 10.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 13.2X50-D15 for the QFX Series.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
<b>Description</b>	<p>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.</p> <p>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.</p>
<b>Options</b>	<i>interface-name</i> —Name of the interface associated with the port in which the transceiver is installed: <i>ge-fpc/pic/port</i> , <i>xe-fpc/pic/port</i> , or <i>et-fpc/pic/port</i> .
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <i>Monitoring Interface Status and Traffic</i></li> <li>• <a href="#">Monitoring Interface Status and Traffic on page 67</a></li> <li>• <i>Installing a Transceiver</i></li> <li>• <i>Installing a Transceiver in a QFX Series Device</i></li> <li>• <i>Removing a Transceiver</i></li> <li>• <i>Removing a Transceiver from a QFX Series Device</i></li> <li>• <a href="#">Junos OS Ethernet Interfaces Configuration Guide</a></li> </ul>
<b>List of Sample Output</b>	<p><a href="#">show interfaces diagnostics optics ge-0/1/0 (SFP Transceiver) on page 286</a></p> <p><a href="#">show interfaces diagnostics optics xe-0/1/0 (SFP+ Transceiver) on page 287</a></p> <p><a href="#">show interfaces diagnostics optics xe-0/1/0 (XFP Transceiver) on page 288</a></p> <p><a href="#">show interfaces diagnostics optics et-3/0/0 (QSFP+ Transceiver) on page 289</a></p> <p><a href="#">show interfaces diagnostics optics et-4/1/0 (CFP Transceiver) on page 290</a></p>
<b>Output Fields</b>	<a href="#">Table 29 on page 280</a> lists the output fields for the <b>show interfaces diagnostics optics</b> command. Output fields are listed in the approximate order in which they appear.

Table 29: 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> (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> (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> (Not available for XFP transceivers)	Displays the voltage, in Volts.
<b>Laser rx power</b> (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> (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> (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> (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> (Not available for QSFP+ transceivers)	Displays whether the laser output power high warning is <b>On</b> or <b>Off</b> .

Table 29: show interfaces diagnostics optics Output Fields (continued)

Field Name	Field Description
<b>Laser output power low warning</b> (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> (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> (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> (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> (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> (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> (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> (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> (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> (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> (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> (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> (Not available for XFP and QSFP+ transceivers)	Displays whether the module voltage low warning is <b>On</b> or <b>Off</b> .

Table 29: show interfaces diagnostics optics Output Fields (continued)

Field Name	Field Description
<b>Laser rx power high alarm</b> (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> (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> (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> (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> (Not available for QSFP+ transceivers)	Displays the vendor-specified threshold for the laser bias current high alarm.
<b>Module not ready alarm</b> (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> (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> (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> (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> (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> (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> (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> (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 29: show interfaces diagnostics optics Output Fields (continued)

Field Name	Field Description
<b>Module power down alarm</b> (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> (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> (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> (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> (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> (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> (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> (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> (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> (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> (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> (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> (Not available for QSFP+ transceivers)	Displays the vendor-specified threshold for the laser output power low alarm.

Table 29: show interfaces diagnostics optics Output Fields (continued)

Field Name	Field Description
<b>Laser output power high warning threshold</b> (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> (Not available for QSFP+ transceivers)	Displays the vendor-specified threshold for the laser output power low warning.
<b>Module temperature high alarm threshold</b> (Not available for QSFP+ transceivers)	Displays the vendor-specified threshold for the module temperature high alarm.
<b>Module temperature low alarm threshold</b> (Not available for QSFP+ transceivers)	Displays the vendor-specified threshold for the module temperature low alarm.
<b>Module temperature high warning threshold</b> (Not available for QSFP+ transceivers)	Displays the vendor-specified threshold for the module temperature high warning.
<b>Module temperature low warning threshold</b> (Not available for QSFP+ transceivers)	Displays the vendor-specified threshold for the module temperature low warning.
<b>Module voltage high alarm threshold</b> (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> (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> (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> (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> (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> (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> (Not available for QSFP+ transceivers)	Displays the vendor-specified threshold for the laser rx power high warning.

Table 29: show interfaces diagnostics optics Output Fields (continued)

Field Name	Field Description
<b>Laser rx power low warning threshold</b> (Not available for QSFP+ transceivers)	Displays the vendor-specified threshold for the laser rx power low warning.
<b>Laser temperature high alarm threshold</b> (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> (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> (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> (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> (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> (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> (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> (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> (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> (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> (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> (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 29: show interfaces diagnostics optics Output Fields (continued)

Field Name	Field Description
<b>Laser receiver power</b> (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> (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> (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> (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> (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
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 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

**List of Syntax**    [Syntax \(EX Series\) on page 293](#)  
                           [Syntax \(QFX Series\) on page 293](#)

**Syntax (EX Series)**    `show interfaces ge-fpc/pic/port`  
                               `<brief | detail | extensive | terse>`  
                               `<media>`  
                               `<statistics>`

**Syntax (QFX Series)**    `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 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 status information about the specified Gigabit Ethernet interface. This command does not display statistics for routed VLAN interfaces.



