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Junos® OS for EX Series Ethernet Switches, Release 11.4: Interfaces
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Revision History
November 2011—Revision 1

The information in this document is current as of the date listed in the revision history.

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Chapter 2

Examples of Interfaces Configuration ................................. 21
Example: Configuring Aggregated Ethernet High-Speed Uplinks Between an
EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis
Distribution Switch.................................................. 21
Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP
Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual
Chassis Distribution Switch........................................ 27
Example: Configuring Layer 3 Subinterfaces for a Distribution Switch and an
Access Switch ....................................................... 32
Example: Configuring Unicast RPF on an EX Series Switch.................. 39
Example: Configuring IP Directed Broadcast on an EX Series Switch...... 43

Chapter 3

Configuring Interfaces .................................................. 47
Configuring Gigabit Ethernet Interfaces (CLI Procedure) ............... 48
  Configuring VLAN Options and Port Mode .......................... 48
  Configuring the Link Settings ...................................... 49
  Configuring the IP Options ....................................... 51
Configuring Gigabit Ethernet Interfaces (J-Web Procedure) .......... 51
Port Role Configuration with the J-Web Interface (with CLI References) . 58
Adding an Interface Description to the Configuration .................. 62
  Example: Adding an Interface Description to the Configuration .... 62
Adding a Logical Unit Description to the Configuration ............... 63
Disabling a Physical Interface ...................................... 64
  Example: Disabling a Physical Interface ......................... 64
Disabling a Logical Interface ..................................... 65
Configuring Flow Control ........................................... 65
Configuring the Interface Address .................................. 66
  Configuring Interface IPv4 Addresses ............................ 67
  Configuring Interface IPv6 Addresses ............................ 68
Configuring the Interface Bandwidth ............................... 68
Configuring the Media MTU ....................................... 69
Setting the Protocol MTU ......................................... 80
Interface Ranges ..................................................... 80
  Configuring Interface Ranges ..................................... 81
  Expanding Interface Range Member and Member Range Statements ... 84
  Configuration Inheritance for Member Interfaces ................. 86
  Member Interfaces Inheriting Configuration from Configuration Groups ... 87
Interfaces Inheriting Common Configuration ........................ 88
Configuring Inheritance Range Priorities ................................ 88
Configuration Expansion Where Interface Range Is Used ............ 89
Configuring Accounting for the Physical Interface .................... 90
  Applying an Accounting Profile to the Physical Interface ....... 90
  Example: Applying an Accounting Profile to the Physical Interface .. 90
Configuring Accounting for the Logical Interface ............... 91
  Applying an Accounting Profile to the Logical Interface ....... 91
  Example: Applying an Accounting Profile to the Logical Interface .. 91
Configuring Ethernet Loopback Capability ........................ 92
Configuring Gratuitous ARP ....................................... 93
# Table of Contents

Configuring Static ARP Table Entries .......................................................... 94
Example: Configuring Static ARP Table Entries .................................................. 95
Disabling the Transmission of Redirect Messages on an Interface .......................... 95
Configuring Restricted and Unrestricted Proxy ARP ............................................. 95
Enabling or Disabling SNMP Notifications on Logical Interfaces ............................ 96
Enabling or Disabling SNMP Notifications on Physical Interfaces .......................... 97
Configuring Aggregated Ethernet Interfaces (CLI Procedure) ................................. 97
Configuring Aggregated Ethernet Interfaces (J-Web Procedure) .............................. 98
Configuring Aggregated Ethernet LACP (CLI Procedure) ..................................... 101
Configuring Aggregated Ethernet Link Protection ................................................. 102
  Configuring Link Protection for Aggregated Ethernet Interfaces ............................ 102
  Configuring Primary and Backup Links for Link Aggregated Ethernet Interfaces .......... 102
  Reverting Traffic to a Primary Link When Traffic is Passing Through a Backup Link .......................................................... 103
Disabling Link Protection for Aggregated Ethernet Interfaces ................................. 103
Configuring Aggregated Ethernet Link Speed ....................................................... 103
Configuring Aggregated Ethernet Minimum Links ................................................. 104
Configuring Tagged Aggregated Ethernet Interfaces .............................................. 105
Configuring a Layer 3 Subinterface (CLI Procedure) ............................................. 105
Configuring Unicast RPF (CLI Procedure) .......................................................... 106
Disabling Unicast RPF (CLI Procedure) ............................................................. 107
Configuring IP Directed Broadcast (CLI Procedure) .............................................. 108
Tracing Operations of an Individual Router or Switch Interface ............................... 109
Tracing Operations of the Interface Process .......................................................... 110
Setting the Mode on an SFP+ Uplink Module (CLI Procedure) ................................. 110
Configuring the Media Type on Dual-Purpose Uplink Ports (CLI Procedure) ............... 111

## Chapter 4

**Verifying Interfaces** ....................................................................................... 113

Monitoring Interface Status and Traffic ............................................................... 113
Verifying the Status of a LAG Interface ................................................................. 114
Verifying That LACP Is Configured Correctly and Bundle Members Are Exchanging LACP Protocol Packets ................................................................. 115
Verifying the LACP Setup .................................................................................... 115
Verifying That LACP Packets Are Being Exchanged ............................................. 115
Verifying That Layer 3 Subinterfaces Are Working ............................................... 116
Verifying Unicast RPF Status .............................................................................. 117
Verifying IP Directed Broadcast Status ................................................................. 119

## Chapter 5

**Troubleshooting Interfaces** ............................................................................. 121

Troubleshooting Network Interfaces on EX3200 Switches ..................................... 121
  The interface on one of the last four built-in network ports in an EX3200 switch (for example, interface ge-0/0/23) is down ............................................. 121
  The interface on the port in which an SFP or SFP+ transceiver is installed in an SFP+ uplink module is down ......................................................... 122
Troubleshooting Network Interfaces on EX4200 Switches ..................................... 122
  The interface on the port in which an SFP or SFP+ transceiver is installed in an SFP+ uplink module is down ......................................................... 122
Chapter 6 Configuration Statements for Interfaces .............................................. 129

[edit chassis] Configuration Statement Hierarchy ........................................... 129
[edit interfaces] Configuration Statement Hierarchy ...................................... 130
802.3ad ................................................................................................. 135
accounting-profile ................................................................................. 136
address ................................................................................................. 137
aggregated-devices ............................................................................... 139
aggregated-ether-options .................................................................... 140
arp ........................................................................................................... 141
auto-negotiation .................................................................................. 142
bandwidth ............................................................................................ 144
broadcast ............................................................................................. 145
chassis .................................................................................................. 146
description ........................................................................................... 147
device-count ........................................................................................ 148
disable (Interface) ............................................................................... 149
ether-options ....................................................................................... 150
ethernet ................................................................................................ 151
eui-64 ................................................................................................... 151
family (for EX Series switches) ............................................................. 152
filter ....................................................................................................... 156
flow-control .......................................................................................... 157
force-up ................................................................................................. 157
gratuitous-arp-reply ............................................................................. 158
interface-range ................................................................................... 159
interfaces (for EX Series switches) ....................................................... 161
lacp (802.3ad) ...................................................................................... 168
lacp (Aggregated Ethernet) ................................................................. 169
link-mode ............................................................................................. 170
link-protection ..................................................................................... 171
link-speed (Aggregated Ethernet) ........................................................ 172
loopback (Aggregated Ethernet, Fast Ethernet, and Gigabit Ethernet) ...... 173
media-type ............................................................................................ 174
member .................................................................................................. 174
members ............................................................................................... 175
member-range ....................................................................................... 177
minimum-links ...................................................................................... 178
mtu .......................................................................................................... 179

Troubleshooting an Aggregated Ethernet Interface ................................... 123
Show Interfaces Command Shows the LAG is Down ............................... 123
Logical Interface Statistics Do Not Reflect All Traffic ......................... 123
Troubleshooting Interface Configuration and Cable Faults ................... 124
Interface Configuration or Connectivity Is Not Working ....................... 124
Troubleshooting Unicast RPF ................................................................. 125
Legitimate Packets Are Discarded ....................................................... 125
Troubleshooting Virtual Chassis Port Connectivity on an EX4200 Switch 125
Virtual Chassis port (VCP) connection does not work ......................... 126
Diagnosing a Faulty Twisted-Pair Cable (CLI Procedure) ...................... 126

VirtualChassisport(VCP)connectiondoesnotwork ................................ 126
Legitimate Packets Are Discarded ....................................................... 125
InterfaceConfigurationorConnectivityIsNotWorking .......................... 124
Logical Interface Statistics Do Not Reflect All Traffic ......................... 123
Show Interfaces Command Shows the LAG is Down ............................ 123
Troubleshooting an Aggregated Ethernet Interface ................................ 123
Troubleshooting Interface Configuration and Cable Faults ................. 124
Troubleshooting Unicast RPF ............................................................... 125
Diagnosing a Faulty Twisted-Pair Cable (CLI Procedure) ..................... 126

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native-vlan-id ................................................................. 180
no-redirects ............................................................... 181
periodic ................................................................. 182
pic ................................................................. 183
pic-mode .............................................................. 183
port-mode ............................................................. 184
preferred ............................................................ 185
primary (Address on Interface) ...................................... 186
proxy-arp ............................................................ 187
rpf-check ............................................................. 188
sfpplus ............................................................... 189
speed ................................................................. 190
targeted-broadcast .................................................... 191
traceoptions (Individual Interfaces) ......................... 192
traceoptions (Interface Process) ................................. 194
traps ................................................................. 195
unit ................................................................. 196
vlan ................................................................. 197
vlan-id ............................................................. 198
vlan-tagging ........................................................ 199

Chapter 7

Operational Commands for Interfaces ......................... 201
clear ipv6 neighbors ................................................. 202
monitor interface ..................................................... 203
request diagnostics tdr ............................................. 210
show diagnostics tdr ............................................... 212
show ethernet-switching interfaces ......................... 217
show interfaces diagnostics optics ......................... 221
show interfaces ge .................................................. 228
show interfaces me0 ............................................... 239
show interfaces queue ............................................ 246
show interfaces vlan ................................................ 252
show interfaces xe- ............................................... 264
show ipv6 neighbors ................................................. 277
show lacp interfaces ................................................ 279
test interface restart-auto-negotiation ...................... 284
About This Topic Collection

- How to Use This Guide on page ix
- List of EX Series Guides for Junos OS Release 11.4 on page ix
- Downloading Software on page xi
- Documentation Symbols Key on page xii
- Documentation Feedback on page xiii
- Requesting Technical Support on page xiv

### How to Use This Guide

Complete documentation for the EX Series product family is provided on webpages at http://www.juniper.net/techpubs/en_US/release-independent/information-products/pathway-pages/ex-series/product/index.html. We have selected content from these webpages and created a number of EX Series guides that collect related topics into a book-like format so that the information is easy to print and easy to download to your local computer.

Software features for EX Series switches are listed by platform and by Junos OS release in a standalone document. See EX Series Switch Software Features Overview.


### List of EX Series Guides for Junos OS Release 11.4

<table>
<thead>
<tr>
<th>Title</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete Hardware Guide for EX2200 Ethernet Switches</td>
<td>Component descriptions, site preparation, installation, replacement, and safety and compliance information for EX2200 Ethernet switches</td>
</tr>
<tr>
<td>Complete Hardware Guide for EX3200 Ethernet Switches</td>
<td>Component descriptions, site preparation, installation, replacement, and safety and compliance information for EX3200 Ethernet switches</td>
</tr>
<tr>
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<td>Component descriptions, site preparation, installation, replacement, and safety and compliance information for EX3300 Ethernet switches</td>
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<td>Description</td>
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</tr>
<tr>
<td>Complete Hardware Guide for EX4200 Ethernet Switches</td>
<td>Component descriptions, site preparation, installation, replacement, and safety and compliance information for EX4200 Ethernet switches</td>
</tr>
<tr>
<td>Complete Hardware Guide for EX4500 Ethernet Switches</td>
<td>Component descriptions, site preparation, installation, replacement, and safety and compliance information for EX4500 Ethernet switches</td>
</tr>
<tr>
<td>Complete Hardware Guide for EX6210 Ethernet Switches</td>
<td>Component descriptions, site preparation, installation, replacement, and safety and compliance information for EX6210 Ethernet switches</td>
</tr>
<tr>
<td>Complete Hardware Guide for EX8208 Ethernet Switches</td>
<td>Component descriptions, site preparation, installation, replacement, and safety and compliance information for EX8208 Ethernet switches</td>
</tr>
<tr>
<td>Complete Hardware Guide for EX8216 Ethernet Switches</td>
<td>Component descriptions, site preparation, installation, replacement, and safety and compliance information for EX8216 Ethernet switches</td>
</tr>
<tr>
<td>Complete Hardware Guide for the XRE200 External Routing Engine</td>
<td>Component descriptions, site preparation, installation, replacement, and safety and compliance information for the XRE200 External Routing Engine</td>
</tr>
<tr>
<td>Complete Software Guide for Junos® OS for EX Series Ethernet Switches, Release 11.4</td>
<td>Software feature descriptions, configuration examples, and tasks for Junos OS for EX Series switches</td>
</tr>
<tr>
<td>Software Topic Collections</td>
<td>Software feature descriptions, configuration examples and tasks, and reference pages for configuration statements and operational commands (This information also appears in the Complete Software Guide for Junos® OS for EX Series Ethernet Switches, Release 11.4.)</td>
</tr>
</tbody>
</table>

- Junos® OS for EX Series Ethernet Switches, Release 11.4: Access and User Management
- Junos® OS for EX Series Ethernet Switches, Release 11.4: Access Control
- Junos® OS for EX Series Ethernet Switches, Release 11.4: Configuration Management
- Junos® OS for EX Series Ethernet Switches, Release 11.4: Class of Service
- Junos® OS for EX Series Ethernet Switches, Release 11.4: Device Security
- Junos® OS for EX Series Ethernet Switches, Release 11.4: Ethernet Switching
- Junos® OS for EX Series Ethernet Switches, Release 11.4: EX3300, EX4200, and EX4500 Virtual Chassis
<table>
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<tr>
<td>Junos® OS for EX Series Ethernet Switches, Release 11.4: EXB200 Virtual Chassis</td>
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</tr>
<tr>
<td>Junos® OS for EX Series Ethernet Switches, Release 11.4: Fibre Channel over Ethernet</td>
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<tr>
<td>Junos® OS for EX Series Ethernet Switches, Release 11.4: High Availability</td>
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<tr>
<td>Junos® OS for EX Series Ethernet Switches, Release 11.4: Interfaces</td>
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</tr>
<tr>
<td>Junos® OS for EX Series Ethernet Switches, Release 11.4: Layer 3 Protocols</td>
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<tr>
<td>Junos® OS for EX Series Ethernet Switches, Release 11.4: MPLS</td>
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<tr>
<td>Junos® OS for EX Series Ethernet Switches, Release 11.4: Multicast</td>
<td></td>
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<tr>
<td>Junos® OS for EX Series Switches, Release 11.4: Network Management and Monitoring</td>
<td></td>
</tr>
<tr>
<td>Junos® OS for EX Series Switches, Release 11.4: Port Security</td>
<td></td>
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<tr>
<td>Junos® OS for EX Series Switches, Release 11.4: Power over Ethernet</td>
<td></td>
</tr>
<tr>
<td>Junos® OS for EX Series Ethernet Switches, Release 11.4: Routing Policy and Packet Filtering</td>
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</tr>
<tr>
<td>Junos® OS for EX Series Ethernet Switches, Release 11.4: Software Installation</td>
<td></td>
</tr>
<tr>
<td>Junos® OS for EX Series Ethernet Switches, Release 11.4: Spanning-Tree Protocols</td>
<td></td>
</tr>
<tr>
<td>Junos® OS for EX Series Ethernet Switches, Release 11.4: System Monitoring</td>
<td></td>
</tr>
<tr>
<td>Junos® OS for EX Series Ethernet Switches, Release 11.4: System Services</td>
<td></td>
</tr>
<tr>
<td>Junos® OS for EX Series Ethernet Switches, Release 11.4: System Setup</td>
<td></td>
</tr>
<tr>
<td>Junos® OS for EX Series Ethernet Switches, Release 11.4: User Interfaces</td>
<td></td>
</tr>
</tbody>
</table>

**Downloading Software**

You can download Junos OS for EX Series switches from the Download Software area at [http://www.juniper.net/customers/support/](http://www.juniper.net/customers/support/). To download the software, you must
have a Juniper Networks user account. For information about obtaining an account, see http://www.juniper.net/entitlement/setupAccountInfo.do.

### Documentation Symbols Key

<table>
<thead>
<tr>
<th>Icon</th>
<th>Meaning</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>Informational note</td>
<td>Indicates important features or instructions.</td>
</tr>
<tr>
<td>!</td>
<td>Caution</td>
<td>Indicates a situation that might result in loss of data or hardware damage.</td>
</tr>
<tr>
<td>!</td>
<td>Warning</td>
<td>Alerts you to the risk of personal injury or death.</td>
</tr>
<tr>
<td>!</td>
<td>Laser warning</td>
<td>Alerts you to the risk of personal injury from a laser.</td>
</tr>
</tbody>
</table>

### Text and Syntax Conventions

<table>
<thead>
<tr>
<th>Convention</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bold text like this</strong></td>
<td>Represents text that you type.</td>
<td>To enter configuration mode, type the <code>configure</code> command:</td>
</tr>
<tr>
<td></td>
<td></td>
<td><code>user@host&gt; configure</code></td>
</tr>
<tr>
<td><strong>Fixed-width text like this</strong></td>
<td>Represents output that appears on the terminal screen.</td>
<td><code>user@host&gt; show chassis alarms</code> No alarms currently active</td>
</tr>
<tr>
<td><strong>Italic text like this</strong></td>
<td>- Introduces important new terms.</td>
<td>- A policy term is a named structure that defines match conditions and actions.</td>
</tr>
<tr>
<td></td>
<td>- Identifies book names.</td>
<td>- Junos OS System Basics Configuration Guide</td>
</tr>
<tr>
<td></td>
<td>- Identifies RFC and Internet draft titles.</td>
<td>- RFC 1997, BGP Communities Attribute</td>
</tr>
<tr>
<td><strong>Italic text like this</strong></td>
<td>Represents variables (options for which you substitute a value) in commands or configuration statements.</td>
<td>Configure the machine’s domain name:</td>
</tr>
<tr>
<td></td>
<td></td>
<td><code>[edit] root@# set system domain-name domain-name</code></td>
</tr>
<tr>
<td><strong>Plain text like this</strong></td>
<td>Represents names of configuration statements, commands, files, and directories; IP addresses; configuration hierarchy levels; or labels on routing platform components.</td>
<td>- To configure a stub area, include the <code>stub</code> statement at the <code>[edit protocols ospf area area-id]</code> hierarchy level.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- The console port is labeled CONSOLE.</td>
</tr>
</tbody>
</table>
### Text and Syntax Conventions

<table>
<thead>
<tr>
<th>Convention</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; &gt; (angle brackets)</td>
<td>Enclose optional keywords or variables.</td>
<td>stub &lt;default-metric metric&gt;;</td>
</tr>
<tr>
<td></td>
<td>(pipe symbol)</td>
<td>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.</td>
</tr>
<tr>
<td># (pound sign)</td>
<td>Indicates a comment specified on the same line as the configuration statement to which it applies.</td>
<td>rsvp [# Required for dynamic MPLS only</td>
</tr>
<tr>
<td>[ ] (square brackets)</td>
<td>Enclose a variable for which you can substitute one or more values.</td>
<td>community name members [ community-ids ]</td>
</tr>
<tr>
<td>Indention and braces ( { } )</td>
<td>Identify a level in the configuration hierarchy.</td>
<td>[edit] routing-options { static { route default { nexthop address; retain; } } }</td>
</tr>
<tr>
<td>: (semicolon)</td>
<td>Identifies a leaf statement at a configuration hierarchy level.</td>
<td></td>
</tr>
</tbody>
</table>

### J-Web GUI Conventions

- **Bold text like this**
  - Represents J-Web graphical user interface (GUI) items you click or select.
  - In the Logical Interfaces box, select All Interfaces.
  - To cancel the configuration, click Cancel.

- **> (bold right angle bracket)**
  - Separates levels in a hierarchy of J-Web selections.
  - In the configuration editor hierarchy, select Protocols>Ospf.

### Documentation Feedback

We encourage you to provide feedback, comments, and suggestions so that we can improve the documentation. Send e-mail to techpubs-comments@juniper.net with the following:

- Document URL or title
- Page number if applicable
- Software version
- Your name and company
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 JNASC 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.

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

- Find CSC offerings: http://www.juniper.net/customers/support/
- Search for known bugs: http://www2.juniper.net/kb/
- Find product documentation: http://www.juniper.net/techpubs/
- Find solutions and answer questions using our Knowledge Base: http://kb.juniper.net/
- Download the latest versions of software and review release notes: http://www.juniper.net/customers/csc/software/
- Search technical bulletins for relevant hardware and software notifications: https://www.juniper.net/alerts/
- Join and participate in the Juniper Networks Community Forum: http://www.juniper.net/company/communities/
- Open a case online in the CSC Case Management tool: http://www.juniper.net/cm/

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

Opening a Case with JTAC

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

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

For international or direct-dial options in countries without toll-free numbers, see http://www.juniper.net/support/requesting-support.html.
PART 1

Interfaces on EX Series Switches

- Interfaces—Overview on page 3
- Examples of Interfaces Configuration on page 21
- Configuring Interfaces on page 47
- Verifying Interfaces on page 113
- Troubleshooting Interfaces on page 121
- Configuration Statements for Interfaces on page 129
- Operational Commands for Interfaces on page 201
CHAPTER 1

Interfaces—Overview

- EX Series Switches Interfaces Overview on page 3
- Understanding Interface Naming Conventions on EX Series Switches on page 6
- Understanding Aggregated Ethernet Interfaces and LACP on page 8
- Understanding Interface Ranges on EX Series Switches on page 10
- Understanding Layer 3 Subinterfaces on page 12
- Understanding Unicast RPF for EX Series Switches on page 13
- Understanding IP Directed Broadcast for EX Series Switches on page 17
- 802.1Q VLANs Overview on page 19

EX Series Switches Interfaces Overview

Juniper Networks EX Series Ethernet Switches have two types of interfaces: network interfaces and special interfaces. This topic provides brief information on these interfaces. For additional information, see the Junos OS Interfaces Fundamentals Configuration Guide.

For information on interface-naming conventions on EX Series switches, see “Understanding Interface Naming Conventions on EX Series Switches” on page 6.

This topic describes:
- Network Interfaces on page 3
- Special Interfaces on page 4

Network Interfaces

Network interfaces connect to the network and carry network traffic. Table 1 on page 3 lists the types of network interfaces supported on EX Series switches.

Table 1: Network Interface Types and Purposes

<table>
<thead>
<tr>
<th>Type</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggregated Ethernet interfaces</td>
<td>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 link aggregation group (LAG) or bundle. These aggregated Ethernet interfaces help to balance traffic and increase the uplink bandwidth.</td>
</tr>
</tbody>
</table>
Table 1: Network Interface Types and Purposes (continued)

<table>
<thead>
<tr>
<th>Type</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAN access interfaces</td>
<td>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.</td>
</tr>
<tr>
<td>Power over Ethernet (PoE) interfaces</td>
<td>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.</td>
</tr>
<tr>
<td>Trunk interfaces</td>
<td>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 port interface for trunk mode. The interfaces from the distribution switch or CE switch to the access switches must also be configured for trunk mode.</td>
</tr>
</tbody>
</table>

Special Interfaces

Table 2 on page 4 lists the types of special interfaces supported on EX Series switches.

Table 2: Special Interface Types and Purposes

<table>
<thead>
<tr>
<th>Type</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Console port</td>
<td>Each EX Series switch has a serial port, labeled CON or CONSOLE, 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 in the sense that 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 on the console port in a Virtual Chassis, see Understanding Global Management of an EX3300, EX4200, or EX4500 Virtual Chassis.</td>
</tr>
<tr>
<td>Loopback</td>
<td>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.</td>
</tr>
<tr>
<td>Management interface</td>
<td>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 fcf0 interfaces on routers running Junos OS.)</td>
</tr>
<tr>
<td>Routed VLAN Interface (RVI)</td>
<td>EX Series switches use a Layer 3 routed VLAN interface (RVI) named vlan 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. The RVI functions as a logical router, eliminating the need for having both a switch and a router. The RVI (the vlan interface) 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.</td>
</tr>
</tbody>
</table>
### Table 2: Special Interface Types and Purposes (continued)

<table>
<thead>
<tr>
<th>Type</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Chassis port (VCP) interfaces</td>
<td>Virtual Chassis ports (VCPs) are used to interconnect switches in a Virtual Chassis:</td>
</tr>
<tr>
<td></td>
<td>• 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 Setting an Uplink Port on an EX3300 or EX4200 Switch as a Virtual Chassis Port (CLI Procedure).</td>
</tr>
<tr>
<td></td>
<td>• 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. See Understanding the High-Speed Interconnection of the EX4200 and EX4500 Virtual Chassis Members.</td>
</tr>
<tr>
<td></td>
<td>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 Setting an Uplink Port on an EX3300 or EX4200 Switch as a Virtual Chassis Port (CLI Procedure) or Setting an SFP+ Port as a Virtual Chassis Port on an EX4500 Switch (CLI Procedure).</td>
</tr>
<tr>
<td></td>
<td>• 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.</td>
</tr>
<tr>
<td></td>
<td>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. See Understanding Virtual Chassis Ports in an EX8200 Virtual Chassis.</td>
</tr>
<tr>
<td>Virtual management Ethernet (VME) interface</td>
<td>EX3300, EX4200, 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 on the VME interface, see Understanding Global Management of an EX3300, EX4200, or EX4500 Virtual Chassis.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
</tr>
<tr>
<td>Related Documentation</td>
<td>• EX2200 Switches Hardware Overview</td>
</tr>
<tr>
<td></td>
<td>• EX3200 Switches Hardware Overview</td>
</tr>
<tr>
<td></td>
<td>• EX3300 Switches Hardware Overview</td>
</tr>
<tr>
<td></td>
<td>• EX4200 Switches Hardware Overview</td>
</tr>
<tr>
<td></td>
<td>• EX4500 Switches Hardware Overview</td>
</tr>
<tr>
<td></td>
<td>• EX6210 Switch Hardware Overview</td>
</tr>
<tr>
<td></td>
<td>• EX8208 Switch Hardware Overview</td>
</tr>
<tr>
<td></td>
<td>• EX8216 Switch Hardware Overview</td>
</tr>
<tr>
<td></td>
<td>• XRE200 External Routing Engine Hardware Overview</td>
</tr>
</tbody>
</table>
Understanding Interface Naming Conventions on EX Series Switches

Juniper Networks EX Series Ethernet Switches use a naming convention for defining the interfaces that is similar to that of other platforms running under Juniper Networks Junos operating system (Junos OS). This topic provides brief information on the naming conventions used for interfaces on EX Series switches. For additional information, see the Junos OS Network Interfaces Configuration Guide.

This topic describes:

- Physical Part of an Interface Name on page 6
- Logical Part of an Interface Name on page 7
- Wildcard Characters in Interface Names on page 7

Physical Part of an Interface Name

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
- **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, and a standalone EX4500 switch, FPC refers to the switch itself. The FPC number is always 0 on these switches.
  - On an EX3300 Virtual Chassis, an EX4200 Virtual Chassis, an EX4500 Virtual Chassis, or a mixed EX4200 and EX4500 Virtual Chassis, the FPC number indicates the member ID of the switch in the Virtual Chassis.
  - On an EX6200 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, and EX4500 switches, the PIC number is 0 for all built-in interfaces (interfaces that are not an uplink port).
  - On EX2200, EX3200, EX3300, and EX4200 switches, the PIC number is 1 for uplink ports.
  - On EX4500 switches, the PIC number is 1 for uplink ports on the left-hand uplink module and 2 for uplink ports on right-hand uplink module.
  - 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, and EX4500 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, and EX4500 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

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:

<table>
<thead>
<tr>
<th>Interface</th>
<th>State</th>
<th>VLAN members</th>
<th>Blocking</th>
</tr>
</thead>
<tbody>
<tr>
<td>ge-0/0/0.0</td>
<td>down</td>
<td>remote-analyzer</td>
<td>unblocked</td>
</tr>
<tr>
<td>ge-0/0/1.0</td>
<td>down</td>
<td>default</td>
<td>unblocked</td>
</tr>
<tr>
<td>ge-0/0/10.0</td>
<td>down</td>
<td>default</td>
<td>unblocked</td>
</tr>
</tbody>
</table>

### Wildcard Characters in Interface Names

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

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.

Link Aggregation Control Protocol (LACP), a component of IEEE 802.3ad, provides additional functionality for LAGs.

This topic describes:

- Link Aggregation Group (LAG) on page 8
- Link Aggregation Control Protocol (LACP) on page 9

Link Aggregation Group (LAG)

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 3 on page 9 lists the EX Series switches and the maximum number of interfaces per LAG and maximum number of LAGs they support.
Table 3: Maximum Interfaces per LAG and Maximum LAGs per Switch

<table>
<thead>
<tr>
<th>Switch</th>
<th>Maximum Interfaces per LAG</th>
<th>Maximum LAGs</th>
</tr>
</thead>
<tbody>
<tr>
<td>EX2200</td>
<td>8</td>
<td>32</td>
</tr>
<tr>
<td>EX3200</td>
<td>8</td>
<td>32</td>
</tr>
<tr>
<td>EX3300 and EX3300 Virtual Chassis</td>
<td>8</td>
<td>32</td>
</tr>
<tr>
<td>EX4200 and EX4200 Virtual Chassis</td>
<td>8</td>
<td>64</td>
</tr>
<tr>
<td>EX4500 and EX4500 Virtual Chassis</td>
<td>8</td>
<td>64</td>
</tr>
<tr>
<td>EX6200</td>
<td>8</td>
<td>64</td>
</tr>
<tr>
<td>EX8200</td>
<td>12</td>
<td>255</td>
</tr>
<tr>
<td>EX8200 Virtual Chassis</td>
<td>12</td>
<td>239</td>
</tr>
</tbody>
</table>

When configuring LAGs, consider the following guidelines:

- 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.
- You can configure and apply firewall filters on a LAG.
- LACP can optionally be configured for link negotiation.

You can combine physical Ethernet ports belonging to different member switches of a Virtual Chassis configuration to form a LAG. See Understanding EX3300, EX4200, and EX4500 Virtual Chassis Link Aggregation and Understanding Link Aggregation into an EX8200 Virtual Chassis.

**NOTE:** The interfaces that are included within a bundle or LAG are sometimes referred to as member interfaces. Do not confuse this term with member switches, which refers to switches that are interconnected as a Virtual Chassis. It is possible to create a LAG that is composed of member interfaces that are located in different member switches of a Virtual Chassis.

A LAG creates a single logical point-to-point connection. A typical deployment for a LAG would be to aggregate trunk links between an access switch and a distribution switch or customer edge (CE) router.

**Link Aggregation Control Protocol (LACP)**

When LACP is configured, it detects misconfigurations on the local end or the remote end of the link.
About enabling LACP:

- 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.

By default, Ethernet links do not 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. The transmitting link is known as the actor and the receiving link is known as the partner.

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 may not be able to exchange LACP PDUs. In such a situation you can configure an interface to be in the UP state even if no PDUs are exchanged. Use the force-up statement to configure an interface when the peer has limited LACP capability. The interface selects the associated LAG by default, whether the switch and peer are both in active or passive mode. When there are no received PDUs, the partner is considered to be working in the passive mode. Therefore, LACP PDU transmissions are controlled by the transmitting link.

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

### Related Documentation

- Understanding EX3300, EX4200, and EX4500 Virtual Chassis Link Aggregation
- Understanding Link Aggregation into an EX8200 Virtual Chassis
- Understanding Redundant Trunk Links on EX Series Switches
- Example: Configuring Aggregated Ethernet High-Speed Uplinks Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch on page 21
- Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch on page 27
- Junos OS Network Interfaces Configuration Guide

### Understanding Interface Ranges on EX Series 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.

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:

- ethernet-switching-options analyzer name input egress interface
- ethernet-switching-options analyzer name input ingress interface
- ethernet-switching-options analyzer output interface
- ethernet-switching-options bpdu-block interface
- ethernet-switching-options interfaces
- ethernet-switching-options redundant-trunk-group group-name interface
- ethernet-switching-options secure-access-port interface
- ethernet-switching-options voip interface
- poe interface
- protocols dot1x authentication interface
- protocols gvrp interface
- protocols igmp interface
- protocols igmp-snooping vlan vlan-name interface
- protocols isis interface
- protocols link-management peer lmp-control-channel interface
- protocols link-management te-link name interface
- protocols lldp interface
- protocols lldp-med interface
- protocols mpls interface
- protocols mstp interface
- protocols mstp msti-id interface
- protocols mstp msti-id vlan vlan-id interface
- protocols oam ethernet link-fault-management interface
- protocols ospf area
Understanding Layer 3 Subinterfaces

A Layer 3 subinterface 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 subinterfaces to route traffic among multiple VLANs along a single trunk line that connects a Juniper Networks EX Series Ethernet Switch to a Layer 2 switch. Only one physical connection is required between the switches. This topology is often called a “router on a stick” or a “one-armed router” when the Layer 3 device is a router.

To create Layer 3 subinterfaces on an EX Series switch, you enable VLAN tagging, partition the physical interface into logical partitions, and bind the VLAN ID to the logical interface.

You can partition one physical interface into up to 4094 different subinterfaces, one for each VLAN. We recommend that you use the VLAN ID as the subinterface number when you configure the subinterface. Juniper Networks Junos operating system (Junos OS) reserves VLAN IDs 0 and 4095.

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 EX Series 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. Double-tagging is not supported.
Understanding Unicast RPF for EX Series Switches

Unicast reverse-path forwarding (RPF) helps protect the switch against denial-of-service (DoS) and distributed denial-of-service (DDoS) attacks by verifying the unicast source address of each packet that arrives on an ingress interface where unicast RPF is enabled. It also helps ensure that traffic arriving on ingress interfaces comes from a network source that the receiving interface can reach.

When you enable unicast RPF, the switch forwards a packet only if the receiving interface is the best return path to the packet’s unicast source address. This is known as strict mode unicast RPF.

NOTE: On Juniper Networks EX3200 and EX4200 Ethernet Switches, the switch applies unicast RPF globally to all interfaces when unicast RPF is configured on any interface. For additional information, see “Limitations of the Unicast RPF Implementation on EX3200 and EX4200 Switches” on page 16.

This topic covers:

- Unicast RPF for EX Series Switches Overview on page 13
- Unicast RPF Implementation for EX Series Switches on page 14
- When to Enable Unicast RPF on page 14
- When Not to Enable Unicast RPF on page 15
- Limitations of the Unicast RPF Implementation on EX3200 and EX4200 Switches on page 16

Unicast RPF for EX Series Switches Overview

Unicast RPF functions as an ingress filter that reduces the forwarding of IP packets that might be spoofing an address. By default, unicast RPF is disabled on the switch interfaces.

The type of unicast RPF provided on the switches—that is, strict mode unicast RPF is especially useful on untrusted interfaces. An untrusted interface is an interface where untrusted users or processes can place packets on the network segment.

The switch supports only the active paths method of determining the best return path back to a unicast source address. The active paths method looks up the best reverse path entry in the forwarding table. It does not consider alternate routes specified using routing-protocol-specific methods when determining the best return path.
If the forwarding table lists the receiving interface as the interface to use to forward the packet back to its unicast source, it is the best return path interface. Strict mode unicast RPF recognizes only one best return path to a unicast source address.

Use strict mode unicast RPF only on symmetrically routed interfaces. (For information about symmetrically routed interfaces, see “When to Enable Unicast RPF” on page 14.)


**Unicast RPF Implementation for EX Series Switches**

This section includes:

- Unicast RPF Packet Filtering on page 14
- Bootstrap Protocol (BOOTP) and DHCP Requests on page 14
- Default Route Handling on page 14

**Unicast RPF Packet Filtering**

When you enable unicast RPF on the switch, the switch handles traffic in the following manner:

- If the switch receives a packet on the interface that is the best return path to the unicast source address of that packet, the switch forwards the packet.
- If the best return path from the switch to the packet’s unicast source address is not the receiving interface, the switch discards the packet.
- If the switch receives a packet that has a source IP address that does not have a routing entry in the forwarding table, the switch discards the packet.

**Bootstrap Protocol (BOOTP) and DHCP Requests**

Bootstrap protocol (BOOTP) and DHCP request packets are sent with a broadcast MAC address and therefore the switch does not perform unicast RPF checks on them. The switch forwards all BOOTP packets and DHCP request packets without performing unicast RPF checks.

**Default Route Handling**

If the best return path to the source is the default route (0.0.0.0) and the default route points to reject, the switch discards all unicast RPF packets. If the default route points to a valid network interface, the switch performs a normal unicast RPF check on the packets.

**When to Enable Unicast RPF**

Enable unicast RPF when you want to ensure that traffic arriving on a network interface comes from a source that resides on a network that that interface can reach. You can enable unicast RPF on untrusted interfaces to filter spoofed packets. For example, a common application for unicast RPF is to help defend an enterprise network from DoS/DDoS attacks coming from the Internet.
Enable unicast RPF only on symmetrically routed interfaces. A symmetrically routed interface uses the same route in both directions between the source and the destination, as shown in Figure 1 on page 15. Symmetrical routing means that if an interface receives a packet, the switch uses the same interface to send a reply to the packet source (the receiving interface matches the forwarding-table entry for the best return path to the source).

Figure 1: Symmetrically Routed Interfaces

Enabling unicast RPF on asymmetrically routed interfaces (where different interfaces receive a packet and reply to its source) results in packets from legitimate sources being filtered (discarded) because the best return path is not the same interface that received the packet.

The following switch interfaces are most likely to be symmetrically routed and thus are candidates for unicast RPF enabling:

- The service provider edge to a customer
- The customer edge to a service provider
- A single access point out of the network (usually on the network perimeter)
- A terminal network that has only one link

NOTE: Because unicast RPF is enabled globally on EX3200 and EX4200 switches, ensure that all interfaces are symmetrically routed before you enable unicast RPF on those switches. Enabling unicast RPF on asymmetrically routed interfaces results in packets from legitimate sources being filtered.

TIP: Enabling unicast RPF as close as possible to the traffic source stops spoofed traffic before it can proliferate or reach interfaces that do not have unicast RPF enabled.

When Not to Enable Unicast RPF

Typically, you will not enable unicast RPF if:

- Switch interfaces are multihomed.
- Switch interfaces are trusted interfaces.
• BGP is carrying prefixes and some of those prefixes are not advertised or are not accepted by the ISP under its policy. (The effect in this case is the same as filtering an interface by using an incomplete access list.)

• Switch interfaces face the network core. Core-facing interfaces are usually asymmetrically routed.

An asymmetrically routed interface uses different paths to send and receive packets between the source and the destination, as shown in Figure 2 on page 16. This means that if an interface receives a packet, that interface does not match the forwarding table entry as the best return path back to the source. If the receiving interface is not the best return path to the source of a packet, unicast RPF causes the switch to discard the packet even though it comes from a valid source.

Figure 2: Asymmetrically Routed Interfaces

NOTE: Do not enable unicast RPF on EX3200 and EX4200 switches if any switch interfaces are asymmetrically routed, because unicast RPF is enabled globally on all interfaces of those switches. All switch interfaces must be symmetrically routed for you to enable unicast RPF without the risk of the switch discarding traffic that you want to forward.

Limitations of the Unicast RPF Implementation on EX3200 and EX4200 Switches

On EX3200 and EX4200 switches, the switch implements unicast RPF on a global basis. You cannot enable unicast RPF on a per-interface basis. Unicast RPF is globally disabled by default.

• When you enable unicast RPF on any interface, it is automatically enabled on all switch interfaces, including link aggregation groups (LAGs) and routed VLAN interfaces (RVIs).

• When you disable unicast RPF on the interface (or interfaces) on which you enabled unicast RPF, it is automatically disabled on all switch interfaces.

NOTE: You must explicitly disable unicast RPF on every interface on which it was explicitly enabled or unicast RPF remains enabled on all switch interfaces.

The EX3200 and EX4200 switches do not perform unicast RPF filtering on equal-cost multipath (ECMP) traffic. The unicast RPF check examines only one best return path to
the packet source, but ECMP traffic employs an address block consisting of multiple paths.

Using unicast RPF to filter ECMP traffic on EX3200 and EX4200 switches can result in the switch discarding packets that you want to forward because the unicast RPF filter does not examine the entire ECMP address block.

Related Documentation

- Example: Configuring Unicast RPF on an EX Series Switch on page 39
- Configuring Unicast RPF (CLI Procedure) on page 106
- Disabling Unicast RPF (CLI Procedure) on page 107

Understanding IP Directed Broadcast for EX Series Switches

IP directed broadcast helps you implement remote administration tasks such as backups and wake-on-LAN (WOL) application tasks by sending broadcast packets targeted at the hosts in a specified destination subnet. IP directed broadcast packets traverse the network in the same way as unicast IP packets until they reach the destination subnet. When they reach the destination subnet and IP directed broadcast is enabled on the receiving switch, the switch translates ("explodes") the IP directed broadcast packet into a broadcast that floods the packet on the target subnet. All hosts on the target subnet receive the IP directed broadcast packet.

This topic covers:

- IP Directed Broadcast for EX Series Switches Overview on page 17
- IP Directed Broadcast Implementation for EX Series Switches on page 18
- When to Enable IP Directed Broadcast on page 18
- When Not to Enable IP Directed Broadcast on page 18

IP Directed Broadcast for EX Series Switches Overview

IP directed broadcast packets have a destination IP address that is a valid broadcast address for the subnet that is the target of the directed broadcast (the target subnet). The intent of an IP directed broadcast is to flood the target subnet with the broadcast packets without broadcasting to the entire network. IP directed broadcast packets cannot originate from the target subnet.

When you send an IP directed broadcast packet, as it travels to the target subnet, the network forwards it in the same way as it forwards a unicast packet. When the packet reaches a switch that is directly connected to the target subnet, the switch checks to see whether IP directed broadcast is enabled on the interface that is directly connected to the target subnet:

- If IP directed broadcast is enabled on that interface, the switch broadcasts the packet on that subnet by rewriting the destination IP address as the configured broadcast IP address for the subnet. The switch converts the packet to a link-layer broadcast packet that every host on the network processes.
• If IP directed broadcast is disabled on the interface that is directly connected to the target subnet, the switch drops the packet.

IP Directed Broadcast Implementation for EX Series Switches

You configure IP directed broadcast on a per-subnet basis by enabling IP directed broadcast on the Layer 3 interface of the subnet’s VLAN. When the switch that is connected to that subnet receives a packet that has the subnet’s broadcast IP address as the destination address, the switch broadcasts the packet to all hosts on the subnet.

By default, IP directed broadcast is disabled.

When to Enable IP Directed Broadcast

IP directed broadcast is disabled by default. Enable IP directed broadcast when you want to perform remote management or administration services such as backups or WOL tasks on hosts in a subnet that does not have a direct connection to the Internet.

Enabling IP directed broadcast on a subnet affects only the hosts within that subnet. Only packets received on the subnet’s Layer 3 interface that have the subnet’s broadcast IP address as the destination address are flooded on the subnet.

When Not to Enable IP Directed Broadcast

Typically, you do not enable IP directed broadcast on subnets that have direct connections to the Internet. Disabling IP directed broadcast on a subnet’s Layer 3 interface affects only that subnet. If you disable IP directed broadcast on a subnet and a packet that has the broadcast IP address of that subnet arrives at the switch, the switch drops the broadcast packet.

If a subnet has a direct connection to the Internet, enabling IP directed broadcast on it increases the network’s susceptibility to denial-of-service (DoS) attacks.

For example, a malicious attacker can spoof a source IP address (use a source IP address that is not the actual source of the transmission to deceive a network into identifying the attacker as a legitimate source) and send IP directed broadcasts containing Internet Control Message Protocol (ICMP) echo (ping) packets. When the hosts on the network with IP directed broadcast enabled receive the ICMP echo packets, they all send replies to the victim that has the spoofed source IP address. This creates a flood of ping replies in a DoS attack that can overwhelm the spoofed source address; this is known as a “smurf” attack. Another common DoS attack on exposed networks with IP directed broadcast enabled is a “fraggle” attack, which is similar to a smurf attack except that the malicious packet is a User Datagram Protocol (UDP) echo packet instead of an ICMP echo packet.

Related Documentation

• Example: Configuring IP Directed Broadcast on an EX Series Switch on page 43
• Configuring IP Directed Broadcast (CLI Procedure) on page 108
802.1Q VLANs Overview

For Ethernet, Fast Ethernet, Tri-Rate Ethernet copper, Gigabit Ethernet, 10-Gigabit Ethernet, and aggregated Ethernet interfaces supporting VPLS, the Junos OS supports a subset of the IEEE 802.1Q standard for channelizing an Ethernet interface into multiple logical interfaces, allowing many hosts to be connected to the same Gigabit Ethernet switch, but preventing them from being in the same routing or bridging domain.

Related Documentation

- Configuring Dynamic 802.1Q VLANs
- 802.1Q VLAN IDs and Ethernet Interface Types
- Enabling VLAN Tagging
- Binding VLAN IDs to Logical Interfaces
- Configuring VLAN Encapsulation
- Configuring Extended VLAN Encapsulation
- Guidelines for Configuring VLAN ID List-Bundled Logical Interfaces That Connect CCCs
- Configuring a Layer 2 VPN Routing Instance on a VLAN-Bundled Logical Interface
- Configuring a VLAN-Bundled Logical Interface to Support a Layer 2 VPN Routing Instance
- Specifying the Interface Over Which VPN Traffic Travels to the CE Router
- Specifying the Interface to Handle Traffic for a CCC
- Configuring a Layer 2 Circuit on a VLAN-Bundled Logical Interface
- Configuring a VLAN-Bundled Logical Interface to Support a Layer 2 VPN Routing Instance
- Specifying the Interface to Handle Traffic for a CCC Connected to the Layer 2 Circuit
- Example: Configuring a Layer 2 VPN Routing Instance on a VLAN-Bundled Logical Interface
- Example: Configuring a Layer 2 Circuit on a VLAN-Bundled Logical Interface
- Configuring a Logical Interface for Access Mode
- Configuring a Logical Interface for Trunk Mode
- Configuring the VLAN ID List for a Trunk Interface
- Configuring a Trunk Interface on a Bridge Network

Junos OS Ethernet Interfaces Configuration Guide
CHAPTER 2

Examples of Interfaces Configuration

- Example: Configuring Aggregated Ethernet High-Speed Uplinks Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch on page 21
- Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch on page 27
- Example: Configuring Layer 3 Subinterfaces for a Distribution Switch and an Access Switch on page 32
- Example: Configuring Unicast RPF on an EX Series Switch on page 39
- Example: Configuring IP Directed Broadcast on an EX Series Switch on page 43

Example: Configuring Aggregated Ethernet High-Speed Uplinks Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch

EX Series switches allow you to combine multiple Ethernet links into one logical interface for higher bandwidth and redundancy. The ports that are combined in this manner are referred to as a link aggregation group (LAG) or bundle. The number of Ethernet links you can combine into a LAG depends on your EX Series switch model. See "Understanding Aggregated Ethernet Interfaces and LACP" on page 8 for more information.

This example describes how to configure uplink LAGs to connect a Virtual Chassis access switch to a Virtual Chassis distribution switch:

- Requirements on page 21
- Overview and Topology on page 22
- Configuration on page 24
- Verification on page 26
- Troubleshooting on page 27

Requirements

This example uses the following software and hardware components:

- Junos OS Release 9.0 or later for EX Series switches
- Two EX4200-48P switches
• Two EX4200-24F switches
• Four XFP uplink modules

Before you configure the LAGs, be sure you have:

• Configured the Virtual Chassis switches. See Configuring an EX4200 or EX4500 Virtual Chassis (CLI Procedure).
• Configured the uplink ports on the switches as trunk ports. See “Configuring Gigabit Ethernet Interfaces (CLI Procedure)” on page 48.

Overview and Topology

For maximum speed and resiliency, you can combine uplinks between an access switch and a distribution switch into LAGs. Using LAGs can be particularly effective when connecting a multimember Virtual Chassis access switch to a multimember Virtual Chassis distribution switch.

The Virtual Chassis access switch in this example is composed of two member switches. Each member switch has an uplink module with two 10-Gigabit Ethernet ports. These ports are configured as trunk ports, connecting the access switch with the distribution switch.

Configuring the uplinks as LAGs has the following advantages:

• Link Aggregation Control Protocol (LACP) can optionally be configured for link negotiation.
• It doubles the speed of each uplink from 10 Gbps to 20 Gbps.
• If one physical port is lost for any reason (a cable is unplugged or a switch port fails, or one member switch is unavailable), the logical port transparently continues to function over the remaining physical port.

The topology used in this example consists of one Virtual Chassis access switch and one Virtual Chassis distribution switch. The access switch is composed of two EX4200-48P switches (SWA-0 and SWA-1), interconnected to each other with their Virtual Chassis ports (VCPs) as member switches of Host-A. The distribution switch is composed of two EX4200-24F switches (SWD-0 and SWD-1), interconnected with their VCPs as member switches of Host-D.

Each member of the access switch has an uplink module installed. Each uplink module has two ports. The uplinks are configured to act as trunk ports, connecting the access switch with the distribution switch. One uplink port from SWA-0 and one uplink port from SWA-1 are combined as LAG ae0 to SWD-0. This link is used for one VLAN. The remaining uplink ports from SWA-0 and from SWA-1 are combined as a second LAG connection (ae1) to SWD-1. LAG ae1 is used for another VLAN.
NOTE: 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.

Figure 3: Topology for LAGs Connecting an EX4200 Virtual Chassis Access Switch to an EX4200 Virtual Chassis Distribution Switch

Table 4 on page 23 details the topology used in this configuration example.

Table 4: Components of the Topology for Connecting a Virtual Chassis Access Switch to a Virtual Chassis Distribution Switch

<table>
<thead>
<tr>
<th>Switch</th>
<th>Hostname and VCID</th>
<th>Base Hardware</th>
<th>Uplink Module</th>
<th>Member ID</th>
<th>Trunk Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>SWA-0</td>
<td>Host-A Access switch</td>
<td>EX4200-48P switch</td>
<td>One XFP uplink module</td>
<td>0</td>
<td>xe-0/1/0 to SWD-0, xe-0/1/1 to SWD-1</td>
</tr>
<tr>
<td></td>
<td>VCID 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SWA-1</td>
<td>Host-A Access switch</td>
<td>EX4200-48P switch</td>
<td>One XFP uplink module</td>
<td>1</td>
<td>xe-1/1/0 to SWD-0, xe-1/1/1 to SWD-1</td>
</tr>
<tr>
<td></td>
<td>VCID 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SWD-0</td>
<td>Host-D Distribution switch</td>
<td>EX4200 L-24F switch</td>
<td>One XFP uplink module</td>
<td>0</td>
<td>xe-0/1/0 to SWA-0, xe-0/1/1 to SWA-1</td>
</tr>
</tbody>
</table>
### Table 4: Components of the Topology for Connecting a Virtual Chassis Access Switch to a Virtual Chassis Distribution Switch (continued)

<table>
<thead>
<tr>
<th>Switch</th>
<th>Hostname and VCID</th>
<th>Base Hardware</th>
<th>Uplink Module</th>
<th>Member ID</th>
<th>Trunk Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>SWD-1</td>
<td>Host-D Distribution switch</td>
<td>EX4200 L-24F switch</td>
<td>One XFP uplink module</td>
<td>1</td>
<td>xe-1/1/0 to SWA-0</td>
</tr>
<tr>
<td></td>
<td>VCID 4</td>
<td></td>
<td></td>
<td></td>
<td>xe-1/1/1 to SWA-1</td>
</tr>
</tbody>
</table>

#### Configuration

To configure two uplink LAGs from the Virtual Chassis access switch to the Virtual Chassis distribution switch:

**CLI Quick**

**Configuration**

To quickly configure aggregated Ethernet high-speed uplinks between a Virtual Chassis access switch and a Virtual Chassis distribution switch, copy the following commands and paste them into the switch terminal window:

```plaintext
[edit]
set chassis aggregated-devices ethernet device-count 2
set interfaces ae0 aggregated-ether-options minimum-links 1
set interfaces ae0 aggregated-ether-options link-speed 10g
set interfaces ae1 aggregated-ether-options minimum-links 1
set interfaces ae1 aggregated-ether-options link-speed 10g
set interfaces ae0 unit 0 family inet address 192.0.2.0/25
set interfaces ae1 unit 0 family inet address 192.0.2.128/25
set interfaces xe-0/1/0 ether-options 802.3ad ae0
set interfaces xe-1/1/0 ether-options 802.3ad ae0
set interfaces xe-0/1/1 ether-options 802.3ad ae1
set interfaces xe-1/1/1 ether-options 802.3ad ae1
```

**Step-by-Step Procedure**

To configure aggregated Ethernet high-speed uplinks between a Virtual Chassis access switch and a Virtual Chassis distribution switch:

1. Specify the number of LAGs to be created on the chassis:
   ```plaintext
   [edit chassis]
   user@Host-A# set aggregated-devices ethernet device-count 2
   ```

2. Specify the number of links that need to be present for the ae0 LAG interface to be up:
   ```plaintext
   [edit interfaces]
   user@Host-A# set ae0 aggregated-ether-options minimum-links 1
   ```

3. Specify the number of links that need to be present for the ae1 LAG interface to be up:
   ```plaintext
   [edit interfaces]
   user@Host-A# set ae1 aggregated-ether-options minimum-links 1
   ```

4. Specify the media speed of the ae0 link:
   ```plaintext
   [edit interfaces]
   user@Host-A# set ae0 aggregated-ether-options link-speed 10g
   ```

5. Specify the media speed of the ae1 link:
6. Specify the interface ID of the uplinks to be included in LAG ae0:

```
[edit interfaces]
user@Host-A# set ae0 aggregated-ether-options link-speed 10g
```

7. Specify the interface ID of the uplinks to be included in LAG ae1:

```
[edit interfaces]
user@Host-A# set xe-0/1/0 ether-options 802.3ad ae0
user@Host-A# set xe-1/1/0 ether-options 802.3ad ae0
```

8. Specify that LAG ae0 belongs to the subnet for the employee broadcast domain:

```
[edit interfaces]
user@Host-A# set ae0 unit 0 family inet address 192.0.2.0/25
```

9. Specify that LAG ae1 belongs to the subnet for the guest broadcast domain:

```
[edit interfaces]
user@Host-A# set ae1 unit 0 family inet address 192.0.2.128/25
```

**Results**

Display the results of the configuration:

```
[edit]
chassis {
  aggregated-devices {
    ethernet {
      device-count 2;
    }
  }
}
}
}
interfaces {
  ae0 {
    aggregated-ether-options {
      link-speed 10g;
      minimum-links 1;
    }
  unit 0 {
    family inet {
      address 192.0.2.0/25;
    }
  }
}
  ae1 {
    aggregated-ether-options {
      link-speed 10g;
      minimum-links 1;
    }
  unit 0 {
    family inet {
      address 192.0.2.128/25;
    }
  }
  xe-0/1/0 {
```
ether-options {
  802.3ad ae0;
}

xe-1/1/0 {
  ether-options {
    802.3ad ae0;
  }
}

xe-0/1/1 {
  ether-options {
    802.3ad ae1;
  }
}

xe-1/1/1 {
  ether-options {
    802.3ad ae1;
  }
}

Verification

To verify that switching is operational and two LAGs have been created, perform these tasks:

- Verifying That LAG ae0 Has Been Created on page 26
- Verifying That LAG ae1 Has Been Created on page 26

Verifying That LAG ae0 Has Been Created

Purpose
Verify that LAG ae0 has been created on the switch.

Action
show interfaces ae0 terse

<table>
<thead>
<tr>
<th>Interface</th>
<th>Admin</th>
<th>Link</th>
<th>Proto</th>
<th>Local</th>
<th>Remote</th>
</tr>
</thead>
<tbody>
<tr>
<td>ae0</td>
<td>up</td>
<td>up</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ae0.0</td>
<td>up</td>
<td>up</td>
<td>inet</td>
<td>192.0.2.0/25</td>
<td></td>
</tr>
</tbody>
</table>

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

Verifying That LAG ae1 Has Been Created

Purpose
Verify that LAG ae1 has been created on the switch

Action
show interfaces ae1 terse

<table>
<thead>
<tr>
<th>Interface</th>
<th>Admin</th>
<th>Link</th>
<th>Proto</th>
<th>Local</th>
<th>Remote</th>
</tr>
</thead>
<tbody>
<tr>
<td>ae1</td>
<td>up</td>
<td>down</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ae1.0</td>
<td>up</td>
<td>down</td>
<td>inet</td>
<td>192.0.2.128/25</td>
<td></td>
</tr>
</tbody>
</table>

Meaning
The output shows that the ae1 link is down.
Troubleshooting

Troubleshooting a LAG That Is Down

Problem
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).
- 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 (or the same Virtual Chassis).

Related Documentation
- Example: Configuring an EX4200 Virtual Chassis with a Master and Backup in a Single Wiring Closet
- Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch on page 27
- Example: Connecting an Access Switch to a Distribution Switch.
- Virtual Chassis Cabling Configuration Examples for EX4200 Switches
- Installing an Uplink Module in an EX4200 Switch
- Uplink Modules in EX4200 Switches

Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch

EX Series switches allow you to combine multiple Ethernet links into one logical interface for higher bandwidth and redundancy. The ports that are combined in this manner are referred to as a link aggregation group (LAG) or bundle. EX Series switches allow you to further enhance these links by configuring Link Aggregation Control Protocol (LACP).

This example describes how to overlay LACP on the LAG configurations that were created in “Example: Configuring Aggregated Ethernet High-Speed Uplinks Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch” on page 21:

- Requirements on page 28
- Overview and Topology on page 28
- Configuring LACP for the LAGs on the Virtual Chassis Access Switch on page 28
- Configuring LACP for the LAGs on the Virtual Chassis Distribution Switch on page 29
Requirements

This example uses the following software and hardware components:

- Junos OS Release 9.0 or later for EX Series switches
- Two EX4200-48P switches
- Two EX4200-24F switches
- Four EX Series XFP uplink modules

Before you configure LACP, be sure you have:

- Set up the Virtual Chassis switches. See Configuring an EX4200 or EX4500 Virtual Chassis (CLI Procedure).
- Configured the uplink ports on the switches as trunk ports. See “Configuring Gigabit Ethernet Interfaces (CLI Procedure)” on page 48.
- Configured the LAGs. See “Example: Configuring Aggregated Ethernet High-Speed Uplinks Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch” on page 21.

Overview and Topology

This example assumes that you are familiar with “Example: Configuring Aggregated Ethernet High-Speed Uplinks Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch” on page 21. The topology in this example is exactly the same as the topology in that other example. This example shows how to use LACP to enhance the LAG functionality.

LACP exchanges are made between actors (the transmitting link) and partners (the receiving link). The LACP mode can be either active or passive.

NOTE: If the actor and partner are both in passive mode, they do not exchange LACP packets, which results in the aggregated Ethernet links not coming up. By default, LACP is in passive mode. To initiate transmission of LACP packets and responses to LACP packets, you must enable LACP in active mode.

By default, the actor and partner send LACP packets every second.

The interval can be fast (every second) or slow (every 30 seconds).

Configuring LACP for the LAGs on the Virtual Chassis Access Switch

To configure LACP for the access switch LAGs, perform these tasks:

CLI Quick Configuration

To quickly configure LACP for the access switch LAGs, copy the following commands and paste them into the switch terminal window:
To configure LACP for Host-A LAGs ae0 and ae1:

1. Specify the aggregated Ethernet options for both bundles:

   [edit interfaces]
   user@Host-A# set ae0 aggregated-ether-options lacp active periodic fast
   user@Host-A# set ae1 aggregated-ether-options lacp active periodic fast

Results

Display the results of the configuration:

[edit interfaces]
user@Host-A# show
ae0 {
  aggregated-ether-options {
    lacp {
      active;
      periodic fast;
    }
  }
}

ae1 {
  aggregated-ether-options {
    lacp {
      active;
      periodic fast;
    }
  }
}

Configuring LACP for the LAGs on the Virtual Chassis Distribution Switch

To configure LACP for the two uplink LAGs from the Virtual Chassis access switch to the Virtual Chassis distribution switch, perform these tasks:

CLI Quick Configuration

To quickly configure LACP for the distribution switch LAGs, copy the following commands and paste them into the switch terminal window:

[edit interfaces]
set ae0 aggregated-ether-options lacp passive periodic fast
set ae1 aggregated-ether-options lacp passive periodic fast

Step-by-Step Procedure

To configure LACP for Host D LAGs ae0 and ae1:

1. Specify the aggregated Ethernet options for both bundles:

   [edit interfaces]
   user@Host-D# set ae0 aggregated-ether-options lacp passive periodic fast
   user@Host-D# set ae1 aggregated-ether-options lacp passive periodic fast

Results

Display the results of the configuration:

[edit interfaces]
user@Host-D# show
Verification

To verify that LACP packets are being exchanged, perform these tasks:

- Verifying the LACP Settings on page 30
- Verifying That the LACP Packets Are Being Exchanged on page 30

Verifying the LACP Settings

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

**Action**
Use the `show lacp interfaces interface-name` command to check that LACP has been enabled as active on one end.

```
user@Host-A> show lacp interfaces xe-0/1/0
```

```
Aggregated interface: ae0

<table>
<thead>
<tr>
<th>LACP state:</th>
<th>Role</th>
<th>Exp</th>
<th>Def</th>
<th>Dist</th>
<th>Col</th>
<th>Syn</th>
<th>Aggr</th>
<th>Timeout</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>xe-0/1/0</td>
<td>Actor</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Fast</td>
<td>Active</td>
</tr>
<tr>
<td>xe-0/1/0</td>
<td>Partner</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Fast</td>
<td>Passive</td>
</tr>
</tbody>
</table>

LACP protocol: Receive State Transmit State Mux State

| xe-0/1/0 | Defaulted | Fast periodic | Detached |
```

**Meaning**
The output indicates that LACP has been set up correctly and is active at one end.

Verifying That the LACP Packets Are Being Exchanged

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

**Action**
Use the `show interfaces aex statistics` command to display LACP information.
user@Host-A> show interfaces ae0 statistics

Physical interface: ae0, Enabled, Physical link is Down
Interface index: 153, SNMP ifIndex: 30
Link-level type: Ethernet, MTU: 1514, Speed: Unspecified, Loopback: Disabled,
Source filtering: Disabled, Flow control: Disabled, Minimum links needed: 1,
Minimum bandwidth needed: 0
Device flags : Present Running
Interface flags: Hardware-Down SNMP-Traps Internal: 0x0
Current address: 02:19:e2:50:45:e0, Hardware address: 02:19:e2:50:45:e0
Last flapped : Never
Statistics last cleared: Never
Input packets : 0
Output packets: 0
Input errors: 0, Output errors: 0

Logical interface ae0.0 (Index 71) (SNMP ifIndex 34)
Flags: Hardware-Down Device-Down SNMP-Traps Encapsulation: ENET2
Statistics

Bundle:
Input : 0 0 0 0
Output: 0 0 0 0

Protocol inet
Flags: None
Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
Destination: 10.10.10/24, Local: 10.10.10.1, Broadcast: 10.10.10.255

Meaning  The output here shows that the link is down and that no protocol data units (PDUs) are being exchanged.

Troubleshooting

To troubleshoot a nonworking LACP link, perform these tasks:

Troubleshooting a Nonworking LACP Link

Problem  The LACP link is not working.

Solution  Check the following:

- Remove the LACP configuration and verify whether the static LAG is up.
- Verify that LACP is configured at both ends.
- Verify that LACP is not passive at both ends.
- Verify whether LACP protocol data units (PDUs) are being exchanged by running the `monitor traffic-interface lag-member detail` command.

Related Documentation

- Example: Connecting an Access Switch to a Distribution Switch
- Virtual Chassis Cabling Configuration Examples for EX4200 Switches
- Installing an Uplink Module in an EX4200 Switch
- Understanding Aggregated Ethernet Interfaces and LACP on page 8
Example: Configuring Layer 3 Subinterfaces for a Distribution Switch and an Access Switch

In a large LAN, you commonly need to partition the network into multiple VLANs. You can configure Layer 3 subinterfaces to route traffic between the VLANs. In one common topology, known as a “router on a stick” or a “one-armed router,” you connect a router to an access switch with connections to multiple VLANs.

This example describes how to create Layer 3 subinterfaces on trunk interfaces of a distribution switch and access switch so that you can route traffic among multiple VLANs:

- Requirements on page 32
- Overview and Topology on page 32
- Configuring the Access Switch Subinterfaces on page 33
- Configuring the Distribution Switch Subinterfaces on page 35
- Verification on page 37

Requirements

This example uses the following hardware and software components:

- For the distribution switch, one EX4200-24F switch. This model is designed to be used as a distribution switch for aggregation or collapsed core network topologies and in space-constrained data centers. It has twenty-four 1-Gigabit Ethernet fiber SFP ports and an EX-UM-2XFP uplink module with two 10-Gigabit Ethernet XFP ports.
- For the access switch, any Layer 2 switch that supports 802.1Q VLAN tags.
- Junos OS Release 9.2 or later for EX Series switches.

Before you connect the switches, make sure you have:

- Connected the two switches.
- Configured the necessary VLANs. See Configuring VLANs for EX Series Switches (CLI Procedure) or Configuring VLANs for EX Series Switches (J-Web Procedure).

Overview and Topology

In a large office with multiple buildings and VLANs, you commonly aggregate traffic from a number of access switches into a distribution switch. This configuration example shows a simple topology to illustrate how to connect a single Layer 2 access switch connected to multiple VLANs to a distribution switch, enabling traffic to pass between those VLANs.

In the example topology, the LAN is segmented into five VLANs, all associated with interfaces on the access switch. One 1-Gigabit Ethernet port on the access switch's uplink module connects to one 1-Gigabit Ethernet port on the distribution switch.

Table 5 on page 33 lists the settings for the example topology.
Table 5: Components of the Topology for Creating Layer 3 Subinterfaces on an Access Switch and a Distribution Switch

<table>
<thead>
<tr>
<th>Property</th>
<th>Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access switch hardware</td>
<td>Any Layer 2 switch with multiple 1-Gigabit Ethernet ports and at least one 1-Gigabit Ethernet uplink module</td>
</tr>
<tr>
<td>Distribution switch hardware</td>
<td>EX4200-24F, 24 1-Gigabit Ethernet fiber SPF ports (ge-0/0/0 through ge-0/0/23); one 2-port 10-Gigabit Ethernet XFP uplink module (EX-UM-4SFP)</td>
</tr>
<tr>
<td>VLAN names and tag IDs</td>
<td>vlan1, tag 101</td>
</tr>
<tr>
<td></td>
<td>vlan2, tag 102</td>
</tr>
<tr>
<td></td>
<td>vlan3, tag 103</td>
</tr>
<tr>
<td></td>
<td>vlan4, tag 104</td>
</tr>
<tr>
<td></td>
<td>vlan5, tag 105</td>
</tr>
<tr>
<td>VLAN subnets</td>
<td>vlan1: 1.1.1.0/24 (addresses 1.1.1.1 through 1.1.1.254)</td>
</tr>
<tr>
<td></td>
<td>vlan2: 2.1.1.0/24 (addresses 2.1.1.1 through 2.1.1.254)</td>
</tr>
<tr>
<td></td>
<td>vlan3: 3.1.1.0/24 (addresses 3.1.1.1 through 3.1.1.254)</td>
</tr>
<tr>
<td></td>
<td>vlan4: 4.1.1.0/24 (addresses 4.1.1.1 through 4.1.1.254)</td>
</tr>
<tr>
<td></td>
<td>vlan5: 5.1.1.0/24 (addresses 5.1.1.1 through 5.1.1.254)</td>
</tr>
<tr>
<td>Port interfaces</td>
<td>On the access switch: ge-0/1/0</td>
</tr>
<tr>
<td></td>
<td>On the distribution switch: ge-0/0/0</td>
</tr>
</tbody>
</table>

Configuring the Access Switch Subinterfaces

**CLI Quick Configuration**

To quickly create and configure subinterfaces on the access switch, copy the following commands and paste them into the switch terminal window:

```plaintext
[edit]
set interfaces ge-0/1/0 vlan-tagging
set interfaces ge-0/1/0 unit 0 vlan-id 101 family inet address 1.1.1.1/24
set interfaces ge-0/1/0 unit 1 vlan-id 102 family inet address 2.1.1.1/24
set interfaces ge-0/1/0 unit 2 vlan-id 103 family inet address 3.1.1.1/24
set interfaces ge-0/1/0 unit 3 vlan-id 104 family inet address 4.1.1.1/24
set interfaces ge-0/1/0 unit 4 vlan-id 105 family inet address 5.1.1.1/24
```

**Step-by-Step Procedure**

To configure the subinterfaces on the access switch:

1. On the trunk interface of the access switch, enable VLAN tagging:
   ```plaintext
   [edit interfaces ge-0/1/0]
   user@access-switch# set vlan-tagging
   ```

2. Bind vlan1's VLAN ID to the logical interface:
   ```plaintext
   [edit interfaces ge-0/1/0]
   user@access-switch# set unit 0 vlan-id 101
   ```
3. Set vlan1's subinterface IP address:
   [edit interfaces ge-0/1/0]
   user@access-switch# set unit 0 family inet address 1.1.1.1/24

4. Bind vlan2's VLAN ID to the logical interface:
   [edit interfaces ge-0/1/0]
   user@access-switch# set unit 1 vlan-id 102

5. Set vlan2's subinterface IP address:
   [edit interfaces ge-0/1/0]
   user@access-switch# set unit 1 family inet address 2.1.1.1/24

6. Bind vlan3's VLAN ID to the logical interface:
   [edit interfaces ge-0/1/0]
   user@access-switch# set unit 2 vlan-id 103

7. Set vlan3's subinterface IP address:
   [edit interfaces ge-0/1/0]
   user@access-switch# set unit 2 family inet address 3.1.1.1/24

8. Bind vlan4's VLAN ID to the logical interface:
   [edit interfaces ge-0/1/0]
   user@access-switch# set unit 3 vlan-id 104

9. Set vlan4's subinterface IP address:
   [edit interfaces ge-0/1/0]
   user@access-switch# set unit 3 family inet address 4.1.1.1/24

10. Bind vlan5's VLAN ID to the logical interface:
    [edit interfaces ge-0/1/0]
        user@access-switch# set unit 4 vlan-id 105

11. Set vlan5's subinterface IP address:
    [edit interfaces ge-0/1/0]
        user@access-switch# set unit 4 family inet address 5.1.1.1/24

Results  Check the results of the configuration:

user@access-switch> show configuration
interfaces {
  ge-0/1/0 {
    vlan-tagging;
    unit 0 {
      vlan-id 101;
      family inet {
        address 1.1.1.1/24;
      }
    }
    unit 1 {
      vlan-id 102;
      family inet {
        address 2.1.1.1/24;
      }
    }
  }
}

Configuring the Distribution Switch Subinterfaces

**CLI Quick Configuration**

To quickly create and configure subinterfaces on the distribution switch, copy the following commands and paste them into the switch terminal window:

```plaintext
[edit]
set interfaces ge-0/0/0 vlan-tagging
set interfaces ge-0/0/0 unit 0 vlan-id 101 family inet address 1.1.1.2/24
set interfaces ge-0/0/0 unit 1 vlan-id 102 family inet address 2.1.1.2/24
set interfaces ge-0/0/0 unit 2 vlan-id 103 family inet address 3.1.1.2/24
set interfaces ge-0/0/0 unit 3 vlan-id 104 family inet address 4.1.1.2/24
set interfaces ge-0/0/0 unit 4 vlan-id 105 family inet address 5.1.1.2/24
```

**Step-by-Step Procedure**

To configure subinterfaces on the distribution switch:

1. On the trunk interface of the distribution switch, enable VLAN tagging:
   ```plaintext
   [edit interfaces ge-0/0/0]
   user@distribution-switch# set vlan-tagging
   ```

2. Bind vlan1's VLAN ID to the logical interface:
   ```plaintext
   [edit interfaces ge-0/0/0]
   user@distribution-switch# set unit 0 vlan-id 101
   ```

3. Set vlan1's subinterface IP address:
   ```plaintext
   [edit interfaces ge-0/0/0]
   user@distribution-switch# set unit 0 family inet address 1.1.1.2/24
   ```

4. Bind vlan2's VLAN ID to the logical interface:
   ```plaintext
   [edit interfaces ge-0/0/0]
   user@distribution-switch# set unit 1 vlan-id 102
   ```

5. Set vlan2's subinterface IP address:
   ```plaintext
   [edit interfaces ge-0/0/0]
   ```
user@distribution-switch# set unit 1 family inet address 2.1.1.2/24

6. Bind vlan3’s VLAN ID to the logical interface:
   [edit interfaces ge-0/0/0]
   user@distribution-switch# set unit 2 vlan-id 103

7. Set vlan3’s subinterface IP address:
   [edit interfaces ge-0/0/0]
   user@distribution-switch# set unit 2 family inet address 3.1.1.2/24

8. Bind vlan4’s VLAN ID to the logical interface:
   [edit interfaces ge-0/0/0]
   user@distribution-switch# set unit 3 vlan-id 104

9. Set vlan4’s subinterface IP address:
   [edit interfaces ge-0/0/0]
   user@distribution-switch# set unit 3 family inet address 4.1.1.2/24

10. Bind vlan5’s VLAN ID to the logical interface:
    [edit interfaces ge-0/0/0]
    user@distribution-switch# set unit 4 vlan-id 105

11. Set vlan5’s subinterface IP address:
    [edit interfaces ge-0/0/0]
    user@distribution-switch# set unit 4 family inet address 5.1.1.2/24

Results
user@distribution-switch> show configuration
interfaces {
  ge-0/0/0 {
    vlan-tagging;
    unit 0 {
      vlan-id 101;
      family inet {
        address 1.1.1.2/24;
      }
    }
    unit 1 {
      vlan-id 102;
      family inet {
        address 2.1.1.2/24;
      }
    }
    unit 2 {
      vlan-id 103;
      family inet {
        address 3.1.1.2/24;
      }
    }
    unit 3 {
      vlan-id 104;
      family inet {
        address 4.1.1.2/24;
      }
    }
  }
}
unit 4 {
  vlan-id 105;
  family inet {
    address 5.1.1.2/24;
  }
}

Verification

To confirm that the configuration is working properly, perform these tasks:

- Verifying That Subinterfaces Were Created on page 37
- Verifying That Traffic Passes Between VLANs on page 37

Verifying That Subinterfaces Were Created

Purpose

Verify that the subinterfaces were properly created on the access switch and distribution switch.

Action

1. Use the `show interfaces` command on the access switch:

   ```
   user@access-switch> show interfaces ge-0/1/0 terse
   Interface             Admin Link Proto    Local                 Remote
   ge-0/1/0               up    up
   ge-0/1/0.0             up    up   inet     1.1.1.1/24
   ge-0/1/0.1             up    up   inet     2.1.1.1/24
   ge-0/1/0.2             up    up   inet     3.1.1.1/24
   ge-0/1/0.3             up    up   inet     4.1.1.1/24
   ge-0/1/0.4             up    up   inet     5.1.1.1/24
   ge-0/1/0.32767         up    up
   ```

2. Use the `show interfaces` command on the distribution switch:

   ```
   user@distribution-switch> show interfaces ge-0/0/0 terse
   Interface             Admin Link Proto    Local                 Remote
   ge-0/0/0               up    up
   ge-0/0/0.0             up    up   inet     1.1.1.2/24
   ge-0/0/0.1             up    up   inet     2.1.1.2/24
   ge-0/0/0.2             up    up   inet     3.1.1.2/24
   ge-0/0/0.3             up    up   inet     4.1.1.2/24
   ge-0/0/0.4             up    up   inet     5.1.1.2/24
   ge-0/0/0.32767         up    up
   ```

Meaning

Each subinterface created is displayed as a `ge-fpc/pic/port.x` logical interface, where `x` is the unit number in the configuration. The status is listed as `up`, indicating the link is working.

Verifying That Traffic Passes Between VLANs

Purpose

Verify that the distribution switch is correctly routing traffic from one VLAN to another.
**Action**  Ping from the access switch to the distribution switch on each subinterface.

1. From the access switch, ping the address of the vlan1 subinterface on the distribution switch:

   user@access-switch> ping 1.1.1.2 count 4
   PING 1.1.1.2 (1.1.1.2): 56 data bytes
   64 bytes from 1.1.1.2: icmp_seq=0 ttl=64 time=0.333 ms
   64 bytes from 1.1.1.2: icmp_seq=1 ttl=64 time=0.113 ms
   64 bytes from 1.1.1.2: icmp_seq=2 ttl=64 time=0.112 ms
   64 bytes from 1.1.1.2: icmp_seq=3 ttl=64 time=0.158 ms

   --- 1.1.1.2 ping statistics ---
   4 packets transmitted, 4 packets received, 0% packet loss
   round-trip min/avg/max/stddev = 0.112/0.179/0.333/0.091 ms

2. From the access switch, ping the address of the vlan2 subinterface on the distribution switch:

   user@access-switch> ping 2.1.1.2 count 4
   PING 2.1.1.2 (2.1.1.2): 56 data bytes
   64 bytes from 2.1.1.2: icmp_seq=0 ttl=64 time=0.241 ms
   64 bytes from 2.1.1.2: icmp_seq=1 ttl=64 time=0.113 ms
   64 bytes from 2.1.1.2: icmp_seq=2 ttl=64 time=0.162 ms
   64 bytes from 2.1.1.2: icmp_seq=3 ttl=64 time=0.167 ms

   --- 2.1.1.2 ping statistics ---
   4 packets transmitted, 4 packets received, 0% packet loss
   round-trip min/avg/max/stddev = 0.113/0.171/0.241/0.046 ms

3. From the access switch, ping the address of the vlan3 subinterface on the distribution switch:

   user@access-switch> ping 3.1.1.2 count 4
   PING 3.1.1.2 (3.1.1.2): 56 data bytes
   64 bytes from 3.1.1.2: icmp_seq=0 ttl=64 time=0.341 ms
   64 bytes from 3.1.1.2: icmp_seq=1 ttl=64 time=0.162 ms
   64 bytes from 3.1.1.2: icmp_seq=2 ttl=64 time=0.112 ms
   64 bytes from 3.1.1.2: icmp_seq=3 ttl=64 time=0.208 ms

   --- 3.1.1.2 ping statistics ---
   4 packets transmitted, 4 packets received, 0% packet loss
   round-trip min/avg/max/stddev = 0.112/0.206/0.341/0.085 ms

4. From the access switch, ping the address of the vlan4 subinterface on the distribution switch:

   user@access-switch> ping 4.1.1.2 count 4
   PING 4.1.1.2 (4.1.1.2): 56 data bytes
   64 bytes from 4.1.1.2: icmp_seq=0 ttl=64 time=0.226 ms
   64 bytes from 4.1.1.2: icmp_seq=1 ttl=64 time=0.166 ms
   64 bytes from 4.1.1.2: icmp_seq=2 ttl=64 time=0.107 ms
   64 bytes from 4.1.1.2: icmp_seq=3 ttl=64 time=0.221 ms

   --- 4.1.1.2 ping statistics ---
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max/stddev = 0.107/0.180/0.226/0.048 ms

5. From the access switch, ping the address of the vlan5 subinterface on the distribution switch:

```
user@access-switch> ping 5.1.1.2 count 4
PING 5.1.1.2 (5.1.1.2): 56 data bytes
64 bytes from 5.1.1.2: icmp_seq=0 ttl=64 time=0.224 ms
64 bytes from 5.1.1.2: icmp_seq=1 ttl=64 time=0.104 ms
64 bytes from 5.1.1.2: icmp_seq=2 ttl=64 time=0.102 ms
64 bytes from 5.1.1.2: icmp_seq=3 ttl=64 time=0.170 ms
--- 5.1.1.2 ping statistics ---
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max/stddev = 0.102/0.150/0.224/0.051 ms
```

Meaning: If all the ping packets are transmitted and are received by the destination address, the subinterfaces are up and working.

Related Documentation:
- Example: Connecting an Access Switch to a Distribution Switch
- Configuring a Layer 3 Subinterface (CLI Procedure) on page 105

**Example: Configuring Unicast RPF on an EX Series Switch**

Unicast reverse-path forwarding (RPF) helps protect the switch against denial-of-service (DoS) and distributed denial-of-service (DDoS) attacks by verifying the unicast source address of each packet that arrives on an ingress interface where unicast RPF is enabled.

This example shows how to help defend the switch ingress interfaces against denial-of-service (DoS) and distributed denial-of-service (DDoS) attacks by configuring unicast reverse-path forwarding (RPF) on a customer-edge interface to filter incoming traffic:

- Requirements on page 39
- Overview and Topology on page 40
- Configuration on page 40
- Verification on page 41

**Requirements**

This example uses the following software and hardware components:

- Junos OS Release 10.1 or later for EX Series switches
- Two EX8200 switches

Before you begin, be sure you have:

- Connected the two switches by symmetrically routed interfaces.
Ensured that the interface on which you will configure unicast RPF is symmetrically routed.

Overview and Topology

Large amounts of unauthorized traffic such as attempts to flood a network with fake (bogus) service requests in a denial-of-service (DoS) attack can consume network resources and deny service to legitimate users. One way to help prevent DoS and distributed denial-of-service (DDoS) attacks is to verify that incoming traffic originates from legitimate network sources.

Unicast RPF helps ensure that a traffic source is legitimate (authorized) by comparing the source address of each packet that arrives on an interface to the forwarding-table entry for its source address. If the switch uses the same interface that the packet arrived on to reply to the packet's source, this verifies that the packet originated from an authorized source, and the switch forwards the packet. If the switch does not use the same interface that the packet arrived on to reply to the packet's source, the packet might have originated from an unauthorized source, and the switch discards the packet.

This example uses two EX8200 switches. On EX3200 and EX4200 switches, you cannot configure individual interfaces for unicast RPF. On EX3200 and EX4200 switches, the switch applies unicast RPF globally to all interfaces on the switch. See “Understanding Unicast RPF for EX Series Switches” on page 13 for more information on limitations regarding the configuration of unicast RPF on EX3200 and EX4200 switches.

In this example, an enterprise network's system administrator wants to protect Switch A against potential DoS and DDoS attacks from the Internet. The administrator configures unicast RPF on interface ge-1/0/10 on Switch A. Packets arriving on interface ge-1/0/10 on Switch A from the Switch B source also use incoming interface ge-1/0/10 as the best return path to send packets back to the source.

The topology of this configuration example uses two EX8200 switches, Switch A and Switch B, connected by symmetrically routed interfaces:

- Switch A is on the edge of an enterprise network. The interface ge-1/0/10 on Switch A connects to the interface ge-1/0/5 on Switch B.
- Switch B is on the edge of the service provider network that connects the enterprise network to the Internet.

Configuration

To enable unicast RPF, perform these tasks:

**CLI Quick Configuration**

To quickly configure unicast RPF on Switch A, copy the following command and paste it into the switch terminal window:

```
[edit interfaces]
set ge-1/0/10 unit 0 family inet rpf-check
```
Step-by-Step Procedure

To configure unicast RPF on Switch A:

1. Enable unicast RPF on interface **ge-1/0/10**:

   ```
   [edit interfaces]
   user@switch# set ge-1/0/10 unit 0 family inet rpf-check
   ```

Results

Check the results:

```plaintext
[edit interfaces]
user@switch# show ge-1/0/10 {
    unit 0 {
        family inet {
            rpf-check;
        }
    }
}
```  

Verification

To confirm that the configuration is correct, perform these tasks:

- **Verifying That Unicast RPF Is Enabled on the Switch** on page 41

Verifying That Unicast RPF Is Enabled on the Switch

Purpose

Verify that unicast RPF is enabled.

Action

Verify that unicast RPF is enabled on interface **ge-1/0/10** by using the `show interfaces ge-1/0/10 extensive` or `show interfaces ge-1/0/10 detail` command.

```
user@switch> show interfaces ge-1/0/10 extensive
Physical interface: ge-1/0/10, Enabled, Physical link is Down
Interface index: 139, SNMP ifIndex: 58, Generation: 140
Link-level type: Ethernet, MTU: 1514, Speed: 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: Hardware-Down SNMP-Traps Internal: 0x0
Link flags : None
CoS queues : 8 supported, 8 maximum usable queues
Hold-times : Up 0 ms, Down 0 ms
Current address: 00:19:e2:50:95:ab, Hardware address: 00:19:e2:50:95:ab
Last flapped : Never
Statistics last cleared: Never
Traffic statistics:
   Input bytes : 0                   0 bps
   Output bytes : 0                    0 bps
   Input packets: 0                     0 pps
   Output packets: 0                      0 pps
IPv6 transit statistics:
   Input bytes : 0
   Output bytes : 0
   Input packets: 0
   Output packets: 0
   Input errors:
```
Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Policed discards: 0, L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0, FIFO errors: 0, Resource errors: 0
Output errors:
   Carrier transitions: 0, Errors: 0, Drops: 0, Collisions: 0, Aged packets: 0, FIFO errors: 0, HS link CRC errors: 0, MTU errors: 0, Resource errors: 0
Egress queues: 8 supported, 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 : LINK
Active defects : LINK
MAC statistics:
   Receive        Transmit
Total octets       0                0
Total packets      0                0
Unicast packets    0                0
Broadcast packets  0                0
Multicast packets  0                0
CRC/Align errors   0                0
FIFO errors        0                0
MAC control frames 0                0
MAC pause frames   0                0
Oversized frames   0                0
Jabber frames      0                0
Fragment frames    0                0
VLAN tagged frames 0                0
Code violations    0                0
Filter statistics:
   Input packet count        0
   Input packet rejects      0
   Input DA rejects          0
   Input SA rejects          0
   Output packet count       0
   Output packet pad count   0
   Output packet error count 0
CAM destination filters: 0, CAM source filters: 0
Autonegotiation information:
   Negotiation status: Incomplete
Packet Forwarding Engine configuration:
   Destination slot: 1

Logical interface ge-1/0/10.0 (Index 69) (SNMP ifIndex 59) (Generation 135)
Flags: Device-Down SNMP-Traps 0x0 Encapsulation: ENET2
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

Meaning
The second-to-last line of the display shows the unicast RPF flag enabled, confirming that unicast RPF is enabled on interface ge-1/0/10.

Related Documentation
- Configuring Unicast RPF (CLI Procedure) on page 106
- Disabling Unicast RPF (CLI Procedure) on page 107

Example: Configuring IP Directed Broadcast on an EX Series Switch

IP directed broadcast provides a method of sending broadcast packets to hosts on a specified subnet without broadcasting those packets to hosts on the entire network.

This example shows how to enable a subnet to receive IP directed broadcast packets so you can perform backups and other network management tasks remotely:

- Requirements on page 43
- Overview and Topology on page 44
- Configuration on page 44

Requirements

This example uses the following software and hardware components:

- Junos OS Release 9.4 or later for EX Series switches
- One PC
- One EX Series switch

Before you configure IP directed broadcast for a subnet:

- Ensure that the subnet does not have a direct connection to the Internet.
- Configure routed VLAN interfaces (RVIs) for the ingress and egress VLANs on the switch. See Configuring Routed VLAN Interfaces (CLI Procedure) or Configuring VLANs for EX Series Switches (J-Web Procedure).
Overview and Topology

You might want to perform remote administration tasks such as backups and wake-on-LAN (WOL) application tasks to manage groups of clients on a subnet. One way to do this is to send IP directed broadcast packets targeted at the hosts in a particular target subnet.

The network forwards IP directed broadcast packets as if they were unicast packets. When the IP directed broadcast packet is received by a VLAN that is enabled for **targeted-broadcast**, the switch broadcasts the packet to all the hosts in its subnet.

In this topology (see Figure 4 on page 44), a host is connected to an interface on an EX Series switch to manage the clients in subnet 10.1.2.1/24. When the switch receives a packet with the broadcast IP address of the target subnet as its destination address, it forwards the packet to the subnet’s Layer 3 interface and broadcasts it to all the hosts within the subnet.

![Figure 4: Topology for IP Directed Broadcast](image)

**Table 6** on page 44 shows the settings of the components in this example.

<table>
<thead>
<tr>
<th>Property</th>
<th>Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switch hardware</td>
<td>EX Series switch</td>
</tr>
<tr>
<td>Ingress VLAN name</td>
<td>v0</td>
</tr>
<tr>
<td>Ingress VLAN IP address</td>
<td>10.1.1.1/24</td>
</tr>
<tr>
<td>Egress VLAN name</td>
<td>v1</td>
</tr>
<tr>
<td>Egress VLAN IP address</td>
<td>10.1.2.1/24</td>
</tr>
<tr>
<td>Interfaces in VLAN v0</td>
<td>ge-0/0/0.0</td>
</tr>
<tr>
<td>Interfaces in VLAN v1</td>
<td>ge-0/0/0.0 and ge-0/0/1.0</td>
</tr>
</tbody>
</table>

**Configuration**

To configure IP directed broadcast on a subnet to enable remote management of its hosts:
CLI Quick Configuration  To quickly configure the switch to accept IP directed broadcasts targeted at subnet 10.1.2.1/24, copy the following commands and paste them into the switch's terminal window:

```
[edit]
set interfaces ge-0/0/0.0 family ethernet-switching vlan members v1
set interfaces ge-0/0/1.0 family ethernet-switching vlan members v1
set interfaces vlan.1 family inet address 10.1.2.1/24
set interfaces ge-0/0/3.0 family ethernet-switching vlan members v0
set interfaces vlan.0 family inet address 10.1.1.1/24
set vlans v1 l3-interface vlan.1
set vlans v0 l3-interface vlan.0
set interfaces vlan.1 family inet targeted-broadcast
```

Step-by-Step Procedure  To configure the switch to accept IP directed broadcasts targeted at subnet 10.1.2.1/24:

1. Add logical interface ge-0/0/0.0 to VLAN v1:
   ```
   [edit interfaces]
   user@switch# set ge-0/0/0.0 family ethernet-switching vlan members v1
   ```

2. Add logical interface ge-0/0/1.0 to VLAN v1:
   ```
   [edit interfaces]
   user@switch# set ge-0/0/1.0 family ethernet-switching vlan members v1
   ```

3. Configure the IP address for the egress VLAN, v1:
   ```
   [edit interfaces]
   user@switch# set vlan.1 family inet address 10.1.2.1/24
   ```

4. Add logical interface ge-0/0/3.0 to VLAN v0:
   ```
   [edit interfaces]
   user@switch# set ge-0/0/3.0 family ethernet-switching vlan members v0
   ```

5. Configure the IP address for the ingress VLAN:
   ```
   [edit interfaces]
   user@switch# set vlan.0 family inet address 10.1.1.1/24
   ```

6. To route traffic between the ingress and egress VLANs, associate a Layer 3 interface with each VLAN:
   ```
   [edit vlans]
   user@switch# set v1 l3-interface vlan.1
   user@switch# set v0 l3-interface vlan.0
   ```

7. Enable the Layer 3 interface for the egress VLAN to receive IP directed broadcasts:
   ```
   [edit interfaces]
   user@switch# set vlan.1 family inet targeted-broadcast
   ```

Results  Check the results:

```
user@switch# show interfaces
ge-0/0/0/1
  unit 0
    family ethernet-switching
      vlan
```
members v1;
}
}
}
}
ge-0/0/1 {
    unit 0 {
        family ethernet-switching {
            vlan {
                members v1;
            }
        }
    }
}
ge-0/0/3 {
    unit 0 {
        family ethernet-switching {
            vlan {
                members v0;
            }
        }
    }
}

vlan {
    unit 0 {
        family inet {
            targeted-broadcast;
            address 10.1.1.1/24;
        }
    }
    unit 1 {
        family inet {
            targeted-broadcast;
            address 10.1.2.1/24;
        }
    }
}
vlans {
    default;
    v0 {
        l3-interface vlan.0;
    }
    v1 {
        l3-interface vlan.1;
    }
}

Related Documentation
• Configuring IP Directed Broadcast (CLI Procedure) on page 108
CHAPTER 3

Configuring Interfaces

- Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 48
- Configuring Gigabit Ethernet Interfaces (J-Web Procedure) on page 51
- Port Role Configuration with the J-Web Interface (with CLI References) on page 58
- Adding an Interface Description to the Configuration on page 62
- Adding a Logical Unit Description to the Configuration on page 63
- Disabling a Physical Interface on page 64
- Disabling a Logical Interface on page 65
- Configuring Flow Control on page 65
- Configuring the Interface Address on page 66
- Configuring the Interface Bandwidth on page 68
- Configuring the Media MTU on page 69
- Setting the Protocol MTU on page 80
- Interface Ranges on page 80
- Configuring Accounting for the Physical Interface on page 90
- Configuring Accounting for the Logical Interface on page 91
- Configuring Ethernet Loopback Capability on page 92
- Configuring Gratuitous ARP on page 93
- Configuring Static ARP Table Entries on page 94
- Disabling the Transmission of Redirect Messages on an Interface on page 95
- Configuring Restricted and Unrestricted Proxy ARP on page 95
- Enabling or Disabling SNMP Notifications on Logical Interfaces on page 96
- Enabling or Disabling SNMP Notifications on Physical Interfaces on page 97
- Configuring Aggregated Ethernet Interfaces (CLI Procedure) on page 97
- Configuring Aggregated Ethernet Interfaces (J-Web Procedure) on page 98
- Configuring Aggregated Ethernet LACP (CLI Procedure) on page 101
- Configuring Aggregated Ethernet Link Protection on page 102
- Configuring Aggregated Ethernet Link Speed on page 103
- Configuring Aggregated Ethernet Minimum Links on page 104
An Ethernet interface must be configured for optimal performance in a high-traffic network. EX Series switches include a factory default configuration that:

- Enables all the 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 (except on EX8200 switches and Virtual Chassis)
- Specifies Rapid Spanning Tree Protocol (RSTP) and Link Layer Discovery Protocol (LLDP)

This topic describes:

- Configuring VLAN Options and Port Mode on page 48
- Configuring the Link Settings on page 49
- Configuring the IP Options on page 51

### Configuring VLAN Options and Port Mode

By default, when you boot a switch and use the factory default configuration, or when you boot the switch and do not explicitly configure a port mode, all interfaces on the switch are in access mode and accept only untagged packets from the VLAN named default. You can optionally configure another VLAN and use that instead of default. You can also configure a port to accept untagged packets from the user-configured VLAN. For details on this concept (native VLAN), see Understanding Bridging and VLANs on EX Series Switches.

If you are connecting either a desktop phone, wireless access point or a security camera to a Power over Ethernet (PoE) port, you can configure some parameters for the PoE interface. PoE interfaces are enabled by default. For detailed information on PoE settings, see Configuring PoE (CLI Procedure).

If you are connecting a device to other switches and to routers on the LAN, you need to assign the interface to a logical port and configure the logical port as a trunk port. See
“Port Role Configuration with the J-Web Interface (with CLI References)” on page 58 for more information about port configuration.

If you are connecting to a server that contains virtual machines and a VEPA for packet aggregation from those virtual machines, configure the port as a tagged-access port. See Understanding Bridging and VLANs on EX Series Switches for more information about tagged access.

To configure a Gigabit Ethernet interface or 10-Gigabit Ethernet interface for trunk port mode:

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

To configure a Gigabit Ethernet interface or 10-Gigabit Ethernet interface for tagged-access port mode:

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

**Configuring the Link Settings**

EX Series switches include a factory default configuration that enables interfaces with the following link settings:

- All Gigabit Ethernet interfaces are set to **auto-negotiation**.
- The speed for Gigabit Ethernet interfaces is set to **auto**, allowing the interface to operate at 10m, 100m, or 1g. The link operates at the highest possible speed, depending on the capabilities of the remote end.
- The flow control for Gigabit Ethernet interfaces and 10-Gigabit Ethernet interfaces is set to **enabled**.
- The link mode is set to **auto**, allowing the interface to operate as either full duplex or half duplex. The link operates as full duplex unless this mode is not supported at the remote end.
- The 10-Gigabit Ethernet interfaces default to **no auto-negotiation**. The default speed is 10g and the default link mode is full duplex.
To configure the link settings:

- Set link settings for a Gigabit Ethernet interface:

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

- Set link settings for a 10-Gigabit Ethernet interface:

  ```
  [edit]
  user@switch# set interfaces xe-fpc/pic/port ether-options
  ```

**NOTE:** On EX Series switches, `fpc` can have the following values:

- On an EX2200 switch, an EX3200 switch, a standalone EX3300 switch, a standalone EX4200 switch, and a standalone EX4500 switch, FPC refers to the switch itself. The FPC number is always 0 on these switches.

- On an EX3300 Virtual Chassis, an EX4200 Virtual Chassis, an EX4500 Virtual Chassis, or a mixed EX4200 and EX4500 Virtual Chassis, the FPC number indicates the member ID of the switch within 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` can have the following values:

- On EX2200, EX3200, EX3300, EX4200, and EX4500 switches, the PIC number is 0 for all built-in interfaces (interfaces that are not an uplink port).

- On EX2200, EX3200, and EX4200 switches, the PIC number is 1 for uplink ports.

- On EX4500 switches, the PIC number is 1 for uplink ports on the left-hand uplink module and 2 for uplink ports on the right-hand uplink module.

- On EX6200 and EX8200 switches, the PIC number is always 0.

The `ether-options` statement allows you to modify the configuration:

- **802.3ad**—Specify an aggregated Ethernet bundle. See “Configuring Aggregated Ethernet Interfaces (CLI Procedure)” on page 97.

- **auto-negotiation**—Enable or disable autonegotiation of flow control, link mode, and speed.
• flow-control—Enable or disable flow control.
• link-mode—Specify full-duplex, half-duplex, or automatic.
• loopback—Enable or disable loopback mode.
• speed—Specify 10m, 100m, 1g, or autonegotiation.

Configuring the IP Options

To specify an IP address for the logical unit using IPv4:

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

To specify an IP address for the logical unit using IPv6:

[edit]
user@switch# set interfaces interface-name unit logical-unit-number family inet6 address ip-address

NOTE: Access interfaces on EX2200, EX3200, EX3300, EX4200, and EX4500 switches are set to family ethernet-switching by default. You might have to delete this or another user-configured family setting before changing the setting to family inet or family inet6.

Related Documentation

• Configuring Gigabit Ethernet Interfaces (J-Web Procedure) on page 51
• Monitoring Interface Status and Traffic on page 113
• show interfaces ge- on page 228
• show interfaces xe- on page 264
• Understanding Interface Naming Conventions on EX Series Switches on page 6

Configuring Gigabit Ethernet Interfaces (J-Web Procedure)

An Ethernet interface must be configured for optimal performance in a high-traffic network.
To configure properties on a Gigabit Ethernet interface or a 10-Gigabit Ethernet interface on an EX Series switch:

1. Select Interfaces > Ports.

The page lists Gigabit Ethernet and 10-Gigabit Ethernet interfaces and their link status.

   NOTE: After you make changes to the configuration in this page, you must commit the changes immediately for them to take effect. To commit all changes to the active configuration, select Commit Options > Commit. See Using the Commit Options to Commit Configuration Changes for details about all commit options.

2. Select the interface you want to configure. If the interface you want to configure is not listed under Ports in the top table on the page, select the FPC (the FPC is the line card on an EX8200 switch or the member switch in a Virtual Chassis configuration) that includes that interface from the List Ports for FPC list.

Details for the selected interface such as administrative status, link status, speed, duplex, and flow control are displayed in the bottom table on the page.

   NOTE: You can select multiple interfaces and modify their settings at the same time. When you do this, you cannot modify the IP address or enable or disable the administrative status of the selected interface.

   NOTE: In the J-Web interface, you cannot configure interface ranges and interface groups.

3. Click Edit and select the set of options you want to configure first:
• Port Role—Enables you to assign a profile for the selected interface.

**NOTE:** When you select a particular port role, pre-configured port security parameters are set for the VLAN that the interface belongs to. For example, if you select the port role Desktop, the port security options `examine-dhcp` and `arp-inspection` are enabled on the VLAN that the interface belongs to. If there are interfaces in the VLAN that have static IP addresses, those interfaces might lose connectivity because those static IP addresses might not be present in the DHCP pool. Therefore, when you are selecting a port role, ensure that the corresponding port security settings for the VLAN are applicable to the interface.

For basic information on port security features such as DHCP snooping (CLI option `examine-dhcp`) or dynamic ARP inspection (DAI) (CLI option `arp-inspection`), see Configuring Port Security (J-Web Procedure). For detailed descriptions of port security features, see the Port Security topics in the EX Series documentation at [http://www.juniper.net/techpubs/](http://www.juniper.net/techpubs/).

Click Details to view the configuration parameters for the selected port role.

• VLAN Options—Enables you to configure VLAN options for the selected interface.

• Link Options—Enables you to modify the following link options for the selected interface:
  • Speed
  • MTU
  • Autonegotiation
  • Flow Control
  • Duplex

• IP Options—Enables you to configure an IP address for the interface.

4. Configure the interface by configuring options in the selected option set. See Table 7 on page 54 for details on options.

5. Repeat steps 3 and 4 for the remaining option sets that you want to configure for the interface.

**NOTE:** To enable or disable the administrative status for a selected interface, click Enable Port or Disable Port.
### Table 7: Port Edit Options

<table>
<thead>
<tr>
<th>Field</th>
<th>Function</th>
<th>Your Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port Role</td>
<td>Specifies a profile (role) to assign to the interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> Once a port role is configured on the interface, you cannot</td>
<td></td>
</tr>
<tr>
<td></td>
<td>specify VLAN options or IP options.</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> Only the following port roles can be applied on EX8200 switch</td>
<td></td>
</tr>
<tr>
<td></td>
<td>interfaces:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Default</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Layer 2 uplink</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Routed uplink</td>
<td></td>
</tr>
<tr>
<td>Default</td>
<td>Applies the default role.</td>
<td>1. Click <a href="#">Details</a> to view CLI commands for this role.</td>
</tr>
<tr>
<td></td>
<td>The interface family is set to <strong>ethernet-switching</strong>, port mode is set</td>
<td>2. Click <strong>OK</strong>.</td>
</tr>
<tr>
<td></td>
<td>to <strong>access</strong>, and RSTP is enabled.</td>
<td></td>
</tr>
<tr>
<td>Desktop</td>
<td>Applies the desktop role.</td>
<td>1. Select an existing VLAN configuration or type the name of a new VLAN</td>
</tr>
<tr>
<td></td>
<td>The interface family is set to <strong>ethernet-switching</strong>, port mode is set</td>
<td>configuration to be associated with the interface.</td>
</tr>
<tr>
<td></td>
<td>to <strong>access</strong>, RSTP is enabled with the <strong>edge</strong> and <strong>point-to-point</strong></td>
<td>2. Click <a href="#">Details</a> to view CLI commands for this role.</td>
</tr>
<tr>
<td>Desktop and</td>
<td>Options, and port security parameters (MAC limit =1; dynamic ARP</td>
<td>3. Click <strong>OK</strong>.</td>
</tr>
<tr>
<td>Phone</td>
<td>Inspection and DHCP snooping enabled) are set, and recommended CoS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>parameters are specified for forwarding classes, schedulers, and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>classifiers.</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> You can also select an existing VoIP VLAN configuration or a</td>
<td></td>
</tr>
<tr>
<td></td>
<td>new VoIP VLAN configuration to be associated with the interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> VoIP is not supported on EX8200 switches.</td>
<td></td>
</tr>
<tr>
<td>Wireless</td>
<td>Applies the wireless access point role.</td>
<td>1. Select an existing VLAN configuration or type the name of a new VLAN</td>
</tr>
<tr>
<td>Access Point</td>
<td>The interface family is set to <strong>ethernet-switching</strong>, port mode is set</td>
<td>configuration to be associated with the interface. Type the <strong>VLAN ID</strong> for</td>
</tr>
<tr>
<td></td>
<td>to <strong>access</strong>, and RSTP is enabled with the <strong>edge</strong> and <strong>point-to-point</strong></td>
<td>a new VLAN.</td>
</tr>
<tr>
<td></td>
<td>Options.</td>
<td>2. Click <a href="#">Details</a> to view CLI commands for this role.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Click <strong>OK</strong>.</td>
</tr>
</tbody>
</table>
### Table 7: Port Edit Options (continued)

<table>
<thead>
<tr>
<th>Field</th>
<th>Function</th>
<th>Your Action</th>
</tr>
</thead>
</table>
| Routed Uplink | Applies the routed uplink role. The interface family is set to `inet`, and recommended CoS parameters are set for schedulers and classifiers. See Table 8 on page 57 for more CoS information. | To specify an IPv4 address:  
1. Select the check box **IPv4 address**.  
2. Type an IP address—for example: `10.10.10.10`.  
3. Enter the subnet mask or address prefix. For example, 24 bits represents `255.255.255.0`.  
4. Click **OK**.  
To specify an IPv6 address:  
1. Select the check box **IPv6 address**.  
2. Type an IP address—for example: `2001:ab8:85a3::8a2e:370:7334`.  
3. Enter the subnet mask or address prefix.  
4. Click **OK**.  
**NOTE:** Ipv6 is not supported on EX2200 and EX4500 switches. |
| Layer 2 Uplink | Applies the Layer 2 uplink role. The interface family is set to `ethernet-switching`, port mode is set to `trunk`, RSTP is enabled with the `point-to-point` option, and port security is set to `dhcp-trusted`. | 2. Click **Details** to view CLI commands for this role.  
3. Click **OK**. |
| None         | Specifies that no port role is configured for the selected interface.     |                                                                              |

**NOTE:** See “Port Role Configuration with the J-Web Interface (with CLI References)” on page 58 for details on the CLI commands that are associated with each port role.  