**NOTE:** You must have a transceiver plugged into an SFP or SFP+ port before information about the interface can be displayed.

**Options**    `ge-fpc/pic/port`—(EX Series) Display standard information about the specified Gigabit Ethernet interface.

`brief | detail | extensive | terse`—(Optional) (EX Series) Display the specified level of output.

`media`—(Optional) (EX Series) Display media-specific information about network interfaces.

`statistics`—(Optional) (EX Series) Display static interface statistics.

`brief | detail | extensive | terse`—(Optional) (QFX Series) Display the specified level of output.

`device-name:type-fpc/pic/port`— (QFX Series) 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) (QFX Series) Display interface description strings.

**media**—(Optional) (QFX Series) Display media-specific information about network interfaces.

**routing instance (all | *instance-name*)**—(Optional) (QFX Series) Display the name of an individual routing-instance or display all routing-instances.

**snmp-index *snmp-index***—(Optional) (QFX Series) Display information for the specified SNMP index of the interface.

**statistics**—(Optional) (QFX Series) Display static interface statistics.

**Required Privilege Level**

view

**Related Documentation**

- *Monitoring Interface Status and Traffic*
- *Troubleshooting Network Interfaces on EX3200 Switches*
- *Troubleshooting Network Interfaces on EX4200 Switches*
- *Troubleshooting an Aggregated Ethernet Interface*
- [Junos OS Ethernet Interfaces Configuration Guide](#)
- [Monitoring Interface Status and Traffic on page 67](#)
- [Troubleshooting Network Interfaces on page 67](#)
- [Troubleshooting an Aggregated Ethernet Interface on page 94](#)
- *Junos OS Network Interfaces Library for Routing Devices*

**List of Sample Output**

[show interfaces ge-0/0/0 on page 301](#)  
[show interfaces ge-0/0/0 brief on page 301](#)  
[show interfaces ge-0/0/0 brief \(with EEE Enabled on the EEE-capable Base-T copper Ethernet interfaces\) on page 302](#)  
[show interfaces ge-0/0/0 detail on page 302](#)  
[show interfaces ge-0/0/4 extensive on page 303](#)

**Output Fields**

[Table 30 on page 294](#) lists the output fields for the **show interfaces ge-** command. Output fields are listed in the approximate order in which they appear.

*Table 30: show interfaces ge- Output Fields*

Field Name	Field Description	Level of Output
Physical Interface		
Physical interface	Name of the physical interface.	All levels
Enabled	State of the interface: <b>Enabled</b> or <b>Disabled</b> .	All levels



Table 30: *show interfaces ge-* Output Fields (continued)

Field Name	Field Description	Level of Output
<b>Interface index</b>	Index number of the physical interface, which reflects its initialization sequence.	<b>detail extensive 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. Default is 1514.	All levels
<b>Speed</b>	Speed of the interface: Auto if autonegotiation of speed is enabled; speed in megabits per second if the interface speed is explicitly configured.	All levels
<b>Duplex</b>	Link mode of the interface: Auto if autonegotiation of link mode is enabled; Full-Duplex or Half-Duplex if the link mode is explicitly configured.	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> .	All levels
<b>Auto-negotiation</b>	Autonegotiation status: <b>Enabled</b> or <b>Disabled</b> .	All levels
<b>Remote-fault</b>	Remote fault status: <ul style="list-style-type: none"> <li>• <b>Online</b>—Autonegotiation is manually configured as online.</li> <li>• <b>Offline</b>—Autonegotiation is manually configured as offline.</li> </ul>	All levels
<b>IEEE 802.3az Energy Efficient Ethernet</b>	IEEE 802.3az Energy Efficient Ethernet status: <b>Enabled</b> or <b>Disabled</b> (appears only for EEE-capable Base-T copper Ethernet interfaces).	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.	<b>detail extensive none</b>
<b>Hold-times</b>	Current interface hold-time up and hold-time down, in milliseconds.	<b>detail extensive</b>
<b>Current address</b>	Configured MAC address.	<b>detail extensive none</b>

Table 30: *show interfaces ge- Output Fields (continued)*

Field Name	Field Description	Level of Output
<b>Hardware address</b>	MAC address of the hardware.	<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>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> <p><b>NOTE:</b> The bandwidth bps counter is not enabled on the switch.</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 the 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 30: *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>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 time, it is promoted to an alarm. Based on the switch configuration, a defect can activate 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 30: *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</b>, <b>Broadcast packets</b>, and <b>Multicast packets</b>—Number of unicast, broadcast, and multicast packets.</li> <li>• <b>CRC/Align errors</b>—Total number of packets received that had a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, and had either a bad FCS with an integral number of octets (FCS Error) or a bad FCS with a nonintegral number of octets (Alignment Error).</li> <li>• <b>FIFO error</b>—Number of FIFO errors 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 frames that exceed 1518 octets.</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>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 30: *show interfaces ge- 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>Complete</b>—The autonegotiation process between the local and remote Ethernet interfaces was successful.</li> <li>• <b>Incomplete</b>—Remote Ethernet interface has the speed or link mode configured or does not perform autonegotiation.</li> <li>• <b>No autonegotiation</b>—Local Ethernet interface has autonegotiation disabled and the link mode and speed are manually configured.</li> </ul> </li> <li>• <b>Link partner</b>—Information from the link partner: <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>. If the link mode of the remote device cannot be determined, the value is <b>Unknown</b>.</li> <li>• <b>Flow control</b>—Types of flow control supported by the remote Ethernet device. For Gigabit Ethernet interfaces, the 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 <b>PAUSE</b> on both receive and transmit or <b>PAUSE</b> 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>—Resolution of the autonegotiation process on the local interface: <ul style="list-style-type: none"> <li>• <b>Flow control</b>—Type of flow control that is used by the local interface. For Gigabit Ethernet interfaces, the 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 <b>PAUSE</b> on both receive and transmit or <b>PAUSE</b> only on receive).</li> <li>• <b>Link mode</b>—Link mode of local interface: either <b>Full-duplex</b> or <b>Half-duplex</b>. Displayed when <b>Negotiation status</b> is <b>Incomplete</b>.</li> <li>• <b>Local link speed</b>—Speed of the local interface. Displayed when <b>Negotiation status</b> is <b>Incomplete</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
Packet Forwarding Engine configuration	<p>Information about the configuration of the Packet Forwarding Engine:</p> <ul style="list-style-type: none"> <li>• <b>Destination slot</b>—FPC slot number: <ul style="list-style-type: none"> <li>• On standalone switches with built-in interfaces, the slot number refers to the switch itself and is always 0.</li> <li>• On Virtual Chassis composed of switches with built-in interfaces, the slot number refers to the member ID of the switch.</li> <li>• On switches with line cards or on Virtual Chassis composed of switches with line cards, the slot number refers to the line card slot number on the switch or Virtual Chassis.</li> </ul> </li> </ul>	extensive

#### Logical Interface

Table 30: *show interfaces ge-* Output Fields (continued)

Field Name	Field Description	Level of Output
<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>	<p>Number and rate of bytes and packets received (input) and transmitted (output) on the specified interface.</p> <p><b>NOTE:</b> For logical interfaces on EX Series switches, the traffic statistics fields in <b>show interfaces</b> commands show only control traffic; the traffic statistics do not include data traffic.</p>	<b>detail extensive</b>
<b>IPv6 transit statistics</b>	EX Series switches do not support the collection and reporting of IPv6 transit statistics.	<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, 0 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>	<p>Information about protocol family flags.</p> <p>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.</p>	<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>

Table 30: *show interfaces ge- Output Fields (continued)*

Field Name	Field Description	Level of Output
<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 ge-0/0/0

```

user@switch> show interfaces ge-0/0/0
Physical interface: ge-0/0/0, 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-0/0/0.0 (Index 65) (SNMP ifIndex 22)
  Flags: SNMP-Traps
  Encapsulation: ENET2
  Input packets : 0
  Output packets: 0
  Protocol eth-switch
  Flags: None

```

### show interfaces ge-0/0/0 brief

```

user@switch> show interfaces ge-0/0/0 brief
Physical interface: ge-0/0/0, 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-0/0/0.0

```

Flags: Device-Down SNMP-Traps Encapsulation: ENET2  
eth-switch

### show interfaces ge-0/0/0 brief (with IEEE Enabled on the IEEE-capable Base-T copper Ethernet interfaces)

```
user@switch> show interfaces ge-0/0/0 brief
Physical interface: ge-0/0/0, Enabled, Physical link is Up
Link-level type: Ethernet, MTU: 1514, Speed: Auto, Duplex: Auto,
Loopback: Disabled, Source filtering: Disabled, Flow control: Enabled,
Auto-negotiation: Enabled, Remote fault: Online,
IEEE 802.3az Energy Efficient Ethernet: Enabled, NO LPI
Device flags : Present Running
Interface flags: Hardware-Down SNMP-Traps Internal: 0x0
Link flags : None
```

### show interfaces ge-0/0/0 detail

```
user@switch> show interfaces ge-0/0/0 detail
Physical interface: ge-0/0/0, 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-0/0/0.0 (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 ge-0/0/4 extensive

```

user@switch> show interfaces ge-0/0/4 extensive
Physical interface: ge-0/0/4, Enabled, Physical link is Up
Interface index: 165, SNMP ifIndex: 152, Generation: 168
Link-level type: Ethernet, MTU: 1514, Speed: Auto, Duplex: Auto,
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:12:33:65:44, Hardware address: 00:1f:12:33:65:44
Last flapped : 2008-09-17 11:02:25 UTC (16:32:54 ago)
Statistics last cleared: Never
Traffic statistics:
Input bytes : 0 0 bps
Output bytes : 2989761 984 bps
Input packets: 0 0 pps
Output packets: 24307 1 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: 1, Errors: 0, Drops: 0, Collisions: 0, Aged packets: 0,

FIFO errors: 0, HS link CRC errors: 0, MTU errors: 0, Resource errors: 0
Egress queues: 8 supported, 4 in use
Queue counters:      Queued packets  Transmitted packets  Dropped packets