**NOTE:** For an EX8200 switch, dynamic ARP inspection and DHCP snooping parameters are not configured.

### VLAN Options
### Table 7: Port Edit Options (continued)

<table>
<thead>
<tr>
<th>Field</th>
<th>Function</th>
<th>Your Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port Mode</td>
<td>Specifies the mode of operation for the interface: trunk or access.</td>
<td>If you select <strong>Trunk</strong>, you can:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. Click <strong>Add</strong> to add a VLAN member.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Select the VLAN and click <strong>OK</strong>.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. (Optional) Associate a native VLAN with the interface.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Click <strong>OK</strong>.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If you select <strong>Access</strong>, you can:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. Select the VLAN member to be associated with the interface.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. (Optional) Associate a VoIP VLAN with the interface. Only a VLAN with a VLAN ID can be associated as a VoIP VLAN.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>NOTE:</strong> VoIP is not supported on EX8200 switches.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Click <strong>OK</strong>.</td>
</tr>
</tbody>
</table>

### Link Options

<table>
<thead>
<tr>
<th>Field</th>
<th>Function</th>
<th>Type a value from <strong>256</strong> through <strong>9216</strong>. The default MTU for Gigabit Ethernet interfaces is <strong>1514</strong>.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTU (bytes)</td>
<td>Specifies the maximum transmission unit size for the interface.</td>
<td>Select one of the following values: 10 Mbps, 100 Mbps, 1000 Mbps, or Auto-Negotiation.</td>
</tr>
<tr>
<td>Speed</td>
<td>Specifies the speed for the mode.</td>
<td>Select one: <strong>automatic</strong>, <strong>half</strong>, or <strong>full</strong>.</td>
</tr>
<tr>
<td>Duplex</td>
<td>Specifies the link mode.</td>
<td>Select one: <strong>automatic</strong>, <strong>half</strong>, or <strong>full</strong>.</td>
</tr>
<tr>
<td>Description</td>
<td>Describes the link.</td>
<td>Enter a brief description for the link.</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> If the interface is part of a link aggregation group (LAG), only the option <strong>Description</strong> is enabled.</td>
<td></td>
</tr>
<tr>
<td>Enable Auto Negotiation</td>
<td>Enables or disables autonegotiation.</td>
<td>Select the check box to enable autonegotiation, or clear the check box to disable it. By default, autonegotiation is enabled.</td>
</tr>
<tr>
<td>Enable Flow Control</td>
<td>Enables or disables flow control.</td>
<td>Select the check box to enable flow control to regulate the amount of traffic sent out of the interface, or clear the check box to disable flow control and permit unrestricted traffic. Flow control is enabled by default.</td>
</tr>
</tbody>
</table>

### IP Options
Table 7: Port Edit Options (continued)

<table>
<thead>
<tr>
<th>Field</th>
<th>Function</th>
<th>Your Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPv4 Address</td>
<td>Specifies an IPv4 address for the interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>NOTE</strong>: If the IP address is cleared, the interface still belongs to the <strong>inet</strong> family.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. To specify an IPv4 address, select the check box <strong>IPv4 address</strong>.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Type an IP address—for example: <strong>10.10.10.10</strong>.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Enter the subnet mask or address prefix. For example, 24 bits represents <strong>255.255.255.0</strong>.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Click <strong>OK</strong>.</td>
<td></td>
</tr>
<tr>
<td>IPv6 Address</td>
<td>Specifies an IPv6 address for the interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>NOTE</strong>: If the IP address is cleared, the interface still belongs to the <strong>inet</strong> family.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. To specify an IPv6 address, select the check box <strong>IPv6 address</strong>.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Type an IP address—for example: <strong>2001:ab8:85a3::8a2e:370:7334</strong>.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Enter the subnet mask or address prefix.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Click <strong>OK</strong>.</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>NOTE</strong>: Ipv6 is not supported on EX2200 and EX4500 switches.</td>
<td></td>
</tr>
</tbody>
</table>

Table 8: Recommended CoS Settings for Port Roles

<table>
<thead>
<tr>
<th>CoS Parameter</th>
<th>Recommended Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forwarding Classes</td>
<td>There are four forwarding classes:</td>
</tr>
<tr>
<td></td>
<td>• <strong>voice</strong>—Queue number is set to 7.</td>
</tr>
<tr>
<td></td>
<td>• <strong>expedited-forwarding</strong>—Queue number is set to 5.</td>
</tr>
<tr>
<td></td>
<td>• <strong>assured-forwarding</strong>—Queue number is set to 1.</td>
</tr>
<tr>
<td></td>
<td>• <strong>best-effort</strong>—Queue number is set to 0.</td>
</tr>
<tr>
<td>Schedulers</td>
<td>The schedulers and their settings are:</td>
</tr>
<tr>
<td></td>
<td>• Strict-priority—Transmission rate is set to 10 percent and buffer size to 5 percent.</td>
</tr>
<tr>
<td></td>
<td>• Expedited-scheduler—Transmission rate is set to 30 percent, buffer size to 30 percent, and priority to <strong>low</strong>.</td>
</tr>
<tr>
<td></td>
<td>• Assured-scheduler—Transmission rate is set to 25 percent, buffer size to 25 percent, and priority to <strong>low</strong>.</td>
</tr>
<tr>
<td></td>
<td>• Best-effort scheduler—Transmission rate is set to 35 percent, buffer size to 40 percent, and priority to <strong>low</strong>.</td>
</tr>
<tr>
<td>Scheduler maps</td>
<td>When a desktop and phone, routed uplink, or layer 2 uplink role is applied on an interface, the forwarding classes and schedulers are mapped using the scheduler map.</td>
</tr>
<tr>
<td>ieee-802.1 classifier</td>
<td>Imports the default <strong>ieee-802.1</strong> classifier configuration and sets the loss priority to <strong>low</strong> for the code point 101 for the <strong>voice</strong> forwarding class.</td>
</tr>
<tr>
<td>dscp classifier</td>
<td>Imports the default <strong>dscp</strong> classifier configuration and sets the loss priority to <strong>low</strong> for the code point 10110 for the <strong>voice</strong> forwarding class.</td>
</tr>
</tbody>
</table>
Port Role Configuration with the J-Web Interface (with CLI References)

When you configure Gigabit Ethernet interface properties with the J-Web interface (Configure > Interfaces) you can optionally select pre-configured port roles for those interfaces. When you select a role from the Port Role field and apply it to a port, the J-Web interface modifies the switch configuration using CLI commands. Table 9 on page 58 lists the CLI commands applied for each port role.

NOTE: If there is an existing port role configuration, it is cleared before the new port role configuration is applied.

Table 9: Port Role Configuration Summary

<table>
<thead>
<tr>
<th>Configuration Description</th>
<th>CLI Commands</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Default Port Role</strong></td>
<td></td>
</tr>
<tr>
<td>Set the port role to Default.</td>
<td>set interfaces interface apply-macro juniper-port-profile Default</td>
</tr>
<tr>
<td>Set port family to ethernet-switching.</td>
<td>set interfaces interface unit 0 family ethernet-switching port-mode access</td>
</tr>
<tr>
<td>Set port mode to access.</td>
<td></td>
</tr>
<tr>
<td>Enable RSTP if redundant trunk groups are not configured.</td>
<td>delete protocols rstp interface interface disable</td>
</tr>
<tr>
<td>Disable RSTP if redundant trunk groups are configured.</td>
<td>set protocols rstp interface interface disable</td>
</tr>
<tr>
<td><strong>Desktop Port Role</strong></td>
<td></td>
</tr>
<tr>
<td>Set the port role to desktop.</td>
<td>set interfaces interface apply-macro juniper-port-profile Desktop</td>
</tr>
<tr>
<td>Set VLAN if new VLAN is specified.</td>
<td>set vlans &lt;vlan name&gt; vlan-id &lt;vlan-id&gt;</td>
</tr>
<tr>
<td>Set port family to ethernet-switching.</td>
<td>set interfaces interface unit 0 family ethernet-switching port-mode access</td>
</tr>
<tr>
<td>Set Port Mode to Access.</td>
<td></td>
</tr>
<tr>
<td>Set VLAN if new VLAN is specified.</td>
<td>set interfaces interface unit 0 family ethernet-switching vlan members vlan-members</td>
</tr>
</tbody>
</table>
Table 9: Port Role Configuration Summary (continued)

<table>
<thead>
<tr>
<th>Configuration Description</th>
<th>CLI Commands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set port security parameters.</td>
<td>set ethernet-switching-options secure-access-port vlan MacTest arp-inspection</td>
</tr>
<tr>
<td>Set RSTP protocol with <code>edge</code> option.</td>
<td>set protocols rstp interface <code>interface</code> edge</td>
</tr>
<tr>
<td>RSTP protocol is disabled if redundant trunk groups are configured.</td>
<td>set protocols rstp interface <code>interface</code> disable</td>
</tr>
</tbody>
</table>

**Desktop and Phone Port Role**

<table>
<thead>
<tr>
<th>Configuration Description</th>
<th>CLI Commands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set the port role to desktop and phone.</td>
<td>set interfaces <code>interface</code> apply-macro juniper-port-profile Desktop and Phone</td>
</tr>
<tr>
<td>Set data VLAN if new VLAN is specified.</td>
<td>set vlans <code>vlan-name</code> vlan <code>vlan-id</code></td>
</tr>
<tr>
<td>Set voice VLAN if new voice VLAN is specified.</td>
<td>set interfaces <code>interface</code> unit 0 family ethernet-switching port-mode access</td>
</tr>
<tr>
<td>Set port family to <code>ethernet-switching</code>.</td>
<td>set interfaces <code>interface</code> unit 0 family ethernet-switching port-mode access</td>
</tr>
<tr>
<td>Set Port Mode to <code>access</code>.</td>
<td></td>
</tr>
<tr>
<td>Set data VLAN on port stanza.</td>
<td>set interfaces <code>interface</code> unit 0 family ethernet-switching <code>vlan-members</code></td>
</tr>
<tr>
<td>Set port security parameters.</td>
<td>set ethernet-switching-options secure-access-port vlan MacTest arp-inspection</td>
</tr>
<tr>
<td>Set VOIP VLAN.</td>
<td>set ethernet-switching-options voip interface <code>interface</code>.0 <code>vlan vlan </code>vlan-name`</td>
</tr>
<tr>
<td>Set class of service parameters</td>
<td>set class-of-service interfaces <code>interfaces</code> scheduler-map <code>juniper-port-profile-map</code>-Juniper-IEEE-classifier DSCP-CLASSIFIER-<code>juniper-dscp-classifier</code></td>
</tr>
<tr>
<td><code>SCHEDULER_MAP</code>=<code>juniper-port-profile-map</code></td>
<td>set class-of-service interfaces <code>interface</code> unit 0 classifiers <code>ieee-802.1</code> <code>juniper-ieee-classifier</code></td>
</tr>
<tr>
<td><code>IEEE_CLASSIFIER</code>=<code>juniper-ieee-classifier</code></td>
<td>set class-of-service interfaces <code>interface</code> unit 0 classifiers <code>dscp</code> <code>juniper-dscp-classifier</code></td>
</tr>
<tr>
<td><code>DSCP_CLASSIFIER</code>=<code>juniper-dscp-classifier</code></td>
<td></td>
</tr>
<tr>
<td>Set CoS Configuration</td>
<td>Refer Table 10 on page 61 for details.</td>
</tr>
</tbody>
</table>

**Wireless Access Point Port Role**

<table>
<thead>
<tr>
<th>Configuration Description</th>
<th>CLI Commands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set the port role to wireless access point.</td>
<td>set interfaces <code>interface</code> apply-macro juniper-port-profile Wireless Access Point</td>
</tr>
<tr>
<td>Set VLAN on VLANs stanza.</td>
<td>set vlans <code>vlan-name</code> <code>vlan-id</code></td>
</tr>
<tr>
<td>Set port family to <code>ethernet-switching</code></td>
<td>set interfaces <code>interface</code> unit 0 family ethernet-switching port-mode access</td>
</tr>
<tr>
<td>Set port mode to <code>Access</code>.</td>
<td></td>
</tr>
<tr>
<td>Set VLAN on port stanza.</td>
<td>set interfaces <code>interface</code> unit 0 family ethernet-switching <code>vlan-members</code></td>
</tr>
<tr>
<td>Set RSTP protocol with edge option.</td>
<td>set protocols rstp interface <code>interface</code> edge</td>
</tr>
</tbody>
</table>
### Table 9: Port Role Configuration Summary (continued)

<table>
<thead>
<tr>
<th>Configuration Description</th>
<th>CLI Commands</th>
</tr>
</thead>
<tbody>
<tr>
<td>RSTP protocol is disabled if redundant trunk groups are configured.</td>
<td>set protocols rstp interface <em>interface</em> disable</td>
</tr>
<tr>
<td><strong>Routed Uplink Port Role</strong></td>
<td></td>
</tr>
<tr>
<td>Set the port role to Routed Uplink.</td>
<td>set interfaces <em>interface</em> apply-macro juniper-port-profile Routed Uplink</td>
</tr>
<tr>
<td>Set port family to inet.</td>
<td>set interfaces <em>interface</em> unit 0 family inet address <em>ip_address</em></td>
</tr>
<tr>
<td>Set IP address on the port.</td>
<td></td>
</tr>
<tr>
<td>Set class-of-service parameters</td>
<td>set class-of-service interfaces <em>scheduler-map</em> juniper-port-profile-map</td>
</tr>
<tr>
<td><em>SCHEDULER_MAP</em>=juniper-port-profile-map</td>
<td>set class-of-service interfaces <em>interface</em> unit 0 <em>classifiers</em> ieee-802.1</td>
</tr>
<tr>
<td><em>IEEE_CLASSIFIER</em>=juniper-ieee-classifier</td>
<td>set class-of-service interfaces <em>interface</em> unit 0 <em>classifiers</em> dscp</td>
</tr>
<tr>
<td><em>DSCP_CLASSIFIER</em>=juniper-dscp-classifier</td>
<td></td>
</tr>
<tr>
<td>Set CoS configuration</td>
<td>Refer <a href="#">Table 10 on page 61</a> for details.</td>
</tr>
<tr>
<td><strong>Layer 2 Uplink Port Role</strong></td>
<td></td>
</tr>
<tr>
<td>Set the port role to Layer 2 Uplink.</td>
<td>set interfaces <em>interface</em> apply-macro juniper-port-profile Layer2 Uplink</td>
</tr>
<tr>
<td>Set port family to <em>ethernet-switching</em></td>
<td>set interfaces <em>interface</em> unit 0 family ethernet-switching port-mode trunk</td>
</tr>
<tr>
<td>Set port mode to trunk.</td>
<td></td>
</tr>
<tr>
<td>Set Native VLAN name.</td>
<td>set interfaces <em>interface</em> unit 0 family ethernet-switching native-vlan-id <em>vlan-name</em></td>
</tr>
<tr>
<td>Set the port as part of all valid VLANs; &quot;valid&quot; refers to all VLANs except native VLAN and voice VLANs.</td>
<td>set interfaces <em>interface</em> unit 0 family ethernet-switching vlan members <em>vlan-members</em></td>
</tr>
<tr>
<td>Set port security parameter.</td>
<td>set ethernet-switching-options secure-access-port dhcp-trusted</td>
</tr>
<tr>
<td>Set RSTP protocol with point-to-point option.</td>
<td>set protocols rstp interface <em>interface</em> mode point-to-point</td>
</tr>
<tr>
<td>Disable RSTP if redundant trunk groups are configured.</td>
<td>set protocols rstp interface <em>interface</em> disable</td>
</tr>
<tr>
<td>Set class-of-service parameters.</td>
<td>set class-of-service interfaces <em>scheduler-map</em> juniper-port-profile-map</td>
</tr>
<tr>
<td><em>SCHEDULER_MAP</em>=juniper-port-profile-map</td>
<td>set class-of-service interfaces <em>interface</em> unit 0 <em>classifiers</em> ieee-802.1</td>
</tr>
<tr>
<td><em>IEEE_CLASSIFIER</em>=juniper-ieee-classifier</td>
<td>set class-of-service interfaces <em>interface</em> unit 0 <em>classifiers</em> dscp</td>
</tr>
<tr>
<td><em>DSCP_CLASSIFIER</em>=juniper-dscp-classifier</td>
<td></td>
</tr>
<tr>
<td>Set CoS configuration</td>
<td>Refer to <a href="#">Table 10 on page 61</a> for details.</td>
</tr>
</tbody>
</table>
Table 10 on page 61 lists the CLI commands for the recommended CoS settings that are committed when the CoS configuration is set.

Table 10: Recommended CoS Settings for Port Roles

<table>
<thead>
<tr>
<th>CoS Parameter</th>
<th>CLI Command</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Forwarding Classes</strong></td>
<td></td>
</tr>
<tr>
<td>voice</td>
<td>set class-of-service forwarding-classes class voice queue-num 7</td>
</tr>
<tr>
<td>expedited-forwarding</td>
<td>set class-of-service forwarding-classes class expedited-forwarding queue-num 5</td>
</tr>
<tr>
<td>assured-forwarding</td>
<td>set class-of-service forwarding-classes class assured-forwarding queue-num 1</td>
</tr>
<tr>
<td>best-effort</td>
<td>set class-of-service forwarding-classes class best-effort queue-num 0</td>
</tr>
<tr>
<td><strong>Schedulers</strong></td>
<td></td>
</tr>
<tr>
<td>strict-priority-scheduler</td>
<td>The CLI commands are:</td>
</tr>
<tr>
<td></td>
<td>set class-of-service schedulers strict-priority-scheduler transmit-rate percent 10</td>
</tr>
<tr>
<td></td>
<td>set class-of-service schedulers strict-priority-scheduler buffer-size percent 5</td>
</tr>
<tr>
<td></td>
<td>set class-of-service schedulers strict-priority-scheduler priority strict-high</td>
</tr>
<tr>
<td>expedited-scheduler</td>
<td>The CLI commands are:</td>
</tr>
<tr>
<td></td>
<td>set class-of-service schedulers expedited-scheduler transmit-rate percent 30</td>
</tr>
<tr>
<td></td>
<td>set class-of-service schedulers expedited-scheduler buffer-size percent 30</td>
</tr>
<tr>
<td></td>
<td>set class-of-service schedulers expedited-scheduler priority low</td>
</tr>
<tr>
<td>assured-scheduler</td>
<td>The CLI commands are:</td>
</tr>
<tr>
<td></td>
<td>set class-of-service schedulers assured-scheduler transmit-rate percent 25</td>
</tr>
<tr>
<td></td>
<td>set class-of-service schedulers strict-priority-scheduler buffer-size percent 25</td>
</tr>
<tr>
<td></td>
<td>set class-of-service schedulers strict-priority-scheduler priority low</td>
</tr>
<tr>
<td>best-effort-scheduler</td>
<td>The CLI commands are:</td>
</tr>
<tr>
<td></td>
<td>set class-of-service schedulers best-effort-scheduler transmit-rate percent 35</td>
</tr>
<tr>
<td></td>
<td>set class-of-service schedulers best-effort-scheduler buffer-size percent 40</td>
</tr>
<tr>
<td></td>
<td>set class-of-service schedulers best-effort-scheduler priority low</td>
</tr>
<tr>
<td><strong>Classifiers</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>set class-of-service classifiers ieee-802.1 juniper_ieee_classifier import default forwarding-class voice loss-priority low code-points 101</td>
</tr>
<tr>
<td></td>
<td>set class-of-service classifiers dscp juniper_dscp_classifier import default forwarding-class voice loss-priority low code-points 101110</td>
</tr>
</tbody>
</table>

Related Documentation
- Configuring Gigabit Ethernet Interfaces (J-Web Procedure) on page 51
- Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 48
Adding an Interface Description to the Configuration

You can include a text description of each physical interface in the configuration file. Any descriptive text you include is displayed in the output of the `show interfaces` commands, and is also exposed in the `ifAlias` Management Information Base (MIB) object. It has no impact on the interface's configuration. To add a text description, include the `description` statement at the `[edit interfaces interface-name]` hierarchy level:

```
[edit interfaces interface-name]
description text;
```

The description can be a single line of text. If the text contains spaces, enclose it in quotation marks.

**NOTE:** You can configure the extended DHCP relay to include the interface description in the option 82 Agent Circuit ID suboption. See Enabling and Disabling Insertion of Option 82 Information in the Junos OS Subscriber Access Configuration Guide.

For information about describing logical units, see “Adding a Logical Unit Description to the Configuration” on page 63.

Example: Adding an Interface Description to the Configuration

Add a description to a Fast Ethernet interface:

```
[edit interfaces]
user@host#
set fe-0/0/1 description "Backbone connection to PHL01"
[edit interfaces]
user@host#

show
fe-0/0/1 {
  description "Backbone connection to PHL01";
  unit 0 {
    family inet {
      address 192.168.0.1/30;
    }
  }
}
```

To display the description from the router or switch CLI, use the `show interfaces` command:

```
user@host>
show interfaces fe-0/0/1
Physical interface: fe-0/0/1, Enabled, Physical link is Up
  Interface index: 129, SNMP ifIndex: 23
  Description: Backbone connection to PHL01
...
```

To display the interface description from the interfaces MIB, use the `snmpwalk` command from a server. To isolate information for a specific interface, search for the interface index
shown in the SNMP ifIndex field of the show interfaces command output. The ifAlias object is in ifXTable.

```
user-server>snmpwalk host-fxp0.mylab public ifXTable | grep -e \'.23'
snmpwalk host-fxp0.mylab public ifXTable | grep -e '\.23'
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifName.23 = fe-0/0/1
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifInMulticastPkts.23 = Counter32: 0
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifInBroadcastPkts.23 = Counter32: 0
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifOutMulticastPkts.23 = Counter32: 0
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifOutBroadcastPkts.23 = Counter32: 0
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifXInOctets.23 = Counter64: 0
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifXInUcastPkts.23 = Counter64: 0
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifXInMulticastPkts.23 = Counter64: 0
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifXInBroadcastPkts.23 = Counter64: 0
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifOutOctets.23 = Counter64: 42
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifOutUcastPkts.23 = Counter64: 0
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifOutMulticastPkts.23 = Counter64: 0
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifOutBroadcastPkts.23 = Counter64: 0
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifLinkUpDownTrapEnable.23 = enabled(1)
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifHighSpeed.23 = Gauge32: 100
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifPromiscuousMode.23 = false(2)
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifConnectorPresent.23 = true(1)
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifAlias.23 = Backbone connection to PHL01
ifMIB.ifMIBObjects.ifXTable.ifXEntry.ifCounterDiscontinuityTime.23 = Timeticks: (0) 0:00:00.00
```

### Adding a Logical Unit Description to the Configuration

You can include a text description of each logical unit in the configuration file. Any descriptive text you include is displayed in the output of the `show interfaces` commands, and is also exposed in the `ifAlias` Management Information Base (MIB) object. It has no impact on the interface's configuration. To add a text description, include the `description` statement:

```
description text;
```

You can include this statement at the following hierarchy levels:

- `[edit interfaces interface-name unit logical-unit-number]`
- `[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number]`

The description can be a single line of text. If the text contains spaces, enclose it in quotation marks.

**NOTE:** You can configure the extended DHCP relay to include the interface description in the option 82 Agent Circuit ID suboption. See “Enabling and Disabling Insertion of Option 82 Information” in the Junos OS Subscriber Access Configuration Guide.

For information about describing physical interfaces, see “Adding an Interface Description to the Configuration” on page 62.
Disabling a Physical Interface

You can disable a physical interface, marking it as being down, without removing the interface configuration statements from the configuration. To do this, include the `disable` statement at the `[edit interfaces interface-name]` hierarchy level:

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

**CAUTION:** Dynamic subscribers and logical interfaces use physical interfaces for connection to the network. The Junos OS allows you to set the interface to disable and commit the change while dynamic subscribers and logical interfaces are still active. This action results in the loss of all subscriber connections on the interface. Use care when disabling interfaces.

**NOTE:** On the router, when you use the disable statement at the `edit interfaces` hierarchy level, depending on the PIC type, the interface might or might not turn off the laser. Older PIC transceivers do not support turning off the laser, but newer Gigabit Ethernet PICs with SFP and XFP transceivers do support it and the laser will be turned off when the interface is disabled.

**WARNING:** Do not stare into the laser beam or view it directly with optical instruments even if the interface has been disabled.

Example: Disabling a Physical Interface

Disable a physical interface:

```
[edit interfaces]
so-1/1/0 {
    mtu 8000;
    clocking internal;
    encapsulation ppp;
    sonet-options {
        fcs 16;
    }
    unit 0 {
        family inet {
            address 172.16.0.0/12 {
                destination 172.16.0.4;
            }
        }
    }
}[edit interfaces]
user@host# set so-1/1/0 disable
[edit interfaces]
```
Disabling a Logical Interface

You can unconfigure a logical interface, effectively disabling that interface, without removing the logical interface configuration statements from the configuration. To do this, include the `disable` statement:

```
disable;
```

You can include this statement at the following hierarchy levels:

- `[edit interfaces interface-name unit logical-unit-number]`
- `[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number]`

When an interface is disabled, a route (pointing to the reserved target “REJECT”) with the IP address of the interface and a 32-bit subnet mask is installed in the routing table. See Routing Protocols.

Configuring Flow Control

By default, the router or switch imposes flow control to regulate the amount of traffic sent out on a Fast Ethernet, Tri-Rate Ethernet copper, Gigabit Ethernet, and 10-Gigabit Ethernet interface. Flow control is not supported on the 4-port Fast Ethernet PIC. This is useful if the remote side of the connection is a Fast Ethernet or Gigabit Ethernet switch.

You can disable flow control if you want the router or switch to permit unrestricted traffic. To disable flow control, include the `no-flow-control` statement:

```
no-flow-control;
```

To explicitly reinstate flow control, include the `flow-control` statement:

```
flow-control;
```

You can include these statements at the following hierarchy levels:
### 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 vpls families, you never configure an address.

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

To assign an address to an interface, include the `address` statement:

```plaintext
class address address {  
  broadcast address;  
  destination address;  
  destination-profile name;  
  eui-64;  
  preferred;  
  primary;  
}
```

You can include these statements at the following hierarchy levels:

- [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]

In the `address` statement, specify the network address of the interface.
For each address, you can optionally configure one or more of the following:

- **Broadcast address for the interface subnet**—Specify this in the `broadcast` statement; this applies only to Ethernet interfaces, such as the management interface `fxp0`, `em0`, or `me0` the Fast Ethernet interface, and the Gigabit Ethernet interface.

- **Address of the remote side of the connection (for point-to-point interfaces only)**—Specify this in the `destination` statement.

- **PPP properties to the remote end**—Specify this in the `destination-profile` statement. You define the profile at the `[edit access group-profile name ppp]` hierarchy level (for point-to-point interfaces only).

- **Whether the router or switch automatically generates the host number portion of interface addresses**—The `eui-64` statement applies only to interfaces that carry IPv6 traffic, in which the prefix length of the address is 64 bits or less, and the low-order 64 bits of the address are zero. This option does not apply to the loopback interface (`lo0`) because IPv6 addresses configured on the loopback interface must have a 128-bit prefix length.

  **NOTE:** IPv6 is not currently supported for the QFX Series.

- **Whether this address is the preferred address**—Each subnet on an interface has a preferred local address. If you configure more than one address on the same subnet, the preferred local address is chosen by default as the source address when you originate packets to destinations on the subnet.

  By default, the preferred address is the lowest-numbered address on the subnet. To override the default and explicitly configure the preferred address, include the `preferred` statement when configuring the address.

- **Whether this address is the primary address**—Each interface has a primary local address. If an interface has more than one address, the primary local address is used by default as the source address when you send packets from an interface where the destination provides no information about the subnet (for example, some `ping` commands).

  By default, the primary address on an interface is the lowest-numbered non-127 (in other words, non-loopback) preferred address on the interface. To override the default and explicitly configure the preferred address, include the `primary` statement when configuring the address.

- Configuring Interface IPv4 Addresses on page 67
- Configuring Interface IPv6 Addresses on page 68

### Configuring Interface IPv4 Addresses

You can configure router or switch interfaces with a 32-bit IP version 4 (IPv4) address and optionally with a destination prefix, sometimes called a `subnet mask`. An IPv4 address utilizes a 4-octet dotted decimal address syntax (for example, `192.16.1.1`). An IPv4 address with destination prefix utilizes a 4-octet dotted decimal address syntax with a destination prefix appended (for example, `192.16.1.1/30`).
To configure an IPv4 address on routers and switches running Junos OS, use the `edit interface interface-name unit number family inet address a.b.c.d/nn` statement at the `[edit interfaces]` hierarchy level.

**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.

### Configuring Interface IPv6 Addresses

You represent IP version 6 (IPv6) addresses in hexadecimal notation using a colon-separated list of 16-bit values.

You assign a 128-bit IPv6 address to an interface by including the `address` statement:

```
address aaaa:bbbb::zzzz/nn;
```

You can include this statement at the following hierarchy levels:

- `[edit interfaces interface-name unit logical-unit-number family inet6]`
- `[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number family inet6]`

The double colon (`::`) represents all bits set to 0, as shown in the following example:

```
interfaces fe-0/0/1 {
    unit 0 {
        family inet6 {
            address fe0::1::2/64;
        }
    }
}
```

**NOTE:** You must manually configure the router or switch advertisement and advertise the default prefix for autoconfiguration to work on a specific interface.

### Related Documentation

- Configuring IPCP Options
- Configuring Default, Primary, and Preferred Addresses and Interfaces

### Configuring the Interface Bandwidth

By default, the Junos OS uses the physical interface’s speed for the MIB-II object, `ifSpeed`. You can configure the logical unit to populate the `ifSpeed` variable by configuring a bandwidth value for the logical interface. The `bandwidth` statement sets an
informational-only parameter; you cannot adjust the actual bandwidth of an interface with this statement.

NOTE: We recommend that you be careful when setting this value. Any interface bandwidth value that you configure using the `bandwidth` statement affects how the interface cost is calculated for a dynamic routing protocol, such as OSPF. By default, the interface cost for a dynamic routing protocol is calculated using the following formula:

\[
\text{cost} = \frac{\text{reference-bandwidth}}{\text{bandwidth}},
\]

where bandwidth is the physical interface speed. However, if you specify a value for bandwidth using the `bandwidth` statement, that value is used to calculate the interface cost, rather than the actual physical interface bandwidth.

To configure the bandwidth value for a logical interface, include the `bandwidth` statement:

```
bandwidth rate;
```

You can include this statement at the following hierarchy levels:

- `[edit interfaces interface-name unit logical-unit-number]`
- `[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number]`

`rate` is the peak rate, in bps or cps. You can specify a value in bits per second either as a complete decimal number or as a decimal number followed by the abbreviation k (1000), m (1,000,000), or g (1,000,000,000). You can also specify a value in cells per second by entering a decimal number followed by the abbreviation c; values expressed in cells per second are converted to bits per second using the formula 1 cps = 384 bps. The value can be any positive integer. The `bandwidth` statement is valid for all logical interfaces, except multilink interfaces.

### Configuring the Media MTU

The default media MTU size used on a physical interface depends on the encapsulation used on that interface. In some cases, the default IP Protocol MTU depends on whether the protocol used is IP version 4 (IPv4) or International Organization for Standardization (ISO). Table 11 on page 70 through Table 21 on page 77 list the media and protocol MTU sizes by interface type, and Table 22 on page 77 lists the encapsulation overhead by encapsulation type.
Table 11: Media MTU Sizes by Interface Type for M5, M7i with CFEB, M10, M10i with CFEB, M20, and M40R Routers

<table>
<thead>
<tr>
<th>Interface Type</th>
<th>Default Media MTU (Bytes)</th>
<th>Maximum MTU (Bytes)</th>
<th>Default IP Protocol MTU (Bytes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adaptive Services</td>
<td>N/A</td>
<td>9192</td>
<td>N/A</td>
</tr>
<tr>
<td>(MTU size not configurable)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ATM</td>
<td>4482</td>
<td>9192</td>
<td>4470</td>
</tr>
<tr>
<td>E1/T1</td>
<td>1504</td>
<td>9192</td>
<td>1500</td>
</tr>
<tr>
<td>E3/T3</td>
<td>4474</td>
<td>9192</td>
<td>4470</td>
</tr>
<tr>
<td>Fast Ethernet</td>
<td>1514</td>
<td>9192</td>
<td>1500 (IPv4), 1497 (ISO)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1532 (8-port)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1532 (12-port)</td>
<td></td>
</tr>
<tr>
<td>Gigabit Ethernet</td>
<td>1514</td>
<td>9192</td>
<td>1500 (IPv4), 1497 (ISO)</td>
</tr>
<tr>
<td>Serial</td>
<td>1504</td>
<td>9192</td>
<td>1500 (IPv4), 1497 (ISO)</td>
</tr>
<tr>
<td>SONET/SDH</td>
<td>4474</td>
<td>9192</td>
<td>4470</td>
</tr>
</tbody>
</table>

Table 12: Media MTU Sizes by Interface Type for M40e Routers

<table>
<thead>
<tr>
<th>Interface Type</th>
<th>Default Media MTU (Bytes)</th>
<th>Maximum MTU (Bytes)</th>
<th>Default IP Protocol MTU (Bytes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adaptive Services</td>
<td>9192</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>(MTU size not configurable)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ATM</td>
<td>4482</td>
<td>9192</td>
<td>4470</td>
</tr>
<tr>
<td>E1/T1</td>
<td>1504</td>
<td>4500</td>
<td>1500</td>
</tr>
<tr>
<td>E3/T3</td>
<td>4474</td>
<td>4500</td>
<td>4470</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9192 (4-port)</td>
<td></td>
</tr>
<tr>
<td>E3/DS3 IQ</td>
<td>4474</td>
<td>9192</td>
<td>4470</td>
</tr>
<tr>
<td>Fast Ethernet</td>
<td>1514</td>
<td>4500</td>
<td>1500 (IPv4), 1497 (ISO)</td>
</tr>
</tbody>
</table>
Table 12: Media MTU Sizes by Interface Type for M40e Routers (continued)

<table>
<thead>
<tr>
<th>Interface Type</th>
<th>Default Media MTU (Bytes)</th>
<th>Maximum MTU (Bytes)</th>
<th>Default IP Protocol MTU (Bytes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gigabit Ethernet</td>
<td>1514</td>
<td>9192 (1- or 2-port)</td>
<td>1500 (IPv4), 1497 (ISO)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9192 (4-port)</td>
<td></td>
</tr>
<tr>
<td>Serial</td>
<td>1504</td>
<td>9192</td>
<td>1500 (IPv4), 1497 (ISO)</td>
</tr>
<tr>
<td>SONET/SDH</td>
<td>4474</td>
<td>4500 (1-port concatenated)</td>
<td>4470</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9192 (4-port OC3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>9192 (4-port OC3c)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4500 (1-port OC12)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4500 (4-port OC12)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4500 (4-port OC12c)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4500 (1-port OC48)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>9192 (2-port OC3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>9192 (2-port OC3c)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>9192 (1-port OC12c)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>9192 (1-port OC48c)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4500 (1-port OC192)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>9192 (1-port OC192c)</td>
<td></td>
</tr>
</tbody>
</table>

Table 13: Media MTU Sizes by Interface Type for M160 Routers

<table>
<thead>
<tr>
<th>Interface Type</th>
<th>Default Media MTU (Bytes)</th>
<th>Maximum MTU (Bytes)</th>
<th>Default IP Protocol MTU (Bytes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adaptive Services (MTU size not configurable)</td>
<td>9192</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ATM</td>
<td>4482</td>
<td>9192</td>
<td>4470</td>
</tr>
<tr>
<td>E1/T1</td>
<td>1504</td>
<td>4500</td>
<td>1500</td>
</tr>
<tr>
<td>E3/T3</td>
<td>4474</td>
<td>4500</td>
<td>4470</td>
</tr>
<tr>
<td>E3/DS3 IQ</td>
<td>4474</td>
<td>9192</td>
<td>4470</td>
</tr>
<tr>
<td>Fast Ethernet</td>
<td>1514</td>
<td>4500</td>
<td>1500 (IPv4), 1497 (ISO)</td>
</tr>
</tbody>
</table>
### Table 13: Media MTU Sizes by Interface Type for M160 Routers (continued)

<table>
<thead>
<tr>
<th>Interface Type</th>
<th>Default Media MTU (Bytes)</th>
<th>Maximum MTU (Bytes)</th>
<th>Default IP Protocol MTU (Bytes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gigabit Ethernet</td>
<td>1514</td>
<td>9192 (1- or 2-port)</td>
<td>1500 (IPv4), 1497 (ISO)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4500 (4-port)</td>
<td></td>
</tr>
<tr>
<td>Serial</td>
<td>1504</td>
<td>9192</td>
<td>1500 (IPv4), 1497 (ISO)</td>
</tr>
<tr>
<td>SONET/SDH</td>
<td>4474</td>
<td>9192 (1-port nonconcatenated)</td>
<td>4470</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4500 (1-port)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4500 (4-port)</td>
<td></td>
</tr>
</tbody>
</table>

### Table 14: Media MTU Sizes by Interface Type for M7i with CFEB-E, M10i with CFEB-E, M320 and M120 Routers

<table>
<thead>
<tr>
<th>Interface Type</th>
<th>Default Media MTU (Bytes)</th>
<th>Maximum MTU (Bytes)</th>
<th>Default IP Protocol MTU (Bytes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATM2 IQ</td>
<td>4482</td>
<td>9192</td>
<td>4470</td>
</tr>
<tr>
<td>Channelized DS3 IQ</td>
<td>4471</td>
<td>4500</td>
<td>4470</td>
</tr>
<tr>
<td>Channelized E1 IQ</td>
<td>1504</td>
<td>4500</td>
<td>1500</td>
</tr>
<tr>
<td>Channelized OC12 IQ</td>
<td>4474</td>
<td>9192</td>
<td>4470</td>
</tr>
<tr>
<td>Channelized STM1 IQ</td>
<td>4474</td>
<td>9192</td>
<td>4470</td>
</tr>
<tr>
<td>DS3</td>
<td>4471</td>
<td>4500</td>
<td>4470</td>
</tr>
<tr>
<td>E1</td>
<td>1504</td>
<td>4500</td>
<td>1500</td>
</tr>
<tr>
<td>E3 IQ</td>
<td>4471</td>
<td>4500</td>
<td>4470</td>
</tr>
<tr>
<td>Fast Ethernet</td>
<td>1514</td>
<td>9192 (4-port)</td>
<td>1500 (IPv4), 1497 (ISO)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1532 (8-, 12- and 48-port)</td>
<td></td>
</tr>
<tr>
<td>Gigabit Ethernet</td>
<td>1514</td>
<td>9192</td>
<td>1500 (IPv4), 1497 (ISO)</td>
</tr>
<tr>
<td>SONET/SDH</td>
<td>4474</td>
<td>9192</td>
<td>4470</td>
</tr>
<tr>
<td>T1</td>
<td>1504</td>
<td>4500</td>
<td>1500</td>
</tr>
</tbody>
</table>
Table 14: Media MTU Sizes by Interface Type for M7i with CFEB-E, M10i with CFEB-E, M320 and M120 Routers (continued)

<table>
<thead>
<tr>
<th>Interface Type</th>
<th>Default Media MTU (Bytes)</th>
<th>Maximum MTU (Bytes)</th>
<th>Default IP Protocol MTU (Bytes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT3 IQ</td>
<td>4474</td>
<td>9192</td>
<td>4470</td>
</tr>
<tr>
<td>(excluding M120)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 15: Media MTU Sizes by Interface Type for MX Series Routers

<table>
<thead>
<tr>
<th>Interface Type</th>
<th>Default Media MTU (Bytes)</th>
<th>Maximum MTU (Bytes)</th>
<th>Default IP Protocol MTU (Bytes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gigabit Ethernet</td>
<td>1514</td>
<td>9192</td>
<td>1500 (IPv4) 1488 (MPLS) 1497 (ISO)</td>
</tr>
<tr>
<td>10-Gigabit Ethernet</td>
<td>1514</td>
<td>9192</td>
<td>1500 (IPv4) 1488 (MPLS) 1497 (ISO)</td>
</tr>
<tr>
<td>Multi-Rate Ethernet</td>
<td>1514</td>
<td>9192</td>
<td>1500 (IPv4) 1488 (MPLS) 1497 (ISO)</td>
</tr>
<tr>
<td>Tri-Rate Ethernet</td>
<td>1514</td>
<td>9192</td>
<td>1500 (IPv4) 1488 (MPLS) 1497 (ISO)</td>
</tr>
<tr>
<td>Channelized SONET/SDH OC3/STM1 (Multi-Rate)</td>
<td>1514</td>
<td>9192</td>
<td>1500 (IPv4) 1488 (MPLS) 1497 (ISO)</td>
</tr>
<tr>
<td>DS3/E3 (Multi-Rate)</td>
<td>1514</td>
<td>9192</td>
<td>1500 (IPv4) 1488 (MPLS) 1497 (ISO)</td>
</tr>
</tbody>
</table>

Table 16: Media MTU Sizes by Interface Type for T320 Routers

<table>
<thead>
<tr>
<th>Interface Type</th>
<th>Default Media MTU (Bytes)</th>
<th>Maximum MTU (Bytes)</th>
<th>Default IP Protocol MTU (Bytes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATM</td>
<td>4482</td>
<td>9192</td>
<td>4470</td>
</tr>
<tr>
<td>ATM2 IQ</td>
<td>4482</td>
<td>9192</td>
<td>4470</td>
</tr>
<tr>
<td>Channelized OC12 IQ</td>
<td>4474</td>
<td>9192</td>
<td>4470</td>
</tr>
<tr>
<td>Channelized STM1 IQ</td>
<td>4474</td>
<td>9192</td>
<td>4470</td>
</tr>
<tr>
<td>DS3</td>
<td>4471</td>
<td>4500</td>
<td>4470</td>
</tr>
</tbody>
</table>
Table 16: Media MTU Sizes by Interface Type for T320 Routers (continued)

<table>
<thead>
<tr>
<th>Interface Type</th>
<th>Default Media MTU (Bytes)</th>
<th>Maximum MTU (Bytes)</th>
<th>Default IP Protocol MTU (Bytes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fast Ethernet</td>
<td>1514</td>
<td>4500 (4-port)</td>
<td>1500 (IPv4), 1497 (ISO)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1532 (12- and 48-port)</td>
<td></td>
</tr>
<tr>
<td>Gigabit Ethernet</td>
<td>1514</td>
<td>9192</td>
<td>1500 (IPv4), 1497 (ISO)</td>
</tr>
<tr>
<td>SONET/SDH</td>
<td>4474</td>
<td>9192</td>
<td>4470</td>
</tr>
<tr>
<td>CT3 IQ</td>
<td>4474</td>
<td>9192</td>
<td>4470</td>
</tr>
</tbody>
</table>

Table 17: Media MTU Sizes by Interface Type for T640 Platforms

<table>
<thead>
<tr>
<th>Interface Type</th>
<th>Default Media MTU (Bytes)</th>
<th>Maximum MTU (Bytes)</th>
<th>Default IP Protocol MTU (Bytes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATM2 IQ</td>
<td>4482</td>
<td>9192</td>
<td>4470</td>
</tr>
<tr>
<td>48-port Fast Ethernet</td>
<td>1514</td>
<td>1532</td>
<td>1500 (IPv4), 1497 (ISO)</td>
</tr>
<tr>
<td>Gigabit Ethernet</td>
<td>1514</td>
<td>9192</td>
<td>1500 (IPv4), 1497 (ISO)</td>
</tr>
<tr>
<td>SONET/SDH</td>
<td>4474</td>
<td>9192</td>
<td>4470</td>
</tr>
<tr>
<td>CT3 IQ</td>
<td>4474</td>
<td>9192</td>
<td>4470</td>
</tr>
</tbody>
</table>

Table 18: Media MTU Sizes by Interface Type for J2300 Platforms

<table>
<thead>
<tr>
<th>Interface Type</th>
<th>Default Media MTU (Bytes)</th>
<th>Maximum MTU (Bytes)</th>
<th>Default IP Protocol MTU (Bytes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fast Ethernet (10/100)</td>
<td>1514</td>
<td>9192</td>
<td>1500</td>
</tr>
<tr>
<td>G.SHDSL</td>
<td>4482</td>
<td>9150</td>
<td>4470</td>
</tr>
<tr>
<td>ISDN BRI</td>
<td>1504</td>
<td>4092</td>
<td>1500</td>
</tr>
<tr>
<td>Serial</td>
<td>1504</td>
<td>9150</td>
<td>1500</td>
</tr>
<tr>
<td>T1 or E1</td>
<td>1504</td>
<td>9150</td>
<td>1500</td>
</tr>
</tbody>
</table>
Table 19: Media MTU Sizes by Interface Type for J4300 and J6300 Platforms

<table>
<thead>
<tr>
<th>Interface Type</th>
<th>Default Media MTU (Bytes)</th>
<th>Maximum MTU (Bytes)</th>
<th>Default IP Protocol MTU (Bytes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADSL2+ PIM</td>
<td>4482</td>
<td>9150</td>
<td>4470</td>
</tr>
<tr>
<td>Dual-port Fast Ethernet (10/100) PIM</td>
<td>1514</td>
<td>9192</td>
<td>1500</td>
</tr>
<tr>
<td>Dual-port Serial PIM</td>
<td>1504</td>
<td>9150</td>
<td>1500</td>
</tr>
<tr>
<td>Dual-port T1 or E1 PIM</td>
<td>1504</td>
<td>9150</td>
<td>1500</td>
</tr>
<tr>
<td>Dual-port Channelized T1/E1 PIM (channelized to DS0s)</td>
<td>1504</td>
<td>4500</td>
<td>1500</td>
</tr>
<tr>
<td>Dual-port Channelized T1/E1 PIM (clear channel T1 or E1)</td>
<td>1504</td>
<td>9150</td>
<td>1500</td>
</tr>
<tr>
<td>Fast Ethernet (10/100) built-in interface</td>
<td>1514</td>
<td>9192</td>
<td>1500</td>
</tr>
<tr>
<td>G.SHDSL PIM</td>
<td>4482</td>
<td>9150</td>
<td>4470</td>
</tr>
<tr>
<td>4-port ISDN BRI PIM</td>
<td>1504</td>
<td>4092</td>
<td>1500</td>
</tr>
<tr>
<td>T3 (DS3) or E3 PIM</td>
<td>4474</td>
<td>9192</td>
<td>4470</td>
</tr>
</tbody>
</table>

Table 20: Media MTU Sizes by Interface Type for J4350 and J6350 Platforms

<table>
<thead>
<tr>
<th>Interface Type</th>
<th>Default Media MTU (Bytes)</th>
<th>Maximum MTU (Bytes)</th>
<th>Default IP Protocol MTU (Bytes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-port ISDN BRI PIM</td>
<td>1504</td>
<td>4092</td>
<td>1500</td>
</tr>
<tr>
<td>ADSL2+ PIM</td>
<td>4482</td>
<td>9150</td>
<td>4470</td>
</tr>
<tr>
<td>Dual-port Fast Ethernet (10/100) PIM</td>
<td>1514</td>
<td>9192</td>
<td>1500</td>
</tr>
<tr>
<td>Dual-port Serial PIM</td>
<td>1504</td>
<td>9150</td>
<td>1500</td>
</tr>
<tr>
<td>Dual-port T1 or E1 PIM</td>
<td>1504</td>
<td>9150</td>
<td>1500</td>
</tr>
</tbody>
</table>
Table 20: Media MTU Sizes by Interface Type for J4350 and J6350 Platforms (continued)

<table>
<thead>
<tr>
<th>Interface Type</th>
<th>Default Media MTU (Bytes)</th>
<th>Maximum MTU (Bytes)</th>
<th>Default IP Protocol MTU (Bytes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dual-port Channelized T1/E1 PIM (channelized to DS0s)</td>
<td>1504</td>
<td>4500</td>
<td>1500</td>
</tr>
<tr>
<td>Dual-port Channelized T1/E1 PIM (clear channel T1 or E1)</td>
<td>1504</td>
<td>9150</td>
<td>1500</td>
</tr>
<tr>
<td>4-port Fast Ethernet (10/100) ePIM</td>
<td>1518</td>
<td>1518</td>
<td>1500</td>
</tr>
<tr>
<td>Gigabit Ethernet (10/100/1000) built-in interface</td>
<td>1514</td>
<td>9018</td>
<td>1500</td>
</tr>
<tr>
<td>Gigabit Ethernet (10/100/1000) Enhanced Physical Interface Module (ePIM)</td>
<td>1514</td>
<td>9018</td>
<td>1500</td>
</tr>
<tr>
<td>Gigabit Ethernet (10/100/1000) SFP ePIM</td>
<td>1514</td>
<td>9018</td>
<td>1500</td>
</tr>
<tr>
<td>G.SHDSL PIM</td>
<td>4482</td>
<td>9150</td>
<td>4470</td>
</tr>
<tr>
<td>T3 (DS3) or E3 PIM</td>
<td>4474</td>
<td>9192</td>
<td>4470</td>
</tr>
</tbody>
</table>
NOTE: On Gigabit Ethernet ePIMs in J4350 and J6350 Services Routers, you can configure a maximum transmission unit (MTU) size of only 9018 bytes even though the CLI indicates that you can configure an MTU of up to 9192 bytes. If you configure an MTU greater than 9018 bytes, the router does not accept the configuration and generates a system log error message similar to the following:

/kernel: ge-0/0/0: Illegal media change. MTU invalid: 9192. Max MTU supported on this PIC: 9018

On 4-port Fast Ethernet ePIMs in J4350 and J6350 Services Routers, you can configure a maximum transmission unit (MTU) size of only 1518 bytes even though the CLI indicates that you can configure an MTU of up to 9192 bytes. If you configure an MTU greater than 1518 bytes, the router does not accept the configuration and generates a system log error message similar to the following:

/kernel: fe-3/0/1: Illegal media change. MTU invalid: 9192. Max MTU supported on this PIC: 1518

Table 21: Media MTU Sizes by Interface Type for EX Series Switches

<table>
<thead>
<tr>
<th>Interface Type</th>
<th>Default Media MTU (Bytes)</th>
<th>Maximum MTU (Bytes)</th>
<th>Default IP Protocol MTU (Bytes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gigabit Ethernet</td>
<td>1514</td>
<td>9192</td>
<td>1500 (IPv4), 1497 (ISO)</td>
</tr>
<tr>
<td>10-Gigabit Ethernet</td>
<td>1514</td>
<td>9192</td>
<td>1500 (IPv4), 1497 (ISO)</td>
</tr>
</tbody>
</table>

Table 22: Encapsulation Overhead by Encapsulation Type

<table>
<thead>
<tr>
<th>Interface Encapsulation</th>
<th>Encapsulation Overhead (Bytes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>802.1Q/Ethernet 802.3</td>
<td>21</td>
</tr>
<tr>
<td>802.1Q/Ethernet Subnetwork Access Protocol (SNAP)</td>
<td>26</td>
</tr>
<tr>
<td>802.1Q/Ethernet version 2</td>
<td>18</td>
</tr>
<tr>
<td>ATM Cell Relay</td>
<td>4</td>
</tr>
<tr>
<td>ATM permanent virtual connection (PVC)</td>
<td>12</td>
</tr>
<tr>
<td>Cisco HDLC</td>
<td>4</td>
</tr>
<tr>
<td>Ethernet 802.3</td>
<td>17</td>
</tr>
<tr>
<td>Ethernet circuit cross-connect (CCC) and virtual private LAN service (VPLS)</td>
<td>4</td>
</tr>
</tbody>
</table>
## Table 22: Encapsulation Overhead by Encapsulation Type (continued)

<table>
<thead>
<tr>
<th>Interface Encapsulation</th>
<th>Encapsulation Overhead (Bytes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethernet over ATM</td>
<td>32</td>
</tr>
<tr>
<td>Ethernet SNAP</td>
<td>22</td>
</tr>
<tr>
<td>Ethernet translational cross-connect (TCC)</td>
<td>18</td>
</tr>
<tr>
<td>Ethernet version 2</td>
<td>14</td>
</tr>
<tr>
<td>Extended virtual local area network (VLAN) CCC and VPLS</td>
<td>4</td>
</tr>
<tr>
<td>Extended VLAN TCC</td>
<td>22</td>
</tr>
<tr>
<td>Frame Relay</td>
<td>4</td>
</tr>
<tr>
<td>PPP</td>
<td>4</td>
</tr>
<tr>
<td>VLAN CCC</td>
<td>4</td>
</tr>
<tr>
<td>VLAN VPLS</td>
<td>4</td>
</tr>
<tr>
<td>VLAN TCC</td>
<td>22</td>
</tr>
</tbody>
</table>

The default media MTU is calculated as follows:

\[
\text{Default media MTU} = \text{Default IP MTU} + \text{encapsulation overhead}
\]

When you are configuring point-to-point connections, the MTU sizes on both sides of the connections must be the same. Also, when you are configuring point-to-multipoint connections, all interfaces in the subnet must use the same MTU size.
**NOTE:** The actual frames transmitted also contain cyclic redundancy check (CRC) bits, which are not part of the media MTU. For example, the media MTU for a Gigabit Ethernet Version 2 interface is specified as 1514 bytes, but the largest possible frame size is actually 1518 bytes; you need to consider the extra bits in calculations of MTUs for interoperability.

The physical MTU for Ethernet interfaces does not include the 4-byte frame check sequence (FCS) field of the Ethernet frame.

A SONET/SDH interface operating in concatenated mode has a “c” added to the rate descriptor. For example, a concatenated OC48 interface is referred to as OC48c.

If you do not configure an MPLS MTU, the Junos OS derives the MPLS MTU from the physical interface MTU. From this value, the software subtracts the encapsulation-specific overhead and space for the maximum number of labels that might be pushed in the Packet Forwarding Engine. Currently, the software provides for three labels of four bytes each, for a total of 12 bytes.

In other words, the formula used to determine the MPLS MTU is the following:

\[ \text{MPLS MTU} = \text{physical interface MTU} - \text{encapsulation overhead} - 12 \]

If you configure an MTU value by including the `mtu` statement at the `[edit interfaces interface-name unit logical-unit-number family mpls]` hierarchy level, the configured value is used.