0 best-effort        0                0                0
1 assured-forw        0                0                0
5 expedited-fo        0                0                0

```

```

7 network-cont                                0                24307                0

Active alarms : None
Active defects : None
MAC statistics:
    Receive          Transmit
    Total octets      0          2989761
    Total packets     0          24307
    Unicast packets   0           0
    Broadcast packets 0           0
    Multicast packets 0          24307
    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
    Code violations    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: None, Remote fault: Link OK
Packet Forwarding Engine configuration:
Destination slot: 0
Direction : Output
CoS transmit queue      Bandwidth      Buffer Priority
Limit
    %      bps      %      usec
0 best-effort      95      950000000      95      NA      low
none
7 network-control    5       50000000      5      NA      low
none

Logical interface ge-0/0/4.0 (Index 82) (SNMP ifIndex 184) (Generation 147)
Flags: SNMP-Traps Encapsulation: ENET2
Traffic statistics:
    Input bytes :      0
    Output bytes :    4107883
    Input packets:      0
    Output packets:    24307
IPv6 transit statistics:
    Input bytes :      0
    Output bytes :      0
    Input packets:      0
    Output packets:      0
Local statistics:
    Input bytes :      0
    Output bytes :    4107883
    Input packets:      0
    Output packets:    24307
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 eth-switch, Generation: 159, Route table: 0
Flags: None
Input Filters: f2,
Output Filters: f1,,,
```

## show interfaces irb

<b>Syntax</b>	<pre>show interfaces irb &lt;brief   detail   extensive   terse&gt; &lt;descriptions&gt; &lt;media&gt; &lt;routing-instance <i>instance-name</i>&gt; &lt;snmp-index <i>snmp-index</i>&gt; &lt;statistics&gt;</pre>
<b>Release Information</b>	<p>Command introduced in Junos OS Release 12.3R2.</p> <p>Command introduced in Junos OS Release 12.3R2 for EX Series switches.</p> <p>Command introduced in Junos OS Release 13.2 for the QFX Series</p>
<b>Description</b>	Display integrated routing and bridging interfaces information.
<b>Options</b>	<p><b>brief   detail   extensive   terse</b>—(Optional) Display the specified level of output.</p> <p><b>descriptions</b>—(Optional) Display interface description strings.</p> <p><b>media</b>—(Optional) Display media-specific information about network interfaces.</p> <p><b>routing-instance <i>instance-name</i></b>—(Optional) Display information for the interface with the specified SNMP index.</p> <p><b>snmp-index <i>snmp-index</i></b>—(Optional) Display information for the interface with the specified SNMP index.</p> <p><b>statistics</b>—(Optional) Display static interface statistics.</p>
<b>Additional Information</b>	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.
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<p><a href="#">show interfaces irb extensive on page 310</a></p> <p><a href="#">show interfaces irb snmp-index on page 311</a></p>
<b>Output Fields</b>	<a href="#">Table 31 on page 306</a> lists the output fields for the <b>show interfaces irb</b> command. Output fields are listed in the approximate order in which they appear.

Table 31: show interfaces irb Output Fields

Field Name	Field Description	Level of Output
Physical Interface		
Physical interface	Name of the physical interface.	All levels

Table 31: 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 31: 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 31: 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> none
<b>SNMP ifIndex</b>	SNMP interface index number of 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. 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>	Dummy value that is ignored by an IRB interface. IRB interfaces are pseudo interfaces and do not have physical bandwidth associated with them.	<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 31: 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> 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, Runt: 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: 10.51.1/8, 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: 10.51.1/8, Local: 10.51.1.2, Broadcast: 10.51.1.255

```

Protocol multiservice, MTU: 1500  
Flags: Is-Primary

## show interfaces queue

**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 32 on page 314](#). 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 32 on page 314](#).

**Table 32: 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 322](#)  
[show interfaces queue \(Aggregated Ethernet on a T320 Router\) on page 323](#)  
[show interfaces queue \(Gigabit Ethernet on a T640 Router\) on page 325](#)  
[show interfaces queue aggregate \(Gigabit Ethernet Enhanced DPC\) on page 325](#)  
[show interfaces queue \(Gigabit Ethernet IQ2 PIC\) on page 329](#)

[show interfaces queue both-ingress-egress \(Gigabit Ethernet IQ2 PIC\) on page 332](#)  
[show interfaces queue ingress \(Gigabit Ethernet IQ2 PIC\) on page 334](#)  
[show interfaces queue egress \(Gigabit Ethernet IQ2 PIC\) on page 335](#)  
[show interfaces queue remaining-traffic \(Gigabit Ethernet Enhanced DPC\) on page 337](#)  
[show interfaces queue \(Channelized OC12 IQE Type 3 PIC in SONET Mode\) on page 339](#)  
[show interfaces queue \(QFX Series\) on page 349](#)  
[show interfaces queue l2-statistics \(lsq interface\) on page 350](#)  
[show interfaces queue lsq \(lsq-ifd\) on page 351](#)  
[show interfaces queue \(Aggregated Ethernet on a MX series Router\) on page 352](#)

**Output Fields** Table 33 on page 317 lists the output fields for the **show interfaces queue** command. Output fields are listed in the approximate order in which they appear.

*Table 33: show interfaces queue Output Fields*

Field Name	Field Description
<b>Physical interface</b>	Name of the physical interface.
<b>Enabled</b>	State of the interface. Possible values are described in the “Enabled Field” section under <i>Common Output Fields Description</i> .
<b>Interface index</b>	Physical interface's index number, which reflects its initialization sequence.
<b>SNMP ifIndex</b>	SNMP index number for the interface.
<b>Forwarding classes supported</b>	Total number of forwarding classes supported on the specified interface.
<b>Forwarding classes in use</b>	Total number of forwarding classes in use on the specified interface.
<b>Ingress queues supported</b>	On Gigabit Ethernet IQ2 PICs only, total number of ingress queues supported on the specified interface.
<b>Ingress queues in use</b>	On Gigabit Ethernet IQ2 PICs only, total number of ingress queues in use on the specified interface.
<b>Output queues supported</b>	Total number of output queues supported on the specified interface.
<b>Output queues in use</b>	Total number of output queues in use on the specified interface.
<b>Egress queues supported</b>	Total number of egress queues supported on the specified interface.
<b>Egress queues in use</b>	Total number of egress queues in use on the specified interface.

Table 33: show interfaces queue Output Fields (continued)

Field Name	Field Description
<b>Queue counters (Ingress)</b>	<p>CoS queue number and its associated user-configured forwarding class name. Displayed on IQ2 interfaces.</p> <ul style="list-style-type: none"> <li><b>Queued packets</b>—Number of queued packets.</li> </ul> <p><b>NOTE:</b> This field is not supported on QFX5100, QFX5110, QFX5200, and QFX5210 switches due to hardware limitations.</p> <ul style="list-style-type: none"> <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>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 315</a>.</p> <p><b>NOTE:</b> This field is not supported on QFX5100, QFX5110, QFX5200, and QFX5210 switches due to hardware limitations.</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 34 on page 321</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 315</a>.</p> <p><b>NOTE:</b> This field is not supported on QFX5100, QFX5110, QFX5200, and QFX5210 switches due to hardware limitations.</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 313</a></p>



Table 33: show interfaces queue Output Fields (continued)

Field Name	Field Description
<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 34 on page 321</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</a>” on page 313</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</a>” on page 315.</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>
<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</a>” on page 315.</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>

Table 33: show interfaces queue Output Fields (continued)

Field Name	Field Description
RED-dropped bytes	<p>Number of bytes dropped because of RED. The byte counts vary by interface hardware. For more information, see <a href="#">Table 34 on page 321</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>
Queue-depth bytes	Displays queue-depth average, current, peak, and maximum values for RTP queues. Because queue-depth values cannot be aggregated, displays the values for RTP queues regardless of whether <b>aggregate</b> , <b>remaining-traffic</b> , or neither option is selected.
Queue-depth bytes	Displays queue-depth average, current, peak, and maximum values for RTP queues. Because queue-depth values cannot be aggregated, displays the values for RTP queues regardless of whether <b>aggregate</b> , <b>remaining-traffic</b> , or neither option is selected.
Last-packet enqueued	Starting with Junos OS Release 16.1, <b>Last-packet enqueued</b> output field is introduced. If <b>packet-timestamp</b> is enabled for an FPC, shows the day, date, time, and year in the format <i>day-of-the-week month day-date hh:mm:ss yyyy</i> when a packet was enqueued in the CoS queue. When the timestamp is aggregated across all active Packet Forwarding Engines, the latest timestamp for each CoS queue is reported.

Byte counts vary by interface hardware. [Table 34 on page 321](#) shows how the byte counts on the outbound interfaces vary depending on the interface hardware. [Table 34 on page 321](#) is based on the assumption that outbound interfaces are sending IP traffic with 478 bytes per packet.

Table 34: 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 34: 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  Transmitted: 482 bytes per packet, representing 478 bytes of Layer 3 packet + 4 bytes  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  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.  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 pps
RED-dropped packets : 0 pps
RED-dropped bytes  : 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 pps
    RL-dropped packets : 0 pps
    RL-dropped bytes  : 0 bps
    RED-dropped packets : 0 pps
    Low           : 0 0 pps
    Medium-low     : 0 0 pps
    Medium-high    : 0 0 pps
    High          : 0 0 pps
    RED-dropped bytes  : 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 pps
    RL-dropped packets : 0 pps
    RL-dropped bytes  : 0 bps
    RED-dropped packets : 0 pps
    Low           : 0 0 pps
    Medium-low     : 0 0 pps
    Medium-high    : 0 0 pps
    High          : 0 0 pps
    RED-dropped bytes  : 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

```

## Sample Output

### show interfaces queue (Aggregated Ethernet on a MX series Router)