For information about configuring the encapsulation on an interface, see Configuring Interface Encapsulation on Physical Interfaces.

To modify the default media MTU size for a physical interface, include the `mtu` statement at the `[edit interfaces interface-name]` hierarchy level:

```
[edit interfaces interface-name]
mtu bytes;
```

If you change the size of the media MTU, you must ensure that the size is equal to or greater than the sum of the protocol MTU and the encapsulation overhead.

**NOTE:** Changing the media MTU or protocol MTU causes an interface to be deleted and added again.

You configure the protocol MTU by including the `mtu` statement at the following hierarchy levels:

- `[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]`
Because tunnel services interfaces are considered logical interfaces, you cannot configure the MTU setting for the physical interface. This means you cannot include the `mtu` statement at the `[edit interfaces interface-name]` hierarchy level for the following interface types: generic routing encapsulation (`gr-`), IP-IP (`ip-`), loopback (`lo-`), link services (`ls-`), multilink services (`ml-`), and multicast (`pe-, pd-`). You can, however, configure the protocol MTU on tunnel interfaces, as described in “Setting the Protocol MTU” on page 80.

## Setting the Protocol MTU

When you initially configure an interface, the protocol maximum transmission unit (MTU) is calculated automatically. If you subsequently change the media MTU, the protocol MTU on existing address families automatically changes.

For a list of default protocol MTU values, see “Configuring the Media MTU” on page 69.

To modify the MTU for a particular protocol family, include the `mtu` statement:

```plaintext
mtu bytes;
```

You can include this statement at the following hierarchy levels:

- `[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]`

If you increase the size of the protocol MTU, you must ensure that the size of the media MTU is equal to or greater than the sum of the protocol MTU and the encapsulation overhead. For a list of encapsulation overhead values, see Table 22 on page 77. If you reduce the media MTU size, but there are already one or more address families configured and active on the interface, you must also reduce the protocol MTU size. (You configure the media MTU by including the `mtu` statement at the `[edit interfaces interface-name]` hierarchy level, as discussed in “Configuring the Media MTU” on page 69.)

---

### Interface Ranges

The Junos OS allows you to group a range of identical interfaces into an `interface range`. You first specify the group of identical interfaces in the interface range. Then you can
apply a common configuration to the specified interface range, reducing the number of configuration statements required and saving time while producing a compact configuration.

- Configuring Interface Ranges on page 81
- Expanding Interface Range Member and Member Range Statements on page 84
- Configuration Inheritance for Member Interfaces on page 86
- Member Interfaces Inheriting Configuration from Configuration Groups on page 87
- Interfaces Inheriting Common Configuration on page 88
- Configuring Inheritance Range Priorities on page 88
- Configuration Expansion Where Interface Range Is Used on page 89

**Configuring Interface Ranges**

To configure an interface range, include the `interface-range` statement at the `[edit interfaces]` hierarchy level.

The `interface-range` statement accepts only physical networking interface names in its definition. The following interface types are supported and example CLI descriptors are shown:

- ATM—`at-fpc/pic/port`
- Channelized—`(coc | cstm)n-fpc/pic/port`
- DPC—`xe-fpc/pic/port`
- E1/E3—`(e1 | e3)-fpc/pic/port`
- Ethernet—`(xe | ge | fe)-fpc/pic/port`
- ISDN—`isdn-fpc/pic/port`
- Serial—`se-fpc/pic/port`
- SONET/SDH—`so-fpc/pic/port`
- T1/T3—`(t1 | t3)-fpc/pic/port`

Interfaces can be grouped either as a range of interfaces or using a number range under the `interface-range` statement definition.

Interfaces in an `interface-range` definition can be added as part of a member range or as individual members or multiple members using a number range.

To specify a member range, use the `member-range` statement at the `[edit interfaces interface-range name]` hierarchy level.

To specify interfaces in lexical order, use the `member-range start-range to end-range` statement.
A range for a member statement should contain the following:

- `*`—All, specifies all available interfaces.
- `num`—Number, specifies one specific interface by its number.
- `[low-high]`—Numbers between low to high, specifies a range of sequential interfaces.
- `[num1, num2, num3]`—Numbers `num1`, `num2`, and `num3` specify multiple specific interfaces.

**Example: Specifying an Interface Range**

```plaintext
member-range ge-0/0/0 to ge-4/0/40;
```

To specify one or multiple members, use the `member` statement at the `[edit interfaces interface-range name]` hierarchy level.

**Example: Specifying an Interface Range Member**

```plaintext
member ge-0/0/0;
member ge-0/*/*
member ge-0/[1-10]/0;
member ge-0/[1,2,3]/3;
```

Regex or wildcards are not supported for interface-type prefixes. For example, prefixes `ge`, `fe`, and `xe` must be mentioned explicitly.

An `interface-range` definition can contain both `member` and `member-range` statements within it. There is no maximum limit on the number of `member` or `member-range` statements within an `interface-range`. However, at least one `member` or `member-range` statement must exist within an `interface-range` definition.

**Example: Interface Range Common Configuration**

```plaintext
[edit]
interfaces {
    + interface-range foo {
        + member-range ge-1/0/0 to ge-4/0/40;
        + member ge-0/1/1;
        + member ge-5/[1-10]/*;
        /*Common configuration is added as part of interface-range definition*/
        mtu 256;
        hold-time up 10;
        ether-options {
            flow-control;
            speed {
                100m;
            }
            802.3ad primary;
        }
    }
}
```
An **interface-range** definition having just **member** or **member-range** statements and no common configurations statements is valid.

These defined interface ranges can be used in other configuration hierarchies, in places where an **interface** node exists.

**Example:**

```plaintext
Interface-Range foo

Used Under the Protocols Hierarchy

protocols {
  dot1x {
    authenticator {
      interface foo {
        retries 1;
      }
    }
  }
}
```

**foo** should be an **interface-range** defined at the [interfaces] hierarchy level. In the above example, the **interface** node can accept both individual interfaces and interface ranges.

---

**TIP:** To view an interface range in expanded configuration, use the (show | display inheritance) command. For more information, see the Junos OS CLI User Guide.

---

By default, **interface-range** is not available to configure in the CLI where the **interface** statement is available. The following locations are supported; however, some of the hierarchies shown in this list are product specific:

- **protocols dot1x authentication interface**
- **protocols dvmrp interface**
- **protocols oam ethernet lmi interface**
- **protocols esis interface**
- **protocols igmp interface**
- **protocols igmp-host client num interface**
- **protocols mdm-host client num interface**
- **protocols router-advertisement interface**
- **protocols isis interface**
- **protocols ldp interface**
- **protocols oam ethernet link-fault-management interface**
- **protocols lldp interface**
- **protocols link-management peer lmp-control-channel interface**
- **protocols link-management peer control-channel**
- **protocols link-management te-link name interface**
- **protocols mid interface**
• protocols ospf area id interface
• protocols pim interface
• protocols router-discovery interface
• protocols rip group name neighbour
• protocols ripng group name neighbour
• protocols rsvp interface
• protocols snmp interface
• protocols layer2-control bpdu-block interface
• protocols layer2-control mac-rewrite interface
• protocols mpls interface
• protocols stp interface
• protocols rstp interface
• protocols mstp interface
• protocols vstp interface
• protocols mstp msti id interface
• protocols mstp msti vlan id interface
• protocols vstp vlan name interface
• protocols gvrp interface
• protocols igmp-snooping vlan name interface
• protocols lldp interface
• protocols lldp-med interface
• protocols sflow interfaces
• ethernet-switching-options analyzer name input [egress | ingress ] interface
• ethernet-switching-options analyzer name output interface
• ethernet-switching-options secure-access-port interface
• ethernet-switching-options interfaces ethernet-switching-options voip interface
• ethernet-switching-options redundant-trunk-group group g1 interface
• ethernet-switching-options redundant-trunk-group group g1 interface
• ethernet-switching-options bpdu-block interface
• poe interface vlans pro-bng-mc1-bsdi interface

Expanding Interface Range Member and Member Range Statements

All member and member-range statements in an interface range definition are expanded to generate the final list of interface names for the specified interface range.
Example: Expanding Interface Range

Member and Member Range Statements

[edit]
interfaces {
interface-range range-1 {
  member-range ge-0/0/0 to ge-4/0/20;
  member ge-10/1/1;
  member ge-5/[0-5]/*;
  /*Common configuration is added part of the interface-range definition*/
  mtu 256;
  hold-time up 10;
  ether-options {
    flow-control;
    speed {
      100m;
    }
    802.3ad primary;
  }
}
}

For the member-range statement, all possible interfaces between start-range and end-range are considered in expanding the members. For example, the following member-range statement:

member-range ge-0/0/0 to ge-4/0/20
expands to:

[ge-0/0/0, ge-0/0/1 ... ge-0/0/max_ports
 ge-0/1/0 ge-0/1/1 ... ge-0/1/max_ports
 ge-0/2/0 ge-0/2/1 ... ge-0/2/max_ports
 ...]

ge-0/MAX_PICS/0 ... ge-0/max_pics/max_ports
ge-1/0/0 ge-1/0/1 ... ge-1/0/max_ports
ge-1/MAX_PICS/0 ... ge-1/max_pics/max_ports
...]

ge-4/0/0 ge-4/0/1 ... ge-4/0/max_ports]

The following member statement:

ge-5/[0-5]/*
expands to:

ge-5/0/0 ... ge-5/0/max_ports
ge-5/1/0 ... ge-5/0/max_ports
 ...]

ge-5/5/0 ... ge-5/5/max_ports

The following member statement:

ge-5/1/[2,3,6,10]
expands to:

ge-5/1/2
ge-5/1/3
Configuration Inheritance for Member Interfaces

When the Junos OS expands the member and member-range statements present in an interface-range, it creates interface objects if they are not explicitly defined in the configuration. The common configuration is copied to all its member interfaces in the interface-range.

Example: Configuration Priorities

```
interfaces {
  interface-range range-1 {
    member-range ge-1/0/0/ to ge-10/0/47;
    mtu 256;
  }
  ge-1/0/1 {
    mtu 1024;
  }
}
```

In the preceding example, interface ge-1/0/1 will have an MTU value of 1024.

This can be verified with output of the show interfaces | display inheritance command, as follows:

```
user@host: # show interfaces | display inheritance
## 'ge-1/0/0' was expanded from interface-range 'range-1'
## '256' was expanded from interface-range 'range-1'
## mtu 256;

ge-1/0/0 {
  ## 'ge-1/0/1' was expanded from interface-range 'range-1'
  ## '256' was expanded from interface-range 'range-1'
  ## mtu 256;
}

ge-1/0/1 {
  mtu 1024;
}

## 'ge-1/0/2' was expanded from interface-range 'range-1'
## '256' was expanded from interface-range 'range-1'
## mtu 256;

ge-1/0/2 {
  ## 'ge-10/0/47' was expanded from interface-range 'range-1'
  ## '256' was expanded from interface-range 'range-1'
  ## mtu 256;
}

...........

ge-10/0/47 {
  ## '256' was expanded from interface-range 'range-1'
  ## mtu 256;
}
```

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Member Interfaces Inheriting Configuration from Configuration Groups

Interface range member interfaces inherit the config-groups configuration like any other foreground configuration. **interface-range** is similar to any other foreground configuration statement. The only difference is that the **interface-range** goes through a member interfaces expansion before the Junos OS reads this configuration.

```
  groups {
    global {
      interfaces {
        <*> {
          hold-time up 10;
        }
      }
    }
  }
  apply-groups [global];
  interfaces {
    interface-range range-1 {
      member-range ge-1/0/0 to ge-10/0/47;
      mtu 256;
    }
  }
```

The **hold-time** configuration is applied to all members of **interface-range range-1**.

This can be verified with **show interfaces | display inheritance** as below:

```
user@host# show interfaces | display inheritance
ge-1/0/0 {
  ## '256' was expanded from interface-range 'range-1'
  ## mtu 256;
  ## 'hold-time' was inherited from group 'global'
  ## '10' was inherited from group 'global'
  ## hold-time up 10;
}
ge-1/0/1 {
  ## '256' was expanded from interface-range 'range-1'
  ## mtu 256;
  ## 'hold-time' was inherited from group 'global'
  ## '10' was inherited from group 'global'
  ## hold-time up 10;
}
ge-10/0/47 {
  ## '256' was expanded from interface-range 'range-1'
  ## mtu 256;
```
Interfaces Inheriting Common Configuration

If an interface is a member of several interface ranges, that interface will inherit the common configuration from all of those interface ranges.

```
[edit]
interfaces {
  interface-range range-1 {
    member-range ge-1/0/0 to ge-10/0/47;
    mtu 256;
  }
}

Interfaces inherits configuration from all interface ranges.

In this example, interfaces ge-10/0/0 through ge-10/0/47 will have both hold-time and mtu.

Configuring Inheritance Range Priorities

The interface ranges are defined in the order of inheritance priority, with the first interface range configuration data taking priority over subsequent interface ranges.

```
[edit]
interfaces {
  interface-range int-grp-one {
    member-range ge-0/0/0 to ge-4/0/40;
    member ge-1/1/1;
    /*Common config is added part of the interface-range definition*/
    mtu 256;
    hold-time up 10;
  }
}
```

Interface ge-1/1/1 exists in both interface-range int-grp-one and interface-range int-grp-two. This interface inherits mtu 256 from interface-range int-grp-one because it was defined first.
Configuration Expansion Where Interface Range Is Used

In this example, `interface-range range-1` is used under the protocols hierarchy:

```conf
[edit]
interfaces {
    interface-range range-1 {
        member ge-10/1/1;
        member ge-5/5/1;
        mtu 256;
        hold-time up 10;
        ether-options {
            flow-control;
            speed {
                100m;
            }
            802.3ad primary;
        }
    }
    protocols {
        dot1x {
            authenticator {
                interface range-1 {
                    retries 1;
                }
            }
        }
    }
}
```

The `interface node present under authenticator` is expanded into member interfaces of the `interface-range range-1` as follows:

```conf
protocols {
    dot1x {
        authenticator {
            interface ge-10/1/1 {
                retries 1;
            }
            interface ge-5/5/1 {
                retries 1;
            }
        }
    }
}
```

The `interface range-1` statement is expanded into two interfaces, `ge-10/1/1` and `ge-5/5/1`, and configuration `retries 1` is copied under those two interfaces.

This configuration can be verified using the `show protocols dot1x | display inheritance` command.
Configuring Accounting for the Physical Interface

Juniper Networks routers and switches can collect various kinds of data about traffic passing through the router and switch. You can set up one or more accounting profiles that specify some common characteristics of this data, including the following:

- The fields used in the accounting records
- The number of files that the router or switch retains before discarding, and the number of bytes per file
- The polling period that the system uses to record the data

You configure the profiles and define a unique name for each profile using statements at the [edit accounting-options] hierarchy level. There are two types of accounting profiles: interface profiles and filter profiles. You configure interface profiles by including the interface-profile statement at the [edit accounting-options] hierarchy level. You configure filter profiles by including the filter-profile statement at the [edit accounting-options] hierarchy level. For more information, see the Junos OS Network Management Configuration Guide.

You apply filter profiles by including the accounting-profile statement at the [edit firewall filter filter-name] and [edit firewall family family filter filter-name] hierarchy levels. For more information, see the Junos OS Routing Policy Configuration Guide.

Applying an Accounting Profile to the Physical Interface

To enable accounting on an interface, include the accounting-profile statement at the [edit interfaces interface-name] hierarchy level:

```
[edit interfaces interface-name]
accounting-profile name;
```

You can also reference profiles by logical unit; for more information, see “Configuring Accounting for the Logical Interface” on page 91.

Example: Applying an Accounting Profile to the Physical Interface

Configure an accounting profile for an interface and apply it to a physical interface:

```
[edit]
accounting-options {
  file_if_stats {
    size 4m files 10 transfer-interval 15;
    archive-sites {
      "ftp://login:password@host/path";
    }
  }
  interface-profile if_profile {
    interval 15;
    file_if_stats {
      fields {
        input-bytes;
        output-bytes;
      }
    }
  }
}
```
Juniper Networks routers or switches can collect various kinds of data about traffic passing through the router or switch. You can set up one or more accounting profiles that specify some common characteristics of this data, including the following:

- The fields used in the accounting records
- The number of files that the router or switch retains before discarding, and the number of bytes per file
- The period that the system uses to record the data

You configure the profiles and define a unique name for each profile using statements at the [edit accounting-options] hierarchy level. There are two types of accounting profiles: interface profiles and filter profiles. You configure interface profiles by including the interface-profile statement at the [edit accounting-options] hierarchy level. You configure filter profiles by including the filter-profile statement at the [edit accounting-options] hierarchy level. For more information, see the "Junos OS Network Management Configuration Guide".

You apply filter profiles by including the accounting-profile statement at the [edit firewall filter filter-name] and [edit firewall family family filter filter-name] hierarchy levels. For more information, see the "Junos OS Routing Policy Configuration Guide".

### Applying an Accounting Profile to the Logical Interface

To enable accounting on a logical interface, include the accounting-profile statement:

```
accounting-profile name;
```

You can include this statement at the following hierarchy level:

```
• [edit interfaces interface-name unit logical-unit-number]
```

You can also reference profiles for the physical interface; for more information, see "Configuring Accounting for the Physical Interface" on page 90.

### Example: Applying an Accounting Profile to the Logical Interface

Configure an accounting profile for an interface and apply it to a logical interface:

```
[edit]
accounting-options {
```
Configuring Ethernet Loopback Capability

By default, local aggregated Ethernet, Fast Ethernet, Tri-Rate Ethernet copper, Gigabit Ethernet, and 10-Gigabit Ethernet interfaces connect to a remote system. To place an interface in loopback mode, include the `loopback` statement:

```
loopback;
```

**NOTE:** If you configure a local loopback on a 1-port 10-Gigabit IQ2 and IQ2-E PIC using the loopback statement at the `[edit interfaces interface-name fastether-options]` hierarchy level, the transmit-path stops working, causing the remote end to detect a link down.

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

```
[edit]
user@host# delete interfaces fe-fpc/pic/port fastether-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]
- [edit interfaces *interface-name* fastether-options]
- [edit interfaces *interface-name* gigether-options]

**Related Documentation**

- loopback on page 173
- Ethernet Interfaces Overview
- Junos OS Ethernet Interfaces Configuration Guide

## Configuring Gratuitous ARP

Gratuitous Address Resolution Protocol (ARP) requests provide duplicate IP address detection. A gratuitous ARP request is a broadcast request for a router’s own IP address. If a router or switch sends an ARP request for its own IP address and no ARP replies are received, the router- or switch-assigned IP address is not being used by other nodes. If a router or switch sends an ARP request for its own IP address and an ARP reply is received, the router- or switch-assigned IP address is already being used by another node.

By default, the router or switch responds to gratuitous ARP requests. On Ethernet interfaces, you can disable responses to gratuitous ARP requests. To disable responses to gratuitous ARP requests, include the **no-gratuitous-arp-request** statement at the [edit interfaces *interface-name*] hierarchy level:

```
[edit interfaces *interface-name*]
no-gratuitous-arp-request;
```

To return to the default—that is, to respond to gratuitous ARP requests—delete the **no-gratuitous-arp-request** statement from the configuration:

```
[edit]
user@host# delete interfaces *interface-name* no-gratuitous-arp-request
```

Gratuitous ARP replies are reply packets sent to the broadcast MAC address with the target IP address set to be the same as the sender's IP address. When the router or switch receives a gratuitous ARP reply, the router or switch can insert an entry for that reply in the ARP cache.

By default, updating the ARP cache on gratuitous ARP replies is disabled on the router or switch. On Ethernet interfaces, you can enable handling of gratuitous ARP replies on a specific interface by including the **gratuitous-arp-reply** statement at the [edit interfaces *interface-name*] hierarchy level:

```
[edit interfaces *interface-name*]
gratuitous-arp-reply;
```
To restore the default behavior, include the `no-gratuitous-arp-reply` statement at the `[edit interfaces interface-name]` hierarchy level:

```
[edit interfaces interface-name]
no-gratuitous-arp-reply;
```

**Related Documentation**
- gratuitous-arp-reply on page 158
- no-gratuitous-arp-request
- Ethernet Interfaces Overview
- Junos OS Ethernet Interfaces Configuration Guide

## Configuring Static ARP Table Entries

To configure static ARP table entries, include the `arp` statement:

```
arp ip-address (mac | multicast-mac) mac-address <publish>;
```

You can include this statement at the following hierarchy levels:

- `[edit interfaces interface-name unit logical-unit-number family inet address address]`
- `[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number family inet address address]`

The IP address that you specify must be part of the subnet defined in the enclosing `address` statement.

To associate a multicast MAC address with a unicast IP address, include the `multicast-mac` statement.

Specify the MAC address as six hexadecimal bytes in one of the following formats: `nnnn.nnnn.nnnn` or `nnnn:nnnn:nnnn`; for example, `0011.2233.4455` or `00:11:22:33:44:55`.

For unicast MAC addresses only, if you include the `publish` option, the router or switch replies to proxy ARP requests.

---

**NOTE:** By default, an ARP policer is installed that is shared among all the Ethernet interfaces on which you have configured the family inet statement. By including the `arp` statement at the `[edit interfaces interface-name unit logical-unit-number family inet policer]` hierarchy level, you can apply a specific ARP-packet policer to an interface. This feature is not available on EX Series switches.

When you need to conserve IP addresses, you can configure an Ethernet interface to be unnumbered by including the unnumbered-address statement at the `[edit interfaces interface-name unit logical-unit-number family inet]` hierarchy level.
NOTE: The Junos OS supports the IPv6 static neighbor discovery cache entries, similar to the static ARP entries in IPv4.

Example: Configuring Static ARP Table Entries

Configure two static ARP table entries on the router or switch’s management interface:

```plaintext
[edit interfaces]
fxp0 {
    unit 0 {
        family inet {
            address 10.10.0.11/24 {
                arp 10.10.0.99 mac 0001.0002.0003;
                arp 10.10.0.101 mac 00:11:22:33:44:55 publish;
            }
        }
    }
}
```

Related Documentation
- Management Ethernet Interface Overview
- Applying Policers
- Configuring an Unnumbered Interface
- Junos OS Ethernet Interfaces Configuration Guide

Disabling the Transmission of Redirect Messages on an Interface

By default, the interface sends protocol redirect messages. To disable the sending of these messages on an interface, include the `no-redirects` statement:

```plaintext
no-redirects;
```

You can include this statement at the following hierarchy levels:

- `[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]`

To disable the sending of protocol redirect messages for the entire router or switch, include the `no-redirects` statement at the `[edit system]` hierarchy level.

Configuring Restricted and Unrestricted Proxy ARP

To configure restricted or unrestricted proxy ARP, include the `proxy-arp` statement:

```plaintext
proxy-arp (restricted [unrestricted]);
```

You can include this statement at the following hierarchy levels:

- `[edit interfaces interface-name unit logical-unit-number]`
To return to the default—that is, to disable restricted or unrestricted proxy ARP—delete the `proxy-arp` statement from the configuration:

```
[edit]
user@host# delete interfaces interface-name unit logical-unit-number proxy-arp
```

You can track the number of restricted or unrestricted proxy ARP requests processed by the router or switch by issuing the `show system statistics arp` operational mode command.

**NOTE:** When proxy ARP is enabled as default or unrestricted, the router responds to any ARP request as long as the router has an active route to the target address of the ARP request. This gratuitous ARP behavior can result in an error when the receiving interface and target response interface are the same and the end device (for example, a client) performs a duplicate address check. To prevent this error, configure the router interface with the `no-gratuitous-arp-reply` statement. See “Configuring Gratuitous ARP” on page 93 for information about how to disable responses to gratuitous ARP requests.

**Related Documentation**

- proxy-arp on page 187
- Restricted and Unrestricted Proxy ARP Overview
- Configuring Gratuitous ARP on page 93
- Junos OS Ethernet Interfaces Configuration Guide

### Enabling or Disabling SNMP Notifications on Logical Interfaces

By default, Simple Network Management Protocol (SNMP) notifications are sent when the state of an interface or a connection changes. To explicitly enable these notifications on the logical interface, include the `traps` statement; to disable these notifications on the logical interface, include the `no-traps` statement:

```
(traps | no-traps);
```

You can include these statements at the following hierarchy levels:

- `[edit interfaces interface-name unit logical-unit-number]`
- `[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number]`

**NOTE:** Gigabit Ethernet interfaces on J Series routers do not support SNMP.
Enabling or Disabling SNMP Notifications on Physical Interfaces

By default, Simple Network Management Protocol (SNMP) notifications are sent when the state of an interface or a connection changes. To explicitly enable these notifications on the physical interface, include the `traps` statement at the `[edit interfaces interface-name]` hierarchy level. To disable these notifications on the physical interface, include the `no-traps` statement at the `[edit interfaces interface-name]` hierarchy level:

```
[edit interfaces interface-name]
(traps | no-traps):
```

**NOTE:** Gigabit Ethernet interfaces on J Series routers do not support SNMP.

Configuring Aggregated Ethernet Interfaces (CLI Procedure)

Use the link aggregation feature to aggregate one or more links to form a virtual link or link aggregation group (LAG). 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 availability.

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

To configure aggregated Ethernet interfaces, using the CLI:

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

   ```
   [edit chassis]
   user@switch# set aggregated-devices ethernet device-count 2
   ```

2. Specify the minimum number of links for the aggregated Ethernet interface (ae), 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 ae0 aggregated-ether-options minimum-links 2
   ```

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

   ```
   [edit interfaces]
   user@switch# set ae0 aggregated-ether-options link-speed 10g
   ```

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

   ```
   [edit interfaces]
   user@switch# set xe-0/1/0 ether-options 802.3ad ae0
   ```
user@switch# set xe-1/1/0 ether-options 802.3ad ae0

5. Specify an interface family for the aggregated Ethernet bundle:

```
[edit interfaces]
user@switch# set ae0 unit 0 family inet address 192.0.2.0/25
```

For information about adding LACP to a LAG, see “Configuring Aggregated Ethernet LACP (CLI Procedure)” on page 101.

**Related Documentation**

- Configuring Aggregated Ethernet Interfaces (J-Web Procedure) on page 98
- Example: Configuring Aggregated Ethernet High-Speed Uplinks Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch on page 21
- Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch on page 27
- Verifying the Status of a LAG Interface on page 114
- Understanding Aggregated Ethernet Interfaces and LACP on page 8

### Configuring Aggregated Ethernet Interfaces (J-Web Procedure)

Use the link aggregation feature to aggregate one or more Ethernet interfaces to form a virtual link or link aggregation group (LAG) on an EX Series switch. 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 availability. You can use the J-Web interface to configure aggregated Ethernet interfaces, or a LAG, on the switch.

**NOTE:** Interfaces that are already configured with MTU, duplex, flow control, or logical interfaces are listed but are not available for aggregation.

To configure an aggregated Ethernet interface (also referred to as a LAG):

1. Select **Configure > Interfaces > Link Aggregation**.

   The list of aggregated interfaces is displayed.

   **NOTE:** After you make changes to the configuration in this page, you must commit the changes immediately for them to take effect. To commit all changes to the active configuration, select **Commit Options > Commit**. See Using the Commit Options to Commit Configuration Changes for details about all commit options.

2. Click one of the following:
- **Add**—Creates an aggregated Ethernet interface, or LAG. Enter information as specified in Table 23 on page 99.
- **Edit**—Modifies a selected LAG.
  - **Aggregation**—Modifies settings for the selected LAG. Enter information as specified in Table 23 on page 99.
  - **VLAN**—Specifies VLAN options for the selected LAG. Enter information as specified in Table 24 on page 100.
  - **IP Option**—Specifies IP options for the selected LAG. Enter information as specified in Table 25 on page 100.
- **Delete**—Deletes the selected LAG.
- **Disable Port or Enable Port**—Disables or enables the administrative status on the selected interface.
- **Device Count**—Configures the number of aggregated logical devices available to the switch. Select the number and click OK.

### Table 23: Aggregated Ethernet Interface Options

<table>
<thead>
<tr>
<th>Field</th>
<th>Function</th>
<th>Your Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggregated Interface</td>
<td>Specifies the name of the aggregated interface.</td>
<td>None. The name is supplied by the software.</td>
</tr>
<tr>
<td>LACP Mode</td>
<td>Specifies the mode in which LACP packets are exchanged between the interfaces. The modes are:</td>
<td>Select from the list.</td>
</tr>
<tr>
<td>Description</td>
<td>Specifies a description for the LAG.</td>
<td>Enter a description.</td>
</tr>
<tr>
<td>Interface</td>
<td>Specifies the interfaces in the LAG.</td>
<td>To add interfaces to the LAG, select the interfaces and click Add. Click OK.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>To remove an interface from the LAG, select the interface and click Remove.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>NOTE:</strong> Only interfaces that are configured with the same speed can be selected together for a LAG.</td>
</tr>
<tr>
<td>Enable Log</td>
<td>Specifies whether to enable generation of log entries for the LAG.</td>
<td>Select the check box to enable log generation, or clear the check box to disable log generation.</td>
</tr>
</tbody>
</table>
### Table 24: VLAN Options

<table>
<thead>
<tr>
<th>Field</th>
<th>Function</th>
<th>Your Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port Mode</td>
<td>Specifies the mode of operation for the port: trunk or access.</td>
<td>If you select <strong>Trunk</strong>, you can:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. Click <strong>Add</strong> to add a VLAN member.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Select the VLAN and click <strong>OK</strong>.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. (Optional) Associate a native VLAN ID with the port.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If you select <strong>Access</strong>, you can:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. Select the VLAN member to be associated with the port.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. (Optional) Associate a VoIP VLAN with the interface. Only a VLAN with a VLAN ID can be associated as a VoIP VLAN.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Click <strong>OK</strong>.</td>
</tr>
</tbody>
</table>

### Table 25: IP Options

<table>
<thead>
<tr>
<th>Field</th>
<th>Function</th>
<th>Your Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPv4 Address</td>
<td>Specifies an IPv4 address for the selected LAG.</td>
<td>1. Select the check box <strong>IPv4 address</strong>.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Type an IP address—for example, 10.10.10.10.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Enter the subnet mask or address prefix. For example, 24 bits represents 255.255.255.0.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Click <strong>OK</strong>.</td>
</tr>
<tr>
<td>IPv6 Address</td>
<td>Specifies an IPv6 address for the selected LAG.</td>
<td>1. Select the check box <strong>IPv6 address</strong>.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Type an IP address—for example, 2001:ab8:85a3:8a2e:370:7334.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Enter the subnet mask or address prefix.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Click <strong>OK</strong>.</td>
</tr>
</tbody>
</table>

### Related Documentation
- Configuring Aggregated Ethernet Interfaces (CLI Procedure) on page 97
- Example: Configuring Aggregated Ethernet High-Speed Uplinks Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch on page 21
- Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch on page 27
- Verifying the Status of a LAG Interface on page 114
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 with or without LACP enabled.

Before you configure LACP, be sure you have:

- Configured the aggregated Ethernet bundles—also known as link aggregation groups (LAGs). See “Configuring Aggregated Ethernet Interfaces (CLI Procedure)” on page 97

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

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

To configure LACP:

1. Enable one side of the aggregated Ethernet link as active:

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

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

   ```
   [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.
Configuring Aggregated Ethernet Link Protection

You can configure link protection for aggregated Ethernet interfaces to provide QoS on the links during operation.

On aggregated Ethernet interfaces, you designate a primary and backup link to support link protection. Egress traffic passes only through the designated primary link. This includes transit traffic and locally generated traffic on the router or switch. When the primary link fails, traffic is routed through the backup link. Because some traffic loss is unavoidable, egress traffic is not automatically routed back to the primary link when the primary link is reestablished. Instead, you manually control when traffic should be diverted back to the primary link from the designated backup link.

- Configuring Link Protection for Aggregated Ethernet Interfaces on page 102
- Configuring Primary and Backup Links for Link Aggregated Ethernet Interfaces on page 102
- Reverting Traffic to a Primary Link When Traffic is Passing Through a Backup Link on page 103
- Disabling Link Protection for Aggregated Ethernet Interfaces on page 103

Configuring Link Protection for Aggregated Ethernet Interfaces

Aggregated Ethernet interfaces support link protection to ensure QoS on the interface.

To configure link protection:

1. Specify that you want to configure the options for an aggregated Ethernet interface.
   ```
   user@host# edit interfaces aex aggregated-ether-options
   ```

2. Configure the link protection mode.
   ```
   [edit interfaces aex aggregated-ether-options]
   user@host# set link-protection
   ```

Configuring Primary and Backup Links for Link Aggregated Ethernet Interfaces

To configure link protection, you must specify a primary and a secondary, or backup, link.

To configure a primary link and a backup link:

1. Configure the primary logical interface.
   ```
   [edit interfaces interface-name]
   user@host# set (fastether-options | gigether-options) 802.3ad aex primary
   ```
2. Configure the backup logical interface.

```
[edit interfaces interface-name]
user@host# set (fastether-options | gigether-options) 802.3ad aex backup
```

**Reverting Traffic to a Primary Link When Traffic is Passing Through a Backup Link**

On aggregated Ethernet interfaces, you designate a primary and backup link to support link protection. Egress traffic passes only through the designated primary link. This includes transit traffic and locally generated traffic on the router or switch. When the primary link fails, traffic is routed through the backup link. Because some traffic loss is unavoidable, egress traffic is not automatically routed back to the primary link when the primary link is reestablished. Instead, you manually control when traffic should be diverted back to the primary link from the designated backup link.

To manually control when traffic should be diverted back to the primary link from the designated backup link, enter the following operational command:

```
user@host> request interface revert aex
```

**Disabling Link Protection for Aggregated Ethernet Interfaces**

To disable link protection, issue the `delete interface revert aex` configuration command.

```
user@host# delete interfaces aex aggregated-ether-options link-protection
```

**Configuring Aggregated Ethernet Link Speed**

On aggregated Ethernet interfaces, you can set the required link speed for all interfaces included in the bundle. All interfaces that make up a bundle must be the same speed. If you include in the aggregated Ethernet interface an individual link that has a speed different from the speed you specify in the `link-speed` parameter, an error message will be logged.

To set the required link speed:

1. Specify that you want to configure the aggregated Ethernet options.

```
user@host# edit interfaces interface-name aggregated-ether-options
```

2. Configure the link speed.

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

`speed` can be in bits per second either as a complete decimal number or as a decimal number followed by the abbreviation `k` (1000), `m` (1,000,000), or `g` (1,000,000,000).

Aggregated Ethernet interfaces on the M120 router can have one of the following speed values:
Aggregated Ethernet links on EX Series switches can be configured to operate at one of the following speeds:

- **10m**—Links are 10 Mbps.
- **100m**—Links are 100 Mbps.
- **1g**—Links are 1 Gbps.
- **10g**—Links are 10 Gbps.
- **OC192**—Links are OC192 or STM64c.

Aggregated Ethernet links on EX Series switches can be configured to operate at one of the following speeds:

- **10m**
- **100m**
- **1g**
- **10g**
- **50g**

### Related Documentation
- aggregated-ether-options
- Junos OS Ethernet Interfaces Configuration Guide

### Configuring Aggregated Ethernet Minimum Links

On aggregated Ethernet interfaces, you can configure the minimum number of links that must be up for the bundle as a whole to be labeled **up**. By default, only one link must be up for the bundle to be labeled **up**.

To configure the minimum number of links:

1. Specify that you want to configure the aggregated Ethernet options.

   ```
   user@host# edit interfaces interface-name aggregated-ether-options
   ```

2. Configure the minimum number of links.

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

On M120, M320, MX Series, T Series, and TX Matrix routers with Ethernet interfaces, the valid range for `minimum-links number` is 1 through 16. When the maximum value (16) is specified, all configured links of a bundle must be up for the bundle to be labeled **up**.

On all other routers and on EX Series switches, other than EXB200 switches, the range of valid values for `minimum-links number` is 1 through 8. When the maximum value (8) is specified, all configured links of a bundle must be up for the bundle to be labeled **up**.

On EXB200 switches, the range of valid values for `minimum-links number` is 1 through 12. When the maximum value (12) is specified, all configured links of a bundle must be up for the bundle to be labeled **up**.
If the number of links configured in an aggregated Ethernet interface is less than the minimum link value configured under the `aggregated-ether-options` statement, the configuration commit fails and an error message is displayed.

**Related Documentation**
- `aggregated-ether-options`
- `minimum-links` on page 178
- *Junos OS Ethernet Interfaces Configuration Guide*

### Configuring Tagged Aggregated Ethernet Interfaces

To specify aggregated Ethernet interfaces, include the `vlan-tagging` statement at the `[edit interfaces aex]` hierarchy level:

```ini
[edit interfaces aex]
vlan-tagging:
```

You must also include the `vlan-id` statement:

```ini
vlan-id number;
```

You can include this statement at the following hierarchy levels:

- `[edit interfaces interface-name unit logical-unit-number]`
- `[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number]`

For more information about the `vlan-tagging` and `vlan-id` statements, see “802.1Q VLANs Overview” on page 19.

**Related Documentation**
- `vlan-id`
- `vlan-tagging` on page 199

### Configuring a Layer 3 Subinterface (CLI Procedure)

EX Series switches use Layer 3 subinterfaces to divide a physical interface into multiple logical interfaces, each corresponding to a VLAN. The switch uses the Layer 3 subinterfaces to route traffic between subnets.

To configure Layer 3 subinterfaces, you 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 for EX Series Switches (CLI Procedure) or Configuring VLANs for EX Series Switches (J-Web Procedure).

To configure Layer 3 subinterfaces:

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

- Example: Configuring Layer 3 Subinterfaces for a Distribution Switch and an Access Switch on page 32
- Verifying That Layer 3 Subinterfaces Are Working on page 116
- Understanding Layer 3 Subinterfaces on page 12

Configuring Unicast RPF (CLI Procedure)

Unicast reverse-path forwarding (RPF) can help protect your LAN from denial-of-service (DoS) and distributed denial-of-service (DDoS) attacks on untrusted interfaces. Enabling unicast RPF on the switch interfaces filters traffic with source addresses that do not use the incoming interface as the best return path back to the source. When a packet comes into an interface, if that interface is not the best return path to the source, the switch discards the packet. If the incoming interface is the best return path to the source, the switch forwards the packet.

**NOTE:** On EX3200 and EX4200 switches, you can only enable unicast RPF globally, on all switch interfaces. You cannot enable unicast RPF on a per-interface basis.

Before you begin:

- On an EX8200 switch, ensure that the selected switch interface is symmetrically routed before you enable unicast RPF. A symmetrically routed interface is an interface that uses the same route in both directions between the source and the destination. Do not enable unicast RPF on asymmetrically routed interfaces. An asymmetrically routed interface uses different paths to send and receive packets between the source and the destination.

- On an EX3200 or EX4200 switch, ensure that all switch interfaces are symmetrically routed before you enable unicast RPF on an interface. When you enable unicast RPF on any interface, it is enabled globally on all switch interfaces. Do not enable unicast RPF on asymmetrically routed interfaces. An asymmetrically routed interface uses different paths to send and receive packets between the source and the destination.
To enable unicast RPF, configure it explicitly on a selected customer-edge interface:

```bash
[edit interfaces]
user@switch# set ge-1/0/10 unit 0 family inet rpf-check
```

**BEST PRACTICE:** On EX3200 and EX4200 switches, unicast RPF is enabled globally on all switch interfaces, regardless of whether you configure it explicitly on only one interface or only on some interfaces.

On EX3200 and EX4200 switches, we recommend that you enable unicast RPF explicitly on either all interfaces or only one interface. To avoid possible confusion, do not enable it on only some interfaces:

- Enabling unicast RPF explicitly on only one interface makes it easier if you choose to disable it in the future because you must explicitly disable unicast RPF on every interface on which you explicitly enabled it. If you explicitly enable unicast RPF on two interfaces and you disable it on only one interface, unicast RPF is still implicitly enabled globally on the switch. The drawback to this approach is that the switch displays the flag that indicates that unicast RPF is enabled only on interfaces on which unicast RPF is explicitly enabled, so even though unicast RPF is enabled on all interfaces, this status is not displayed.

- Enabling unicast RPF explicitly on all interfaces makes it easier to know whether unicast RPF is enabled on the switch because every interface shows the correct status. (Only interfaces on which you explicitly enable unicast RPF display the flag that indicates that unicast RPF is enabled.) The drawback to this approach is that if you want to disable unicast RPF, you must explicitly disable it on every interface. If unicast RPF is enabled on any interface, it is implicitly enabled on all interfaces.

**Related Documentation**
- Example: Configuring Unicast RPF on an EX Series Switch on page 39
- Verifying Unicast RPF Status on page 117
- Disabling Unicast RPF (CLI Procedure) on page 107
- Troubleshooting Unicast RPF on page 125
- Understanding Unicast RPF for EX Series Switches on page 13

**Disabling Unicast RPF (CLI Procedure)**

Unicast reverse-path forwarding (RPF) can help protect your LAN from denial-of-service (DoS) and distributed denial-of-service (DDoS) attacks on untrusted interfaces. Unicast RPF filters traffic with source addresses that do not use the incoming interface as the best return path back to the source. If the network configuration changes so that an interface that has unicast RPF enabled becomes a trusted interface or becomes asymmetrically routed (the interface that receives a packet is not the best return path to the packet’s source), disable unicast RPF.
To disable unicast RPF on an EX3200 or EX4200 switch, you must delete it from every interface on which you explicitly configured it. If you do not disable unicast RPF on every interface on which you explicitly enabled it, it remains implicitly enabled on all interfaces. If you attempt to delete unicast RPF from an interface on which it was not explicitly enabled, the message `warning: statement not found` displays. If you do not disable unicast RPF on every interface on which you explicitly enabled it, unicast RPF remains implicitly enabled on all interfaces of the EX3200 or EX4200 switch.

On EX8200 switches, the switch does not apply unicast RPF to an interface unless you explicitly enable that interface for unicast RPF.

To disable unicast RPF, delete its configuration from the interface:

```
[edit interfaces]
user@switch# delete ge-1/0/10 unit 0 family inet rpf-check
```

**NOTE:** On EX3200 and EX4200 switches, if you do not disable unicast RPF on every interface on which you explicitly enabled it, unicast RPF remains implicitly enabled on all interfaces.

**Related Documentation**
- Example: Configuring Unicast RPF on an EX Series Switch on page 39
- Verifying Unicast RPF Status on page 117
- Configuring Unicast RPF (CLI Procedure) on page 106
- Understanding Unicast RPF for EX Series Switches on page 13

**Configuring IP Directed Broadcast (CLI Procedure)**

You can use IP directed broadcast on an EX Series switch to facilitate remote network management by sending broadcast packets to hosts on a specified subnet without broadcasting to the entire network. IP directed broadcast packets are broadcast on only the target subnet. The rest of the network treats IP directed broadcast packets as unicast packets and forwards them accordingly.

Before you begin to configure IP directed broadcast:

- Ensure that the subnet on which you want broadcast packets using IP direct broadcast is not directly connected to the Internet.
- Configure a routed VLAN interface (RVI) for the subnet that will be enabled for IP direct broadcast. See Configuring Routed VLAN Interfaces (CLI Procedure) or Configuring VLANs for EX Series Switches (J-Web Procedure).

**NOTE:** We recommend that you do not enable IP directed broadcast on subnets that have a direct connection to the Internet because of increased exposure to denial-of-service (DoS) attacks.
To enable IP directed broadcast for a specified subnet:

1. Add the target subnet’s logical interfaces to the VLAN:
   ```
   [edit interfaces]
   user@switch# set ge-0/0/0.0 family ethernet-switching vlan members v1
   user@switch# set ge-0/0/1.0 family ethernet-switching vlan members v1
   ```

2. Configure the Layer 3 interface on the VLAN that is the target of the IP directed broadcast packets:
   ```
   [edit interfaces]
   user@switch# set vlan.1 family inet address 10.1.2.1/24
   ```

3. Associate a Layer 3 interface with the VLAN:
   ```
   [edit vlans]
   user@switch# set vl13-interface vlan.1
   ```

4. Enable the Layer 3 interface for the VLAN to receive IP directed broadcasts:
   ```
   [edit interfaces]
   user@switch# set vlan.1 family inet targeted-broadcast
   ```

**Related Documentation**
- Example: Configuring IP Directed Broadcast on an EX Series Switch on page 43
- Understanding IP Directed Broadcast for EX Series Switches on page 17

**Tracing Operations of an Individual Router or Switch Interface**

To trace the operations of individual router or switch interfaces, include the `traceoptions` statement at the `[edit interfaces interface-name]` hierarchy level:

```
[edit interfaces interface-name]
traceoptions {
  flag flag;
}
```

You can specify the following interface tracing flags:

- `all`—Trace all interface operations.
- `event`—Trace all interface events.
- `ipc`—Trace all interface interprocess communication (IPC) messages.
- `media`—Trace all interface media changes.

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` files.

**Related Documentation**
- Tracing Operations of the Interface Process on page 110
- Tracing Interface Operations Overview
Tracing Operations of the Interface Process

To trace the operations of the router or switch interface process, dcd, include the `traceoptions` statement at the [edit interfaces] hierarchy level:

```
[edit interfaces]
traceoptions {
  file <filename> <files number> <match regular-expression> <size size> <world-readable | no-world-readable>;
  flag <disable>; 
  no-remote-trace;
}
```

By default, interface process operations are placed in the file named dcd and three 1-MB files of tracing information are maintained.

You can specify the following flags in the `interfaces traceoptions` statement:

- `change-events`—Log changes that produce configuration events.
- `config-states`—Log the configuration state machine changes.
- `kernel`—Log configuration IPC messages to kernel.
- `kernel-detail`—Log details of configuration messages to kernel.

For general information about tracing, see the tracing and logging information in the *Junos OS System Basics Configuration Guide*.

Related Documentation

- Tracing Interface Operations Overview
- Tracing Operations of an Individual Router or Switch Interface on page 109

Setting the Mode on an SFP+ Uplink Module (CLI Procedure)

SFP+ uplink modules are supported on EX3200 and EX4200 switches. You can use these uplink modules either for two SFP+ transceivers or four SFP transceivers. You configure the operating mode on the module to match the type of transceiver you want to use—that is, for SFP+ transceivers, you configure the 10-gigabit operating mode, and for SFP transceivers, you configure the 1-gigabit operating mode.

By default, the SFP+ uplink module operates in the 10-gigabit mode and supports only SFP+ transceivers. If you have not changed the module from the default setting and you want to use SFP+ transceivers, you do not need to configure the operating mode.

To set the operating mode of an SFP+ uplink module:

1. Change the operating mode to the appropriate mode for the transceiver type you want to use by using one of the following commands:

```
[edit]
user@switch# set chassis fpc 0 pic 1 sfplus pic-mode 1g
```

```
2. If the switch is running:

- Junos OS Release 10.1 or later, the changed operating mode takes effect immediately unless a port on the SFP+ uplink module is a Virtual Chassis port (VCP). If any port on the SFP+ uplink module is a VCP, the changed operating mode does not take effect until the next reboot of the switch.

**NOTE:** During the operating mode change, the Packet Forwarding Engine is restarted. In a Virtual Chassis configuration, this means that the Flexible PIC Concentrator connection with the master is dropped and then reconnected.

- Junos OS Release 10.0 or earlier, reboot the switch.

You can see whether the operating mode has been changed to the new mode you configured by issuing the `show chassis pic fpc-slot slot-number pic-slot 1` command.

**Related Documentation**
- Uplink Modules in EX3200 Switches
- Uplink Modules in EX4200 Switches
- Optical Interface Support in EX3200 Switches
- Optical Interface Support in EX4200 Switches

**Configuring the Media Type on Dual-Purpose Uplink Ports (CLI Procedure)**

EX2200-C switches provide two dual-purpose uplink ports. Each dual uplink port is a single interface that offers a choice of two connections: an RJ-45 connection for a copper Ethernet cable and an SFP connection for a fiber-optic Ethernet cable. You can choose to use either connection, but only one connection can be active at a time.

By default, if you plug a transceiver into the SFP connector, the port becomes a fiber-optic Gigabit Ethernet port, even if a copper Ethernet cable is plugged into the RJ-45 connection as well. If a transceiver is not plugged into the SFP connector, the port defaults to a copper 10/100/1000 Ethernet port.

You can constrain the use of the port to one connection type by configuring the media type for the port to be either copper or fiber. When you configure a media type on the port, the port will no longer accept the alternate connection type. For example, if you configure the uplink port as a fiber port and then plug a copper Ethernet cable into the RJ-45 connector, the interface will not come up.

To configure the media type for an uplink port:

```
user@switch# set interfaces interface-name media-type media-type
```

For example, to set the media type for uplink port `ge-0/1/0` to copper:

```
user@switch# set interfaces ge-0/1/0 media-type copper
```
NOTE: When you change the media type setting for a dual-purpose uplink port, it can take up to 6 seconds for the interface to appear in operational commands.

Related Documentation

- EX2200 Switches Hardware Overview
CHAPTER 4

Verifying Interfaces

- Monitoring Interface Status and Traffic on page 113
- Verifying the Status of a LAG Interface on page 114
- Verifying That LACP Is Configured Correctly and Bundle Members Are Exchanging LACP Protocol Packets on page 115
- Verifying That Layer 3 Subinterfaces Are Working on page 116
- Verifying Unicast RPF Status on page 117
- Verifying IP Directed Broadcast Status on page 119

Monitoring Interface Status and Traffic

**Purpose**

Use the monitoring functionality to view interface status or to monitor interface bandwidth utilization and traffic statistics on the EX Series switches.

The J-Web interface monitors interface bandwidth utilization and plots real-time charts to display input and output rates in bytes per second. In addition, the Interface monitoring page displays input and output packet counters and error counters in the form of charts.

Alternatively, you can enter the show commands in the CLI to view interface status and traffic statistics.

---

**NOTE:** For logical interfaces on EX Series switches, the traffic statistics fields in `show interfaces` commands show only control traffic; the traffic statistics do not include data traffic.

---

**Action**

To view general interface information in the J-Web interface such as available interfaces, select **Monitor > Interfaces**. Click any interface to view details about its status.

To set up interface monitoring for Virtual Chassis and EX8200 switches, select a member from the **Port for FPC** list. Details such as the admin status and link status are displayed in the table.

---

**NOTE:** By default, the details of the first member in the Port for FPC drop-down list is displayed.
You have the following options:

- **Start/Stop**—Starts or stops monitoring the selected interface.
- **Show Graph**—Displays input and output packet counters and error counters in the form of charts. Also, click on the pop-up icon to view the graph in a separate window.
- **Details**—Displays interface information such as general details, traffic statistics, I/O errors, CoS counters, and Ethernet statistics.
- **Refresh Interval (sec)**—Displays the time interval you have set for page refresh.
- **Clear Statistics**—Clears the statistics for the interface selected from the table.

**Using the CLI:**

- 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**

In the J-Web interface the charts displayed are:

- Bar charts—Display the input and output error counters.
- Pie charts—Display the number of broadcast, unicast, and multicast packet counters.

For details about output from the CLI commands, see `show interfaces ge-` (Gigabit Ethernet) or `show interfaces xe-` (10-Gigabit Ethernet).

**Related Documentation**

- Configuring Gigabit Ethernet Interfaces (J-Web Procedure) on page 51
- Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 48

**Verifying the Status of a LAG Interface**

**Purpose**

Verify that a LAG (ae0) has been created on the switch.

**Action**

Enter the following command:

```
user@switch> show interfaces ae0 terse
Interface       Admin  Link  Proto     Local               Remote
ae0             up     up     inet     10.10.10.2/24
ae0.0           up     up     inet     10.10.10.2/24
```

**Meaning**

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

**Related Documentation**

- Configuring Aggregated Ethernet Interfaces (CLI Procedure) on page 97
- Configuring Aggregated Ethernet Interfaces (J-Web Procedure) on page 98
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 115
2. Verifying That LACP Packets Are Being Exchanged on page 115

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-0/1/0
```

```
Aggregated interface: ae0

<table>
<thead>
<tr>
<th>LACP state:</th>
<th>Role</th>
<th>Exp</th>
<th>Def</th>
<th>Dist</th>
<th>Col</th>
<th>Syn</th>
<th>Aggr</th>
<th>Timeout</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>xe-0/1/0</td>
<td>Actor</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Fast</td>
<td>Active</td>
</tr>
<tr>
<td>xe-0/1/0</td>
<td>Partner</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Fast</td>
<td>Passive</td>
</tr>
</tbody>
</table>

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 interfaces aeX statistics` command to display LACP BPDU exchange information.