```
user@host> show interfaces queue ae0 remaining-traffic
```

```
Physical interface: ae0 , Enabled, Physical link is Up
```

```
Interface index: 128, SNMP ifIndex: 543
```

```
Forwarding classes: 16 supported, 4 in use
```

```
Egress queues: 8 supported, 4 in use
```

```
Queue: 0, Forwarding classes: best-effort
```

```
Queued:
```

```

  Packets          :          16          0 pps
  Bytes           :         1896          0 bps

```

```
Transmitted:
```

```

  Packets          :          16          0 pps
  Bytes           :         1896          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-depth bytes :
    Average          :          0
    Current          :          0
    Peak             :          0
    Maximum          :      119013376
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
    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-depth bytes :
    Average          :          0
    Current          :          0
    Peak             :          0
    Maximum          :      32768
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
    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-depth bytes :
    Average          :          0
    Current          :          0
    Peak             :          0

```

```
Maximum : 32768
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
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-depth bytes :
  Average : 0
  Current : 0
  Peak : 0
  Maximum : 6258688
```

## show interfaces xe

**List of Syntax**    [Syntax \(QFX Series\) on page 355](#)  
                           [Syntax \(EX Series\) on page 355](#)

**Syntax (QFX Series)**    `show interfaces device-name:type-fpc/pic/port`  
                                   `<brief | detail | extensive | terse>`  
                                   `<descriptions>`  
                                   `<media>`  
                                   `<routing-instance (all | instance-name)>`  
                                   `<snmp-index snmp-index>`  
                                   `<statistics>`

**Syntax (EX Series)**    `show interfaces xe-fpc/pic/port`  
                                   `<brief | detail | extensive | terse>`  
                                   `<media>`  
                                   `<statistics>`

**Release Information**    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 status information about the specified 10-Gigabit Ethernet interface. This command does not display statistics for routed VLAN interfaces.



**NOTE:** You must have a transceiver plugged into an SFP+ or an XFP port before information about the interface can be displayed.



**NOTE:** On an EX Series switch, the traffic statistics for a LAG might vary slightly from the cumulative traffic statistics of the member interfaces of the LAG. This difference is more likely to be seen when the traffic is bursty in nature, and because the statistics are not fetched from the LAG and the members in the same instant. For accurate traffic statistics for a LAG, use the aggregated Ethernet counters.

**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) (QFX Series) Display the specified level of output.

`descriptions`—(Optional) (QFX Series) Display interface description strings.

**media**—(Optional) (QFX Series) Display media-specific information about network interfaces.

**routing-instance (all | *instance-name*)**—(Optional) (QFX Series) Display the name of an individual routing instance or display all routing instances.

**snmp-index *snmp-index***—(Optional) (QFX Series) Display information for the specified SNMP index of the interface.

**statistics**—(Optional) (QFX Series) Display static interface statistics.

**xe-*fpc/pic/port***—(EX Series) Display standard information about the specified 10-Gigabit Ethernet interface.

**brief | detail | extensive | terse**—(Optional) (EX Series) Display the specified level of output.

**media**—(Optional) (EX Series) Display media-specific information about network interfaces. For 10-Gigabit Ethernet interfaces, using the media option does not provide you with new or additional information. The output is the same as when the media option is not used.

**statistics**—(Optional) (EX Series) Display static interface statistics. For 10-Gigabit Ethernet interfaces, using the statistics option does not provide you with new or additional information. The output is the same as when the statistics option is not used.

**Required Privilege  
Level**

view

**Related  
Documentation**

- [Monitoring Interface Status and Traffic on page 67](#)
- *Monitoring Interface Status and Traffic*
- [Troubleshooting Network Interfaces on page 67](#)
- [Troubleshooting an Aggregated Ethernet Interface on page 94](#)
- *Junos OS Network Interfaces Library for Routing Devices*
- *Troubleshooting Network Interfaces on EX3200 Switches*
- *Troubleshooting Network Interfaces on EX4200 Switches*
- *Troubleshooting an Aggregated Ethernet Interface*
- [Junos OS Ethernet Interfaces Configuration Guide](#)

**List of Sample Output**

[show interfaces on page 364](#)  
[show interfaces \(Asymmetric Flow Control\) on page 365](#)  
[show interfaces brief on page 365](#)  
[show interfaces detail on page 365](#)  
[show interfaces detail \(Asymmetric Flow Control\) on page 367](#)

[show interfaces extensive on page 368](#)

[show interfaces extensive \(Asymmetric Flow Control\) on page 370](#)

[show interfaces terse on page 372](#)

[show interfaces \(QFabric System\) on page 372](#)

**Output Fields** Table 35 on page 357 lists the output fields for the **show interfaces xe** command. Output fields are listed in the approximate order in which they appear.

*Table 35: show interfaces xe Output Fields*

Field Name	Field Description	Level of Output
<b>Physical Interface</b>		
Physical interface	Name of the physical interface.	All levels
Enabled	State of the interface.	All levels
Interface index	Index number of the physical interface, which reflects its initialization sequence.	detail extensive none
SNMP ifIndex	SNMP index number for the physical interface.	detail extensive none
Generation	Unique number for use by Juniper Networks technical support only.	detail extensive
Link-level type	Encapsulation being used on the physical interface.	All levels
MTU	Maximum transmission unit size on the physical interface.	All levels
Speed	Speed at which the interface is running.	All levels
Duplex	Duplex mode of the interface, either <b>Full-Duplex</b> or <b>Half-Duplex</b> .	All levels
Loopback	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
Source filtering	Source filtering status: <b>Enabled</b> or <b>Disabled</b> .	All levels
LAN-PHY mode	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
Unidirectional	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
Flow control	Flow control status: <b>Enabled</b> or <b>Disabled</b> .	All levels
NOTE: This field is only displayed if asymmetric flow control is not configured.		

Table 35: *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. <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. <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 35: *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 35: 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 35: *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 35: *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 35: *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 35: *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.  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, Runt: 0, Policed discards: 0, L3
incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0, FIFO errors: 0,
Resource errors: 0
Output errors:
  Carrier transitions: 0, Errors: 0, Drops: 0, Collisions: 0, Aged packets: 0,