```
show interfaces ae0 statistics
```

Physical interface: ae0, Enabled, Physical link is Down
Interface index: 153, SNMP ifIndex: 30
Device flags : Present Running
Meaning

The output here shows that the link is down and that no PDUs are being exchanged (when there is no other traffic flowing on the link).

Related Documentation

- Configuring Aggregated Ethernet LACP
- Verifying the Status of a LAG Interface

Verifying That Layer 3 Subinterfaces Are Working

Purpose

After configuring Layer 3 subinterfaces, verify they are set up properly and transmitting data.

Action

1. Use the `show interfaces` command to determine if you successfully created the subinterfaces and the links are up:

   ```
   user@switch> show interfaces interface-name terse
   Interface          Admin Link Proto    Local                 Remote
   ge-0/0/0           up    up    inet     1.1.1.1/24
   ge-0/0/0.0         up    up    inet     1.1.1.1/24
   ge-0/0/0.1         up    up    inet     2.1.1.1/24
   ge-0/0/0.2         up    up    inet     3.1.1.1/24
   ge-0/0/0.3         up    up    inet     4.1.1.1/24
   ge-0/0/0.4         up    up    inet     5.1.1.1/24
   ge-0/0/0.32767     up    up
   ```

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

   ```
   user@switch> ping ip-address
   ```

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

The output confirms that the subinterfaces are created and the links are up.

Related Documentation

- Configuring a Layer 3 Subinterface (CLI Procedure) on page 105
- Example: Configuring Layer 3 Subinterfaces for a Distribution Switch and an Access Switch on page 32

Verifying Unicast RPF Status

Purpose

Verify that unicast reverse-path forwarding (RPF) is enabled and is working on the interface.

Action

Use one of the show interfaces interface-name commands with either the extensive or detail options to verify that unicast RPF is enabled and working on the switch. The example below displays output from the show interfaces ge-1/0/10 extensive command.

```
user@switch> show interfaces ge-1/0/10 extensive
Physical interface: ge-1/0/10, Enabled, Physical link is Down
Interface index: 139, SNMP ifIndex: 58, Generation: 140
Link-level type: Ethernet, MTU: 1514, Speed: 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: Hardware-Down SNMP-Traps Internal: 0x0
Link flags  : None
CoS queues  : 8 supported, 8 maximum usable queues
Hold-times  : Up 0 ms, Down 0 ms
Current address: 00:19:e2:50:95:ab, Hardware address: 00:19:e2:50:95:ab
Last flapped : Never
Statistics last cleared: Never
Traffic statistics:
  Input  bytes  : 0                    0 bps
  Output bytes : 0                    0 bps
  Input  packets: 0                    0 pps
  Output packets: 0                    0 pps
IPv6 transit statistics:
  Input bytes : 0
  Output bytes : 0
  Input packets: 0
  Output packets: 0
Input errors:
  Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Policed discards: 0,
  L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0,
  FIFO errors: 0, Resource errors: 0
Output errors:
  Carrier transitions: 0, Errors: 0, Drops: 0, Collisions: 0, Aged packets: 0,
  FIFO errors: 0, HS link CRC errors: 0, MTU errors: 0, Resource errors: 0
Egress queues: 8 supported, 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
```
Active alarms : LINK
Active defects : LINK

MAC statistics:

- 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

Filter statistics:

- Input packet count: 0
- Input packet rejects: 0
- Input DA rejects: 0
- Input SA rejects: 0
- Output packet count: 0
- Output packet pad count: 0
- Output packet error count: 0
- CAM destination filters: 0, CAM source filters: 0

Autonegotiation information:

- Negotiation status: Incomplete

Packet Forwarding Engine configuration:

- Destination slot: 1

Logical interface ge-1/0/10.0 (Index 69) (SNMP ifIndex 59) (Generation 135)

Flags: Device-Down SNMP-Traps 0x0 Encapsulation: ENET2

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, Generation: 144, Route table: 0
Flags: uRPF
Addresses, Flags: Is-Preferred Is-Primary

Meaning
The `show interfaces ge-1/0/10 extensive` command (and the `show interfaces ge-1/0/10 detail` command) displays in-depth information about the interface. The Flags: output field near the bottom of the display reports the unicast RPF status. If unicast RPF has not been enabled, the uRPF flag is not displayed.

On EX3200 and EX4200 switches, unicast RPF is implicitly enabled on all switch interfaces, including aggregated Ethernet interfaces (also referred to as link aggregation groups or LAGs) and routed VLAN interfaces (RVIs) when you enable unicast RPF on a single interface. However, the unicast RPF status is shown as enabled only on interfaces for which you have explicitly configured unicast RPF. Thus, the uRPF flag is not displayed on interfaces for which you have not explicitly configured unicast RPF even though unicast RPF is implicitly enabled on all interfaces on EX3200 and EX4200 switches.

Related Documentation
- `show interfaces xe-` on page 264
- Example: Configuring Unicast RPF on an EX Series Switch on page 39
- Configuring Unicast RPF (CLI Procedure) on page 106
- Disabling Unicast RPF (CLI Procedure) on page 107
- Troubleshooting Unicast RPF on page 125

Verifying IP Directed Broadcast Status

Purpose
Verify that IP directed broadcast is enabled and is working on the subnet.

Action
Use the `show vlans extensive` command to verify that IP directed broadcast is enabled and working on the subnet as shown in the following example.

Related Documentation
- Configuring IP Directed Broadcast (CLI Procedure) on page 108
- Example: Configuring IP Directed Broadcast on an EX Series Switch on page 43
CHAPTER 5

Troubleshooting Interfaces

- Troubleshooting Network Interfaces on EX3200 Switches on page 121
- Troubleshooting Network Interfaces on EX4200 Switches on page 122
- Troubleshooting an Aggregated Ethernet Interface on page 123
- Troubleshooting Interface Configuration and Cable Faults on page 124
- Troubleshooting Unicast RPF on page 125
- Troubleshooting Virtual Chassis Port Connectivity on an EX4200 Switch on page 125
- Diagnosing a Faulty Twisted-Pair Cable (CLI Procedure) on page 126

Troubleshooting Network Interfaces on EX3200 Switches

This topic provides troubleshooting information for specific problems related to interfaces on EX3200 switches.

- The interface on one of the last four built-in network ports in an EX3200 switch (for example, interface ge-0/0/23) is down on page 121
- The interface on the port in which an SFP or SFP+ transceiver is installed in an SFP+ uplink module is down on page 122

The interface on one of the last four built-in network ports in an EX3200 switch (for example, interface ge-0/0/23) is down

**Problem**
The interface on one of the last four built-in ports (ge-0/0/20 through ge-0/0/23 on 24-port models or ge-0/0/44 through ge-0/0/47 on 48-port models) of an EX3200 switch is down.

An SFP or SFP+ uplink module is installed in the switch and a transceiver is installed in one of the ports on the uplink module.

When you check the status with the CLI command `show interfaces ge-` or with the J-Web user interface, the disabled port is not listed.

**Cause**
The last four built-in ports use the same ASIC as the SFP uplink module. Therefore, if you install a transceiver in an SFP or SFP+ uplink module installed in an EX3200 switch, a corresponding base port from the last four built-in ports is disabled.
Solution  If you need to use the disabled built-in port, you must remove the transceiver from the SFP or SFP+ uplink module. Alternatively, you can install an XFP uplink module instead of an SFP or SFP+ uplink module. There is no conflict between the built-in network ports and the ports on the XFP uplink modules.

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

Problem  The interface on the port in which an SFP or SFP+ transceiver is installed in an SFP+ uplink module installed in an EX3200 switch is down.

When you check the status with the CLI command `show interfaces` or with the J-Web user interface, the disabled port is not listed.

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

Solution  Either SFP+ or SFP transceivers can be installed in SFP+ uplink modules. You must configure the operating mode of the SFP+ uplink module to match the type of transceiver you want to use. For SFP+ transceivers, configure the 10-gigabit operating mode and for SFP transceivers, configure the 1-gigabit operating mode. See “Setting the Mode on an SFP+ Uplink Module (CLI Procedure)” on page 110.

Related Documentation  • Troubleshooting Uplink Module Installation or Replacement on EX3200 Switches
• Monitoring Interface Status and Traffic on page 113
• Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 48
• Configuring Gigabit Ethernet Interfaces (J-Web Procedure) on page 51
• Removing a Transceiver from an EX Series Switch
• Uplink Modules in EX3200 Switches
• EX Series Switches Interfaces Overview on page 3

Troubleshooting Network Interfaces on EX4200 Switches

This topic provides troubleshooting information for specific problems related to interfaces on EX4200 switches.

• The interface on the port in which an SFP or SFP+ transceiver is installed in an SFP+ uplink module is down on page 122

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

Problem  The interface on the port in which an SFP or SFP+ transceiver is installed in an SFP+ uplink module installed in an EX4200 switch is down.
When you check the status with the CLI command `show interfaces ge-` or with the J-Web user interface, the disabled port is not listed.

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

**Solution**  
Either SFP+ or SFP transceivers can be installed in SFP+ uplink modules. You must configure the operating mode of the SFP+ uplink module to match the type of transceiver you want to use. For SFP+ transceivers, configure the 10-gigabit operating mode and for SFP transceivers, configure the 1-gigabit operating mode. See “Setting the Mode on an SFP+ Uplink Module (CLI Procedure)” on page 110.

**Related Documentation**  
- Troubleshooting Virtual Chassis Port Connectivity on an EX4200 Switch on page 125
- Monitoring Interface Status and Traffic on page 113
- Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 48
- Configuring Gigabit Ethernet Interfaces (J-Web Procedure) on page 51
- Removing a Transceiver from an EX Series Switch
- Uplink Modules in EX4200 Switches
- EX Series Switches Interfaces Overview on page 3

**Troubleshooting an Aggregated Ethernet Interface**

Troubleshooting issues for aggregated Ethernet interfaces:

- Show Interfaces Command Shows the LAG is Down on page 123
- Logical Interface Statistics Do Not Reflect All Traffic on page 123

**Show Interfaces Command Shows the LAG is Down**

**Problem**  
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).
- 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 (or the same Virtual Chassis).

**Logical Interface Statistics Do Not Reflect All Traffic**

**Problem**  
The traffic statistics for a logical interface do not include all of the traffic.
Solution  
Traffic statistics fields for logical interfaces in `show interfaces` commands show only control traffic; the traffic statistics do not include data traffic. You can view the statistics for all traffic only per physical interface.

**Related Documentation**
- Verifying the Status of a LAG Interface on page 114
- Example: Configuring Aggregated Ethernet High-Speed Uplinks Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch on page 21
- Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch on page 27

**Troubleshooting Interface Configuration and Cable Faults**

Troubleshooting interface configuration and connectivity on the EX Series switch:

1. Interface Configuration or Connectivity Is Not Working on page 124

**Interface Configuration or Connectivity Is Not Working**

**Problem**  
You encounter errors when you attempt to configure an interface on the switch, or the interface is exhibiting connectivity problems.

**Solution**  
Use the port troubleshooter feature in the J-Web interface to identify and rectify port configuration and connectivity related problems.

To use the J-Web interface port troubleshooter:

1. Select the option **Troubleshoot** from the main menu.
2. Click **Troubleshoot Port**. The Port Troubleshooting wizard is displayed. Click **Next**.
3. Select the ports to troubleshoot.
4. Select the test cases to be executed on the selected port. Click **Next**.
   
   When the selected test cases are executed, the final result and the recommended action is displayed.

If there is a cable fault, the port troubleshooter displays details and the recommended action. For example, the cable must be replaced.

If the port configuration needs to be modified, the port troubleshooter displays details and the recommended action.

**Related Documentation**
- Monitoring Interface Status and Traffic on page 113
- Configuring Gigabit Ethernet Interfaces (J-Web Procedure) on page 51
- Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 48
- Connecting and Configuring an EX Series Switch (CLI Procedure)
Troubleshooting Unicast RPF

Troubleshooting issues for unicast reverse-path forwarding (RPF) on EX Series switches include:

1. **Legitimate Packets Are Discarded on page 125**

**Legitimate Packets Are Discarded**

**Problem** The switch filters valid packets from legitimate sources, which results in the switch's discarding packets that should be forwarded.

**Solution** The interface or interfaces on which legitimate packets are discarded are asymmetrically routed interfaces. An asymmetrically routed interface uses different paths to send and receive packets between the source and the destination, so the interface that receives a packet is not the same interface the switch uses to reply to the packet's source.

Unicast RPF works properly only on symmetrically routed interfaces. A symmetrically routed interface is an interface that uses the same route in both directions between the source and the destination. Unicast RPF filters packets by checking the forwarding table for the best return path to the source of an incoming packet. If the best return path uses the same interface as the interface that received the packet, the switch forwards the packet. If the best return path uses a different interface than the interface that received the packet, the switch discards the packet.

**NOTE:** On EX3200 and EX4200 switches, unicast RPF works properly only if all switch interfaces—including aggregated Ethernet interfaces (also referred to as link aggregation groups or LAGs) and routed VLAN interfaces (RVIs)—are symmetrically routed, because unicast RPF is enabled globally on all switch interfaces.

**Related Documentation**

- Verifying Unicast RPF Status on page 117
- Understanding Unicast RPF for EX Series Switches on page 13

Troubleshooting Virtual Chassis Port Connectivity on an EX4200 Switch

This topic provides troubleshooting information for specific problems related to uplink module ports on EX4200 switches.

1. **Virtual Chassis port (VCP) connection does not work on page 126**
Virtual Chassis port (VCP) connection does not work

**Problem**  The Virtual Chassis port (VCP) connection configured in an EX4200 switch does not work.

A port of the uplink module is set as a VCP.

**Cause**  The uplink module installed in the switch was replaced.

**Solution**  Set a port in the uplink module as a VCP. See Setting an Uplink Port on an EX3300 or EX4200 Switch as a Virtual Chassis Port (CLI Procedure).

**Related Documentation**  
- Monitoring Interface Status and Traffic on page 113
- Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 48
- Configuring Gigabit Ethernet Interfaces (J-Web Procedure) on page 51
- Installing an Uplink Module in an EX4200 Switch
- Removing a Transceiver from an EX Series Switch
- Uplink Modules in EX4200 Switches
- Understanding EX4200 and EX4500 Virtual Chassis Hardware Configurations

Diagnosing a Faulty Twisted-Pair Cable (CLI Procedure)

**Problem**  A 10/100/1000BASE-T Ethernet interface has connectivity problems that you suspect might be caused by a faulty cable.

**Solution**  Use the time domain reflectometry (TDR) test to determine whether a twisted-pair Ethernet cable is faulty.

The TDR test:

- Detects and reports faults for each twisted pair in an Ethernet cable. Faults detected include open circuits, short circuits, and impedance mismatches.
- Reports the distance to fault to within 1 meter.
- Detects and reports pair swaps, pair polarity reversals, and excessive pair skew.

The TDR test is supported on the following switches and interfaces:

- EX2200, EX3200, EX3300, and EX4200 switches—RJ-45 network interfaces. The TDR test is not supported on management interfaces and SFP interfaces.
- EX6200 and EX8200 switches—RJ-45 network interfaces on line cards.

**NOTE:** We recommend running the TDR test on an interface when there is no traffic on the interface.
To diagnose a cable problem by running the TDR test:

1. Run the request diagnostics tdr command.

```
user@switch> request diagnostics tdr start interface ge-0/0/10
```

Interface TDR detail:
Test status : Test successfully executed ge-0/0/10

2. View the results of the TDR test with the show diagnostics tdr command.

```
user@switch> show diagnostics tdr interface ge-0/0/10
```

Interface TDR detail:
Interface name : ge-0/0/10
Test status : Passed
Link status : Down
MDI pair : 1-2
  Cable status : Normal
  Distance fault : 0 Meters
  Polarity swap : N/A
  Skew time : N/A
MDI pair : 3-6
  Cable status : Normal
  Distance fault : 0 Meters
  Polarity swap : N/A
  Skew time : N/A
MDI pair : 4-5
  Cable status : Open
  Distance fault : 1 Meters
  Polarity swap : N/A
  Skew time : N/A
MDI pair : 7-8
  Cable status : Normal
  Distance fault : 0 Meters
  Polarity swap : N/A
  Skew time : N/A
Channel pair : 1
  Pair swap : N/A
Channel pair : 2
  Pair swap : N/A
Downshift : N/A

3. Examine the Cable status field for the four MDI pairs to determine if the cable has a fault. In the preceding example, the twisted pair on pins 4 and 5 is broken or cut at approximately one meter from the ge-0/0/10 port connection.

---

**NOTE:** The Test Status field indicates the status of the TDR test, not the cable. The value Passed means the test completed—it does not mean that the cable has no faults.

---

The following is additional information about the TDR test:

- The TDR test can take some seconds to complete. If the test is still running when you execute the show diagnostics tdr command, the Test status field displays Started. For example:
You can terminate a running TDR test before it completes by using the `request diagnostics tdr abort interface interface-name` command. The test terminates with no results, and the results from any previous test are cleared.

You can display summary information about the last TDR test results for all interfaces on the switch that support the TDR test by not specifying an interface name with the `show diagnostics tdr` command. For example:

```
user@switch> show diagnostics tdr

<table>
<thead>
<tr>
<th>Interface</th>
<th>Test status</th>
<th>Link status</th>
<th>Cable status</th>
<th>Max distance fault</th>
</tr>
</thead>
<tbody>
<tr>
<td>ge-0/0/0</td>
<td>Passed</td>
<td>UP</td>
<td>OK</td>
<td>0</td>
</tr>
<tr>
<td>ge-0/0/1</td>
<td>Not Started</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ge-0/0/2</td>
<td>Passed</td>
<td>UP</td>
<td>OK</td>
<td>0</td>
</tr>
<tr>
<td>ge-0/0/3</td>
<td>Not Started</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ge-0/0/4</td>
<td>Passed</td>
<td>UP</td>
<td>OK</td>
<td>0</td>
</tr>
<tr>
<td>ge-0/0/5</td>
<td>Passed</td>
<td>UP</td>
<td>OK</td>
<td>0</td>
</tr>
<tr>
<td>ge-0/0/6</td>
<td>Passed</td>
<td>UP</td>
<td>OK</td>
<td>0</td>
</tr>
<tr>
<td>ge-0/0/7</td>
<td>Not Started</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ge-0/0/8</td>
<td>Passed</td>
<td>Down</td>
<td>OK</td>
<td>0</td>
</tr>
<tr>
<td>ge-0/0/9</td>
<td>Not Started</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ge-0/0/10</td>
<td>Passed</td>
<td>Down</td>
<td>Fault</td>
<td>1</td>
</tr>
<tr>
<td>ge-0/0/11</td>
<td>Passed</td>
<td>UP</td>
<td>OK</td>
<td>0</td>
</tr>
<tr>
<td>ge-0/0/12</td>
<td>Not Started</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ge-0/0/13</td>
<td>Not Started</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ge-0/0/14</td>
<td>Not Started</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ge-0/0/15</td>
<td>Not Started</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ge-0/0/16</td>
<td>Not Started</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ge-0/0/17</td>
<td>Not Started</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ge-0/0/18</td>
<td>Not Started</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ge-0/0/19</td>
<td>Passed</td>
<td>Down</td>
<td>OK</td>
<td>0</td>
</tr>
<tr>
<td>ge-0/0/20</td>
<td>Not Started</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ge-0/0/21</td>
<td>Not Started</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ge-0/0/22</td>
<td>Passed</td>
<td>UP</td>
<td>OK</td>
<td>0</td>
</tr>
<tr>
<td>ge-0/0/23</td>
<td>Not Started</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
```

Related Documentation

- Troubleshooting Interface Configuration and Cable Faults on page 124
- `request diagnostics tdr` on page 210
- `show diagnostics tdr` on page 212
CHAPTER 6

Configuration Statements for Interfaces

- [edit chassis] Configuration Statement Hierarchy on page 129
- [edit interfaces] Configuration Statement Hierarchy on page 130

[edit chassis] Configuration Statement Hierarchy

```c
chassis {
    aggregated-devices {
        ethernet {
            device-count number;
        }
    }
    auto-image-upgrade;
    fpc slot {
        pic pic-number {
            sfpplus {
                pic-mode mode;
            }
        }
        power-budget-priority priority;
    }
    lcd-menu {
        fpc slot-number {
            menu-item (menu-name | menu-option) {
                disable;
            }
        }
    }
    nssu {
        upgrade-group group-name {
            fpcs (slot-number | [list-of-slot-numbers]);
            member member-id {
                fpcs (slot-number | [list-of-slot-numbers]);
            }
        }
    }
    PSU {
        redundancy {
            n-plus-n;
        }
    }
    redundancy {
```
graceful-switchover;
}
}

Related Documentation

- Configuring Aggregated Ethernet Interfaces (CLI Procedure) on page 97
- Upgrading Software Using Automatic Software Download on EX Series Switches
- Configuring the LCD Panel on EX Series Switches (CLI Procedure)
- Configuring Graceful Routing Engine Switchover in an EX3300, EX4200, or EX4500 Virtual Chassis (CLI Procedure)
- Configuring Power Supply Redundancy (CLI Procedure)
- Configuring the Power Priority of Line Cards (CLI Procedure)
- Configuring Line-Card Upgrade Groups for Nonstop Software Upgrade (CLI Procedure)

[edit interfaces] Configuration Statement Hierarchy

interfaces {
aex {
    accounting-profile name;
    aggregated-ether-options {
        (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;
        (loopback | no-loopback);
        minimum-links number;
    }
    description text;
    disable;
    (gratuitous-arp-reply | no-gratuitous-arp-reply);
    mtu bytes;
    no-gratuitous-arp-request;
    traceoptions {
        flag flag;
    }
    (traps | no-traps);
    unit logical-unit-number {
        accounting-profile name;
        bandwidth rate;
        description text;
        disable;
        family family-name {...}
        proxy-arp (restricted | unrestricted);
        (traps | no-traps);
        vlan-id vlan-id-number;
    }
}
vlan-tagging;
}
ge-fpc/pic/port {
  accounting-profile name;
  description text;
  disable;
  ether-options {
    802.3ad {
      aex;
      (backup | primary);
      lacp {
        force-up;
      }
    }
    (auto-negotiation | no-auto-negotiation);
    (flow-control | no-flow-control);
    link-mode mode;
    (loopback | no-loopback);
    speed (auto-negotiation | speed);
  }
  (gratuitous-arp-reply | no-gratuitous-arp-reply);
  media-type;
  mtu bytes;
  no-gratuitous-arp-request;
  traceoptions {
    flag flag;
  }
  (traps | no-traps);
  unit logical-unit-number {
    accounting-profile name;
    bandwidth rate;
    description text;
    disable;
    family family-name {...}
    proxy-arp (restricted | unrestricted);
    (traps | no-traps);
    vlan-id vlan-id-number;
  }
  vlan-tagging;
}
interface-range name {
  accounting-profile name;
  description text;
  disable;
  ether-options {
    802.3ad {
      aex;
      (backup | primary);
      lacp {
        force-up;
      }
    }
    (auto-negotiation | no-auto-negotiation);
    (flow-control | no-flow-control);
    link-mode mode;
    (loopback | no-loopback);
speed (auto-negotiation | speed);
}
(gratuitous-arp-reply | no-gratuitous-arp-reply);
member interface-name;
member-range starting-interface name to ending-interface name;
mtu bytes;
no-gratuitous-arp-request;
traceoptions {
  flag flag;
}
(traps | no-traps);
unit logical-unit-number {
  accounting-profile name;
  bandwidth rate;
  description text;
  disable;
  family family-name {...}
  proxy-arp (restricted | unrestricted);
  (traps | no-traps);
  vlan-id vlan-id-number;
}
  vlan-tagging;
}
lo0 {
  accounting-profile name;
  description text;
  disable;
  traceoptions {
    flag flag;
  }
  (traps | no-traps);
  unit logical-unit-number {
    accounting-profile name;
    bandwidth rate;
    description text;
    disable;
    family family-name {...}
    (traps | no-traps);
  }
}
me0 {
  accounting-profile name;
  description text;
  disable;
  (gratuitous-arp-reply | no-gratuitous-arp-reply);
  no-gratuitous-arp-request;
  traceoptions {
    flag flag;
  }
  (traps | no-traps);
  unit logical-unit-number {
    accounting-profile name;
    bandwidth rate;
    description text;
    disable;
    family family-name {...}
  }
}
(traps | no-traps);
   vlan-id vlan-id-number;
 }
 vlan-tagging;
 }

vlan {
   accounting-profile name;
   description text;
   disable;
   (gratuitous-arp-reply | no-gratuitous-arp-reply);
   mtu bytes;
   no-gratuitous-arp-request;
   traceoptions {
      flag flag;
   }
   (traps | no-traps);
   unit logical-unit-number {
      accounting-profile name;
      bandwidth rate;
      description text;
      disable;
      family family-name {...}
      proxy-arp (restricted | unrestricted);
      (traps | no-traps);
   }
   traceoptions {
      file <filename> <files number> <match regular-expression> <size size>
      <world-readable | no-world-readable>;
      flag flag <disable>;
      no-remote-trace;
   }
   vme {
      accounting-profile name;
      description text;
      disable;
      (gratuitous-arp-reply | no-gratuitous-arp-reply);
      mtu bytes;
      no-gratuitous-arp-request;
      traceoptions {
         flag flag;
      }
      (traps | no-traps);
      unit logical-unit-number {
         accounting-profile name;
         bandwidth rate;
         description text;
         disable;
         family family-name {...}
         (traps | no-traps);
         vlan-id vlan-id-number;
      }
      vlan-tagging;
   }
   xe-fpc/pic/port {
      accounting-profile name;
description text;
disable;
ether-options {
  802.3ad {
    aex;
    (backup | primary);
    lACP {
      force-up;
    }
  }
  (flow-control | no-flow-control);
  link-mode mode;
  (loopback | no-loopback);
}
(gratuitous-arp-reply | no-gratuitous-arp-reply);
mtu bytes;
no-gratuitous-arp-request;
traceoptions {
  flag flag;
}
(traps | no-traps);
unit logical-unit-number {
  accounting-profile name;
  bandwidth rate;
  description text;
  disable;
  family family-name {...
  proxy-arp (restricted | unrestricted);
  (traps | no-traps);
  vlan-id vlan-id-number;
}
vlan-tagging;
}

Related Documentation

- Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 48
- Configuring Aggregated Ethernet Interfaces (CLI Procedure) on page 97
- Configuring a Layer 3 Subinterface (CLI Procedure) on page 105
- Configuring Routed VLAN Interfaces (CLI Procedure)
- Configuring the Virtual Management Ethernet Interface for Global Management of an EX3300, EX4200, or EX4500 Virtual Chassis (CLI Procedure)
- EX Series Switches Interfaces Overview on page 3
- Junos OS Interfaces Fundamentals Configuration Guide
- Junos OS Ethernet Interfaces Configuration Guide
### 802.3ad

**Syntax**

```plaintext
802.3ad {
  aex;
  (backup | primary);
  lACP {
    force-up;
  }
}
```

**Hierarchy Level**

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

**Release Information**

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

**Description**

Configure membership in a link aggregation group (LAG).

**Options**

- `aex`—Name of the LAG.
- `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.

**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 on page 21
- Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch on page 27
- Configuring Aggregated Ethernet Interfaces (CLI Procedure) on page 97
- Configuring Aggregated Ethernet LACP (CLI Procedure) on page 101
- Understanding Aggregated Ethernet Interfaces and LACP on page 8
- Junos OS Ethernet Interfaces Configuration Guide
accounting-profile

Syntax accounting-profile name;

Hierarchy Level [edit interfaces interface-name],
    [edit interfaces interface-name unit logical-unit-number],
    [edit interfaces interface-range name]

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

Description Enable collection of accounting data for the specified physical or logical interface or interface range.

Options name—Name of the accounting profile.

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

Related Documentation • Applying an Accounting Profile to the Physical Interface on page 90
    • Applying an Accounting Profile to the Logical Interface on page 91
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 dcli dcli-identifier;
    multipoint-destination address {
        epd-threshold cells;
        inverse-arp;
        oam-liveness {
            up-count cells;
            down-count cells;
        }
        oam-period (disable | seconds);
        shaping {
            (cbr rate | rtvbr peak rate sustained rate burst length | vbr peak rate sustained rate burst
            length);
            queue-length number;
        }
        vci vpi-identifier.vci-identifier;
    }
    primary;
    preferred;
    (vrrp-group | vrrp-inet6-group) group-number {
        (accept-data | no-accept-data);
        advertise-interval seconds;
        authentication-type authentication;
        authentication-key key;
        fast-interval milliseconds;
        (preempt | no-preempt) {
            hold-time seconds;
        }
        priority-number number;
        track {
            priority-cost seconds;
            priority-hold-time interface-name {
                interface priority;
                bandwidth-threshold bits-per-second {
                    priority;
                }
            }
            route ip-address/mask routing-instance instance-name priority-cost cost;
        }
        virtual-address [ addresses ];
    }
}

Hierarchy Level  [edit interfaces interface-name unit logical-unit-number family family],
    [edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number
    family family]
Release Information
Statement introduced before Junos OS Release 7.4.
Statement introduced in Junos OS Release 9.0 for EX Series switches.
Statement introduced in Junos OS Release 11.1 for QFX Series switches.

Description
Configure the interface address.

NOTE: The vrrp High Availability functionality is not available for the QFX Series switches.

Options
address—Address of the interface.

The remaining statements are explained separately.

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

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

Related Documentation
• Configuring the Protocol Family
• negotiate-address
• unnumbered-address (Ethernet)
• Junos OS System Basics Configuration Guide
**aggregated-devices**

**Syntax**

```plaintext
aggregated-devices {
  ethernet {
    device-count number;
  }
}
```

**Hierarchy Level**

```
[edit chassis]
```

**Release Information**

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

**Description**

Configure properties for aggregated devices on the switch.

The remaining statements are explained separately.

**Default**

Aggregated devices are disabled.

**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 on page 21
- Configuring Aggregated Ethernet Interfaces (CLI Procedure) on page 97
- Understanding Aggregated Ethernet Interfaces and LACP on page 8
- Junos OS Ethernet Interfaces Configuration Guide

---

Chapter 6: Configuration Statements for Interfaces
aggregated-ether-options

Syntax

aggregated-ether-options {
  (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;
  (loopback | no-loopback);
  minimum-links number;
}

Hierarchy Level  [edit interfaces aex]

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

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

The remaining statements are explained separately.

Required Privilege Level

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

Related Documentation

• Example: Configuring Aggregated Ethernet High-Speed Uplinks Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch on page 21
• Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch on page 27
• Configuring Aggregated Ethernet Interfaces (CLI Procedure) on page 97
• Configuring Aggregated Ethernet LACP (CLI Procedure) on page 101
• Understanding Aggregated Ethernet Interfaces and LACP on page 8
• Junos OS Ethernet Interfaces Configuration Guide
arp

Syntax

```
arp ip-address (mac | multicast-mac) mac-address publish;
```

Hierarchy Level

```
[edit interfaces interface-name unit logical-unit-number family inet address address],
[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number family inet address address]
```

Release Information

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.

Description

For Ethernet, Fast Ethernet, and Gigabit Ethernet interfaces only, configure Address Resolution Protocol (ARP) table entries, mapping IP addresses to MAC addresses.

Options

**ip-address**—IP address to map to the MAC address. The IP address specified must be part of the subnet defined in the enclosing `address` statement.

**mac mac-address**—MAC address to map to the IP 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, `0011.2233.4455` or `00:11:22:33:44:55`.

**multicast-mac mac-address**—Multicast MAC address to map to the IP address. Specify the multicast MAC address as six hexadecimal bytes in one of the following formats: `nnnn.nnnn.nnnn` or `nn:nn:nn:nn:nn:nn`. For example, `0011.2233.4455` or `00:11:22:33:44:55`.

**publish**—(Optional) Have the router or switch reply to ARP requests for the specified IP address. If you omit this option, the router or switch uses the entry to reach the destination but does not reply to ARP requests.

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

Required Privilege

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

Related Documentation

- Configuring Static ARP Table Entries on page 94
- Configuring Static ARP Entries
auto-negotiation

Syntax  (auto-negotiation | no-auto-negotiation) <remote-fault (local-interface-online | local-interface-offline)>;

Hierarchy Level  [edit interfaces interface-name ether-options],
[edit interfaces interface-name gigether-options],
[edit interfaces ge-pim/0/0 switch-options switch-port port-number]

Release Information  Statement introduced in Junos OS Release 7.6.
Statement introduced in Junos OS Release 8.4 for J Series Services Routers.
Statement introduced in Junos OS Release 9.0 for EX Series switches.

Description  For Gigabit Ethernet interfaces on M Series, MX Series, T Series, and TX Matrix routers, explicitly enable autonegotiation and remote fault. For EX Series switches and J Series Services Routers, explicitly enable autonegotiation only.

- **auto-negotiation**—Enables autonegotiation. This is the default.
- **no-auto-negotiation**—Disable autonegotiation. When autonegotiation is disabled, you must explicitly configure the link mode and speed.

When you configure Tri-Rate Ethernet copper interfaces to operate at 1 Gbps, autonegotiation must be enabled.

**NOTE:** On EX Series switches, an interface configuration that disables autonegotiation and manually sets the link speed to 1 Gbps is accepted when you commit the configuration; however, if the interface you are configuring is a Tri-Rate Ethernet copper interface, the configuration is ignored as invalid and autonegotiation is enabled by default.

To correct the invalid configuration and disable autonegotiation:

1. Delete the no-auto-negotiation statement and commit the configuration.
2. Set the link speed to 10 or 100 Mbps, set no-auto-negotiation, and commit the configuration.

On J Series Services Routers with universal Physical Interface Modules (uPIMs) and on EX Series switches, if the link speed and duplex mode are also configured, the interfaces use the values configured as the desired values in the negotiation. If autonegotiation is disabled, the link speed and link mode must be configured.

Default  Autonegotiation is automatically enabled. No explicit action is taken after the autonegotiation is complete or if the negotiation fails.
Options  
remote-fault (local-interface-online | local-interface-offline)—(Optional) For M Series, MX Series, T Series, and TX Matrix routers only, manually configure remote fault on an interface.

Default: local-interface-online

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

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

Related Documentation
• Gigabit Ethernet Autonegotiation Overview
• Configuring J Series Services Router Switching Interfaces
• Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 48
• Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 48
bandwidth

Syntax  
bandwidth rate;

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

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

Description  
Configure an informational-only bandwidth value for an interface. This statement is valid for all logical interface types except multilink and aggregated interfaces.

NOTE: We recommend that you be careful when setting this value. Any interface bandwidth value that you configure using the bandwidth statement affects how the interface cost is calculated for a dynamic routing protocol, such as OSPF. By default, the interface cost for a dynamic routing protocol is calculated using the following formula:

\[
\text{cost} = \frac{\text{reference-bandwidth}}{\text{bandwidth}},
\]

where bandwidth is the physical interface speed. However, if you specify a value for bandwidth using the bandwidth statement, that value is used to calculate the interface cost, rather than the actual physical interface bandwidth.

Options  
rate—Peak rate, in bits per second (bps) or cells per second (cps). You can specify a value in bits per second either as a complete decimal number or as a decimal number followed by the abbreviation k (1000), m (1,000,000), or g (1,000,000,000). You can also specify a value in cells per second by entering a decimal number followed by the abbreviation c; values expressed in cells per second are converted to bits per second by means of the formula 1 cps = 384 bps.

Range: Not limited.

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

Related Documentation  
• Configuring the Interface Bandwidth on page 68
broadcast

Syntax  broadcast address;

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

Release Information  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.

Description  Set the broadcast address on the network or subnet. On a subnet you cannot specify a host address of 0, nor can you specify a broadcast address.

Default  The default broadcast address has a host portion of all ones.

Options  address—Broadcast address. The 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.

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

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

Related Documentation  • Configuring the Interface Address on page 66
chassis

Syntax

chassis {
    aggregated-devices {
        ethernet {
            device-count number;
        }
    }
    auto-image-upgrade;
    fpc slot {
        pic pic-number {
            sfplus {
                pic-mode mode;
            }
        }
        power-budget-priority priority;
    }
    lcd-menu {
        fpc slot-number {
            menu-item (menu-name | menu-option) {
                disable;
            }
        }
    }
    nssu {
        upgrade-group group-name {
            fpcs (slot-number | [list-of-slot-numbers]);
            member member-id {
                fpcs (slot-number | [list-of-slot-numbers]);
            }
        }
    }
    psu {
        redundancy {
            n-plus-n;
        }
        redundancy {
            graceful-switchover;
        }
    }
}

Hierarchy Level [edit]

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

Description Configure chassis-specific properties for the switch.

The remaining statements are explained separately.

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

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

<table>
<thead>
<tr>
<th>Syntax</th>
<th>description text;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hierarchy Level</td>
<td>[edit interfaces interface-name], [edit interfaces interface-name unit logical-unit-number], [edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number]</td>
</tr>
<tr>
<td>Description</td>
<td>Provide a textual description of the interface or the logical unit. Any descriptive text you include is displayed in the output of the <code>show interfaces</code> commands, and is also exposed in the <code>ifAlias</code> Management Information Base (MIB) object. It has no effect on the operation of the interface on the router or switch. The textual description can also be included in the extended DHCP relay option 82 Agent Circuit ID suboption.</td>
</tr>
<tr>
<td>Options</td>
<td>text—Text to describe the interface. If the text includes spaces, enclose the entire text in quotation marks.</td>
</tr>
<tr>
<td>Required Privilege Level</td>
<td>interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.</td>
</tr>
<tr>
<td>Related Documentation</td>
<td>• Adding an Interface Description to the Configuration on page 62 • Adding a Logical Unit Description to the Configuration on page 63 • Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 48 • Enabling and Disabling Insertion of Option 82 Information</td>
</tr>
</tbody>
</table>
device-count

Syntax  
device-count number;

Hierarchy Level  
[edit chassis aggregated-devices ethernet]

Release Information  
Statement introduced in Junos OS Release 9.0 for EX Series switches.
Range updated in Junos OS Release 9.5 for EX Series switches.

Description  
Configure the number of aggregated Ethernet logical devices available to the switch.

Options  
number—Maximum number of aggregated Ethernet logical interfaces on the switch.
Range: 1 through 32 for EX2200, EX3200, and standalone EX3300 switches and for EX3300 Virtual Chassis
Range: 1 through 64 for standalone EX4200, standalone EX4500, and EX6200 switches and for EX4200 and EX4500 Virtual Chassis
Range: 1 through 239 for EX8200 Virtual Chassis
Range: 1 through 255 for standalone EX8200 switches

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 on page 21
- Configuring Aggregated Ethernet Interfaces (CLI Procedure) on page 97
- Junos OS Network Interfaces Configuration Guide
disable (Interface)

Syntax  disable;

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

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

Description  Disable a physical or a logical interface, effectively unconfiguring it.

CAUTION:  Dynamic subscribers and logical interfaces use physical interfaces for connection to the network. The Junos OS allows you to set the interface to disable and commit the change while dynamic subscribers and logical interfaces are still active. This action results in the loss of all subscriber connections on the interface. Use care when disabling interfaces.

NOTE:  When you use the disable statement at the edit interfaces hierarchy level, depending on the PIC type, the interface might or might not turn off the laser. Older PIC transceivers do not support turning off the laser, but newer Gigabit Ethernet (GE) PICs with SFP and XFP transceivers do support it and the laser will be turned off when the interface is disabled.

NOTE:  When you disable or deactivate an interface, then all the references made to the deactivated interface must be removed from the routing instance.

WARNING:  Do not stare into the laser beam or view it directly with optical instruments even if the interface has been disabled.

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

Related Documentation  • Disabling a Physical Interface on page 64
                       • Disabling a Logical Interface on page 65
ether-options

Syntax

Gigabit Ethernet interfaces:

ether-options {
  802.3ad {
    aex;
    (backup | primary);
    lacp {
      force-up;
    }
  }
  (auto-negotiation | no-auto-negotiation);
  (flow-control | no-flow-control);
  link-mode mode;
  (loopback | no-loopback);
  speed (speed | auto-negotiation);
}

10-Gigabit Ethernet interfaces:

ether-options {
  802.3ad {
    aex;
    (backup | primary);
    lacp {
      force-up;
    }
  }
  (flow-control | no-flow-control);
  (loopback | no-loopback);
}

Hierarchy Level

[edit interfaces interface-name],
[edit interfaces interface-range name]

Release Information

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

Description

Configure Ethernet properties for a Gigabit Ethernet interface or a 10-Gigabit Ethernet interface on an EX Series switch.

The remaining statements are explained separately.

Required Privilege Level

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

Related Documentation

• Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 48
• Configuring Gigabit Ethernet Interfaces (J-Web Procedure) on page 51
• Understanding Aggregated Ethernet Interfaces and LACP on page 8
• EX Series Switches Interfaces Overview on page 3
• Junos OS Ethernet Interfaces Configuration Guide
**ethernet**

**Syntax**
```
ethernet {
  device-count number;
}
```

**Hierarchy Level**
```
[edit chassis aggregated-devices]
```

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

**Description**
Configure properties for Ethernet aggregated devices on the switch.

The remaining statement is explained separately.

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

**Related Documentation**
- Configuring Aggregated Ethernet Interfaces (CLI Procedure) on page 97
- Junos OS Ethernet Interfaces Configuration Guide

**eui-64**

**Syntax**
eui-64;

**Hierarchy Level**
```
[edit interfaces interface-name unit number family inet6 address address]
```

**Release Information**
- 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 11.1 for QFX Series switches.

**Description**
For interfaces that carry IP version 6 (IPv6) traffic, automatically generate the host number portion of interface addresses. Not supported on QFX Series switches.

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

**Related Documentation**
- Configuring the Interface Address on page 66
family (for EX Series switches)

Syntax

family ccc on page 152
family ethernet-switching on page 152
family inet on page 152
family inet6 on page 152
family iso on page 153
family mpls on page 153

family ccc

family ccc;

family ethernet-switching

family ethernet-switching { [filter { input filter-name; output filter-name; } native-vlan-id vlan-id; port-mode mode; reflective-relay; vlan [ members [ (all | names | vlan-ids) ]; ] }]

family inet

family inet { [address address { [arp ip-address (mac | multicast-mac) mac-address <publish>; broadcast; preferred; primary; vrrp-group group-id { advertise-interval milliseconds; preempt | no-preempt { hold-time seconds; } priority number; virtual-address [addresses]; virtual-link-local-address ip-address; } } filter { [input filter-name; output filter-name; } mtu bytes; no-redirects; no-neighbor-learn; primary; rpf-check; targeted-broadcast; } ]}

family inet6

family inet6 { [address address { ]} ]}
eui-64;
ndp ip-address (mac | multicast-mac) mac-address <publish>;
pREFERRED;
primary;
vrrp-inet6-group group-id {
  inet6-advertise-interval milliseconds;
  preempt | preempt {
    hold-time seconds;
  }
  priority number;
  virtual-inet6-address [addresses];
  virtual-link-local-address ipv6-address;
}
(dad-disable | no-dad-disable);
filter {
  input filter-name;
  output filter-name;
}
mtu bytes;
no-neighbor-learn;
rpf-check;
}

family iso   {
  address interface-address;
  mtu bytes;
}

family mpls  {
  mtu bytes;
}

Hierarchy Level
[edit interfaces interface-name unit logical-unit-number],
[edit interfaces interface-range name unit logical-unit-number]

Release Information
Statement introduced in Junos OS Release 9.0 for EX Series switches, including options ethernet-switching, inet, and iso.
Option inet6 introduced in Junos OS Release 9.3 for EX Series switches.
Options ccc and mpls introduced in Junos OS Release 9.5 for EX Series switches.

Description
Configure protocol family information for the logical interface on the switch.

Default
Interfaces on EX2200, EX3200, EX3300, EX4200, and EX4500 switches are set to family ethernet-switching by the default factory configuration. 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 before you change the setting to another family type.

EX6200 and EX8200 switch interfaces do not have a default family setting.

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

See Table 26 on page 154 for protocol families available on the switch interfaces. Different protocol families support different subsets of the interfaces types on the switch.

Interface types on the switch are:

- Aggregated Ethernet (ae)
- Gigabit Ethernet (ge)
- Interface-range configuration (interface-range)
- Loopback (lo0)
- Management Ethernet (me0)
- Routed VLAN interface (RVI) (vlan)
- Virtual management Ethernet (vme)
- 10-Gigabit Ethernet (xe)

If you are using an interface range, the supported protocol families are the ones supported by the interface types that compose the range.

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

Table 26: Protocol Families and Supported Interface Types

<table>
<thead>
<tr>
<th>Family</th>
<th>Description</th>
<th>Supported Interface Types</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>ae</td>
</tr>
<tr>
<td>ccc</td>
<td>Circuit cross-connect protocol family</td>
<td>✓</td>
</tr>
<tr>
<td>ethernet-switching</td>
<td>Ethernet switching protocol family</td>
<td>✓</td>
</tr>
<tr>
<td>inet</td>
<td>IPv4 protocol family</td>
<td>✓</td>
</tr>
<tr>
<td>inet6</td>
<td>IPv6 protocol family</td>
<td>✓</td>
</tr>
<tr>
<td>iso</td>
<td>Junos OS protocol family for IS-IS traffic</td>
<td>✓</td>
</tr>
<tr>
<td>mpls</td>
<td>MPLS protocol family</td>
<td>✓</td>
</tr>
</tbody>
</table>

*Supported on EX8200 switches only

The remaining statements are explained separately.

Required Privilege
Level

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

- Example: Configuring MPLS on EX Series Switches
- Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 48
- Configuring Aggregated Ethernet Interfaces (CLI Procedure) on page 97
- Configuring Routed VLAN Interfaces (CLI Procedure)

- Junos OS Ethernet Interfaces Configuration Guide
- Junos OS Interfaces Fundamentals Configuration Guide
filter

Syntax

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

Hierarchy Level

```
[edit interfaces interface-name unit logical-unit-number family family],
[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number family family]
```

Release Information

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

Description

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

Options

- `group filter-group-number`—Define an interface to be part of a filter group. The default filter group number is 0.
  
  Range: 0 through 255

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

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

The remaining statements are explained separately.

Required Privilege Level

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

Related Documentation

- Applying a Filter to an Interface
- Configuring Firewall Filters (CLI Procedure)
  - Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 48
  - Example: Configuring Firewall Filters for Port, VLAN, and Router Traffic on EX Series Switches
- Junos OS Services Interfaces Configuration Guide
- Junos OS Routing Policy Configuration Guide
- Junos OS System Basics Configuration Guide
flow-control

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

Hierarchy Level
[edit interfaces interface-name aggregated-ether-options],
[edit interfaces interface-name ether-options],
[edit interfaces interface-name fastether-options],
[edit interfaces interface-name gigether-options],
[edit interfaces interface-name multiservice-options],
[edit interfaces interface-range name aggregated-ether-options],
[edit interfaces interface-range name ether-options]

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

Description
For aggregated Ethernet, Fast Ethernet, and Gigabit Ethernet interfaces only, explicitly enable flow control, which regulates the flow of packets from the router or switch to the remote side of the connection. Enabling flow control is useful when the remote device is a Gigabit Ethernet switch. Flow control is not supported on the 4-port Fast Ethernet PIC.

Default  Flow control is enabled.

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

Related Documentation
• Configuring Flow Control on page 65
• Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 48

force-up

Syntax  force-up;

Hierarchy Level  [edit interfaces interface-name ether-options 802.3ad lacp]

Release Information
Statement introduced in Junos OS Release 10.0 for EX Series switches.

Description
Set the state of the interface as UP when the peer has limited LACP capability.

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

Related Documentation
• Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 48
• Configuring Gigabit Ethernet Interfaces (J-Web Procedure) on page 51
• Understanding Aggregated Ethernet Interfaces and LACP on page 8
• Junos OS Ethernet Interfaces Configuration Guide
gratuitous-arp-reply

Syntax  (gratuitous-arp-reply | no-gratuitous-arp-reply);

Hierarchy Level  [edit interfaces interface-name]

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

Description  For Ethernet interfaces, enable updating of the ARP cache for replies received in response to gratuitous ARP requests.

Default  Updating of the ARP cache is disabled on all Ethernet interfaces.

Required Privilege  level

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

Related Documentation

• Configuring Gratuitous ARP on page 93
• no-gratuitous-arp-request
interface-range

Syntax

interface-range name {
    accounting-profile name;
    description text;
    disable;
    ether-options {
        802.3ad {
            ae;
            (backup | primary);
            lacp {
                force-up;
            }
        }
        (auto-negotiation | no-auto-negotiation);
        (flow-control | no-flow-control);
        link-mode mode;
        (loopback | no-loopback);
        speed (auto-negotiation | speed);
    }
    (gratuitous-arp-reply | no-gratuitous-arp-reply);
    member interface-name;
    member-range starting-interface name to ending-interface name;
    mtu bytes;
    no-gratuitous-arp-request;
    traceoptions {
        flag flag;
    }
    (traps | no-traps);
    unit logical-unit-number {
        accounting-profile name;
        bandwidth rate;
        description text;
        disable;
        family family-name {...}
        proxy-arp (restricted | unrestricted);
        (traps | no-traps);
        vlan-id vlan-id-number;
    }
    vlan-tagging;
}

Hierarchy Level
[edit interfaces]

Release Information
Statement introduced in Junos OS Release 10.0 for EX Series switches.

Description
Group interfaces that share a common configuration profile.

NOTE: You can use interface ranges only for Gigabit and 10-Gigabit Ethernet interfaces.
**Options**  
*name*—Name of the interface range.

---

**NOTE:** You can use regular expressions and wildcards to specify the interfaces in the member configuration. Do not use wildcards for interface types.

---

The remaining statements are explained separately.

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

**Related Documentation**
- Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 48
- Understanding Interface Ranges on EX Series Switches on page 10
- EX Series Switches Interfaces Overview on page 3
- *Junos OS Interfaces Fundamentals Configuration Guide*
interfaces (for EX Series switches)

Syntax

interfaces ae on page 161
interfaces ge on page 161
interfaces interface-range on page 163
interfaces lo0 on page 163
interfaces me0 on page 164
interfaces traceoptions on page 164
interfaces vlan on page 164
interfaces vme on page 165
interfaces xe on page 166

interfaces ae  
  aex {
    accounting-profile name;
    aggregated-ether-options {
      (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;
      (loopback | no-loopback);
      minimum-links number;
    }
    description text;
    disable;
    (gratuitous-arp-reply | no-gratuitous-arp-reply);
    mtu bytes;
    no-gratuitous-arp-request;
    traceoptions {
      flag flag;
    }
   (traps | no-traps);
    unit logical-unit-number {
      accounting-profile name;
      bandwidth rate;
      description text;
      disable;
      family family-name [...]
      proxy-arp (restricted | unrestricted);
      (traps | no-traps);
      vlan-id vlan-id-number;
    }
    vlan-tagging;
  }

interfaces ge  
  ge-fpc/pic/port {
    accounting-profile name;
    description text;
    disable;
    ether-options {
      802.3ad { 

ae;
  (backup | primary);
lacp [
    force-up;
  ]
} (auto-negotiation | no-auto-negotiation);
(flow-control | no-flow-control);
link-mode mode;
(loopback | no-loopback);
speed (auto-negotiation | speed);
}
(gratuitous-arp-reply | no-gratuitous-arp-reply);
media-type;
mtu bytes;
no-gratuitous-arp-request;
traceoptions {
  flag flag;
}
(traps | no-traps);
unit logical-unit-number {
  accounting-profile name;
  bandwidth rate;
  description text;
  disable;
  family family-name {...}
  proxy-arp (restricted | unrestricted);
  (traps | no-traps);
  vlan-id vlan-id-number;
}
vlan-tagging;
}
interfaces

interface-range name {
  accounting-profile name;
  description text;
  disable;
  ether-options {
    802.3ad {
      aex;
      (backup | primary);
      lacp {
        force-up;
      }
    }
    (auto-negotiation | no-auto-negotiation);
    (flow-control | no-flow-control);
    link-mode mode;
    (loopback | no-loopback);
    speed (auto-negotiation | speed);
  }
  (gratuitous-arp-reply | no-gratuitous-arp-reply);
  member interface-name;
  member-range starting-interface name to ending-interface name;
  mtu bytes;
  unit logical-unit-number {
    accounting-profile name;
    bandwidth rate;
    description text;
    disable;
    family family-name [...] proxy-arp (restricted | unrestricted);
    (traps | no-traps);
    vlan-id vlan-id-number;
  }
  vlan-tagging;
}

interfaces lo0

lo0 {
  accounting-profile name;
  description text;
  disable;
  traceoptions {
    flag flag;
  }
  (traps | no-traps);
  unit logical-unit-number {
    accounting-profile name;
    bandwidth rate;
    description text;
    disable;
    family family-name [...] (traps | no-traps);
  }
}

Chapter 6: Configuration Statements for Interfaces
interfaces me0  me0 {
    accounting-profile name;
    description text;
    disable;
    (gratuitous-arp-reply | no-gratuitous-arp-reply);
    no-gratuitous-arp-request;
    traceoptions {
        flag flag;
    } (traps | no-traps);
    unit logical-unit-number {
        accounting-profile name;
        bandwidth rate;
        description text;
        disable;
        family family-name [...]
        (traps | no-traps);
        vlan-id vlan-id-number;
    }
    vlan-tagging;
}

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

interfaces vlan  vlan {
    accounting-profile name;
    description text;
    disable;
    (gratuitous-arp-reply | no-gratuitous-arp-reply);
    mtu bytes;
    no-gratuitous-arp-request;
    traceoptions {
        flag flag;
    } (traps | no-traps);
    unit logical-unit-number {
        accounting-profile name;
        bandwidth rate;
        description text;
        disable;
        family family-name [...]
        proxy-arp (restricted | unrestricted);
        (traps | no-traps);
    }
}
interfaces vme

vme {
  accounting-profile name;
description text;
disable;
(gratuitous-arp-reply | no-gratuitous-arp-reply);
mtu bytes;
no-gratuitous-arp-request;
traceoptions {
  flag flag;
}
(traps | no-traps);
unit logical-unit-number {
  accounting-profile name;
  bandwidth rate;
description text;
disable;
family family-name [...] (traps | no-traps);
vlan-id vlan-id-number;
}
vlan-tagging;
}
interfaces xe xe-fpc/pic/port {
  accounting-profile name;
  description text;
  disable;
  ether-options {
    802.3ad {
      ae;
      (backup | primary);
      lacp {
        force-up;
      }
    }
    (flow-control | no-flow-control);
    link-mode mode;
    (loopback | no-loopback);
  }
  (gratuitous-arp-reply | no-gratuitous-arp-reply);
  mtu bytes;
  no-gratuitous-arp-request;
  traceoptions {
    flag flag;
  }
  (traps | no-traps);
  unit logical-unit-number {
    accounting-profile name;
    bandwidth rate;
    description text;
    disable;
    family family-name {...}
    proxy-arp (restricted | unrestricted);
    (traps | no-traps);
    vlan-id vlan-id-number;
  }
  vlan-tagging;
}

Hierarchy Level [edit]

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

Description Configure interfaces on EX Series switches.
Options  See Table 27 on page 167 for the interface types and protocol-family options supported on the switch. Different protocol families support different subsets of the interface types on the switch. See the family statement for syntax of the protocol families supported for switch interfaces.

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

Table 27: Interface Types and Their Supported Protocol Families

<table>
<thead>
<tr>
<th>Interface Type</th>
<th>Description</th>
<th>Supported Protocol Families</th>
</tr>
</thead>
<tbody>
<tr>
<td>ae</td>
<td>Aggregated Ethernet interface (also referred to as a link aggregation group [LAG])</td>
<td>✓* ✓ ✓ ✓ ✓ ✓ ✓</td>
</tr>
<tr>
<td>ge</td>
<td>Gigabit Ethernet interface</td>
<td>✓ ✓ ✓ ✓ ✓ ✓ ✓</td>
</tr>
<tr>
<td>lo0</td>
<td>Loopback interface</td>
<td>✓ ✓ ✓ ✓ ✓</td>
</tr>
<tr>
<td>me0</td>
<td>Management Ethernet interface</td>
<td>✓ ✓ ✓ ✓ ✓</td>
</tr>
<tr>
<td>vlan</td>
<td>Routed VLAN interface (RVI)</td>
<td>✓ ✓ ✓ ✓</td>
</tr>
<tr>
<td>vme</td>
<td>Virtual management Ethernet interface</td>
<td>✓ ✓ ✓ ✓ ✓</td>
</tr>
<tr>
<td>xe</td>
<td>10-Gigabit Ethernet interface</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
</tr>
<tr>
<td>interface-range</td>
<td>Interface-range configuration</td>
<td>Supported protocol families are the ones supported by the interface types that compose the range.</td>
</tr>
</tbody>
</table>

*Supported on EX8200 switches only

The remaining statements are explained separately.

Required Privilege Level

interface—To view this statement in the configuration.
interface-control—To add this statement to the configuration.
lacp (802.3ad)

Syntax