```

FIFO errors: 0, HS link CRC errors: 0, MTU errors: 0, Resource errors: 0

Egress queues: 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:

Prioity : 0	0	0
Prioity : 1	0	0
Prioity : 2	0	0
Prioity : 3	0	0
Prioity : 4	0	0
Prioity : 5	0	0
Prioity : 6	0	0
Prioity : 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
    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:
  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 5000000000 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>Syntax</b>	<code>show lacp interfaces</code> <code>&lt;interface-name&gt;</code> <code>extensive</code>
<b>Release Information</b>	Command introduced in Junos OS Release 7.6. <b>extensive</b> statement introduced in Junos OS Release 16.1R1 Command introduced in Junos OS Release 10.0 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. Command introduced in Junos OS Release 14.2R3
<b>Description</b>	Display Link Aggregation Control Protocol (LACP) information about the specified aggregated Ethernet, Fast Ethernet, or Gigabit Ethernet interface.
<b>Options</b>	<b>none</b> —Display LACP information for all interfaces.  <b>interface-name</b> —(Optional) Display LACP information for the specified interface: <ul style="list-style-type: none"><li>• Aggregated Ethernet—<b>aenumber</b></li><li>• Fast Ethernet—<b>fe-fpc/pic/port</b></li><li>• Gigabit Ethernet—<b>ge-fpc/pic/port</b></li><li>• 10 Gigabit Ethernet—<b>xe-fpc/pic/port</b></li></ul> <b>extensive</b> —Display LACP information for the interface in detail.



**NOTE:** The `show lacp interfaces` command returns the following error message if your system is not configured in either active or passive LACP mode:

“Warning: lacp subsystem not running – not needed by configuration”

**Required Privilege Level**

view

**Related Documentation**

- [Configuring Aggregated Ethernet Links \(CLI Procedure\)](#)
- [Configuring Link Aggregation on page 83](#)
- [Configuring Aggregated Ethernet LACP \(CLI Procedure\) on page 81](#)
- [Configuring Aggregated Ethernet LACP \(CLI Procedure\) on page 81](#)
- [Configuring LACP Link Protection of Aggregated Ethernet Interfaces for Switches on page 87](#)

- [Understanding Aggregated Ethernet Interfaces and LACP](#)
- [Understanding Aggregated Ethernet Interfaces and LACP for Switches on page 77](#)
- [Junos OS Interfaces Fundamentals Configuration Guide](#)

**List of Sample Output** [show lacp interfaces \(Aggregated Ethernet\) on page 379](#)  
[show lacp interfaces \(Gigabit Ethernet\) on page 379](#)  
[show lacp interfaces \(10 Gigabit Ethernet\) on page 380](#)

**Output Fields** [Table 36 on page 377](#) lists the output fields for the **show lacp interfaces** command. Output fields are listed in the approximate order in which they appear.

*Table 36: show lacp interfaces Output Fields*

Field Name	Field Description	Level of Output
LACP State	For a child interface configured with the force-up statement, LACP state displays FUP along with the interface name.	All Levels
Aggregated interface	Aggregated interface value.	All Levels
LACP State	<p>LACP state information for each aggregated interface:</p> <ul style="list-style-type: none"> <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 LACP negotiation.</li> <li>• <b>Partner</b>—Remote device participating in LACP negotiation.</li> </ul> </li> <li>• <b>Exp</b>—Expired state. <b>Yes</b> indicates the actor or partner is in an expired state. <b>No</b> indicates 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, administratively configured for the partner. <b>No</b> indicates 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 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 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 synchronized. It 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. It is currently not in the right aggregation.</li> <li>• <b>Aggr</b>—Ability of 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 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 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>	All Levels

Table 36: show lacp interfaces Output Fields (continued)

Field Name	Field Description	Level of Output
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 state machine. 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>—Multiplexer state machine initiates the process of attaching the port to the selected aggregator.</li> <li>• <b>Collecting—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—Yes</b> indicates that the transmit function of this link is enabled with respect to its participation in an aggregation. Frames may 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>—Multiplexer state machine is in a holding process, awaiting an outcome.</li> </ul> </li> </ul>	All Levels

Table 36: show lacp interfaces Output Fields (continued)