```plaintext
lacp {
  force-up;
}
```

Hierarchy Level

```
[edit interfaces interface-name ether-options 802.3ad]
```

Release Information

Statement introduced in Junos OS Release 10.0 for EX Series switches.

Description

Configure the Link Aggregation Control Protocol (LACP) parameters for interfaces.

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 on page 21
- Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch on page 27
- Configuring Aggregated Ethernet Interfaces (CLI Procedure) on page 97
- Configuring Aggregated Ethernet LACP (CLI Procedure) on page 101
- Understanding Aggregated Ethernet Interfaces and LACP on page 8
- Junos OS Ethernet Interfaces Configuration Guide
lacp (Aggregated Ethernet)

Syntax

```plaintext
lacp {
  (active | passive);
  admin-key key;
  link-protection {
    disable;
    (revertive | non-revertive);
  }
  periodic interval;
  system-id mac-address;
  system-priority priority;
}
```

Hierarchy Level

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

Release Information

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

Description

For aggregated Ethernet interfaces only, configure Link Aggregation Control Protocol (LACP).

Default

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

Options

- **active**—Initiate transmission of LACP packets.
- **passive**—Respond to LACP packets.

The remaining statements are explained separately.

Required Privilege Level

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

Related Documentation

- Configuring Aggregated Ethernet LACP
  - Configuring Aggregated Ethernet LACP (CLI Procedure) on page 101
- Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch on page 27
**link-mode**

**Syntax**  
link-mode mode (automatic | full-duplex | half-duplex);

**Hierarchy Level**  
[edit interfaces interface-name],  
[edit interfaces interface-name ether-options],  
[edit interfaces ge-pim/0/0 switch-options switch-port port-number]

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

**Description**  
Set the device's link connection characteristic.

**Options**  
mode—Link characteristics:

- automatic—Link mode is negotiated. This is the default for EX Series switches.
- full-duplex—Connection is full duplex.
- half-duplex—Connection is half duplex.

**Default:**  
Fast Ethernet interfaces, except the J Series ePIM Fast Ethernet interfaces, can operate in either full-duplex or half-duplex mode. The router’s management Ethernet interface, fxp0 or em0, the built-in Fast Ethernet interfaces on the FiC (M7i router), and the Gigabit Ethernet ports on J Series Services Routers with uPIMs installed and configured for access switching mode autonegotiate whether to operate in full-duplex or half-duplex mode. Unless otherwise noted here, all other interfaces operate only in full-duplex mode.

**NOTE:**  
On J Series ePIM Fast Ethernet interfaces, if you specify half-duplex (or if full-duplex mode is not autonegotiated), the following message is written to the system log: "Half-duplex mode not supported on this PIC, forcing full-duplex mode."

**NOTE:**  
On EX Series switches, if no-auto-negotiation is specified in [edit interfaces interface-name ether-options], you can select only full-duplex or half-duplex. If auto-negotiation is specified, you can select any mode.

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

**Related Documentation**  
- Configuring the Link Characteristics on Ethernet Interfaces  
- Understanding Management Ethernet Interfaces
**link-protection**

**Syntax**

```plaintext
link–protection {
  disable;
  (revertive | non-revertive);
}
```

**Hierarchy Level**

```
[edit interfaces ae x aggregated-ether-options]
[edit interfaces ae aggregated-ether-options lACP]
```

**Release Information**

Statement introduced in Junos OS Release 8.3.
Statement introduced in Junos OS Release 9.0 for EX Series switches.
Support for disable, revertive, and non-revertive statements added in Junos OS Release 9.3.

**Description**

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 primary and backup statements at the [edit interfaces ge-fpc/pic/port gigether-options 802.3ad aeX] hierarchy level or the [edit interfaces fe-fpc/pic/port fastether-options 802.3ad aeX] hierarchy level.

To configure those links on the switch, configure those statements at the [edit interfaces ge-fpc/pic/port ether-options 802.3ad aeX] hierarchy level or at the [edit interfaces xe-fpc/pic/port ether-options 802.3ad aeX] hierarchy level.

**Options**

The statements are explained separately.

**Required Privilege Level**

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

**Related Documentation**

- Configuring Aggregated Ethernet Link Protection on page 102
link-speed (Aggregated Ethernet)

Syntax

link-speed speed;

Hierarchy Level

[edit interfaces ae x aggregated-ether-options],
[edit interfaces interface-range name aggregated-ether-options],
[edit interfaces interface-range name aggregated-sonet-options]

Release Information

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

Description

For aggregated Ethernet interfaces only, set the required link speed.

Options

speed—For aggregated Ethernet links, you can specify speed in bits per second either as a complete decimal number or as a decimal number followed by the abbreviation k (1000), m (1,000,000), or g (1,000,000,000).

Aggregated Ethernet links on the M120 router can have one of the following speed values:

• 100m—Links are 100 Mbps.
• 10g—Links are 10 Gbps.
• 1g—Links are 1 Gbps.
• oc192—Links are OC192 or STM64c.

Aggregated Ethernet links on EX Series switches can be configured to operate at one of the following speed values:

• 10m
• 100m
• 1g
• 10g

Required Privilege

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

Related Documentation

• Configuring Aggregated Ethernet Link Speed on page 103
• Configuring Aggregated Ethernet Interfaces (CLI Procedure) on page 97
• Example: Configuring Aggregated Ethernet High-Speed Uplinks Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch on page 21
**loopback (Aggregated Ethernet, Fast Ethernet, and Gigabit Ethernet)**

**Syntax**  
(loopback | no-loopback);

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

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

**Description**  
For aggregated Ethernet, Fast Ethernet, Gigabit Ethernet, and 10-Gigabit Ethernet interfaces, enable or disable loopback mode.

**NOTE:** By default, local aggregated Ethernet, Fast Ethernet, Tri-Rate Ethernet copper, Gigabit Ethernet, and 10-Gigabit Ethernet interfaces connect to a remote system.

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

**Related Documentation**  
- Configuring Ethernet Loopback Capability on page 92
media-type

Syntax    media-type (copper | fiber);

Hierarchy Level    [edit interfaces interface-name]

Release Information    Statement introduced in Junos OS Release 11.3 for EX Series switches.

Description    (EX2200-C switch only) Configure the media type for a dual-purpose uplink port (one RJ-45 port and one SFP port) on an EX2200 switch. If you use the media-type for a dual-purpose uplink port, the alternate media type cannot be used with the port.

Default    When media-type is not set, the port accepts either type of connection. The media type is fiber if a transceiver is installed in the SFP connection. If no transceiver is installed, the media type is copper.

Options      copper—The dual-purpose uplink port accepts only a 10/100/1000BASE-T copper connection.

      fiber—The dual-purpose uplink port accepts only an SFP fiber connection.

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

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

Related Documentation    • Configuring the Media Type on Dual-Purpose Uplink Ports (CLI Procedure) on page 111

member

Syntax    member interface-name;

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

Release Information    Statement introduced in Junos OS Release 10.0 for EX Series switches.

Description    Specify the name of the member interface belonging to an interface range on the EX Series switch.

Options      interface-name—Name of the interface.

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

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

Related Documentation    • Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 48

      • Understanding Interface Ranges on EX Series Switches on page 10

      • EX Series Switches Interfaces Overview on page 3

      • Junos OS Interfaces Fundamentals Configuration Guide
members

Syntax  

members [ (all | names | vlan-ids) ];

Hierarchy Level  

[edit interfaces interface-name unit logical-unit-number family ethernet-switching vlan]

Release Information  


Description  

For trunk interfaces, configure the VLANs that can carry traffic.

TIP: To display a list of all configured VLANs on the system, including VLANs that are configured but not committed, type ? after vlan or vlans in your configuration mode command line. Note that only one VLAN is displayed for a VLAN range.

NOTE: The number of VLANs supported per switch varies for each model. Use the configuration-mode command set vlans id vlan-id ? to determine the maximum number of VLANs allowed on a switch. You cannot exceed this VLAN limit because each VLAN is assigned an ID number when it is created. You can, however, exceed the recommended VLAN member maximum. To determine the maximum number of VLAN members allowed on a switch, multiply the VLAN maximum for the switch times 8 (vmember limit = vlan max * 8).

If a switch configuration exceeds the recommended VLAN member maximum, you see a warning message when you commit the configuration. If you ignore the warning and commit such a configuration, the configuration succeeds but you run the risk of crashing the Ethernet switching process (eswd) due to memory allocation failure.

Options  

all—Specifies that this trunk interface is a member of all the VLANs that are configured on this switch. When a new VLAN is configured on the switch, this trunk interface automatically becomes a member of the VLAN.

NOTE: Since VLAN members are limited, specifying all could cause the number of VLAN members to exceed the limit at some point.

names—Name of one or more VLANs. VLAN IDs are applied automatically in this case.
NOTE: all cannot be a VLAN name.

`vlan-ids`—Numeric identifier of one or more VLANs. For a series of tagged VLANs, specify a range; for example, 10-20 or 10-20 23 27-30.

NOTE: Each configured VLAN must have a specified VLAN ID to successfully commit the configuration; otherwise, the configuration commit fails.

<table>
<thead>
<tr>
<th>Required Privilege Level</th>
<th>Related Documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>interface</td>
<td>show ethernet-switching interfaces on page 217</td>
</tr>
<tr>
<td>interface-control</td>
<td>show vlans</td>
</tr>
<tr>
<td></td>
<td>Example: Setting Up Basic Bridging and a VLAN for an EX Series Switch</td>
</tr>
<tr>
<td></td>
<td>Example: Connecting an Access Switch to a Distribution Switch</td>
</tr>
<tr>
<td></td>
<td>Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 48</td>
</tr>
<tr>
<td></td>
<td>Configuring Gigabit Ethernet Interfaces (J-Web Procedure) on page 51</td>
</tr>
<tr>
<td></td>
<td>Configuring VLANs for EX Series Switches (CLI Procedure)</td>
</tr>
<tr>
<td></td>
<td>Creating a Series of Tagged VLANs (CLI Procedure)</td>
</tr>
<tr>
<td></td>
<td>Understanding Bridging and VLANs on EX Series Switches</td>
</tr>
<tr>
<td></td>
<td>Junos OS Ethernet Interfaces Configuration Guide</td>
</tr>
</tbody>
</table>
### member-range

**Syntax**

```
member-range starting-interface-name to ending-interface-name;
```

**Hierarchy Level**

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

**Release Information**

Statement introduced in Junos OS Release 10.0 for EX Series switches.

**Description**

Specify the names of the first and last members of a sequence of interfaces belonging to an interface range.

**Options**

**Range:** Starting `interface-name` to `ending interface-name`—The name of the first member and the name of the last member in the interface sequence.

**Required Privilege Level**

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

**Related Documentation**

- Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 48
- Understanding Interface Ranges on EX Series Switches on page 10
- EX Series Switches Interfaces Overview on page 3
- Junos OS Interfaces Fundamentals Configuration Guide
## minimum-links

**Syntax**  
minimum-links number;

**Hierarchy Level**  
[edit interfaces aex aggregated-ether-options],  
[edit interfaces aex aggregated-sonet-options],  
[edit interfaces interface-name mifr-uni-nni-bundle-options],  
[edit interfaces interface-name unit logical-unit-number],  
[edit interfaces interface-range range aggregated-ether-options],  
[edit interfaces interface-range range aggregated-sonet-options],  
[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number]

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

**Description**  
For aggregated Ethernet, SONET/SDH, multilink, link services, and voice services interfaces only, set the minimum number of links that must be up for the bundle to be labeled up.

**Options**  
* number—Number of links.  
  **Range:** 1 through 8 (1 through 16 for Ethernet and SONET interfaces on the MX Series, M320, M120, T Series, or TX Matrix routers, and 1 through 12 for EX8200 switches)  
  **Default:** 1

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

**Related Documentation**  
- Configuring Aggregated Ethernet Minimum Links on page 104  
- Configuring Aggregated SONET/SDH Minimum Links  
- Configuring Aggregated Ethernet Interfaces (CLI Procedure) on page 97  
- Example: Configuring Aggregated Ethernet High-Speed Uplinks Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch on page 21  
- Junos OS Services Interfaces Configuration Guide
**mtu**

**Syntax**

mtu bytes;

**Hierarchy Level**

[edit interfaces interface-name],
[edit interfaces interface-name unit logical-unit-number family family],
[edit interfaces interface-range name],
[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number family family]

**Release Information**

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

**Description**

Specify the maximum transmission unit (MTU) size for the media or protocol. The default MTU size depends on the device type. Changing the media MTU or protocol MTU causes an interface to be deleted and added again.

To route jumbo data packets on the RVI on EX Series switches, you must configure the jumbo MTU size on the member physical interfaces and also on the RVI itself (the VLAN interface).

---

**CAUTION:** For EX Series switches, setting or deleting the jumbo MTU size on the RVI (the vlan interface) while the switch is transmitting packets might result in dropped packets.

---

**NOTE:** Not all devices allow you to set an MTU value, and some devices have restrictions on the range of allowable MTU values. You cannot configure an MTU for management Ethernet interfaces (fxp0, em0, or me0) or for loopback, multilink, and multicast tunnel devices.

For more information on configuring MTU for specific interfaces and router or switch combinations, see "Configuring the Media MTU" on page 69.

**Options**

- **bytes**—MTU size.

  **Range:** 256 through 9192 bytes
  **Default:** 1500 bytes (INET, INET6, and ISO families), 1448 bytes (MPLS), 1514 bytes (EX Series interfaces)

**Required Privilege Level**

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

**Related Documentation**

- Configuring the Media MTU on page 69
- Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 48
native-vlan-id

Syntax

native-vlan-id vlan-id;

Hierarchy Level

[edit interfaces interface-name unit 0 family ethernet-switching]

Release Information

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

Description

Configure the VLAN identifier to associate with untagged packets received on the interface.

Options

vlan-id—Numeric identifier of the VLAN.
Range: 0 through 4095

Required Privilege Level

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

Related Documentation

• show vlans
• show ethernet-switching interfaces on page 217
• Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 48
• Configuring Gigabit Ethernet Interfaces (J-Web Procedure) on page 51
• Understanding Bridging and VLANs on EX Series Switches
• Junos OS Ethernet Interfaces Configuration Guide
no-redirects

Syntax  no-redirects;

Hierarchy Level  [edit interfaces interface-name unit logical-unit-number family family]

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

Description  Do not send protocol redirect messages on the interface.

To disable the sending of protocol redirect messages for the entire router or switch, include the no-redirects statement at the [edit system] hierarchy level.

Default  Interfaces send protocol redirect messages.

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

Related Documentation  • Disabling the Transmission of Redirect Messages on an Interface on page 95
• Junos OS System Basics Configuration Guide
periodic

Syntax  
periodic interval;

Hierarchy Level  
[edit interfaces aex aggregated-ether-options lACP],
[edit interfaces interface-range name aggregated-ether-options lACP]

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

Description  
For aggregated Ethernet interfaces only, configure the interval for periodic transmission of LACP packets.

Options  
interval—Interval for periodic transmission of LACP packets.
  
  • fast—Transmit packets every second.
  
  • slow—Transmit packets every 30 seconds.

Default: fast

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

Related Documentation  
• Configuring Aggregated Ethernet LACP
• Configuring Aggregated Ethernet LACP (CLI Procedure) on page 101
• Example: Configuring Aggregated Ethernet High-Speed Uplinks Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch on page 21
**pic**

Syntax

```
pic pic-number {
    sfpplus {
        pic-mode mode;
    }
}
```

Hierarchy Level  
[edit chassis fpc slot]

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

Description  
Enable the specified port of the SFP+ uplink module to perform in the operating mode specified by `pic-mode`. The port is indicated by a Physical Interface Card (PIC) number.

Options  
`pic-number`—Number of the PIC. For uplink ports in EX3200 and EX4200 switches, the PIC number is always 1.

The remaining statements are explained separately.

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

Related Documentation  
• Setting the Mode on an SFP+ Uplink Module (CLI Procedure) on page 110

---

**pic-mode**

Syntax  
```
pic-mode mode;
```

Hierarchy Level  
[edit chassis fpc slot pic pic-number sfpplus]

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

Description  
Configure the operating mode for the specified port on the SFP+ uplink module on an EX3200 or EX4200 switch.

Options  
`mode`—Operating mode of the SFP+ uplink module:

- 1G—1-gigabit operating mode
- 10G—10-gigabit operating mode

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

Related Documentation  
• Setting the Mode on an SFP+ Uplink Module (CLI Procedure) on page 110
**port-mode**

**Syntax**

```
port-mode mode;
```

**Hierarchy Level**

```
[edit interfaces interface-name unit logical-unit-number family ethernet-switching]
```

**Release Information**

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

**Description**

Configure whether an interface on the switch operates in access, tagged-access, or trunk mode.

**Default**

All switch interfaces are in access mode.

**Options**

```
mode—Operating mode for an interface can be one of the following:
```

- **access**—In this mode, the interface can be in a single VLAN only. Access interfaces typically connect to single network devices such as PCs, printers, IP telephones, and IP cameras.
- **tagged-access**—In this mode, the interface can accept tagged packets from one access device. Tagged-access interfaces typically connect to servers running Virtual machines using VEPA technology.
- **trunk**—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.

**NOTE:** The number of VLANs supported per switch varies for each model. Use the configuration-mode command set vlans id vlan-id ? to determine the maximum number of VLANs allowed on a switch. You cannot exceed this VLAN limit because each VLAN is assigned an ID number when it is created. You can, however, exceed the recommended VLAN member maximum. To determine the maximum number of VLAN members allowed on a switch, multiply the VLAN maximum for the switch times 8 \((vmember limit = vlan max * 8)\).

If a switch configuration exceeds the recommended VLAN member maximum, you see a warning message when you commit the configuration. If you ignore the warning and commit such a configuration, the configuration succeeds but you run the risk of crashing the Ethernet switching process \((eswd)\) due to memory allocation failure.

**Required Privilege Level**

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

**Related Documentation**

- Example: Connecting an Access Switch to a Distribution Switch
- Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 48
preferred

Syntax  preferred:

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

Release Information  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.

Description  Configure this address to be the preferred address on the interface. If you configure more  
than one address on the same subnet, the preferred source address is chosen by default  
as the source address when you initiate frame transfers to destinations on the subnet.

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

Default  The lowest-numbered address on the subnet is the preferred address.

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

Related Documentation  • Configuring the Interface Address on page 66
primary (Address on Interface)

Syntax

primary;

Hierarchy Level

[edit interfaces interface-name unit logical-unit-number family family address address],
[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number family family address address]

Release Information

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.

Description

Configure this address to be the primary address of the protocol on the interface. If the logical unit has more than one address, the primary address is used by default as the source address when packet transfer originates from the interface and the destination address does not indicate the subnet.

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

Default

For unicast traffic, the primary address is the lowest non-127 (in other words, non-loopback) preferred address on the unit.

Required Privilege Level

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

Related Documentation

• Configuring the Interface Address on page 66
**proxy-arp**

| **Syntax** | proxy-arp (restricted | unrestricted); |
|------------|------------------------|
| **Hierarchy Level** | [edit interfaces interface-name unit logical-unit-number], [edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number] |
| **Description** | For Ethernet interfaces only, configure the router or switch to respond to any ARP request, as long as the router or switch has an active route to the ARP request’s target address. |
| **Default** | Proxy ARP is not enabled. The router or switch responds to an ARP request only if the destination IP address is its own. |
| **Options** | • none—The router or switch responds to any ARP request for a local or remote address if the router or switch has a route to the target IP address.  
• restricted—(Optional) The router or switch responds to ARP requests in which the physical networks of the source and target are different and does not respond if the source and target IP addresses are in the same subnet. The router or switch must also have a route to the target IP address.  
• unrestricted—(Optional) The router or switch responds to any ARP request for a local or remote address if the router or switch has a route to the target IP address. |
| **Default:** | unrestricted |
| **Required Privilege Level** | interface—To view this statement in the configuration. interface-control—To add this statement to the configuration. |
| **Related Documentation** |  • Configuring Restricted and Unrestricted Proxy ARP on page 95  
• Configuring Proxy ARP (CLI Procedure)  
• Example: Configuring Proxy ARP on an EX Series Switch  
• Configuring Gratuitous ARP on page 93 |
### rpf-check

**Syntax**  
rpf-check;

**Hierarchy Level**  
[edit interfaces interface-name unit logical-unit-number family inet],  
[edit interfaces interface-name unit logical-unit-number family inet6]

**Release Information**  
Statement introduced in Junos OS Release 9.3 for EX Series switches.

**Description**  
On EX3200 and EX4200 switches, enable a reverse-path forwarding (RPF) check on unicast traffic (except ECMP packets) on all ingress interfaces.

On EX8200 switches, enable an RPF check on unicast traffic, including ECMP packets, on the selected ingress interface.

**Default**  
Unicast RPF is disabled on all interfaces.

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

**Related Documentation**  
- Example: Configuring Unicast RPF on an EX Series Switch on page 39  
- Configuring Unicast RPF (CLI Procedure) on page 106  
- Disabling Unicast RPF (CLI Procedure) on page 107  
- Understanding Unicast RPF for EX Series Switches on page 13
**sfplus**

**Syntax**
```
sfplus {  
  pic-mode mode;  
}
```

**Hierarchy Level**
```
[edit chassis fpc slot pic pic-number]
```

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

**Description**
Configure the operating mode for the specified port on the SFP+ uplink module on the EX3200 or EX4200 switch.

The remaining statement is explained separately.

**Default**
By default, the SFP+ uplink module operates in the 10-gigabit mode and supports SFP+ transceivers.

**NOTE:** The SFP+ uplink module provides two ports for 10-gigabit small form-factor pluggable (SFP+) transceivers when configured to operate in 10-gigabit mode or four ports for 1-gigabit small form-factor pluggable (SFP) transceivers when configured to operate in 1-gigabit mode.

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

**Related Documentation**
- Setting the Mode on an SFP+ Uplink Module (CLI Procedure) on page 110
speed

**Syntax**  
speed (auto-negotiation | speed) ;

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

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

**Description**  
Configure the interface’s speed.

**Default**  
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**  
- **auto-negotiation**—Automatically negotiate the speed based on the speed of the other end of the link. This option is available only when the auto-negotiation statement at the [edit interfaces interface-name ether-options] hierarchy level is enabled.
- **speed**—Specify the interface speed. If the auto-negotiation statement at the [edit interfaces interface-name ether-options] hierarchy level is disabled, you must specify a specific value. This value sets the speed that is used on the link. If the auto-negotiation statement is enabled, you might want to configure a specific speed value to advertise the desired speed to the remote end.
  - 10m—10 Mbps
  - 100m—100 Mbps
  - 1g—1 Gbps

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

**Related Documentation**  
- Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 48
- Configuring Gigabit Ethernet Interfaces (J-Web Procedure) on page 51
- Junos OS Ethernet Interfaces Configuration Guide
### targeted-broadcast

**Syntax**
```
targeted-broadcast;
```

**Hierarchy Level**
```
[edit interfaces ge-chassis/slot/port unit logical-unit-number family inet]
```

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

**Description**
Enable IP directed broadcast on a specified subnet.

**Default**
IP directed broadcast is disabled.

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

**Related Documentation**
- Example: Configuring IP Directed Broadcast on an EX Series Switch on page 43
- Configuring IP Directed Broadcast (CLI Procedure) on page 108
- Understanding IP Directed Broadcast for EX Series Switches on page 17
traceoptions (Individual Interfaces)

Syntax

```plaintext
traceoptions {
  file filename <files name> <size size> <world-readable | no-world-readable>;
  flag flag;
  match;
}
```

Hierarchy Level

[edit interfaces interface-name]

Release Information

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

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.

Default

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

Options

file name—Name of the file to receive the output of the tracing operation. Enclose the name within quotation marks. All files are placed in the directory /var/log. By default, interface process tracing output is placed in the file files number—(Optional) Maximum number of trace files. When a trace file named trace-file reaches its maximum size, it is renamed trace-file,0, then trace-file,1, and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten dcd.

match—(Optional) Regular expression for lines to be traced.

no-world-readable—(Optional) Prevent any user from reading the log file.

world-readable—(Optional) Allow any user to read the log file.

size size—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named trace-file reaches this size, it is renamed trace-file,0. When the trace-file again reaches its maximum size, trace-file,0 is renamed trace-file,1 and trace-file is renamed trace-file,0. This renaming scheme continues until the maximum number of trace files is reached. Then, the oldest trace file is overwritten.

flag—Tracing operation to perform. To specify more than one tracing operation, include multiple flag statements. The following are the interface-specific tracing options.

- all—All interface tracing operations
- event—Interface events
- ipc—Interface interprocess communication (IPC) messages
- media—Interface media changes
- q921—Trace ISDN Q.921 frames
- q931—Trace ISDN Q.931 frames

**Required Privilege**

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>interface</td>
<td>To view this statement in the configuration.</td>
</tr>
<tr>
<td>interface-control</td>
<td>To add this statement to the configuration.</td>
</tr>
</tbody>
</table>

**Related Documentation**

- Tracing Operations of an Individual Router or Switch Interface on page 109
traceoptions (Interface Process)

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

Hierarchy Level [edit interfaces]

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

Description Define tracing operations for the interface process (dcd).

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

Options
disable—(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 all.

filename—Name of the file to receive the output of the tracing operation. Enclose the name within quotation marks. All files are placed in the directory /var/log. By default, interface process tracing output is placed in the file dcd.

files number—(Optional) Maximum number of trace files. When a trace file named trace-file reaches its maximum size, it is renamed trace-file.0, then trace-file.1, and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten.

If you specify a maximum number of files, you also must specify a maximum file size with the size option.

Range: 2 through 1000
Default: 3 files

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

• all
• change-events—Log changes that produce configuration events
• config-states—Log the configuration state machine changes
• kernel—Log configuration IPC messages to kernel
• kernel-detail—Log details of configuration messages to kernel
• no-world-readable—(Optional) Disallow any user to read the log file.
size size—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named `trace-file` reaches this size, it is renamed `trace-file.0`. When the `trace-file` again reaches its maximum size, `trace-file.0` is renamed `trace-file.1` and `trace-file` is renamed `trace-file.0`. 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 `files` option.

Syntax: `xk` to specify kilobytes, `xm` to specify megabytes, or `xg` to specify gigabytes

Range: 10 KB through the maximum file size supported on your router

Default: 1 MB

`world-readable`—(Optional) Allow any user to read the log file.

`match regex`—(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.

Related Documentation
- Tracing Operations of the Interface Process on page 110

traps

Syntax
`(traps | no-traps);

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

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

Description
Enable or disable the sending of Simple Network Management Protocol (SNMP) notifications when the state of the connection changes.

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

Related Documentation
- Enabling or Disabling SNMP Notifications on Physical Interfaces on page 97
- Enabling or Disabling SNMP Notifications on Logical Interfaces on page 96
unit

Syntax  

```plaintext
unit logical-unit-number {  
  accounting-profile name;
  bandwidth rate;
  description text;
  disable;
  family family-name [ ... ]
  proxy-arp (restricted | unrestricted);
  (traps | no-traps);
  vlan-id vlan-id-number;
}
```

Hierarchy Level  

[edit interfaces interface-name],
[edit interfaces interface-range name]

Release Information  

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

Description  

Configure a logical interface on the physical device. 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.

Required Privilege Level  

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

Related Documentation  

- Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 48
- Configuring Aggregated Ethernet Interfaces (CLI Procedure) on page 97
- EX Series Switches Interfaces Overview on page 3
- Junos OS Ethernet Interfaces Configuration Guide
**vlan**

Syntax

```
vlan {
    members [ (all | names | vlan-ids) ];
}
```

Hierarchy Level

```
[edit interfaces interface-name unit logical-unit-number family ethernet-switching]
```

Release Information

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

Description

Bind an 802.1Q VLAN tag ID to a logical interface.

The remaining statement is explained separately.

Required Privilege Level

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

Related Documentation

- show ethernet-switching interfaces on page 217
- Example: Setting Up Bridging with Multiple VLANs for EX Series Switches
- Configuring Routed VLAN Interfaces (CLI Procedure)
- Understanding Bridging and VLANs on EX Series Switches
- *Junos OS Ethernet Interfaces Configuration Guide*
### vlan-id

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

**Hierarchy Level**
```
[edit interfaces interface-name unit logical-unit-number]
```

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

**Description**
Bind an 802.1Q VLAN tag ID to a logical interface.

**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**—A 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 199](#)
- [Example: Configuring Layer 3 Subinterfaces for a Distribution Switch and an Access Switch on page 32](#)
- [Configuring Gigabit Ethernet Interfaces (CLI Procedure) on page 48](#)
- [Configuring Gigabit Ethernet Interfaces (J-Web Procedure) on page 51](#)
- [Configuring a Layer 3 Subinterface (CLI Procedure) on page 105](#)
- [Junos OS Ethernet Interfaces Configuration Guide](#)
**vlan-tagging**

**Syntax**

```plaintext
vlan-tagging;
```

**Hierarchy Level**

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

**Release Information**


**Description**

For Fast Ethernet and Gigabit Ethernet interfaces and aggregated Ethernet interfaces configured for VPLS, enable the reception and transmission of 802.1Q VLAN-tagged frames on the interface.

**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 on page 19](#)
- [vlan-id on page 198](#)
- [Configuring a Layer 3 Subinterface (CLI Procedure) on page 105](#)
- [Configuring Tagged Aggregated Ethernet Interfaces on page 105](#)
- [Example: Configuring Layer 3 Subinterfaces for a Distribution Switch and an Access Switch on page 32](#)
CHAPTER 7

Operational Commands for Interfaces
clear ipv6 neighbors

Syntax
clear ipv6 neighbors
<all | host hostname>

Release Information
Command introduced before Junos OS Release 7.4.
Command introduced in Junos OS Release 9.3 for EX Series switches.

Description
Clear IPv6 neighbor cache information.

Options
none—Clear all IPv6 neighbor cache information.
all—(Optional) Clear all IPv6 neighbor cache information.
host hostname—(Optional) Clear the information for the specified IPv6 neighbors.

Required Privilege
view

Related Documentation
• show ipv6 neighbors on page 277

List of Sample Output
clear ipv6 neighbors on page 202

Output Fields
When you enter this command, you are provided feedback on the status of your request.

Sample Output

```
clear ipv6 neighbors  user@host> clear ipv6 neighbors
```
**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.

**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.

**Options**

- **none**—Display real-time statistics for all interfaces.
- **interface-name**—(Optional) Display real-time statistics for the specified interface.
- **traffic**—(Optional) Display traffic data for all active interfaces.
- **detail**—(Optional) With traffic option only, display detailed output.

**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 using 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 Junos OS Interfaces Command Reference. To control the output of the `monitor interface interface-name` command while it is running, use the keys listed in Table 28 on page 203. The keys are not case-sensitive.

**Table 28: Output Control Keys for the monitor interface interface-name Command**

<table>
<thead>
<tr>
<th>Key</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>c</td>
<td>Clears (returns to zero) the delta counters since <code>monitor interface</code> was started. This does not clear the accumulative counter. To clear the accumulative counter, use the <code>clear interfaces interval</code> command.</td>
</tr>
<tr>
<td>f</td>
<td>Freezes the display, halting the display of updated statistics and delta counters.</td>
</tr>
<tr>
<td>i</td>
<td>Displays information about a different interface. The command prompts you for the name of a specific interface.</td>
</tr>
<tr>
<td>n</td>
<td>Displays information about the next interface. The <code>monitor interface</code> command displays the physical or logical interfaces in the same order as the <code>show interfaces terse</code> command.</td>
</tr>
<tr>
<td>q or Esc</td>
<td>Quits the command and returns to the command prompt.</td>
</tr>
<tr>
<td>t</td>
<td>Thaws the display, resuming the update of the statistics and delta counters.</td>
</tr>
</tbody>
</table>

To control the output of the `monitor interface traffic` command while it is running, use the keys listed in Table 29 on page 204. The keys are not case-sensitive.
Table 29: Output Control Keys for the monitor interface traffic Command

<table>
<thead>
<tr>
<th>Key</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>b</td>
<td>Displays the statistics in units of bytes and bytes per second (bps).</td>
</tr>
<tr>
<td>c</td>
<td>Clears (return to 0) the delta counters in the Current Delta column. The statistics counters are not cleared.</td>
</tr>
<tr>
<td>d</td>
<td>Displays the Current Delta column (instead of the rate column) in bps or packets per second (pps).</td>
</tr>
<tr>
<td>p</td>
<td>Displays the statistics in units of packets and packets per second (pps).</td>
</tr>
<tr>
<td>q or Esc</td>
<td>Quits the command and returns to the command prompt.</td>
</tr>
<tr>
<td>r</td>
<td>Displays the rate column (instead of the Current Delta column) in bps and pps.</td>
</tr>
</tbody>
</table>

Required Privilege Level: trace

List of Sample Output:
- monitor interface (Physical) on page 205
- monitor interface (OTN Interface) on page 207
- monitor interface (Logical) on page 208
- monitor interface traffic on page 208
- monitor interface traffic detail on page 209

Output Fields:
Table 30 on page 204 describes the output fields for the monitor interface command. Output fields are listed in the approximate order in which they appear.

Table 30: monitor interface Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>router1</td>
<td>Hostname of the router.</td>
<td>All levels</td>
</tr>
<tr>
<td>Seconds</td>
<td>How long the monitor interface command has been running or how long since you last cleared the counters.</td>
<td>All levels</td>
</tr>
<tr>
<td>Time</td>
<td>Current time (UTC).</td>
<td>All levels</td>
</tr>
<tr>
<td>Delay x/y/z</td>
<td>Time difference between when the statistics were displayed and the actual clock time.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- x—Time taken for the last polling (in milliseconds).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- y—Minimum time taken across all pollings (in milliseconds).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- z—Maximum time taken across all pollings (in milliseconds).</td>
<td></td>
</tr>
<tr>
<td>Interface</td>
<td>Short description of the interface, including its name, status, and encapsulation.</td>
<td>All levels</td>
</tr>
<tr>
<td>Link</td>
<td>State of the link: Up, Down, or Test.</td>
<td>All levels</td>
</tr>
</tbody>
</table>
### Table 30: monitor interface Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current delta</strong></td>
<td>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.</td>
<td>All levels</td>
</tr>
<tr>
<td><strong>Local Statistics</strong></td>
<td>(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 takes awhile (generally, less than 1 second) for this counter to stabilize.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Input bytes</strong>—Number of bytes received on the interface.</td>
<td>All levels</td>
</tr>
<tr>
<td></td>
<td>• <strong>Output bytes</strong>—Number of bytes transmitted on the interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Input packets</strong>—Number of packets received on the interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Output packets</strong>—Number of packets transmitted on the interface.</td>
<td></td>
</tr>
<tr>
<td><strong>Remote Statistics</strong></td>
<td>(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 takes awhile (generally, less than 1 second) for this counter to stabilize.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Input bytes</strong>—Number of bytes received on the interface.</td>
<td>All levels</td>
</tr>
<tr>
<td></td>
<td>• <strong>Output bytes</strong>—Number of bytes transmitted on the interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Input packets</strong>—Number of packets received on the interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Output packets</strong>—Number of packets transmitted on the interface.</td>
<td></td>
</tr>
<tr>
<td><strong>Traffic statistics</strong></td>
<td>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 takes awhile (generally, less than 1 second) for this counter to stabilize.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Input bytes</strong>—Number of bytes received on the interface.</td>
<td>All levels</td>
</tr>
<tr>
<td></td>
<td>• <strong>Output bytes</strong>—Number of bytes transmitted on the interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Input packets</strong>—Number of packets received on the interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Output packets</strong>—Number of packets transmitted on the interface.</td>
<td></td>
</tr>
</tbody>
</table>

**Description**

With the `traffic` option, displays the interface description configured at the hierarchy level.

### Sample Output

```plaintext
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: OC48
Traffic statistics:  
<table>
<thead>
<tr>
<th></th>
<th>Current Delta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input packets:</td>
<td>6045 (0 pps)</td>
</tr>
<tr>
<td>Input bytes:</td>
<td>6290065 (0 bps)</td>
</tr>
<tr>
<td>Output packets:</td>
<td>10376 (0 pps)</td>
</tr>
</tbody>
</table>
| Output bytes:  | 10365540 (0 bps) |```
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  user@host> monitor interface ge-7/0/0

(OTN Interface)

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

Chapter 7: Operational Commands for Interfaces
### OTN ODU - Counters

<table>
<thead>
<tr>
<th>BIP</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>BBE</td>
<td>0</td>
</tr>
<tr>
<td>ES</td>
<td>0</td>
</tr>
<tr>
<td>SES</td>
<td>0</td>
</tr>
<tr>
<td>UAS</td>
<td>422</td>
</tr>
</tbody>
</table>

### OTN ODU - Received Overhead

| APS C | 0-3: | 0 |

---

```
user@host> monitor interface so-1/0/0.0

deployname:                Seconds: 16
host name                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 |
| Output bytes: | 0 |
| Input packets: | 0 |
| Output packets: | 0 |

Remote statistics:
| Input bytes: | 0 (0 bps) |
| Output bytes: | 0 (0 bps) |
| Input packets: | 0 (0 pps) |
| Output packets: | 0 (0 pps) |

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'
```

---

```
user@host> monitor interface traffic

deployname:                Seconds: 15
host name                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)
s2-1/0/0        Up         189378          (1)              36349          (0)
s2-1/0/1        Down              0          (0)              18747          (0)
s2-1/0/2        Down              0          (0)              16078          (0)
s2-1/0/3        Up         80338          (0)                  0          (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
```
```
user@host> monitor interface traffic detail
 host name    Seconds: 15    Time: 12:31:09

<table>
<thead>
<tr>
<th>Interface</th>
<th>Link</th>
<th>Input packets (pps)</th>
<th>Output packets (pps)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>t1-0/1/1:0</td>
<td>Up</td>
<td>19769</td>
<td>0</td>
<td>To-OSAKA-1</td>
</tr>
</tbody>
</table>

...`

Bytes=b, Clear=c, Delta=d, Packets=p, Quit=q or ESC, Rate=r, Up=^U, Down=^D
```
request diagnostics tdr

Syntax  
request diagnostics tdr (abort | start) interface interface-name

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

Description  
Start a time domain reflectometry (TDR) diagnostic test on the specified interface. This test characterizes and locates faults on twisted-pair Ethernet cables. For example, it can detect a broken twisted pair and provide the approximate distance to the break. It can also detect polarity swaps, pair swaps, and excessive skew.

The TDR test is supported on the following switches and interfaces:

- EX2200, EX3200, EX3300, and EX4200 switches—RJ-45 network interfaces. The TDR test is not supported on management interfaces and SFP interfaces.
- EX6200 and EX8200 switches—RJ-45 interfaces on line cards.

NOTE: We recommend running the TDR test when there is no traffic on the interface under test.

You view the results of the TDR test with the show diagnostics tdr command.

Options  
- abort—Stop the TDR test currently in progress on the specified interface. No results are reported, and previous results, if any, are cleared.
- interface-name—The name of the interface.
- start—Start a TDR test on the specified interface.

Required Privilege Level  
maintenance

Related Documentation  
- show diagnostics tdr on page 212
- Diagnosing a Faulty Twisted-Pair Cable (CLI Procedure) on page 126

List of Sample Output  
request diagnostics tdr start interface ge-0/0/19 on page 211

Output Fields  
Table 31 on page 211 lists the output fields for the request diagnostics tdr command. Output fields are listed in the approximate order in which they appear.
Table 31: request diagnostics tdr Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Status</td>
<td>Information about the status of the TDR test request:</td>
</tr>
<tr>
<td></td>
<td>• Admin Down interface-name—The interface is administratively down. The TDR test cannot run on interfaces that are administratively down.</td>
</tr>
<tr>
<td></td>
<td>• Interface interface-name not found—The interface does not exist.</td>
</tr>
<tr>
<td></td>
<td>• Test successfully executed interface-name—The test has successfully started on the interface. You can view the test results with the show diagnostics tdr command.</td>
</tr>
<tr>
<td></td>
<td>• VCT not supported on interface-name—The TDR test is not supported on the interface.</td>
</tr>
</tbody>
</table>

Sample Output

```
user@switch> request diagnostics tdr start interface ge-0/0/19
Interface TDR detail:
Test status                     : Test successfully executed  ge-0/0/19
```
**show diagnostics tdr**

**Syntax**
```
show diagnostics tdr
<interface interface-name>
```

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

**Description**
Display the results of a time domain reflectometry (TDR) diagnostic test run on an interface. A TDR test characterizes and locates faults on twisted-pair Ethernet cables. For example, it can detect a broken twisted pair and provide the approximate distance to the break. It can also detect polarity swaps, pair swaps, and excessive skew.

The TDR test is supported on the following switches and interfaces:

- EX2200, EX3200, EX3300, and EX4200 switches—RJ-45 network interfaces. The TDR test is not supported on management interfaces and SFP interfaces.
- EX6200 and EX8200 switches—RJ-45 interfaces on line cards.

Use the `request diagnostics tdr` command to request a TDR test on a specified interface.
Use the `show diagnostic tdr` command to display the last TDR test results for a specified interface or the last TDR test results for all network interfaces on the switch that support the TDR test.

**Options**
- **none**—Show summarized last results for all interfaces on the switch that support the TDR test.
- **interface interface-name**—(Optional) Show detailed last results for the specified interface or a range of interfaces. Specify a range of interfaces by entering the beginning and ending interface in the range, separated by a dash—for example, `ge-0/0/15-ge-0/0/20`.

**Required Privilege Level**
```
view
```

**Related Documentation**
- `request diagnostics tdr` on page 210
- Diagnosing a Faulty Twisted-Pair Cable (CLI Procedure) on page 126

**List of Sample Output**
```
show diagnostics tdr interface ge-0/0/19 (Normal Cable) on page 214
show diagnostics tdr interface ge-2/0/2 (Faulty Cable) on page 215
show diagnostics tdr (All Supported Interfaces) on page 215
```

**Output Fields**
Table 32 on page 213 lists the output fields for the `show diagnostics tdr` command. Output fields are listed in the approximate order in which they appear.
Table 32: show diagnostics tdr Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface name</td>
<td>Name of interface for which TDR test results are being reported.</td>
</tr>
<tr>
<td>Test status</td>
<td>Status of TDR test:</td>
</tr>
<tr>
<td></td>
<td>• Aborted—Test was terminated by operator before it was complete.</td>
</tr>
<tr>
<td></td>
<td>• Failed—Test was not completed successfully.</td>
</tr>
<tr>
<td></td>
<td>• Interface interface-name not found—Specified interface does not exist.</td>
</tr>
<tr>
<td></td>
<td>• Not Started—No TDR test results are available for the interface.</td>
</tr>
<tr>
<td></td>
<td>• Passed—Test completed successfully. The cable, however, might still have a fault—see the Cable status field for information on the cable.</td>
</tr>
<tr>
<td></td>
<td>• Started—Test is currently running and not yet complete.</td>
</tr>
<tr>
<td></td>
<td>• VCT not supported on interface-name—TDR test is not supported on the interface.</td>
</tr>
<tr>
<td>Link status</td>
<td>Operating status of link: UP or Down.</td>
</tr>
<tr>
<td>MDI pair</td>
<td>Twisted pair for which test results are being reported, identified by pin numbers. (Displayed only when the interface option is used.)</td>
</tr>
<tr>
<td>Cable status</td>
<td>When detailed information is displayed, status for a twisted pair:</td>
</tr>
<tr>
<td></td>
<td>• Failed—TDR test failed on the cable pair.</td>
</tr>
<tr>
<td></td>
<td>• Impedance Mismatch—Impedance on the twisted pair is not correct. Possible reasons for an impedance mismatch include:</td>
</tr>
<tr>
<td></td>
<td>• The twisted pair is not connected properly.</td>
</tr>
<tr>
<td></td>
<td>• The twisted pair is damaged.</td>
</tr>
<tr>
<td></td>
<td>• The connector is faulty.</td>
</tr>
<tr>
<td></td>
<td>• Normal—No cable fault detected for the twisted pair.</td>
</tr>
<tr>
<td></td>
<td>• Open—Lack of continuity between the pins at each end of the twisted-pair.</td>
</tr>
<tr>
<td></td>
<td>• Short on Pair-n—A short-circuit was detected on the twisted pair.</td>
</tr>
<tr>
<td></td>
<td>When summary information for all interfaces is displayed, status for the cable as a whole:</td>
</tr>
<tr>
<td></td>
<td>• Fault—A fault was detected on one or more of the twisted-pairs.</td>
</tr>
<tr>
<td></td>
<td>• OK—No fault was detected on any of the twisted pairs.</td>
</tr>
<tr>
<td>Distance fault</td>
<td>Distance to the fault in whole meters. If there is no fault, this value is 0.</td>
</tr>
<tr>
<td>Max distance fault</td>
<td>When summary information for all interfaces is displayed, this value is the distance to the most distant fault if there is more than one twisted pair with a fault.</td>
</tr>
<tr>
<td>Field Name</td>
<td>Field Description</td>
</tr>
<tr>
<td>-------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Polarity swap</td>
<td>Indicates the polarity status of the twisted pair:</td>
</tr>
<tr>
<td></td>
<td>• Normal—Polarity is normal. Each conductor in the twisted pair has been connected the same pins at the both ends of the connection. For example, a conductor connected to pin 1 at the near end of the connection is connected to pin 1 at the far end.</td>
</tr>
<tr>
<td></td>
<td>• Reversed—Polarity has been reversed. For the twisted pair, the conductors have switched which pins they are connected to at the near and far ends of the connection. For example, the conductor connected to pin 1 at the near end is connected to pin 2 at the far end.</td>
</tr>
<tr>
<td></td>
<td>(Not available on EX8200 switches.) (Displayed only when the interface option is used)</td>
</tr>
<tr>
<td>Skew time</td>
<td>Difference in nanoseconds between the propagation delay on this twisted pair and the twisted pair with the shortest propagation delay. (Not available on EX8200 switches.) (Displayed only when the interface option is used.)</td>
</tr>
<tr>
<td>Channel Pair</td>
<td>Number of the 10/100BASE-T transmit/receive pair being reported on.</td>
</tr>
<tr>
<td>Pair Swap</td>
<td>Indicates whether or not the twisted pairs are swapped:</td>
</tr>
<tr>
<td></td>
<td>• MDI—The pairs are not swapped (straight-through cable).</td>
</tr>
<tr>
<td></td>
<td>• MDIX—The pairs are swapped (cross-over cable).</td>
</tr>
<tr>
<td></td>
<td>(Displayed only when the interface option is used.)</td>
</tr>
<tr>
<td>Downshift</td>
<td>Indicates whether the connection speed is being downshifted:</td>
</tr>
<tr>
<td></td>
<td>• No Downshift—No downshifting of connection speed.</td>
</tr>
<tr>
<td></td>
<td>• Downshift occurs—Connection speed is downshifted to 10 or 100 Mbs. This occurs if the cable is a two-pair cable rather than the four-pair cable required by Gigabit Ethernet.</td>
</tr>
<tr>
<td></td>
<td>(Displayed only when the interface option is used.)</td>
</tr>
</tbody>
</table>

**Sample Output**

```
user@switch> show diagnostics tdr interface ge-0/0/19
Interface TDR detail:
Interface name : ge-0/0/19
Test status    : Passed
Link status    : UP
MDI pair       : 1-2
Cable status   : Normal
Distance fault : 0 Meters
Polarity swap  : Normal
Skew time      : 0 ns
MDI pair       : 3-6
Cable status   : Normal
Distance fault : 0 Meters
```
Polarity swap : Normal
Skew time     : 8 ns
MDI pair      : 4-5
  Cable status : Normal
  Distance fault: 0 Meters
  Polarity swap : Normal
  Skew time     : 8 ns
Channel pair  : 1
  Pair swap     : MDI
Channel pair  : 2
  Pair swap     : MDI
Downshift     : No Downshift

show diagnostics tdr  
interface ge-2/0/2  
(Faulty Cable)

user@switch> show diagnostics tdr interface ge-2/0/2
Interface TDR detail:
  Interface name : ge-2/0/2
  Test status    : Passed
  Link status    : Down
  MDI Pair       : 1-2
  Cable status   : 1-2
  Distance fault : 2 Meters
  Polarity swap  : N/A
  Skew time      : N/A
  MDI Pair       : 3-6
  Cable status   : Impedance Mismatch
  Distance fault : 3 Meters
  Polarity swap  : N/A
  Skew time      : N/A
  MDI Pair       : 4-5
  Cable status   : Impedance Mismatch
  Distance fault : 3 Meters
  Polarity swap  : N/A
  Skew time      : N/A
  MDI Pair       : 7-8
  Cable status   : Short on Pair-2
  Distance fault : 3 Meters
  Polarity swap  : N/A
  Skew time      : N/A
Channel pair   : 1
  Pair swap      : N/A
Channel pair   : 2
  Pair swap      : N/A
Downshift      : N/A

show diagnostics tdr  
(All Supported Interfaces)

user@switch> show diagnostics tdr

<table>
<thead>
<tr>
<th>Interface</th>
<th>Test status</th>
<th>Link status</th>
<th>Cable status</th>
<th>Max distance fault</th>
</tr>
</thead>
<tbody>
<tr>
<td>ge-0/0/0</td>
<td>Not Started</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ge-0/0/1</td>
<td>Not Started</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ge-0/0/2</td>
<td>Started</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ge-0/0/3</td>
<td>Started</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ge-0/0/4</td>
<td>Passed</td>
<td>UP</td>
<td>OK</td>
<td>0</td>
</tr>
<tr>
<td>ge-0/0/5</td>
<td>Passed</td>
<td>UP</td>
<td>Fault</td>
<td>173</td>
</tr>
<tr>
<td>ge-0/0/6</td>
<td>Passed</td>
<td>UP</td>
<td>OK</td>
<td>0</td>
</tr>
<tr>
<td>ge-0/0/7</td>
<td>Passed</td>
<td>UP</td>
<td>OK</td>
<td>0</td>
</tr>
<tr>
<td>ge-0/0/8</td>
<td>Passed</td>
<td>UP</td>
<td>OK</td>
<td>0</td>
</tr>
<tr>
<td>ge-0/0/9</td>
<td>Passed</td>
<td>UP</td>
<td>OK</td>
<td>0</td>
</tr>
<tr>
<td>Interface</td>
<td>Status</td>
<td>State</td>
<td>Status</td>
<td>Count</td>
</tr>
<tr>
<td>-------------</td>
<td>------------</td>
<td>-------</td>
<td>--------</td>
<td>-------</td>
</tr>
<tr>
<td>ge-0/0/10</td>
<td>Passed</td>
<td>UP</td>
<td>OK</td>
<td>0</td>
</tr>
<tr>
<td>ge-0/0/11</td>
<td>Passed</td>
<td>UP</td>
<td>OK</td>
<td>0</td>
</tr>
<tr>
<td>ge-0/0/12</td>
<td>Passed</td>
<td>UP</td>
<td>OK</td>
<td>0</td>
</tr>
<tr>
<td>ge-0/0/13</td>
<td>Passed</td>
<td>UP</td>
<td>OK</td>
<td>0</td>
</tr>
<tr>
<td>ge-0/0/14</td>
<td>Passed</td>
<td>UP</td>
<td>OK</td>
<td>0</td>
</tr>
<tr>
<td>ge-0/0/15</td>
<td>Passed</td>
<td>UP</td>
<td>OK</td>
<td>0</td>
</tr>
<tr>
<td>ge-0/0/16</td>
<td>Passed</td>
<td>UP</td>
<td>OK</td>
<td>0</td>
</tr>
<tr>
<td>ge-0/0/17</td>
<td>Passed</td>
<td>UP</td>
<td>OK</td>
<td>0</td>
</tr>
<tr>
<td>ge-0/0/18</td>
<td>Passed</td>
<td>UP</td>
<td>OK</td>
<td>0</td>
</tr>
<tr>
<td>ge-0/0/19</td>
<td>Passed</td>
<td>UP</td>
<td>OK</td>
<td>0</td>
</tr>
<tr>
<td>ge-0/0/20</td>
<td>Passed</td>
<td>Down</td>
<td>Fault</td>
<td>0</td>
</tr>
<tr>
<td>ge-0/0/21</td>
<td>Passed</td>
<td>Down</td>
<td>Fault</td>
<td>0</td>
</tr>
<tr>
<td>ge-0/0/22</td>
<td>Passed</td>
<td>UP</td>
<td>OK</td>
<td>0</td>
</tr>
<tr>
<td>ge-0/0/23</td>
<td>Passed</td>
<td>UP</td>
<td>OK</td>
<td>0</td>
</tr>
</tbody>
</table>
show ethernet-switching interfaces

Syntax

```
show ethernet-switching interfaces
  <brief | detail | summary>
  <interface interface-name>
```

Release Information

Command introduced in Junos OS Release 9.0 for EX Series switches. In Junos OS Release 9.6 for EX Series switches, the following updates were made:

- Blocking field output was updated.
- The default view was updated to include information about 802.1Q tags.
- The detail view was updated to include information on VLAN mapping.

In Junos OS Release 11.1 for EX Series switches, the detail view was updated to include reflective relay information.

Description

Display information about Ethernet switching interfaces.

Options

- none—Display brief information for Ethernet switching interfaces.
- brief | detail | summary—(Optional) Display the specified level of output.
- interface interface-name—(Optional) Display Ethernet switching information for a specific interface.

Required Privilege Level

view

Related Documentation

- show ethernet-switching mac-learning-log
- show ethernet-switching table
- Configuring Autorecovery From the Disabled State on Secure or Storm Control Interfaces (CLI Procedure)

List of Sample Output

- show ethernet-switching interfaces on page 219
- show ethernet-switching interfaces ge-0/0/15 brief on page 219
- show ethernet-switching interfaces ge-0/0/2 detail (Blocked by RTG rtggroup) on page 219
- show ethernet-switching interfaces ge-0/0/15 detail (Blocked by STP) on page 220
- show ethernet-switching interfaces ge-0/0/17 detail (Disabled by bpdu-control) on page 220
- show ethernet-switching interfaces detail (C-VLAN to S-VLAN Mapping) on page 220
- show ethernet-switching interfaces detail (Reflective Relay Is Configured) on page 220

Output Fields

Table 33 on page 218 lists the output fields for the `show ethernet-switching interfaces` command. Output fields are listed in the approximate order in which they appear.
## Table 33: show ethernet-switching interfaces Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
<td>Name of a switching interface.</td>
<td>none, brief, detail, summary</td>
</tr>
<tr>
<td>Index</td>
<td>VLAN index internal to Junos OS.</td>
<td>detail</td>
</tr>
<tr>
<td>State</td>
<td>Interface state. Values are up and down.</td>
<td>none, brief, detail</td>
</tr>
<tr>
<td>Port mode</td>
<td>The access mode is the port mode default and works with a single VLAN. Port mode can also be trunk, which accepts tagged packets from multiple VLANs on other switches. The third port mode value is tagged-access, which accepts tagged packets from access devices.</td>
<td>detail</td>
</tr>
<tr>
<td>Reflective Relay Status</td>
<td>Reflective relay allows packets to use the same interface for both upstream and downstream traffic. When reflective relay has been configured, the status displayed is always enabled. When reflective relay is not configured, this entry does not appear in the command output.</td>
<td>detail</td>
</tr>
<tr>
<td>Ether type for the interface</td>
<td>Ether type is a two-octet field in an Ethernet frame used to indicate which protocol is encapsulated in the payload of an incoming Ethernet packet. Both 802.1Q packets and Q-in-Q packets use this field. The output displayed for this particular field indicates the interface's Ether type, which is used to match the Ether type of incoming 802.1Q packets and Q-in-Q packets. The indicated Ether type field is also added to the interface's outgoing 802.1Q and Q-in-Q packets.</td>
<td>detail</td>
</tr>
<tr>
<td>VLAN membership</td>
<td>Names of VLANs that belong to this interface.</td>
<td>none, brief, detail</td>
</tr>
<tr>
<td>Tag</td>
<td>Number of the 802.1Q tag.</td>
<td>none, brief, detail</td>
</tr>
<tr>
<td>Tagging</td>
<td>Specifies whether the interface forwards 802.1Q tagged or untagged traffic.</td>
<td>none, brief, detail</td>
</tr>
<tr>
<td>Blocking</td>
<td>The forwarding state of the interface:</td>
<td>none, brief, detail</td>
</tr>
<tr>
<td></td>
<td>• unblocked—Traffic is forwarded on the interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• blocked—Traffic is not being forwarded on the interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Disabled by bpdu control—The interface is disabled due to receiving BPDUIs on a protected interface. If the disable-timeout statement has been included in the BPDU configuration, the interface automatically returns to service after the timer expires.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• blocked by RTG—The specified redundant trunk group is disabled.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• blocked by STP—The interface is disabled due to a spanning-tree protocol error.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• MAC limit exceeded—The interface is temporarily disabled due to a MAC limit error. The disabled interface is automatically restored to service when the disable timeout expires.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• MAC move limit exceeded—The interface is temporarily disabled due to a MAC move limit error. The disabled interface is automatically restored to service when the disable timeout expires.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Storm control in effect—The interface is temporarily disabled due to a storm control error. The disabled interface is automatically restored to service when the disable timeout expires.</td>
<td></td>
</tr>
</tbody>
</table>
Table 33: show ethernet-switching interfaces Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of MACs learned on IFL</td>
<td>Number of MAC addresses learned by this interface.</td>
<td>detail</td>
</tr>
<tr>
<td>mapping</td>
<td>When mapping is configured, the status is one of the following C-VLAN to S-VLAN mapping types:</td>
<td>detail</td>
</tr>
<tr>
<td></td>
<td>• dot1q-tunneled—The interface maps all traffic to the S-VLAN (all-in-one bundling).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• native—The interface maps untagged and priority tagged packets to the S-VLAN.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• push—The interface maps packets to a firewall filter to an S-VLAN.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• policy-mapped—The interface maps packets to a specifically defined S-VLAN.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• integer—The interface maps packets to the specified S-VLAN.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>When mapping is not configured, this entry does not appear in the command output.</td>
<td></td>
</tr>
</tbody>
</table>

Sample Output

```
user@switch> show ethernet-switching interfaces
Interface   State  VLAN members        Tag   Tagging  Blocking
ae0.0        up      default                   untagged unblocked
ge-0/0/2.0   up      vlan300            300    untagged blocked by RTG (rtggroup)
ge-0/0/3.0    up      default                   untagged unblocked
ge-0/0/4.0    down    default                            blocked by STP
ge-0/0/5.0    down    default                            MAC limit exceeded
ge-0/0/6.0    down    default                            MAC move limit exceeded
ge-0/0/7.0    down    default                            Storm control in effect
ge-0/0/13.0   up      vlan100        100    tagged        unblocked
ge-0/0/14.0   up      vlan100        100    tagged        unblocked
ge-0/0/15.0   up      vlan100        100    tagged        blocked by STP
ge-0/0/15.0   down    default                            Blocked by STP
ge-0/0/16.0   down    vlan100        100    tagged        Disabled by bpdu-control
ge-0/0/17.0   down    vlan100        100    tagged        Disabled by bpdu-control

user@switch> show ethernet-switching interfaces ge-0/0/15 brief
Interface   State  VLAN members   Tag   Tagging        Blocking
ge-0/0/15.0   up      vlan100        100    tagged        blocked by STP
gvln200       200    tagged        blocked by STP

user@switch> show ethernet-switching interfaces ge-0/0/2 detail (Blocked by RTG rtggroup)
Interface: ge-0/0/2.0, Index: 65, State: up, Port mode: Access
Ether type for the interface: 0x8100
VLAN membership:
  vlan300, 802.1Q Tag: 300, untagged, msti-id: 0, blocked by RTG(rtggroup)
```
Number of MACs learned on IFL: 0

```
show ethernet-switching interfaces ge-0/0/15 detail
Interface: ge-0/0/15.0, Index: 70, State: up, Port mode: Trunk
Ether type for the interface: 0x8100
VLAN membership:
  vlan100, 802.1Q Tag: 100, tagged, msti-id: 0, blocked by STP
  vlan200, 802.1Q Tag: 200, tagged, msti-id: 0, blocked by STP
```

Number of MACs learned on IFL: 0

```
show ethernet-switching interfaces ge-0/0/17 detail
Interface: ge-0/0/17.0, Index: 71, State: down, Port mode: Trunk
Ether type for the interface: 0x8100
VLAN membership:
  vlan100, 802.1Q Tag: 100, tagged, msti-id: 1, Disabled by bpdu-control
  vlan200, 802.1Q Tag: 200, tagged, msti-id: 2, Disabled by bpdu-control
```

Number of MACs learned on IFL: 0

```
show ethernet-switching interfaces ge-0/0/6 detail
Interface: ge-0/0/6.0, Index: 73, State: up, Port mode: Access
Ether type for the interface: 0x8100
VLAN membership:
  map, 802.1Q Tag: 134, Mapped Tag: native, push, dot1q-tunneled, unblocked
  map, 802.1Q Tag: 134, Mapped Tag: 20, push, dot1q-tunneled, unblocked
```

Number of MACs learned on IFL: 0

```
show ethernet-switching interfaces ge-7/0/2 detail
Interface: ge-7/0/2, Index: 66, State: down, Port mode: Tagged-access
Ether type for the interface: 0x8100
Reflective Relay Status: Enabled
VLAN membership:
  VLAN_Purple VLAN_Orange VLAN_Blue, 802.1Q Tag: 450, tagged, unblocked
```

Number of MACs learned on IFL: 0
show interfaces diagnostics optics

**Syntax**  
show interfaces diagnostics optics *interface-name*

**Release Information**  
Command introduced in Junos OS Release 10.0 for EX Series switches.

**Description**  
Display diagnostics data and alarms for Gigabit Ethernet optical transceivers (SFP, SFP+, or XFP) installed in EX Series switches. The information provided by this command is known as digital optical monitoring (DOM) information.

Thresholds that trigger a high alarm, low alarm, high warning, or low warning are set by the transponder vendors. Generally, a high alarm or low alarm indicates that the optics module is not operating properly. This information can be used to diagnose why a transceiver is not working.

**Options**  
*interface-name*—Name of the interface associated with the port in which the transceiver is installed: *ge-fpc/pic/port* or *xe-fpc/pic/port*.

**Required Privilege Level**  
view

**Related Documentation**
- Monitoring Interface Status and Traffic on page 113
- Installing a Transceiver in an EX Series Switch
- Removing a Transceiver from an EX Series Switch
- *Junos OS Ethernet Interfaces Configuration Guide*

**List of Sample Output**
- show interfaces diagnostics optics ge-0/1/0 (SFP Transceiver) on page 225
- show interfaces diagnostics optics xe-0/1/0 (SFP+ Transceiver) on page 226
- show interfaces diagnostics optics xe-0/1/0 (XFP Transceiver) on page 226

**Output Fields**  
Table 34 on page 221 lists the output fields for the show interfaces diagnostics optics command. Output fields are listed in the approximate order in which they appear.

**Table 34: show interfaces diagnostics optics Output Fields**

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical interface</td>
<td>Displays the name of the physical interface.</td>
</tr>
<tr>
<td>Laser bias current</td>
<td>Displays the magnitude of the laser bias power setting current, in milliampere. The laser bias provides direct modulation of laser diodes and modulates currents.</td>
</tr>
<tr>
<td>Laser output power</td>
<td>Displays the laser output power, in milliwatts (mW) and decibels referred to 1.0 mW (dBm).</td>
</tr>
<tr>
<td>Module temperature</td>
<td>Displays the temperature, in Celsius and Fahrenheit.</td>
</tr>
<tr>
<td>Field Name</td>
<td>Field Description</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>-----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Module voltage</td>
<td>Displays the voltage, in Volts.</td>
</tr>
<tr>
<td>(Not available for XFP transceivers)</td>
<td></td>
</tr>
<tr>
<td>Laser rx power</td>
<td>Displays the laser received optical power, in milliwatts (mW) and decibels referred to 1.0 mW (dBm).</td>
</tr>
<tr>
<td>(Not available for SFP and SFP+ transceivers)</td>
<td></td>
</tr>
<tr>
<td>Receiver signal average optical power</td>
<td>Displays the receiver signal average optical power, in milliwatts (mW) and decibels referred to 1.0 mW (dBm).</td>
</tr>
<tr>
<td>(Not available for XFP transceivers)</td>
<td></td>
</tr>
<tr>
<td>Laser bias current high alarm</td>
<td>Displays whether the laser bias power setting high alarm is On or Off.</td>
</tr>
<tr>
<td>Laser bias current low alarm</td>
<td>Displays whether the laser bias power setting low alarm is On or Off.</td>
</tr>
<tr>
<td>Laser bias current high warning</td>
<td>Displays whether the laser bias power setting high warning is On or Off.</td>
</tr>
<tr>
<td>Laser bias current low warning</td>
<td>Displays whether the laser bias power setting low warning is On or Off.</td>
</tr>
<tr>
<td>Laser output power high alarm</td>
<td>Displays whether the laser output power high alarm is On or Off.</td>
</tr>
<tr>
<td>Laser output power low alarm</td>
<td>Displays whether the laser output power low alarm is On or Off.</td>
</tr>
<tr>
<td>Laser output power high warning</td>
<td>Displays whether the laser output power high warning is On or Off.</td>
</tr>
<tr>
<td>Laser output power low warning</td>
<td>Displays whether the laser output power low warning is On or Off.</td>
</tr>
<tr>
<td>Module temperature high alarm</td>
<td>Displays whether the module temperature high alarm is On or Off.</td>
</tr>
<tr>
<td>Module temperature low alarm</td>
<td>Displays whether the module temperature low alarm is On or Off.</td>
</tr>
<tr>
<td>Module temperature high warning</td>
<td>Displays whether the module temperature high warning is On or Off.</td>
</tr>
<tr>
<td>Module temperature low warning</td>
<td>Displays whether the module temperature low warning is On or Off.</td>
</tr>
<tr>
<td>Module voltage high alarm</td>
<td>Displays whether the module voltage high alarm is On or Off.</td>
</tr>
<tr>
<td>(Not available for XFP transceivers)</td>
<td></td>
</tr>
<tr>
<td>Module voltage low alarm</td>
<td>Displays whether the module voltage low alarm is On or Off.</td>
</tr>
<tr>
<td>(Not available for XFP transceivers)</td>
<td></td>
</tr>
<tr>
<td>Module voltage high warning</td>
<td>Displays whether the module voltage high warning is On or Off.</td>
</tr>
</tbody>
</table>
### Table 34: show interfaces diagnostics optics Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module voltage low warning</td>
<td>Displays whether the module voltage low warning is <strong>On</strong> or <strong>Off</strong>.</td>
</tr>
<tr>
<td>(Not available for XFP transceivers)</td>
<td></td>
</tr>
<tr>
<td>Laser rx power high alarm</td>
<td>Displays whether the receive laser power high alarm is <strong>On</strong> or <strong>Off</strong>.</td>
</tr>
<tr>
<td>Laser rx power low alarm</td>
<td>Displays whether the receive laser power low alarm is <strong>On</strong> or <strong>Off</strong>.</td>
</tr>
<tr>
<td>Laser rx power high warning</td>
<td>Displays whether the receive laser power high warning is <strong>On</strong> or <strong>Off</strong>.</td>
</tr>
<tr>
<td>Laser rx power low warning</td>
<td>Displays whether the receive laser power low warning is <strong>On</strong> or <strong>Off</strong>.</td>
</tr>
<tr>
<td>Laser bias current high alarm threshold</td>
<td>Displays the vendor-specified threshold for the laser bias current high alarm.</td>
</tr>
<tr>
<td>Module not ready alarm</td>
<td>Displays whether the module not ready alarm is <strong>On</strong> or <strong>Off</strong>. When the output is <strong>On</strong>, the module has an operational fault.</td>
</tr>
<tr>
<td>(Not available for SFP and SFP+ transceivers)</td>
<td></td>
</tr>
<tr>
<td>Module power down alarm</td>
<td>Displays whether the module power down alarm is <strong>On</strong> or <strong>Off</strong>. When the output is <strong>On</strong>, module is in a limited power mode, low for normal operation.</td>
</tr>
<tr>
<td>(Not available for SFP and SFP+ transceivers)</td>
<td></td>
</tr>
<tr>
<td>Tx data not ready alarm</td>
<td>Any condition leading to invalid data on the transmit path. Displays whether the Tx data not ready alarm is <strong>On</strong> or <strong>Off</strong>.</td>
</tr>
<tr>
<td>(Not available for SFP and SFP+ transceivers)</td>
<td></td>
</tr>
<tr>
<td>Tx not ready alarm</td>
<td>Any condition leading to invalid data on the transmit path. Displays whether the Tx not ready alarm is <strong>On</strong> or <strong>Off</strong>.</td>
</tr>
<tr>
<td>(Not available for SFP and SFP+ transceivers)</td>
<td></td>
</tr>
<tr>
<td>Tx laser fault alarm</td>
<td>Laser fault condition. Displays whether the Tx laser fault alarm is <strong>On</strong> or <strong>Off</strong>.</td>
</tr>
<tr>
<td>(Not available for SFP and SFP+ transceivers)</td>
<td></td>
</tr>
<tr>
<td>Tx CDR loss of lock alarm</td>
<td>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 <strong>On</strong> or <strong>Off</strong>.</td>
</tr>
<tr>
<td>(Not available for SFP and SFP+ transceivers)</td>
<td></td>
</tr>
<tr>
<td>Rx not ready alarm</td>
<td>Any condition leading to invalid data on the receive path. Displays whether the Rx not ready alarm is <strong>On</strong> or <strong>Off</strong>.</td>
</tr>
<tr>
<td>(Not available for SFP and SFP+ transceivers)</td>
<td></td>
</tr>
<tr>
<td>Rx loss of signal alarm</td>
<td>Receive loss of signal alarm. When on, indicates insufficient optical input power to the module. Displays whether the Rx loss of signal alarm is <strong>On</strong> or <strong>Off</strong>.</td>
</tr>
<tr>
<td>(Not available for SFP and SFP+ transceivers)</td>
<td></td>
</tr>
<tr>
<td>Rx CDR loss of lock alarm</td>
<td>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 <strong>On</strong> or <strong>Off</strong>.</td>
</tr>
<tr>
<td>(Not available for SFP and SFP+ transceivers)</td>
<td></td>
</tr>
</tbody>
</table>
Table 34: show interfaces diagnostics optics Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laser bias current low alarm threshold</td>
<td>Displays the vendor-specified threshold for the laser bias current low alarm.</td>
</tr>
<tr>
<td>Laser bias current high warning threshold</td>
<td>Displays the vendor-specified threshold for the laser bias current high warning.</td>
</tr>
<tr>
<td>Laser bias current low warning threshold</td>
<td>Displays the vendor-specified threshold for the laser bias current low warning.</td>
</tr>
<tr>
<td>Laser output power high alarm threshold</td>
<td>Displays the vendor-specified threshold for the laser output power high alarm.</td>
</tr>
<tr>
<td>Laser output power low alarm threshold</td>
<td>Displays the vendor-specified threshold for the laser output power low alarm.</td>
</tr>
<tr>
<td>Laser output power high warning threshold</td>
<td>Displays the vendor-specified threshold for the laser output power high warning.</td>
</tr>
<tr>
<td>Laser output power low warning threshold</td>
<td>Displays the vendor-specified threshold for the laser output power low warning.</td>
</tr>
<tr>
<td>Module temperature high alarm threshold</td>
<td>Displays the vendor-specified threshold for the module temperature high alarm.</td>
</tr>
<tr>
<td>Module temperature low alarm threshold</td>
<td>Displays the vendor-specified threshold for the module temperature low alarm.</td>
</tr>
<tr>
<td>Module temperature high warning threshold</td>
<td>Displays the vendor-specified threshold for the module temperature high warning.</td>
</tr>
<tr>
<td>Module temperature low warning threshold</td>
<td>Displays the vendor-specified threshold for the module temperature low warning.</td>
</tr>
<tr>
<td>Module voltage high alarm threshold</td>
<td>Displays the vendor-specified threshold for the module voltage high alarm.</td>
</tr>
<tr>
<td>(Not available for XFP transceivers)</td>
<td></td>
</tr>
<tr>
<td>Module voltage low alarm threshold</td>
<td>Displays the vendor-specified threshold for the module voltage low alarm.</td>
</tr>
<tr>
<td>(Not available for XFP transceivers)</td>
<td></td>
</tr>
<tr>
<td>Module voltage high warning threshold</td>
<td>Displays the vendor-specified threshold for the module voltage high warning.</td>
</tr>
<tr>
<td>(Not available for XFP transceivers)</td>
<td></td>
</tr>
<tr>
<td>Module voltage low warning threshold</td>
<td>Displays the vendor-specified threshold for the module voltage low warning.</td>
</tr>
<tr>
<td>(Not available for XFP transceivers)</td>
<td></td>
</tr>
<tr>
<td>Laser rx power high alarm threshold</td>
<td>Displays the vendor-specified threshold for the laser rx power high alarm.</td>
</tr>
</tbody>
</table>
### Table 34: show interfaces diagnostics optics Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laser rx power low alarm threshold</td>
<td>Displays the vendor-specified threshold for the laser rx power low alarm.</td>
</tr>
<tr>
<td>Laser rx power high warning threshold</td>
<td>Displays the vendor-specified threshold for the laser rx power high warning.</td>
</tr>
<tr>
<td>Laser rx power low warning threshold</td>
<td>Displays the vendor-specified threshold for the laser rx power low warning.</td>
</tr>
</tbody>
</table>

### Sample Output

```
user@host> 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 : 0.6300 mW / -2.01 dBm
  Laser output power high warning threshold : 0.0780 mW / -11.08 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 diagnosticsoptics
user@host> show interfaces diagnosticsoptics xe-0/1/0
Physical interface: xe-0/1/0
(SFP+ Transceiver)
```

```
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
```
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laser rx power</td>
<td>0.0012 mW / -29.21 dBm</td>
</tr>
<tr>
<td>Laser bias current high alarm</td>
<td>Off</td>
</tr>
<tr>
<td>Laser bias current low alarm</td>
<td>Off</td>
</tr>
<tr>
<td>Laser bias current high warning</td>
<td>Off</td>
</tr>
<tr>
<td>Laser bias current low warning</td>
<td>Off</td>
</tr>
<tr>
<td>Laser output power high alarm</td>
<td>Off</td>
</tr>
<tr>
<td>Laser output power low alarm</td>
<td>Off</td>
</tr>
<tr>
<td>Laser output power high warning</td>
<td>Off</td>
</tr>
<tr>
<td>Laser output power low warning</td>
<td>Off</td>
</tr>
<tr>
<td>Module temperature high alarm</td>
<td>Off</td>
</tr>
<tr>
<td>Module temperature low alarm</td>
<td>Off</td>
</tr>
<tr>
<td>Module temperature high warning</td>
<td>Off</td>
</tr>
<tr>
<td>Module temperature low warning</td>
<td>Off</td>
</tr>
<tr>
<td>Laser rx power high alarm</td>
<td>Off</td>
</tr>
<tr>
<td>Laser rx power low alarm</td>
<td>On</td>
</tr>
<tr>
<td>Laser rx power high warning</td>
<td>Off</td>
</tr>
<tr>
<td>Laser rx power low warning</td>
<td>On</td>
</tr>
<tr>
<td>Module not ready alarm</td>
<td>On</td>
</tr>
<tr>
<td>Module power down alarm</td>
<td>Off</td>
</tr>
<tr>
<td>Tx data not ready alarm</td>
<td>Off</td>
</tr>
<tr>
<td>Tx not ready alarm</td>
<td>Off</td>
</tr>
<tr>
<td>Tx laser fault alarm</td>
<td>Off</td>
</tr>
<tr>
<td>Tx CDR loss of lock alarm</td>
<td>Off</td>
</tr>
<tr>
<td>Rx not ready alarm</td>
<td>On</td>
</tr>
<tr>
<td>Rx loss of signal alarm</td>
<td>On</td>
</tr>
<tr>
<td>Rx CDR loss of lock alarm</td>
<td>On</td>
</tr>
<tr>
<td>Laser bias current high alarm threshold</td>
<td>13.000 mA</td>
</tr>
<tr>
<td>Laser bias current low alarm threshold</td>
<td>2.000 mA</td>
</tr>
<tr>
<td>Laser bias current high warning threshold</td>
<td>12.000 mA</td>
</tr>
<tr>
<td>Laser bias current low warning threshold</td>
<td>3.000 mA</td>
</tr>
<tr>
<td>Laser output power high alarm threshold</td>
<td>0.8310 mW / -0.80 dBm</td>
</tr>
<tr>
<td>Laser output power low alarm threshold</td>
<td>0.1650 mW / -7.83 dBm</td>
</tr>
<tr>
<td>Laser output power high warning threshold</td>
<td>0.7410 mW / -1.30 dBm</td>
</tr>
<tr>
<td>Laser output power low warning threshold</td>
<td>0.1860 mW / -7.30 dBm</td>
</tr>
<tr>
<td>Module temperature high alarm threshold</td>
<td>90 degrees C / 194 degrees F</td>
</tr>
<tr>
<td>Module temperature low alarm threshold</td>
<td>0 degrees C / 32 degrees F</td>
</tr>
<tr>
<td>Module temperature high warning threshold</td>
<td>85 degrees C / 185 degrees F</td>
</tr>
<tr>
<td>Module temperature low warning threshold</td>
<td>0 degrees C / 32 degrees F</td>
</tr>
<tr>
<td>Laser rx power high alarm threshold</td>
<td>0.8912 mW / -0.50 dBm</td>
</tr>
<tr>
<td>Laser rx power low alarm threshold</td>
<td>0.0912 mW / -10.40 dBm</td>
</tr>
<tr>
<td>Laser rx power high warning threshold</td>
<td>0.7943 mW / -1.00 dBm</td>
</tr>
<tr>
<td>Laser rx power low warning threshold</td>
<td>0.1023 mW / -9.90 dBm</td>
</tr>
</tbody>
</table>
show interfaces ge

Syntax
show interfaces ge-fpc/pic/port<br/>&lt;brief | detail | extensive | terse&gt;<br/>&lt;media&gt;<br/>&lt;statistics&gt;

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

Description
Display status information about the specified Gigabit Ethernet interface.

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—Display standard information about the specified Gigabit Ethernet interface.

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

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

statistics—(Optional) Display static interface statistics.

Required Privilege
view

Related Documentation
• Monitoring Interface Status and Traffic on page 113
• Troubleshooting Network Interfaces on EX3200 Switches on page 121
• Troubleshooting Network Interfaces on EX4200 Switches on page 122
• Troubleshooting an Aggregated Ethernet Interface on page 123
• Junos OS Ethernet Interfaces Configuration Guide

List of Sample Output
show interfaces ge-0/0/0 on page 235
show interfaces ge-0/0/0 brief on page 235
show interfaces ge-0/0/0 detail on page 236
show interfaces ge-0/0/4 extensive on page 237

Output Fields
Table 35 on page 228 lists the output fields for the show interfaces ge- command. Output fields are listed in the approximate order in which they appear.

Table 35: show interfaces ge- Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical interface</td>
<td>Name of the physical interface.</td>
<td>All levels</td>
</tr>
</tbody>
</table>
### Table 35: show interfaces ge- Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enabled</td>
<td>State of the interface: <strong>Enabled</strong> or <strong>Disabled</strong>.</td>
<td>All levels</td>
</tr>
<tr>
<td>Interface index</td>
<td>Index number of the physical interface, which reflects its initialization sequence.</td>
<td>detail extensive none</td>
</tr>
<tr>
<td>SNMP ifIndex</td>
<td>SNMP index number for the physical interface.</td>
<td>detail extensive none</td>
</tr>
<tr>
<td>Generation</td>
<td>Unique number for use by Juniper Networks technical support only.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Description</td>
<td>Optional user-specified description.</td>
<td>brief detail extensive</td>
</tr>
<tr>
<td>Link-level type</td>
<td>Encapsulation being used on the physical interface.</td>
<td>All levels</td>
</tr>
<tr>
<td>MTU</td>
<td>Maximum transmission unit size on the physical interface. Default is 1514.</td>
<td>All levels</td>
</tr>
<tr>
<td>Speed</td>
<td>Speed of the interface: Auto if autonegotiation of speed is enabled; speed in megabits per second if the interface speed is explicitly configured.</td>
<td>All levels</td>
</tr>
<tr>
<td>Duplex</td>
<td>Link mode of interface: Auto if autonegotiation of link mode is enabled; Full-Duplex or Half-Duplex if the link mode is explicitly configured.</td>
<td>All levels</td>
</tr>
<tr>
<td>Loopback</td>
<td>Loopback status: <strong>Enabled</strong> or <strong>Disabled</strong>. If loopback is enabled, type of loopback: <strong>Local</strong> or <strong>Remote</strong>.</td>
<td>All levels</td>
</tr>
<tr>
<td>Source filtering</td>
<td>Source filtering status: <strong>Enabled</strong> or <strong>Disabled</strong>.</td>
<td>All levels</td>
</tr>
<tr>
<td>Flow control</td>
<td>Flow control status: <strong>Enabled</strong> or <strong>Disabled</strong>.</td>
<td>All levels</td>
</tr>
<tr>
<td>Auto-negotiation</td>
<td>Autonegotiation status: <strong>Enabled</strong> or <strong>Disabled</strong>.</td>
<td>All levels</td>
</tr>
<tr>
<td>Remote-fault</td>
<td>Remote fault status:</td>
<td>All levels</td>
</tr>
<tr>
<td></td>
<td>• <strong>Online</strong>—Autonegotiation is manually configured as online.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Offline</strong>—Autonegotiation is manually configured as offline.</td>
<td></td>
</tr>
<tr>
<td>Device flags</td>
<td>Information about the physical device.</td>
<td>All levels</td>
</tr>
<tr>
<td>Interface flags</td>
<td>Information about the interface.</td>
<td>All levels</td>
</tr>
<tr>
<td>Link flags</td>
<td>Information about the link.</td>
<td>All levels</td>
</tr>
<tr>
<td>CoS queues</td>
<td>Number of CoS queues configured.</td>
<td>detail extensive none</td>
</tr>
<tr>
<td>Hold-times</td>
<td>Current interface hold-time up and hold-time down, in milliseconds.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Current address</td>
<td>Configured MAC address.</td>
<td>detail extensive none</td>
</tr>
<tr>
<td>Hardware address</td>
<td>MAC address of the hardware.</td>
<td>detail extensive none</td>
</tr>
</tbody>
</table>
Table 35: show interfaces ge- Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Last flapped</td>
<td>Date, time, and how long ago the interface went from down to up. The format is Last flapped: year-month-day hour:minute:second timezone (hour:minute:second ago). For example, Last flapped: 2008–01–16 10:52:40 UTC (3d 22:58 ago).</td>
<td>detail extensive none</td>
</tr>
<tr>
<td>Statistics last cleared</td>
<td>Time when the statistics for the interface were last set to zero.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Traffic statistics</td>
<td>Number and rate of bytes and packets received and transmitted on the physical interface.</td>
<td>detail extensive</td>
</tr>
<tr>
<td></td>
<td>• <strong>Input bytes</strong>—Number of bytes received on the interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Output bytes</strong>—Number of bytes transmitted on the interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Input packets</strong>—Number of packets received on the interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Output packets</strong>—Number of packets transmitted on the interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> The bandwidth bps counter is not enabled on the switch.</td>
<td></td>
</tr>
<tr>
<td>Input errors</td>
<td>Input errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td>• <strong>Errors</strong>—Sum of the incoming frame aborts and FCS errors.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Drops</strong>—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.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Framing errors</strong>—Number of packets received with an invalid frame checksum (FCS).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Runt</strong>s—Number of frames received that are smaller than the runt threshold.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Policed discards</strong>—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.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>L3 incompletes</strong>—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.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>L2 channel errors</strong>—Number of times the software did not find a valid logical interface for an incoming frame.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>L2 mismatch timeouts</strong>—Number of malformed or short packets that caused the incoming packet handler to discard the frame as unreadable.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>FIFO errors</strong>—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.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Resource errors</strong>—Sum of transmit drops.</td>
<td></td>
</tr>
</tbody>
</table>
Table 35: show interfaces ge- Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Output errors</strong></td>
<td>Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Carrier transitions</strong>—Number of times the interface has gone from <strong>down</strong> to <strong>up</strong>.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Errors</strong>—Sum of the outgoing frame aborts and FCS errors.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Drops</strong>—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.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Collisions</strong>—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.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Aged packets</strong>—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.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>FIFO errors</strong>—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.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>HS link CRC errors</strong>—Number of errors on the high-speed links between the ASICs responsible for handling the switch interfaces.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>MTU errors</strong>—Number of packets whose size exceeded the MTU of the interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Resource errors</strong>—Sum of transmit drops.</td>
<td></td>
</tr>
<tr>
<td><strong>Egress queues</strong></td>
<td>Total number of egress queues supported on the specified interface.</td>
<td></td>
</tr>
<tr>
<td><strong>Queue counters</strong></td>
<td>CoS queue number and its associated user-configured forwarding class name.</td>
<td></td>
</tr>
<tr>
<td>(Egress)</td>
<td>• <strong>Queued packets</strong>—Number of queued packets.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Transmitted packets</strong>—Number of transmitted packets.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Dropped packets</strong>—Number of packets dropped by the ASIC’s RED mechanism.</td>
<td></td>
</tr>
</tbody>
</table>

**Active alarms and Active defects**

Ethernet-specific defects that can prevent the interface from passing packets. When a defect persists for a certain amount of time, it is promoted to an alarm.

Based on the switch configuration, an alarm can ring the red or yellow alarm bell on the switch or turn on the red or yellow alarm LED on the front of the switch. These fields can contain the value `None` or `Link`.

- **None**—There are no active defects or alarms.
- **Link**—Interface has lost its link state, which usually means that the cable is unplugged, the far-end system has been turned off, or the PIC is malfunctioning.
### Table 35: show interfaces ge- Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MAC statistics</strong></td>
<td>Receive and Transmit statistics reported by the PIC’s MAC subsystem.</td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td>• <strong>Total octets</strong> and <strong>total packets</strong>—Total number of octets and packets. For Gigabit Ethernet IQ PICs, the received octets count varies by interface type.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Unicast packets</strong>, <strong>Broadcast packets</strong>, and <strong>Multicast packets</strong>—Number of unicast, broadcast, and multicast packets.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>CRC/Align errors</strong>—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).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>FIFO error</strong>—Number of FIFO errors that are reported by the ASIC on the PIC. If this value is ever nonzero, the PIC is probably malfunctioning.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>MAC control frames</strong>—Number of MAC control frames.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>MAC pause frames</strong>—Number of MAC control frames with pause operational code.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Oversized frames</strong>—Number of frames that exceed 1518 octets.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Jabber frames</strong>—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.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Fragment frames</strong>—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.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Code violations</strong>—Number of times an event caused the PHY to indicate “Data reception error” or “invalid data symbol error.”</td>
<td></td>
</tr>
<tr>
<td><strong>Filter Statistics</strong></td>
<td>Receive and Transmit statistics reported by the PIC’s MAC address filter subsystem.</td>
<td>extensive</td>
</tr>
</tbody>
</table>
Table 35: show interfaces ge- Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autonegotiation information</td>
<td>Information about link autonegotiation:</td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td>• Negotiation status:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Complete—The autonegotiation process between the local and remote Ethernet</td>
<td></td>
</tr>
<tr>
<td></td>
<td>interfaces was successful.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Incomplete—Remote Ethernet interface has the speed or link mode configured or</td>
<td></td>
</tr>
<tr>
<td></td>
<td>does not perform autonegotiation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• No autonegotiation—Local Ethernet interface has autonegotiation disabled and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>the link mode and speed are manually configured.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Link partner—Information from the link partner:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Link mode—Depending on the capability of the attached Ethernet device, either</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Full-duplex or Half-duplex. If the link mode of the remote device cannot be</td>
<td></td>
</tr>
<tr>
<td></td>
<td>determined, value is Unknown.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Flow control—Types of flow control supported by the remote Ethernet device.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>For Gigabit Ethernet interfaces, types are Symmetric (link partner supports</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PAUSE on receive and transmit), Asymmetric (link partner supports PAUSE on</td>
<td></td>
</tr>
<tr>
<td></td>
<td>transmit), and Symmetric/Asymmetric (link partner supports PAUSE on both</td>
<td></td>
</tr>
<tr>
<td></td>
<td>receive and transmit or PAUSE only on receive).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Remote fault—Remote fault information from the link partner—Failure indicates</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a receive link error. OK indicates that the link partner is receiving.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Negotiation error indicates a negotiation error. Offline indicates that the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>link partner is going offline.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Link partner speed—Speed of the link partner.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Local resolution—Resolution of the autonegotiation process on the local</td>
<td></td>
</tr>
<tr>
<td></td>
<td>interface:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Flow control—Type of flow control that is used by local interface. For Gigabit</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ethernet interfaces, types are Symmetric (link partner supports PAUSE on</td>
<td></td>
</tr>
<tr>
<td></td>
<td>receive and transmit), Asymmetric (link partner supports PAUSE on transmit),</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and Symmetric/Asymmetric (link partner supports PAUSE on both receive and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>transmit or PAUSE only on receive).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Link mode—Link mode of local interface: either Full-duplex or Half-duplex.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Displayed when Negotiation status is Incomplete.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Local link speed—Speed of the local interface. Displayed when Negotiation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>status is Incomplete.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Remote fault—Remote fault information. Link OK (no error detected on receive),</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Offline (local interface is offline), and Link Failure (link error detected</td>
<td></td>
</tr>
<tr>
<td></td>
<td>on receive).</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Packet Forwarding Engine configuration</th>
<th>Information about the configuration of the Packet Forwarding Engine:</th>
<th>extensive</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Destination slot—FPC slot number:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• On standalone switches with built-in interfaces, the slot number refers to</td>
<td></td>
</tr>
<tr>
<td></td>
<td>the switch itself and is always 0.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• On Virtual Chassis composed of switches with built-in interfaces, the slot</td>
<td></td>
</tr>
<tr>
<td></td>
<td>number refers to the member ID of the switch.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• On switches with line cards or on Virtual Chassis composed of switches with</td>
<td></td>
</tr>
<tr>
<td></td>
<td>line cards, the slot number refers to the line card slot number on the switch</td>
<td></td>
</tr>
<tr>
<td></td>
<td>or Virtual Chassis.</td>
<td></td>
</tr>
</tbody>
</table>
Table 35: show interfaces ge- Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logical interface</td>
<td>Name of the logical interface.</td>
<td>All levels</td>
</tr>
<tr>
<td>Index</td>
<td>Index number of the logical interface, which reflects its initialization sequence.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>SNMP ifIndex</td>
<td>SNMP interface index number for the logical interface.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Generation</td>
<td>Unique number for use by Juniper Networks technical support only.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Flags</td>
<td>Information about the logical interface.</td>
<td>All levels</td>
</tr>
<tr>
<td>Encapsulation</td>
<td>Encapsulation on the logical interface.</td>
<td>All levels</td>
</tr>
<tr>
<td>Protocol</td>
<td>Protocol family.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Traffic statistics</td>
<td>Number and rate of bytes and packets received (input) and transmitted (output)</td>
<td>detail extensive</td>
</tr>
<tr>
<td></td>
<td>on the specified interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> For logical interfaces on EX Series switches, the traffic statistics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>fields in <code>show interfaces</code> commands show only control traffic; the traffic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>statistics do not include data traffic.</td>
<td></td>
</tr>
<tr>
<td>IPv6 transit</td>
<td>If IPv6 statistics tracking is enabled, number of IPv6 bytes and packets received</td>
<td>extensive</td>
</tr>
<tr>
<td>statistics</td>
<td>and transmitted on the logical interface.</td>
<td></td>
</tr>
<tr>
<td>Local statistics</td>
<td>Number and rate of bytes and packets destined to and from the switch.</td>
<td>extensive</td>
</tr>
<tr>
<td>Transit statistics</td>
<td>Number and rate of bytes and packets transiting the switch.</td>
<td>extensive</td>
</tr>
<tr>
<td>Generation</td>
<td>Unique number for use by Juniper Networks technical support only.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Route Table</td>
<td>Route table in which the logical interface address is located. For example, 0</td>
<td>detail extensive</td>
</tr>
<tr>
<td></td>
<td>refers to the routing table inet.0.</td>
<td>none</td>
</tr>
<tr>
<td>Input Filters</td>
<td>Names of any input filters applied to this interface.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Output Filters</td>
<td>Names of any output filters applied to this interface.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Flags</td>
<td>Information about protocol family flags.</td>
<td>detail extensive</td>
</tr>
<tr>
<td></td>
<td>If unicast reverse-path forwarding (RPF) is explicitly configured on the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>specified interface, the uRPF flag is displayed. If unicast RPF was configured on</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a different interface (and therefore is enabled on all switch interfaces) but was</td>
<td></td>
</tr>
<tr>
<td></td>
<td>not explicitly configured on the specified interface, the uRPF flag is not</td>
<td></td>
</tr>
<tr>
<td></td>
<td>displayed even though unicast RPF is enabled.</td>
<td></td>
</tr>
<tr>
<td>protocol-family</td>
<td>Protocol family configured on the logical interface. If the protocol is <strong>inet</strong>,</td>
<td>brief</td>
</tr>
<tr>
<td></td>
<td>the IP address of the interface is also displayed.</td>
<td></td>
</tr>
<tr>
<td>Flags</td>
<td>Information about the address flags.</td>
<td>detail extensive</td>
</tr>
</tbody>
</table>

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Table 35: show interfaces ge- Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Destination</td>
<td>IP address of the remote side of the connection.</td>
<td>detail extensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
<tr>
<td>Local</td>
<td>IP address of the logical interface.</td>
<td>detail extensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
<tr>
<td>Broadcast</td>
<td>Broadcast address of the logical interface.</td>
<td>detail extensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
<tr>
<td>Generation</td>
<td>Unique number for use by Juniper Networks technical support only.</td>
<td>detail extensive</td>
</tr>
</tbody>
</table>

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,
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 ingress 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 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
- Output bytes : 0
- Input packets: 0
- Output packets: 0

**IPv6 transit statistics:**
- Input bytes : 0
- Output bytes : 0
- Input packets: 0
- Output packets: 0

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

<table>
<thead>
<tr>
<th>Queue counters</th>
<th>Queued packets</th>
<th>Transmitted packets</th>
<th>Dropped packets</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 best-effort</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1 assured-forw</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5 expedited-fo</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7 network-cont</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

- 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
- Output bytes : 0
- Input packets: 0
- Output packets: 0

**Protocol eth-switch, Generation: 146, Route table: 0**

- Flags: Is-Primary
- Input Filters: f1,
- Output Filters: f2,..
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:
0 best-effort: 0 queued packets, 0 transmitted packets, 0 dropped packets
1 assured-forw: 0
5 expedited-fo: 0
7 network-cont: 0 queued packets, 24307 transmitted packets, 0 dropped packets
Active alarms  : None
Active defects : None
MAC statistics:
Receive          Transmit
Total octets: 0   2989761
Total packets: 0   243070
Unicast packets: 0
Broadcast packets: 0
Multicast packets: 0 243070
CRC/Align errors: 0
FIFO errors: 0
MAC control frames: 0
MAC pause frames: 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

<table>
<thead>
<tr>
<th>Limit</th>
<th>%</th>
<th>bps</th>
<th>%</th>
<th>usec</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 best-effort</td>
<td>95</td>
<td>95000000</td>
<td>95</td>
<td>NA</td>
<td>low</td>
</tr>
<tr>
<td>none</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 network-control</td>
<td>5</td>
<td>50000000</td>
<td>5</td>
<td>NA</td>
<td>low</td>
</tr>
<tr>
<td>none</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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 me0

Syntax

show interfaces me0
  <brief | detail | extensive | terse>
  <descriptions>
  <media>
  <routing-instance>
  <statistics>

Release Information

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

Description

Display status information about the management Ethernet interface.

Options

none—Display standard information about the management Ethernet interface.

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

descriptions—(Optional) Display interface description strings.

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

routing-instance—(Optional) Display the name of the routing instance.

statistics—(Optional) Display static interface statistics.

Required Privilege

Level

view

Related Documentation

• Example: Configuring a Firewall Filter on a Management Interface on an EX Series Switch

• Configuring Firewall Filters (CLI Procedure)

List of Sample Output

show interfaces me0 on page 243
show interfaces me0 brief on page 243
show interfaces me0 detail on page 243
show interfaces me0 extensive on page 244

Output Fields

Table 36 on page 239 lists the output fields for the show interfaces me0 command. Output fields are listed in the approximate order in which they appear.

Table 36: show interfaces me0 Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Interface</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical interface</td>
<td>Name of the physical interface.</td>
<td>All levels</td>
</tr>
<tr>
<td>Enabled</td>
<td>State of the interface: Enabled or Disabled.</td>
<td>All levels</td>
</tr>
<tr>
<td>Interface index</td>
<td>Index number of the physical interface, which reflects its initialization sequence.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Field Name</td>
<td>Field Description</td>
<td>Level of Output</td>
</tr>
<tr>
<td>-----------------</td>
<td>-----------------------------------------------------------------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>SNMP ifindex</td>
<td>SNMP index number for the physical interface.</td>
<td>detail extensive none</td>
</tr>
<tr>
<td>Generation</td>
<td>Unique number for use by Juniper Networks technical support only.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Description</td>
<td>Optional user-specified description.</td>
<td>brief detail extensive</td>
</tr>
<tr>
<td>Type</td>
<td>Information about the type of functional interface.</td>
<td>All levels</td>
</tr>
<tr>
<td>Link-level type</td>
<td>Encapsulation being used on the physical interface.</td>
<td>All levels</td>
</tr>
<tr>
<td>MTU</td>
<td>Maximum transmission unit size on the physical interface. The default is 1514.</td>
<td>All levels</td>
</tr>
<tr>
<td>Clocking</td>
<td>Interface that acts as a clock source. This field is not supported on EX Series switches and the default value is always Unspecified.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Speed</td>
<td>Speed at which the interface is running.</td>
<td>All levels</td>
</tr>
<tr>
<td>Device flags</td>
<td>Information about the physical device.</td>
<td>All levels</td>
</tr>
<tr>
<td>Interface flags</td>
<td>Information about the interface.</td>
<td>All levels</td>
</tr>
<tr>
<td>Link type</td>
<td>Information about whether the link is duplex and whether the negotiation is manual or automatic.</td>
<td>detail extensive none</td>
</tr>
<tr>
<td>Physical info</td>
<td>Information about the device dependent physical interface selector. This field is applied only when a clocking option is specified. This field is not supported on EX Series switches and the default value is always Unspecified.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Hold-times</td>
<td>Current interface hold-time up and hold-time down, in milliseconds.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Current address</td>
<td>Configured MAC address.</td>
<td>detail extensive none</td>
</tr>
<tr>
<td>Hardware address</td>
<td>MAC address of the hardware.</td>
<td>detail extensive none</td>
</tr>
<tr>
<td>Alternate link address</td>
<td>Information about alternate hardware address.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Last flapped</td>
<td>Date, time, and how long ago the interface went from down to up. The format is Last flapped: year-month-day hour:minute:second timezone (weeks:days:hour:minute:second ago). For example, Last flapped: 2008–01–16 10:52:40 UTC (3w:3d 22:58 ago).</td>
<td>detail extensive none</td>
</tr>
<tr>
<td>Statistics last cleared</td>
<td>Time when the statistics for the interface was last set to zero. The format is Last flapped: year-month-day hour:minute:second timezone (weeks:days:hour:minute:second ago). For example, Last flapped: 2008–01–16 10:52:40 UTC (3w:3d 22:58 ago).</td>
<td>detail extensive</td>
</tr>
</tbody>
</table>
Table 36: show interfaces me0 Output Fields  
(continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic statistics</td>
<td>Number and rate of bytes and packets received and transmitted on the physical</td>
<td>detail extensive</td>
</tr>
<tr>
<td></td>
<td>interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Following are fields in <strong>Traffic statistics</strong>:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Input bytes—Number of bytes received on the interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Output bytes—Number of bytes transmitted on the interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Input packets—Number of packets received on the interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Output packets—Number of packets transmitted on the interface.</td>
<td></td>
</tr>
<tr>
<td>IPv6 transit</td>
<td>Number and rate of bytes and IPv6 packets received and transmitted on the physical</td>
<td>detail extensive</td>
</tr>
<tr>
<td>statistics</td>
<td>interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Following are fields in <strong>IPv6 transit statistics</strong>:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Input bytes—Number of bytes received on the interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Output bytes—Number of bytes transmitted on the interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Input packets—Number of packets received on the interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Output packets—Number of packets transmitted on the interface.</td>
<td></td>
</tr>
<tr>
<td>Input errors</td>
<td>Input errors on the interface. The following paragraphs explain the counters whose</td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td>meaning might not be obvious:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Errors—Sum of the incoming frame aborts and frame checksum (FCS) errors.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Drops—Number of packets dropped by the input queue of the I/O Manager ASIC.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Framing errors—Number of packets received with an invalid FCS.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Runts—Number of frames received that are smaller than the runt threshold.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Giants—Number of packets that exceed the size for the medium. For example, if</td>
<td></td>
</tr>
<tr>
<td></td>
<td>the medium is Ethernet, the <strong>Giant</strong> field shows the count of packets with size</td>
<td></td>
</tr>
<tr>
<td></td>
<td>greater than 1518 bytes.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Policed discards—Number of frames that the incoming packet match code discarded</td>
<td></td>
</tr>
<tr>
<td></td>
<td>because they were not recognized or not of interest. Usually, this field reports</td>
<td></td>
</tr>
<tr>
<td></td>
<td>protocols that the Junos OS does not handle.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Resource errors—Sum of transmit drops.</td>
<td></td>
</tr>
<tr>
<td>Output errors</td>
<td>Output errors on the interface. The following paragraphs explain the counters whose</td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td>meaning might not be obvious:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Carrier transitions—Number of times the interface has gone from <strong>down</strong> to <strong>up</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>This number does not normally increment quickly. It increases only when the cable</td>
<td></td>
</tr>
<tr>
<td></td>
<td>is unplugged, the far-end system is powered down and then up, or another problem</td>
<td></td>
</tr>
<tr>
<td></td>
<td>occurs. If the number of carrier transitions increment quickly (perhaps once every</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 seconds), the cable, the far-end system, or the PIC or PIM is malfunctioning.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Errors—Sum of the outgoing frame aborts and FCS errors.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Drops—Number of packets dropped by the output queue of the I/O Manager ASIC.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If the interface is saturated, this number increments once for every packet that</td>
<td></td>
</tr>
<tr>
<td></td>
<td>is dropped by the ASIC’s RED mechanism.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• MTU errors—Number of packets whose size exceeded the MTU of the interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Resource errors—Sum of transmit drops.</td>
<td></td>
</tr>
</tbody>
</table>
## Table 36: show interfaces me0 Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logical Interface</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Logical interface</td>
<td>Name of the logical interface.</td>
<td>All levels</td>
</tr>
<tr>
<td>Index</td>
<td>Index number of the logical interface, which reflects its initialization sequence.</td>
<td>detail extensive none</td>
</tr>
<tr>
<td>SNMP ifindex</td>
<td>SNMP interface index number for the logical interface.</td>
<td>detail extensive none</td>
</tr>
<tr>
<td>Generation</td>
<td>Unique number for use by Juniper Networks technical support only.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Flags</td>
<td>Information about the logical interface.</td>
<td>All levels</td>
</tr>
<tr>
<td>Encapsulation</td>
<td>Encapsulation on the logical interface.</td>
<td>All levels</td>
</tr>
<tr>
<td>Traffic statistics</td>
<td>Number and rate of bytes and packets received (input) and transmitted (output) on the specified interface.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>IPv6 transit statistics</td>
<td>If IPv6 statistics tracking is enabled, number of IPv6 bytes and packets received and transmitted on the logical interface.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Local statistics</td>
<td>Number and rate of bytes and packets destined to and exiting from the switch.</td>
<td>extensive</td>
</tr>
<tr>
<td>Protocol</td>
<td>Protocol family.</td>
<td>detail extensive none</td>
</tr>
<tr>
<td>Generation</td>
<td>Unique number for use by Juniper Networks technical support only.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Route Table</td>
<td>Routing table in which the logical interface address is located. For example, 0 refers to the routing table inet.0.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Flags</td>
<td>Information about protocol family flags.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Input Filter</td>
<td>Ingress filter name.</td>
<td>extensive</td>
</tr>
<tr>
<td>Output Filter</td>
<td>Egress filter name.</td>
<td>extensive</td>
</tr>
<tr>
<td>Addresses</td>
<td>Information about the management interface addresses.</td>
<td>detail extensive none</td>
</tr>
<tr>
<td>Flags</td>
<td>Information about the address flags.</td>
<td>detail extensive none</td>
</tr>
<tr>
<td>Destination</td>
<td>IP address of the remote side of the connection.</td>
<td>detail extensive none</td>
</tr>
<tr>
<td>Local</td>
<td>IP address of the logical interface.</td>
<td>detail extensive none</td>
</tr>
<tr>
<td>Broadcast</td>
<td>Broadcast address of the logical interface.</td>
<td>detail extensive none</td>
</tr>
<tr>
<td>Generation</td>
<td>Unique number for use by Juniper Networks technical support only.</td>
<td>detail extensive</td>
</tr>
</tbody>
</table>

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Sample Output

**show interfaces me0**

```
user@switch> show interfaces me0
Physical interface: me0, Enabled, Physical link is Up
  Interface index: 1, SNMP ifIndex: 33
  Type: Ethernet, Link-level type: Ethernet, MTU: 1514, Speed: 1000mbps
  Device flags : Present Running
  Interface flags: SNMP-Traps
  Link type : Full-Duplex
  Current address: 00:1f:12:35:3c:bf, Hardware address: 00:1f:12:35:3c:bf
  Last flapped : 2010-07-31 23:45:50 PDT (5d 00:32 ago)
    Input packets : 1661830
    Output packets: 3200

Logical interface me0.0 (Index 3) (SNMP ifIndex 34)
  Flags: SNMP-Traps Encapsulation: ENET2
  Input packets : 1661830
  Output packets: 3200
  Protocol inet
    Flags: Is-Primary
    Addresses, Flags: Is-Preferred Is-Primary
      Destination: 10.204.32/20, Local: 10.204.33.103,
      Broadcast: 10.204.47.255
  Protocol inet6
    Flags: Is-Primary
    Addresses, Flags: Is-Preferred
      Destination: fe80::/64, Local: fe80::21f:12ff:fe35:3cbf
```

**show interfaces me0 brief**

```
user@switch> show interfaces me0 brief
Physical interface: me0, Enabled, Physical link is Up
  Type: Ethernet, Link-level type: Ethernet, MTU: 1514, Clocking: Unspecified,
  Speed: 1000mbps
  Device flags : Present Running
  Interface flags: SNMP-Traps

Logical interface me0.0
  Flags: SNMP-Traps Encapsulation: ENET2
  inet  10.204.33.103/20
  inet6 fe80::21f:12ff:fe35:3cbf/64
```

**show interfaces me0 detail**

```
user@switch> show interfaces me0 detail
Physical interface: me0, Enabled, Physical link is Up
  Interface index: 1, SNMP ifIndex: 33, Generation: 1
  Type: Ethernet, Link-level type: Ethernet, MTU: 1514, Clocking: Unspecified,
  Speed: 1000mbps
  Device flags : Present Running
  Interface flags: SNMP-Traps
  Link type : Full-Duplex
  Physical info : Unspecified
  Hold-times : Up 0 ms, Down 0 ms
  Current address: 00:1f:12:35:3c:bf, Hardware address: 00:1f:12:35:3c:bf
  Alternate link address: Unspecified
  Last flapped : 2010-07-31 23:45:50 PDT (5d 00:37 ago)
  Statistics last cleared: Never
  Traffic statistics:
    Input bytes : 366663167
    Output bytes : 498590
    Input packets: 1664031
    Output packets: 3259
```
IPv6 transit statistics:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0

Logical interface me0.0 (Index 3) (SNMP ifIndex 34) (Generation 1)
Flags: SNMP-Traps Encapsulation: ENET2
Traffic statistics:
Input bytes : 366665637
Output bytes : 500569
Input packets: 1664048
Output packets: 3275
IPv6 transit statistics:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0
Local statistics:
Input bytes : 366665637
Output bytes : 500569
Input packets: 1664048
Output packets: 3275
Protocol inet, Generation: 1, Route table: 0
Flags: Is-Primary
Addresses, Flags: Is-Preferred Is-Primary
Destination: 10.204.32/20, Local: 10.204.33.103, Broadcast: 10.204.47.255,
Generation: 1
Protocol inet6, Generation: 2, Route table: 0
Flags: Is-Primary
Addresses, Flags: Is-Preferred
Destination: fe80::/64, Local: fe80::21f:12ff:fe35:3cbf
Generation: 2

show interfaces me0
user@switch> show interfaces me0 extensive
Physical interface: me0, Enabled, Physical link is Up
Interface index: 1, SNMP ifIndex: 33, Generation: 1
Type: Ethernet, Link-level type: Ethernet, MTU: 1514, Clocking: Unspecified, Speed: 100mbps
Device flags : Present Running
Interface flags: SNMP-Traps
Link type : Full-Duplex
Physical info : Unspecified
Hold-times : Up 0 ms, Down 0 ms
Current address: 00:1f:12:38:58:bf, Hardware address: 00:1f:12:38:58:bf
Alternate link address: Unspecified
Last flapped : 2010-08-15 06:27:33 UTC (03:06:22 ago)
Statistics last cleared: Never
Traffic statistics:
Input bytes : 82310392
Output bytes : 1966952
Input packets: 110453
Output packets: 17747
IPv6 transit statistics:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0
Input errors:
Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0, Policed discards: 0, Resource errors: 0
Output errors:
Carrier transitions: 1, Errors: 0, Drops: 0, MTU errors: 0,
Resource errors: 0

Logical interface me0.0 (Index 3) (SNMP ifIndex 34) (Generation 1)
Flags: SNMP-Traps Encapsulation: ENET2
Traffic statistics:
Input bytes : 82310392
Output bytes : 1966952
Input packets: 110453
Output packets: 17747
Local statistics:
Input bytes : 82310392
Output bytes : 1966952
Input packets: 110453
Output packets: 17747
Protocol inet, Generation: 1, Route table: 0
Flags: Is-Primary
Input Filters: mgmt_filter,
Addresses, Flags: Is-Default Is-Preferred Is-Primary
  Destination: 10.204.96/20, Local: 10.204.96.234,
  Broadcast: 10.204.111.255, Generation: 1
**show interfaces queue**

**Syntax**

```
show interfaces queue
<both-ingress-egress>
<egress>
<forwarding-class forwarding-class>
<ingress>
<interface-name>
```

**Release Information**

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

**Description**

Display class-of-service (CoS) queue information for physical interfaces.