Field Name	Field Description	Level of Output
LACP info	<ul style="list-style-type: none"> <li>• <b>Role</b> can be one of the following: <ul style="list-style-type: none"> <li>• <b>Actor</b>—Local device participating in LACP negotiation.</li> <li>• <b>Partner</b>—Remote device participating in LACP negotiation.</li> </ul> </li> <li>• <b>System priority</b>—Priority assigned to the system (by management or administrative policy), encoded as an unsigned integer.</li> <li>• <b>System identifier</b>—Actor or partner system ID, encoded as a MAC address.</li> <li>• <b>Port priority</b>—Priority assigned to the port by the actor or partner (by management or administrative policy), encoded as an unsigned integer.</li> <li>• <b>Port number</b>—Port number assigned to the port by the actor or partner, encoded as an unsigned integer.</li> <li>• <b>Port key</b>—Operational key value assigned to the port by the actor or partner, encoded as an unsigned integer.</li> </ul>	Extensive

## Sample Output

### show lacp interfaces (Aggregated Ethernet)

```

user@host> show lacp interfaces ae0 extensive
LACP state:
  ge-0/0/1    Actor    No    No    Yes Yes Yes Yes Fast Active
  ge-0/0/1    Partner  No    No    Yes Yes Yes Yes Fast Active
  ge-0/0/2    Actor    No    No    Yes Yes Yes Yes Fast Active
  ge-0/0/2    Partner  No    No    Yes Yes Yes Yes Fast Active
  ge-0/0/3    Actor    No    No    Yes Yes Yes Yes Fast Active
  ge-0/0/3    Partner  No    No    Yes Yes Yes Yes Fast Active
LACP protocol:
  ge-0/0/1    Receive State Transmit State Mux State
  ge-0/0/1    Current    Fast periodic Collecting distributing
  ge-0/0/2    Current    Fast periodic Collecting distributing
  ge-0/0/3    Current    Fast periodic Collecting distributing
LACP info:
  Port      Role      System      System      Port      Port
  key
  ge-0/0/1    Actor      127  00:05:86:4e:b6:c0    127      1
  1
  ge-0/0/1    Partner    127  00:05:86:7e:d3:c0    127      1
  1
  ge-0/0/2    Actor      127  00:05:86:4e:b6:c0    127      2
  1
  ge-0/0/2    Partner    127  00:05:86:7e:d3:c0    127      2
  1
  ge-0/0/3    Actor      127  00:05:86:4e:b6:c0    127      3
  1
  ge-0/0/3    Partner    127  00:05:86:7e:d3:c0    127      3
  1

```

### show lacp interfaces (Gigabit Ethernet)

```

user@host> show lacp interfaces ge-0/3/0
Aggregated interface: ae0
LACP State:
  ge-0/3/0    Role    Exp    Def    Dist    Col    Syn    Aggr    Timeout    Activity
  ge-0/3/0    Actor    No     No     Yes     Yes     Yes     Yes     Fast      Active

```

ge-0/3/0	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Active
LACP Protocol:	Receive State		Transmit State					Mux State	
ge-0/3/0	Current		Fast periodic	Collecting	distributing				

#### show lacp interfaces (10 Gigabit Ethernet)

```
user@host> show lacp interfaces xe-1/0/2
```

```
Aggregated interface: ae0
```

LACP State:	Role	Exp	Def	Dist	Col	Syn	Aggr	Timeout	Activity
xe-1/0/2	Actor	No	No	Yes	Yes	Yes	Yes	Fast	Active
xe-1/0/2	Partner	No	No	Yes	Yes	Yes	Yes	Fast	Active
LACP Protocol:	Receive State		Transmit State					Mux State	
xe-1/0/2	Current		Fast periodic	Collecting	distributing				

## show lacp statistics interfaces (View)

**Syntax** `show lacp statistics interfaces interface-name`

**Release Information** Command modified in Release 10.2 of Junos OS.  
Command introduced in Release 11.1 of Junos OS for the QFX Series.  
Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

**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 92](#)
- [Verifying That LACP Is Configured Correctly and Bundle Members Are Exchanging LACP Protocol Packets on page 93](#)
- [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](#)

**List of Sample Output** [show lacp statistics interfaces on page 382](#)

**Output Fields** [Table 37 on page 381](#) lists the output fields for the `show lacp statistics interfaces` command. Output fields are listed in the approximate order in which they appear.

*Table 37: 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>Syntax</b>	<b>show redundant-trunk-group</b> <group-name <i>group-name</i> >
<b>Release Information</b>	Command introduced in Junos OS Release 9.0 for EX Series switches. 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>	<b>group-name</b> <i>group-name</i> —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 Devices with ELS Support on page 112</a></li> <li>• <a href="#">Understanding Redundant Trunk Links (Legacy RTG Configuration) on page 110</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">show redundant-trunk-group group-name Group1 on page 385</a>
<b>Output Fields</b>	<a href="#">Table 38 on page 384</a> lists the output fields for the <b>show redundant-trunk-group</b> command. Output fields are listed in the approximate order in which they appear.

Table 38: 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