**Options**

- **none**—Show detailed CoS queue statistics for all physical interfaces.
- **both-ingress-egress**—(Optional) Show both ingress and egress queue statistics. (Ingress statistics are not available for all interfaces.)
- **egress**—(Optional) Show egress queue statistics only.
- **forwarding-class forwarding-class**—(Optional) Show queue statistics only for the specified forwarding class.
- **ingress**—(Optional) Show ingress queue statistics only. (Ingress statistics are not available for all interfaces.)
- **interface-name**—(Optional) Show queue statistics for the specified interface.

**Required Privilege Level**

view

**Related Documentation**

- Monitoring Interface Status and Traffic on page 113
- Monitoring Interfaces That Have CoS Components
- Defining CoS Schedulers (CLI Procedure)
- Configuring CoS Traffic Classification for Ingress Queuing on Oversubscribed Ports on EX8200 Line Cards (CLI Procedure)

**List of Sample Output**

- `show interfaces queue ge-0/0/0 (EX2200 Switch)` on page 248
- `show interfaces queue xe-6/0/39 (Line Card with Oversubscribed Ports in an EX8200 Switch)` on page 249

**Output Fields**

Table 37 on page 246 lists the output fields for the `show interfaces queue` command. Output fields are listed in the approximate order in which they appear.

**Table 37: show interfaces queue Output Fields**

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physical Interface and Forwarding Class Information</strong></td>
<td></td>
</tr>
<tr>
<td>Physical interface</td>
<td>Name of the physical interface.</td>
</tr>
</tbody>
</table>
Table 37: show interfaces queue Output Fields *(continued)*

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enabled</td>
<td>State of the interface. Possible values are:</td>
</tr>
<tr>
<td></td>
<td>• Administrative down, Physical link is Down—The interface is turned off, and the physical link is inoperable.</td>
</tr>
<tr>
<td></td>
<td>• Administrative down, Physical link is Up—The interface is turned off, but the physical link is operational and can pass packets when it is enabled.</td>
</tr>
<tr>
<td></td>
<td>• Enabled, Physical link is Down—The interface is turned on, but the physical link is inoperable and cannot pass packets.</td>
</tr>
<tr>
<td></td>
<td>• Enabled, Physical link is Up—The interface is turned on, and the physical link is operational and can pass packets.</td>
</tr>
<tr>
<td>Interface index</td>
<td>Index number of the physical interface, which reflects its initialization sequence.</td>
</tr>
<tr>
<td>SNMP ifIndex</td>
<td>SNMP index number for the physical interface.</td>
</tr>
<tr>
<td>Description</td>
<td>User-configured interface description.</td>
</tr>
<tr>
<td>Forwarding classes</td>
<td>Number of forwarding classes supported and in use for the interface.</td>
</tr>
</tbody>
</table>

**Ingress Queues Information (not shown for all interfaces)**

<table>
<thead>
<tr>
<th>Ingress queues</th>
<th>Number of input queues supported and in use on the specified interface. For an interface on a line card with oversubscribed ports, the ingress queue handles low priority traffic on the interface.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmitted</td>
<td>Transmission statistics for the queue:</td>
</tr>
<tr>
<td></td>
<td>• Packets—Number of packets transmitted by this queue.</td>
</tr>
<tr>
<td></td>
<td>• Bytes—Number of bytes transmitted by this queue.</td>
</tr>
<tr>
<td></td>
<td>• Tail-dropped packets—Number of packets dropped because the queue buffers were full.</td>
</tr>
<tr>
<td>PFE chassis queues</td>
<td>For an interface on a line card with oversubscribed ports, the number of Packet Forwarding Engine chassis queues supported and in use for the port group to which the interface belongs. The Packet Forwarding Engine chassis queue for a port group handles high priority traffic from all the interfaces in the port group.</td>
</tr>
</tbody>
</table>

**Egress Queues Information**

<table>
<thead>
<tr>
<th>Egress queues</th>
<th>Number of output queues supported and in use on the specified interface.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Queue</td>
<td>CoS queue number.</td>
</tr>
<tr>
<td>Queued</td>
<td>This counter is not supported on EX Series switches.</td>
</tr>
</tbody>
</table>
### Table 37: show interfaces queue Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmitted</td>
<td>Number of packets and bytes transmitted by this queue. Information on transmitted packets and bytes can include:</td>
</tr>
<tr>
<td></td>
<td>• Packets—Number of packets transmitted.</td>
</tr>
<tr>
<td></td>
<td>• Bytes—Number of bytes transmitted.</td>
</tr>
<tr>
<td></td>
<td>• Tail-dropped packets—Number of arriving packets dropped because output queue buffers were full.</td>
</tr>
<tr>
<td></td>
<td>• RED-dropped packets—Number of packets dropped because of random early detection (RED).</td>
</tr>
<tr>
<td></td>
<td>• Low—Number of low loss priority packets dropped because of RED.</td>
</tr>
<tr>
<td></td>
<td>• High—Number of high loss priority packets dropped because of RED.</td>
</tr>
<tr>
<td></td>
<td>• RED-dropped bytes—Number of bytes dropped because of random early detection (RED).</td>
</tr>
<tr>
<td></td>
<td>• Low—Number of low loss priority bytes dropped because of RED.</td>
</tr>
<tr>
<td></td>
<td>• High—Number of high loss priority bytes dropped because of RED.</td>
</tr>
</tbody>
</table>

### Packet Forwarding Engine Chassis Queues

For an interface on a line card with oversubscribed ports, the number of Packet Forwarding Engine chassis queues supported and in use for the port group to which the interface belongs. The queue statistics reflect the traffic flowing on all the interfaces in the port group.

### Sample Output

```text
user@switch> show interfaces queue ge-0/0/0
Physical interface: ge-0/0/0, Enabled, Physical link is Down
Interface index: 130, SNMP ifIndex: 501
Egress queues: 8 supported, 4 in use
Queue: 0, Forwarding classes: best-effort
Queued:
    Transmitted:
        Packets : 0
        Bytes : 0
        Tail-dropped packets : 0
Queue: 1, Forwarding classes: assured-forwarding
Queued:
    Transmitted:
        Packets : 0
        Bytes : 0
        Tail-dropped packets : 0
Queue: 5, Forwarding classes: expedited-forwarding
Queued:
    Transmitted:
        Packets : 0
        Bytes : 0
        Tail-dropped packets : 0
Queue: 7, Forwarding classes: network-control
Queued:
    Transmitted:
        Packets : 0
```
show interfaces queue xe-6/0/39

<table>
<thead>
<tr>
<th>Queue</th>
<th>Forwarding classes:</th>
<th>Queued</th>
<th>Transmitted</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>best-effort</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>assured-forwarding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>mcast-be</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>mcast-ef</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>expedited-forwarding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>mcast-af</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>network-control</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Copyright © 2011, Juniper Networks, Inc.
<table>
<thead>
<tr>
<th>Queue</th>
<th>Forwarding Classes</th>
<th>Queued</th>
<th>Transmitted</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>best-effort</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Packets</td>
<td>739338141426</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bytes</td>
<td>94635282101928</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tail-dropped packets</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RED-dropped packets</td>
<td>5606426444</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>5606426444</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RED-dropped bytes</td>
<td>683262846464</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>683262846464</td>
<td></td>
</tr>
<tr>
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<td>High</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>assured-forwarding</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Packets</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bytes</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tail-dropped packets</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RED-dropped packets</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RED-dropped bytes</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>mcast-be</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Packets</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bytes</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tail-dropped packets</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RED-dropped packets</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RED-dropped bytes</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>mcast-ef</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Packets</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bytes</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tail-dropped packets</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RED-dropped packets</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RED-dropped bytes</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>expedited-forwarding</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Packets</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bytes</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tail-dropped packets</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RED-dropped packets</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RED-dropped bytes</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
RED-dropped bytes : 0
Low : 0
High : 0

Queue: 6, Forwarding classes: mcast-af
Queued:
Transmitted:
Packets : 0
Bytes : 0
Tail-dropped packets : 0
RED-dropped packets : 0
Low : 0
High : 0
RED-dropped bytes : 0
Low : 0
High : 0

Queue: 7, Forwarding classes: network-control
Queued:
Transmitted:
Packets : 97990
Bytes : 14987506
Tail-dropped packets : 0
RED-dropped packets : 0
Low : 0
High : 0
RED-dropped bytes : 0
Low : 0
High : 0
show interfaces vlan

Syntax

```
show interfaces (vlan | vlan.vlan-id)
  <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.

Description

Display status information about routed VLAN interfaces (RVIs).

Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>vlan</td>
<td>vlan.vlan-id</td>
</tr>
<tr>
<td>brief</td>
<td>detail</td>
</tr>
<tr>
<td>descriptions</td>
<td>Display interface description strings.</td>
</tr>
<tr>
<td>media</td>
<td>Display media-specific information about network interfaces.</td>
</tr>
<tr>
<td>routing-instance (all</td>
<td>instance-name)</td>
</tr>
<tr>
<td>snmp-index snmp-index</td>
<td>Display information for the specified SNMP index of the interface.</td>
</tr>
<tr>
<td>statistics</td>
<td>Display static interface statistics.</td>
</tr>
</tbody>
</table>

Required Privilege Level

view

Related Documentation

- show ethernet-switching table
- show vlans
- Monitoring Interface Status and Traffic on page 113
- Troubleshooting Network Interfaces on EX3200 Switches on page 121
- Troubleshooting Network Interfaces on EX4200 Switches on page 122
- Verifying Routed VLAN Interface Status and Statistics

List of Sample Output

- show interfaces vlan on page 260
- show interfaces vlan terse on page 260
- show interfaces vlan extensive on page 261
- show interfaces vlan detail on page 262

Output Fields

- Table 38 on page 253 lists the output fields for the show interfaces vlan command. Output fields are listed in the approximate order in which they appear. The level of output none means the basic command with no optional options—that is, either just show interfaces vlan or show interfaces vlan.vlan-id.
## Table 38: show interfaces vlan Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Interface</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical interface</td>
<td>Name of the physical interface, which is always vlan.</td>
<td>All levels</td>
</tr>
<tr>
<td>Enabled</td>
<td>State of the interface: Enabled or Disabled, followed by the statement Physical link is &lt;Up/Down&gt;</td>
<td>All levels</td>
</tr>
<tr>
<td>Interface index</td>
<td>Index number of the physical interface, which reflects its initialization sequence.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>SNMP ifIndex</td>
<td>SNMP index number for the physical interface.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Generation</td>
<td>Unique number for use by Juniper Networks technical support only.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Type</td>
<td>Because this is routed VLAN interface information, this entry is always VLAN.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Link-level type</td>
<td>Encapsulation (added control information) being used on the physical interface.</td>
<td>All levels</td>
</tr>
<tr>
<td>MTU</td>
<td>Maximum transmission unit (MTU) size on the physical interface. The default MTU size depends on the switch platform. Changing either the media MTU or protocol MTU causes an interface to be deleted and added again.</td>
<td>All levels</td>
</tr>
<tr>
<td>Clocking</td>
<td>Value is always Unspecified—not applicable on switches.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Speed</td>
<td>Speed of the interface, either Auto if autonegotiation of speed is enabled or a number representing the configured speed in megabits per second.</td>
<td>detail extensive</td>
</tr>
</tbody>
</table>
Table 38: show interfaces vlan Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Device flags</strong></td>
<td>Information about the physical device such as: Dest-route-down—The routing process detected that the link was not operational and changed the interface routes to nonforwarding status. Down—Device has been administratively disabled. Hear-Own-Xmit—Device receives its own transmissions. Is-Default—This address is the default address of the switch. The default address is used as the source address by SNMP, ping, traceroute, and other network utilities. Is-Preferred—This address is the default local address for packets originating from the local switch and sent to destinations on the subnet. Is-Primary—This address is the default local address for broadcast and multicast packets originated locally and sent out the interface. Link-Layer-Down—The link-layer protocol has failed to connect with the remote endpoint. Loopback—Switch is in physical loopback. Loop-Detected—The link layer has received frames that it sent, thereby detecting a physical loopback. No-Carrier—On media that support carrier recognition, no carrier is currently detected. No-Multicast—Device does not support multicast traffic. Preferred—This address is a candidate to become the preferred address. Present—Device is physically present and recognized. Promiscuous—Device is in promiscuous mode and recognizes frames addressed to all physical addresses on the media. Primary—This address is a candidate to become the primary address. Quench—Transmission on the device is quenched, because the output buffer is overflowing. Recv-All-Multicasts—Device is in multicast promiscuous mode and therefore provides no multicast filtering. Running—Device is active and enabled.</td>
<td>detail extensive none</td>
</tr>
<tr>
<td><strong>Link type</strong></td>
<td>Link mode of the interface—Auto if autonegotiation is enabled, or the configured Full-Duplex or Half-Duplex.</td>
<td>detail extensive none</td>
</tr>
<tr>
<td><strong>Link flags</strong></td>
<td>Value is always None—not applicable on switches.</td>
<td>detail extensive none</td>
</tr>
<tr>
<td><strong>Physical Info</strong></td>
<td>Value is always Unspecified—not applicable on switches.</td>
<td>detail extensive</td>
</tr>
<tr>
<td><strong>Hold-times</strong></td>
<td>Current interface hold-time up and hold-time down, in milliseconds.</td>
<td>detail extensive</td>
</tr>
<tr>
<td><strong>Current address</strong></td>
<td>MAC address of the hardware.</td>
<td>detail extensive none</td>
</tr>
<tr>
<td><strong>Hardware address</strong></td>
<td>MAC address of the switch.</td>
<td>detail extensive none</td>
</tr>
</tbody>
</table>
Table 38: show interfaces vlan Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternate link address</td>
<td>Value is always Unspecified—not applicable on switches.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Last flapped</td>
<td>Date, time, and how long ago the interface went from down to up. The format is Last flapped: year-month-day hour:minute:second timezone (hour:minute:second ago). For example, Last flapped: 2008–01–16 10:52:40 UTC (3d 22:58 ago). The entry can also be Never.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Statistics last cleared</td>
<td>Time when the statistics for the interface were last set to zero.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Traffic statistics</td>
<td>Number and rate of bytes and packets transmitted or received on the physical interface for supported switches.</td>
<td>detail extensive</td>
</tr>
<tr>
<td></td>
<td>• Input bytes—Number of bytes received on the interface for this switch. This value reflects the information gathered by the automatic ingress counter on EX3200 switches and EX4200 switches. EX8200 switches can also be configured to collect this information with the command l3-interface-ingress-counting.</td>
<td>detail extensive</td>
</tr>
<tr>
<td></td>
<td>• Output bytes—Number of bytes sent on the interface. This value reflects the information gathered by the automatic egress counter for EX8200 switches.</td>
<td>detail extensive</td>
</tr>
<tr>
<td></td>
<td>• Input packets—Number of packets received on the interface for this switch. This value reflects the information gathered by the automatic ingress counter for EX3200 and EX4200 switches. EX8200 switches can also be configured to collect this information with the command l3-interface-ingress-counting.</td>
<td>detail extensive</td>
</tr>
<tr>
<td></td>
<td>• Output packets—Number of packets sent on the interface. This value reflects the information gathered by the automatic egress counter for EX8200 switches.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>IPv6 transit statistics</td>
<td>Number and rate of bytes and packets transmitted and/or received on the IPv6 interface for supported switches.</td>
<td>detail extensive</td>
</tr>
<tr>
<td></td>
<td>• Input bytes—Number of bytes received on the interface. This value reflects the information gathered by the automatic ingress counter for EX3200 and EX4200 switches. EX8200 switches can also be configured to collect this information with the command l3-interface-ingress-counting.</td>
<td>detail extensive</td>
</tr>
<tr>
<td></td>
<td>• Output bytes—Number of bytes sent on the IPv6 interface. This value reflects the information gathered by the automatic egress counter for EX8200 switches.</td>
<td>detail extensive</td>
</tr>
<tr>
<td></td>
<td>• Input packets—Number of packets received on the interface. This value reflects the information gathered by the automatic ingress counter for EX3200 and EX4200 switches. EX8200 switches can also be configured to collect this information with the command l3-interface-ingress-counting.</td>
<td>detail extensive</td>
</tr>
<tr>
<td></td>
<td>• Output packets—Number of packets sent on the IPv6 interface. This value reflects the information gathered by the automatic egress counter for and EX8200 switches.</td>
<td>detail extensive</td>
</tr>
</tbody>
</table>
Table 38: show interfaces vlan Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input Errors</strong></td>
<td>Input errors on the interface. The following paragraphs explain some of the counters whose meaning may not be obvious.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Errors</strong>—Sum of the incoming frame aborts and FCS errors.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Drops</strong>—Number of packets dropped by the input queue of the I/O Manager ASIC. If the interface is saturated, this value increments once for every packet that is dropped by the ASIC’s RED mechanism.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Framing errors</strong>—Number of packets received with an invalid frame checksum (FCS).</td>
</tr>
<tr>
<td></td>
<td>• <strong>Runt</strong>—Number of frames received that are smaller than the runt threshold.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Policed discards</strong>—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.</td>
</tr>
<tr>
<td></td>
<td>• <strong>L3 incompletes</strong>—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.</td>
</tr>
<tr>
<td></td>
<td>• <strong>L2 channel errors</strong>—Number of times the software did not find a valid logical interface for an incoming frame.</td>
</tr>
<tr>
<td></td>
<td>• <strong>L2 mismatch timeouts</strong>—Number of malformed or short packets that caused the incoming packet handler to discard the frame as unreadable.</td>
</tr>
<tr>
<td></td>
<td>• <strong>FIFO errors</strong>—Number of FIFO errors in the receive direction that are reported by the ASIC. If this value is ever nonzero, the interface is probably malfunctioning.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Resource errors</strong>—Sum of transmit drops.</td>
</tr>
</tbody>
</table>
Table 38: show interfaces vlan Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Output errors</strong></td>
<td>Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td>• <strong>Carrier transitions</strong>—Number of times the interface has gone from <strong>down</strong> to <strong>up</strong>. This value 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 interface is malfunctioning.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Errors</strong>—Sum of the outgoing frame aborts and FCS errors.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Drops</strong>—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.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Collisions</strong>—Number of Ethernet collisions. Both Gigabit Ethernet interfaces and 10 Gigabit Ethernet interfaces support only full-duplex operation, so for those two interfaces, this value should always be zero. If the value is nonzero for either Gigabit Ethernet or 10 Gigabit Ethernet, there is a software bug.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Aged packets</strong>—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.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>FIFO errors</strong>—Number of FIFO errors in the send direction as reported by the ASIC on the interface. If this value is ever nonzero, the interface is probably malfunctioning.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>HS link CRC errors</strong>—Number of errors on the high-speed links between the ASICS responsible for handling the switch interfaces.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>MTU errors</strong>—Number of packets whose size exceeded the MTU of the interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Resource errors</strong>—Sum of transmit drops.</td>
<td></td>
</tr>
</tbody>
</table>

**Logical Interface**

<table>
<thead>
<tr>
<th></th>
<th>VLAN ID, index, and SNMP index number for the logical interface. The logical interface index values reflect the item’s initialization sequence.</th>
<th>detail extensive none</th>
</tr>
</thead>
<tbody>
<tr>
<td>vlan.vlan-id, Index</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SNMP ifIndex</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Generation**

<table>
<thead>
<tr>
<th></th>
<th>Unique number for Juniper Networks Technical support use only.</th>
<th>detail extensive none</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flags</td>
<td>Errors that have occurred on this interface, such as <strong>Link Layer Down</strong>. Other possible flags include:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Device-down</strong>—Device has been administratively disabled.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Disabled</strong>—Interface is administratively disabled.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Down</strong>—A hardware failure has occurred.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Hardware-Down</strong>—Interface protocol initialization failed to complete successfully.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>SNMP-Traps</strong>—SNMP trap notifications are enabled.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Up</strong>—Interface is enabled and operational.</td>
<td></td>
</tr>
</tbody>
</table>
### Table 38: show interfaces vlan Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SNMP-Traps</strong></td>
<td>Each configured SNMP trap has a number that appears here—0x0 is always displayed for logical interface SNMP traps.</td>
<td>detail extensive none</td>
</tr>
<tr>
<td><strong>Encapsulation</strong></td>
<td>Encapsulation method, which is the process of adding control information. The value is always Ethernet 2 (ENET2) for logical encapsulation.</td>
<td>detail extensive none</td>
</tr>
<tr>
<td><strong>Traffic statistics</strong></td>
<td>Number and rate of bytes and packets received and transmitted on the logical interface of supported switches. Traffic statistics represent the sum of the next two fields, Local statistics and Transit statistics. Note that these are not the values for the RVI ingress or egress counters—for that value, see Transit statistics below.</td>
<td>detail extensive</td>
</tr>
<tr>
<td></td>
<td>• Input bytes—Number of bytes received on the interface. Same value as the physical interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Output bytes—Number of bytes sent on the interface. Same value as the physical interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Input packets—Number of packets received on the interface. Same value as the physical interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Output packets—Number of bytes sent on the interface. Same value as the physical interface.</td>
<td></td>
</tr>
<tr>
<td><strong>Local statistics</strong></td>
<td>Number and rate of bytes and packets received and transmitted locally by the Routing Engine on the logical interface of supported switches. All packets for protocols and process statistics are counted here.</td>
<td>detail extensive none</td>
</tr>
<tr>
<td></td>
<td>• Input bytes—Number of bytes received on the interface. Same value as for the physical interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Output bytes—Number of bytes sent on the interface. Same value as for the physical interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Input packets—Number of packets received on the interface. Same value as for the physical interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Output packets—Number of bytes sent on the interface. Same value as for the physical interface.</td>
<td></td>
</tr>
<tr>
<td><strong>Transit statistics</strong></td>
<td>Number and rate of bytes and packets received and transmitted on the RVI logical interface of supported switches. Look at this value to see the RVI ingress and egress count.</td>
<td>detail extensive</td>
</tr>
<tr>
<td></td>
<td>• Input bytes—Number of bytes received on the interface. This ingress counter is automatic for EX3200 and EX4200 switches and configurable for EXB200 switches.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Output bytes—Number of bytes sent on the interface. This egress counter is automatic for EXB200.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Input packets—Number of packets received on the interface. This ingress counter is automatic for EX3200 and EX4200 switches and configurable for EXB200 switches.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Output packets—Number of packets sent on the interface. This egress counter is automatic for EXB200 switches.</td>
<td></td>
</tr>
</tbody>
</table>
Table 38: show interfaces vlan Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPv6 transit statistics</td>
<td>Number and rate of IPv6 bytes and packets received and transmitted on the RVI logical interface of supported switches. Transit values are unique to the logical interface and do not appear in physical interface output. Look at the values listed below to see the RVI ingress and egress count for IPv6 traffic.</td>
<td>detail extensive</td>
</tr>
<tr>
<td></td>
<td>• <strong>Input bytes</strong>—Number of bytes received on the interface. This ingress counter is automatic for EX3200 and EX4200 switches and configurable for EX8200 switches.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Output bytes</strong>—Number of bytes sent by the interface. This egress counter is automatic for EX8200 switches.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Input packets</strong>—Number of packets received on the interface. This ingress counter is automatic for EX3200 and EX4200 and configurable for EX8200 switches.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Output packets</strong>—Number of packets sent by the interface. This egress counter is automatic for EX8200 switches.</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> The bandwidth bps counter is not enabled on the switches.</td>
<td></td>
</tr>
<tr>
<td>Protocol</td>
<td>Protocol used for the logical interface—this value is <code>inet</code> for IPv4 traffic and <code>inet6</code> for IPv6 traffic.</td>
<td>All levels</td>
</tr>
<tr>
<td>Generation</td>
<td>Unique number for use by Juniper Networks technical support only.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Route table</td>
<td>Route table in which the logical interface address is located. For example, <code>0</code> refers to the routing table <code>inet.0</code>.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Protocol flags</td>
<td>Information about the protocol such as <strong>Targeted-broadcast</strong>.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Protocol addresses and</td>
<td>Protocol address values here can be: <strong>Dest-route-down</strong>—The routing process detected that the link was not operational and changed the interface routes to nonforwarding status. <strong>Device-down</strong>—Device has been administratively disabled. <strong>Disabled</strong>—Interface is administratively disabled. <strong>Down</strong>—A hardware failure has occurred. <strong>Hardware-Down</strong>—Interface protocol initialization failed to complete successfully. <strong>Is-Default</strong>—This address is the default address of the switch. The default address is used as the source address by SNMP, ping, traceroute, and other network utilities. <strong>Is-Preferred</strong>—This address is the default local address for packets originating from the local switch and sent to destinations on the subnet. <strong>Is-Primary</strong>—This address is the default local address for broadcast and multicast packets originated locally and sent out the interface. <strong>Preferred</strong>—This address is a candidate to become the preferred address. <strong>Primary</strong>—This address is a candidate to become the primary address. <strong>SNMP-Traps</strong>—SNMP trap notifications are enabled. <strong>Up</strong>—Interface is enabled and operational.</td>
<td>none</td>
</tr>
<tr>
<td>Address flags</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Table 38: show interfaces vlan Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address destination</td>
<td>Logical destination's network address.</td>
<td>detail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
<tr>
<td>Local address</td>
<td>IP address of the logical interface.</td>
<td>detail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
<tr>
<td>Broadcast address</td>
<td>Broadcast address of the logical interface.</td>
<td>detail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
<tr>
<td>Generation</td>
<td>Unique number for use by Juniper Networks technical support only.</td>
<td>detail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>extensive</td>
</tr>
</tbody>
</table>

Sample Output

show interfaces vlan

user@switch> show interfaces vlan
Physical interface: vlan, Enabled, Physical link is Up
  Interface index: 150, SNMP ifIndex: 556
  Type: VLAN, Link-level type: VLAN, MTU: 1518, Speed: 1000mbps
  Device flags : Present Running
  Link type : Full-Duplex
  Link flags : None
  Current address: 00:21:59:c5:f0:40, Hardware address: 00:21:59:c5:f0:40
  Last flapped : Never
  Input packets : 0
  Output packets: 0

Logical interface vlan.0 (Index 82) (SNMP ifIndex 557)
  Flags: Link-Layer-Down SNMP-Traps 0x0 Encapsulation: ENET2
  Input packets : 0
  Output packets: 1
  Protocol inet
    Flags: Targeted-broadcast
    Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
      Destination: 10.1.1/24, Local: 10.1.1.1, Broadcast: 10.1.1.255

Logical interface vlan.1 (Index 83) (SNMP ifIndex 558)
  Flags: Link-Layer-Down SNMP-Traps 0x0 Encapsulation: ENET2
  Input packets : 0
  Output packets: 1
  Protocol inet
    Flags: Targeted-broadcast
    Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
      Destination: 10.1.2/24, Local: 10.1.2.1, Broadcast: 10.1.2.255

show interfaces vlan terse

user@switch> show interfaces vlan terse
Interface Admin Link Proto Local Remote
vlan   up    up   up

Copyright © 2011, Juniper Networks, Inc.
<table>
<thead>
<tr>
<th>VLAN</th>
<th>Status</th>
<th>Mode</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>VLAN 0</td>
<td>up</td>
<td>down</td>
<td>10.1.1.1/24</td>
</tr>
<tr>
<td>VLAN 1</td>
<td>up</td>
<td>down</td>
<td>10.1.2.1/24</td>
</tr>
</tbody>
</table>

```bash
user@switch> show interfaces vlan extensive
```

**Physical interface: vlan, Enabled, Physical link is Up**

- Interface index: 150, SNMP ifIndex: 556, Generation: 153
- Type: VLAN, Link-level type: VLAN, MTU: 1518, Clocking: Unspecified, Speed: 1000mbps
- Device flags: Present Running
- Link type: Full-Duplex
- Link flags: None
- Physical info: Unspecified
- Hold-times: Up 0 ms, Down 0 ms
- Current address: 00:21:59:c5:f0:40, Hardware address: 00:21:59:c5:f0:40
- Alternate link address: Unspecified
- Last flapped: Never
- Statistics last cleared: Never

**Traffic statistics:**
- Input bytes: 0
- Output bytes: 0
- Input packets: 0
- Output packets: 0

**IPv6 transit statistics:**
- Input bytes: 0
- Output bytes: 0
- Input packets: 0
- Output packets: 0

**Input errors:**
- Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0, Policed discards: 0, Resource errors: 0

**Output errors:**
- Carrier transitions: 0, Errors: 0, Drops: 0, MTU errors: 0, Resource errors: 0

**Logical interface vlan.0 (Index 82) (SNMP ifIndex 557) (Generation 147)**

- Flags: Link-Layer-Down SNMP-Traps 0x0 Encapsulation: ENET2
- Traffic statistics:
  - Input bytes: 0
  - Output bytes: 42
  - Input packets: 0
  - Output packets: 1

**Local statistics:**
- Input bytes: 0
- Output bytes: 42
- Input packets: 0
- Output packets: 1

**Transit statistics:**
- Input bytes: 0 (0 bps)
- Output bytes: 0 (0 bps)
- Input packets: 0 (0pps)
- Output packets: 0 (0pps)

**Protocol inet, Generation: 159, Route table: 0**
- Flags: Targeted-broadcast
- Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
  - Destination: 10.1.1.24, Local: 10.1.1.1, Broadcast: 10.1.1.255, Generation: 138

**Logical interface vlan.1 (Index 83) (SNMP ifIndex 558) (Generation 148)**

- Flags: Link-Layer-Down SNMP-Traps 0x0 Encapsulation: ENET2
- Traffic statistics:
  - Input bytes: 0

---

Copyright © 2011, Juniper Networks, Inc.
<table>
<thead>
<tr>
<th></th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output bytes :</td>
<td>42</td>
</tr>
<tr>
<td>Input packets:</td>
<td>0</td>
</tr>
<tr>
<td>Output packets:</td>
<td>1</td>
</tr>
<tr>
<td>Local statistics:</td>
<td></td>
</tr>
<tr>
<td>Input bytes :</td>
<td>0</td>
</tr>
<tr>
<td>Output bytes :</td>
<td>42</td>
</tr>
<tr>
<td>Input packets:</td>
<td>0</td>
</tr>
<tr>
<td>Output packets:</td>
<td>1</td>
</tr>
<tr>
<td>Transit statistics:</td>
<td></td>
</tr>
<tr>
<td>Input bytes :</td>
<td>0 0 bps</td>
</tr>
<tr>
<td>Output bytes :</td>
<td>0 0 bps</td>
</tr>
<tr>
<td>Input packets:</td>
<td>0 0 pps</td>
</tr>
<tr>
<td>Output packets:</td>
<td>0 0 pps</td>
</tr>
</tbody>
</table>

Protocol inet, Generation: 160, Route table: 0
Flags: Targeted-broadcast
Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
Destination: 10.1.2/24, Local: 10.1.2.1, Broadcast: 10.1.2.255,
Generation: 140

show interfaces vlan detail

Physical interface: vlan, Enabled, Physical link is Up
Interface index: 150, SNMP ifIndex: 556, Generation: 153
Type: VLAN, Link-level type: VLAN, MTU: 1518, Clocking: Unspecified,
Speed: 1000mbps
Device flags : Present Running
Link type : Full-Duplex
Link flags : None
Physical info : Unspecified
Hold-times : Up 0 ms, Down 0 ms
Current address: 00:21:59:c5:f0:40, Hardware address: 00:21:59:c5:f0:40
Alternate link address: Unspecified
Last flapped : Never
Statistics last cleared: Never
Traffic statistics:
<table>
<thead>
<tr>
<th></th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input bytes :</td>
<td>0</td>
</tr>
<tr>
<td>Output bytes :</td>
<td>0</td>
</tr>
<tr>
<td>Input packets:</td>
<td>0</td>
</tr>
<tr>
<td>Output packets:</td>
<td>0</td>
</tr>
<tr>
<td>IPv6 transit statistics:</td>
<td></td>
</tr>
<tr>
<td>Input bytes :</td>
<td>0</td>
</tr>
<tr>
<td>Output bytes :</td>
<td>0</td>
</tr>
<tr>
<td>Input packets:</td>
<td>0</td>
</tr>
<tr>
<td>Output packets:</td>
<td>0</td>
</tr>
</tbody>
</table>

Logical interface vlan.0 (Index 82) (SNMP ifIndex 557) (Generation 147)
Flags: Link-Layer-Down SNMP-Traps 0x0 Encapsulation: ENET2
Traffic statistics:
<table>
<thead>
<tr>
<th></th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input bytes :</td>
<td>0</td>
</tr>
<tr>
<td>Output bytes :</td>
<td>42</td>
</tr>
<tr>
<td>Input packets:</td>
<td>0</td>
</tr>
<tr>
<td>Output packets:</td>
<td>1</td>
</tr>
<tr>
<td>Local statistics:</td>
<td></td>
</tr>
<tr>
<td>Input bytes :</td>
<td>0</td>
</tr>
<tr>
<td>Output bytes :</td>
<td>42</td>
</tr>
<tr>
<td>Input packets:</td>
<td>0</td>
</tr>
<tr>
<td>Output packets:</td>
<td>1</td>
</tr>
<tr>
<td>Transit statistics:</td>
<td></td>
</tr>
<tr>
<td>Input bytes :</td>
<td>0 0 bps</td>
</tr>
<tr>
<td>Output bytes :</td>
<td>0 0 bps</td>
</tr>
<tr>
<td>Input packets:</td>
<td>0 0 pps</td>
</tr>
</tbody>
</table>

show interfacesvlan detail

user@switch> show interfaces vlan detail

Physical interface: vlan, Enabled, Physical link is Up
Interface index: 150, SNMP ifIndex: 556, Generation: 153
Type: VLAN, Link-level type: VLAN, MTU: 1518, Clocking: Unspecified,
Speed: 1000mbps
Device flags : Present Running
Link type : Full-Duplex
Link flags : None
Physical info : Unspecified
Hold-times : Up 0 ms, Down 0 ms
Current address: 00:21:59:c5:f0:40, Hardware address: 00:21:59:c5:f0:40
Alternate link address: Unspecified
Last flapped : Never
Statistics last cleared: Never
Traffic statistics:
<table>
<thead>
<tr>
<th></th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input bytes :</td>
<td>0</td>
</tr>
<tr>
<td>Output bytes :</td>
<td>0</td>
</tr>
<tr>
<td>Input packets:</td>
<td>0</td>
</tr>
<tr>
<td>Output packets:</td>
<td>0</td>
</tr>
<tr>
<td>IPv6 transit statistics:</td>
<td></td>
</tr>
<tr>
<td>Input bytes :</td>
<td>0</td>
</tr>
<tr>
<td>Output bytes :</td>
<td>0</td>
</tr>
<tr>
<td>Input packets:</td>
<td>0</td>
</tr>
<tr>
<td>Output packets:</td>
<td>0</td>
</tr>
</tbody>
</table>
Output packets:                    0                    0 pps
Protocol inet, Generation: 159, Route table: 0
  Flags: Targeted-broadcast
  Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
    Destination: 10.1.1/24, Local: 10.1.1.1, Broadcast: 10.1.1.255,
    Generation: 138

Logical interface vlan.1 (Index 83) (SNMP ifIndex 558) (Generation 148)
  Flags: Link-Layer-Down SNMP-Traps 0x0 Encapsulation: ENET2
  Traffic statistics:
    Input bytes :                    0
    Output bytes :                   42
    Input packets:                    0
    Output packets:                    1
    Local statistics:
      Input bytes :                    0
      Output bytes :                   42
      Input packets:                    0
      Output packets:                    1
  Transit statistics:
    Input bytes :                    0                    0 bps
    Output bytes :                    0                    0 bps
    Input packets:                    0                    0 pps
    Output packets:                    0                    0 pps
Protocol inet, Generation: 160, Route table: 0
  Flags: Targeted-broadcast
  Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
    Destination: 10.1.2/24, Local: 10.1.2.1, Broadcast: 10.1.2.255,
    Generation: 140
**show interfaces xe-**

**Syntax**

```
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.

**Description**

Display status information about the specified 10-Gigabit Ethernet interface.

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

**Options**

- `xe-fpc/pic/port` — Display standard information about the specified 10-Gigabit Ethernet interface.

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

- `media` — (Optional) 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) 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 113
- Troubleshooting Network Interfaces on EX3200 Switches on page 121
- Troubleshooting Network Interfaces on EX4200 Switches on page 122
- Troubleshooting an Aggregated Ethernet Interface on page 123
- Junos OS Ethernet Interfaces Configuration Guide

**List of Sample Output**

- `show interfaces xe-4/1/0` on page 273
- `show interfaces xe-0/1/0 brief` on page 273
- `show interfaces xe-4/1/0 detail` on page 273
- `show interfaces xe-6/0/39 extensive` on page 274

**Output Fields**

Table 39 on page 265 lists the output fields for the `show interfaces xe-` command. Output fields are listed in the approximate order in which they appear.
Table 39: show interfaces xe- Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fields for the Terse Output Level Only</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interface</td>
<td>Name of the physical or logical interface.</td>
<td>terse</td>
</tr>
<tr>
<td>Admin</td>
<td>Administrative state of the interface.</td>
<td>terse</td>
</tr>
<tr>
<td>Link</td>
<td>State of the physical link.</td>
<td>terse</td>
</tr>
<tr>
<td>Proto</td>
<td>Protocol family configured on the logical interface.</td>
<td>terse</td>
</tr>
<tr>
<td>Local</td>
<td>Local IP address of the logical interface.</td>
<td>terse</td>
</tr>
<tr>
<td>Remote</td>
<td>Remote IP address of the logical interface.</td>
<td>terse</td>
</tr>
<tr>
<td>Fields for the Physical Interface</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical interface</td>
<td>Name of the physical interface.</td>
<td>brief</td>
</tr>
<tr>
<td>Enabled</td>
<td>State of the interface. Can be one of the following:</td>
<td>brief</td>
</tr>
<tr>
<td></td>
<td>• <strong>Administratively down, Physical link is Down</strong>—The interface is turned off, and</td>
<td>brief</td>
</tr>
<tr>
<td></td>
<td>the physical link is inoperable and cannot pass packets even when it is enabled.</td>
<td>brief</td>
</tr>
<tr>
<td></td>
<td>• <strong>Administratively down, Physical link is Up</strong>—The interface is turned off, but</td>
<td>brief</td>
</tr>
<tr>
<td></td>
<td>the physical link is operational and can pass packets when it is enabled.</td>
<td>brief</td>
</tr>
<tr>
<td></td>
<td>• <strong>Enabled, Physical link is Down</strong>—The interface is turned on, but the physical</td>
<td>brief</td>
</tr>
<tr>
<td></td>
<td>link is inoperable and cannot pass packets.</td>
<td>brief</td>
</tr>
<tr>
<td></td>
<td>• <strong>Enabled, Physical link is Up</strong>—The interface is turned on, and the physical</td>
<td>brief</td>
</tr>
<tr>
<td></td>
<td>link is operational and can pass packets.</td>
<td>brief</td>
</tr>
<tr>
<td>Interface index</td>
<td>Index number of the physical interface, which reflects its initialization sequence.</td>
<td>detail</td>
</tr>
<tr>
<td>SNMP ifindex</td>
<td>SNMP index number for the physical interface.</td>
<td>detail</td>
</tr>
<tr>
<td>Generation</td>
<td>Unique number for use by Juniper Networks technical support only.</td>
<td>detail</td>
</tr>
<tr>
<td>Description</td>
<td>User-configured interface description.</td>
<td>brief</td>
</tr>
</tbody>
</table>
Table 39: show interfaces xe - Output Fields *(continued)*

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Link-level type</td>
<td>Encapsulation being used on the physical interface.</td>
<td>brief</td>
</tr>
<tr>
<td></td>
<td></td>
<td>detail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
<tr>
<td>MTU</td>
<td>Maximum transmission unit size on the physical interface.</td>
<td>brief</td>
</tr>
<tr>
<td></td>
<td></td>
<td>detail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
<tr>
<td>Speed</td>
<td>Speed at which the interface is running.</td>
<td>brief</td>
</tr>
<tr>
<td></td>
<td></td>
<td>detail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
<tr>
<td>Duplex</td>
<td>Duplex mode of the interface.</td>
<td>brief</td>
</tr>
<tr>
<td></td>
<td></td>
<td>detail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
<tr>
<td>BPDU Error</td>
<td>Not supported on EX Series switches.</td>
<td>detail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
<tr>
<td>MAC-REWRITE Error</td>
<td>Not supported on EX Series switches.</td>
<td>detail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
<tr>
<td>Loopback</td>
<td>Loopback status: Enabled or Disabled. If loopback is enabled, type of loopback:</td>
<td>brief</td>
</tr>
<tr>
<td></td>
<td>Local or Remote.</td>
<td>detail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
<tr>
<td>Source filtering</td>
<td>Source filtering status: Enabled or Disabled.</td>
<td>brief</td>
</tr>
<tr>
<td></td>
<td></td>
<td>detail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
<tr>
<td>Flow control</td>
<td>Flow control status: Enabled or Disabled.</td>
<td>brief</td>
</tr>
<tr>
<td></td>
<td></td>
<td>detail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
<tr>
<td>Device flags</td>
<td>Information about the physical device.</td>
<td>brief</td>
</tr>
<tr>
<td></td>
<td></td>
<td>detail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
<tr>
<td>Interface flags</td>
<td>Information about the interface.</td>
<td>brief</td>
</tr>
<tr>
<td></td>
<td></td>
<td>detail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
</tbody>
</table>
Table 39: show interfaces xe- Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Link flags</td>
<td>Information about the link.</td>
<td>brief</td>
</tr>
<tr>
<td></td>
<td></td>
<td>detail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
<tr>
<td>CoS queues</td>
<td>Number of CoS queues configured.</td>
<td>detail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
<tr>
<td>Hold-times</td>
<td>Current interface hold-time up and hold-time down, in milliseconds.</td>
<td>detail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
<tr>
<td>Current address</td>
<td>Configured MAC address.</td>
<td>detail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
<tr>
<td>Hardware address</td>
<td>Hardware MAC address.</td>
<td>detail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
<tr>
<td>Last flapped</td>
<td>Date, time, and how long ago the interface went from down to up. The format is</td>
<td>detail</td>
</tr>
<tr>
<td></td>
<td>year-month-day hour:minute:second timezone (weeks:days:hours:minutes:seconds ago).</td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td>For example, 2008–01–16 10:52:40 UTC (3d 22:58 ago).</td>
<td>none</td>
</tr>
<tr>
<td>Input Rate</td>
<td>Input rate in bits per second (bps) and packets per second (pps).</td>
<td>none</td>
</tr>
<tr>
<td>Output Rate</td>
<td>Output rate in bps and pps.</td>
<td>none</td>
</tr>
<tr>
<td>Statistics last</td>
<td>Date, time, and how long ago the statistics for the interface were cleared. The</td>
<td>detail</td>
</tr>
<tr>
<td>cleared</td>
<td>format is year-month-day hour:minute:second timezone (weeks:days:hours:minutes:seconds ago).</td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td>For example, 2010-05-17 07:51:28 PDT (00:04:33 ago).</td>
<td>none</td>
</tr>
<tr>
<td>Traffic statistics</td>
<td>Number and rate of bytes and packets received and transmitted on the physical</td>
<td>detail</td>
</tr>
<tr>
<td></td>
<td>interface.</td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td>• Input bytes—Number of bytes received on the interface and rate in bits per</td>
<td></td>
</tr>
<tr>
<td></td>
<td>second.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Output bytes—Number of bytes transmitted on the interface and rate in bits per</td>
<td></td>
</tr>
<tr>
<td></td>
<td>second.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Input packets—Number of packets received on the interface and rate in packets</td>
<td></td>
</tr>
<tr>
<td></td>
<td>per second.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Output packets—Number of packets transmitted on the interface and rate in</td>
<td></td>
</tr>
<tr>
<td></td>
<td>packets per second.</td>
<td></td>
</tr>
</tbody>
</table>
Table 39: show interfaces xe- Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPv6 transit statistics</td>
<td>If IPv6 statistics tracking is enabled, number of IPv6 bytes and packets received and transmitted on the logical interface:</td>
<td>detail extensive</td>
</tr>
<tr>
<td></td>
<td>• Input bytes—Number of bytes received on the interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Output bytes—Number of bytes transmitted on the interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Input packets—Number of packets received on the interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Output packets—Number of packets transmitted on the interface.</td>
<td></td>
</tr>
<tr>
<td>Input errors</td>
<td>Input errors on the interface:</td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td>• Errors—Sum of the incoming frame aborts and FCS errors.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Drops—Number of packets dropped by the input queue of the I/O Manager ASIC.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Framing errors—Number of packets received with an invalid frame checksum (FCS).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Runts—Number of frames received that are smaller than the runt threshold.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Policed discards—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• L3 incompletes—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 ignore-l3-incompletes statement.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• L2 channel errors—Number of times the software did not find a valid logical interface for an incoming frame.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• L2 mismatch timeouts—Number of malformed or short packets that caused the incoming packet handler to discard the frame as unreadable.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• FIFO errors—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.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Resource errors—Sum of transmit drops.</td>
<td></td>
</tr>
</tbody>
</table>
### Table 39: show interfaces xe- Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Output errors</strong></td>
<td>Output errors on the interface:</td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td>• <strong>Carrier transitions</strong>—Number of times the interface has gone from <em>down</em> to <em>up</em>. 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.</td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td>• <strong>Errors</strong>—Sum of the outgoing frame aborts and FCS errors.</td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td>• <strong>Drops</strong>—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.</td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td>• <strong>Collisions</strong>—Number of Ethernet collisions. A 10-Gigabit Ethernet interface supports only full-duplex operation, so for 10-Gigabit Ethernet interfaces, this number should always remain 0. If it is nonzero, there is a software bug.</td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td>• <strong>Aged packets</strong>—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.</td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td>• <strong>FIFO errors</strong>—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.</td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td>• <strong>HS link CRC errors</strong>—Number of errors on the high-speed links between the ASICS responsible for handling the switch interfaces.</td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td>• <strong>MTU errors</strong>—Number of packets whose size exceeded the MTU of the interface.</td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td>• <strong>Resource errors</strong>—Sum of transmit drops.</td>
<td>extensive</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ingress queues</th>
<th>Number of CoS ingress queues supported on the specified interface. Displayed only for an interface on a line card with oversubscribed ports.</th>
<th>detail extensive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egress queues</td>
<td>Number of CoS egress queues supported on the specified interface.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>PFE Egress queues</td>
<td>Number of Packet Forwarding Engine egress queues shared by the interfaces in a port group. Displayed only for an interface on a line card with oversubscribed ports.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Queue counters</td>
<td>Statistics for queues:</td>
<td>detail extensive</td>
</tr>
<tr>
<td></td>
<td>• <strong>Queued packets</strong>—Number of queued packets. This counter is not supported on EX switches and always contains 0.</td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td>• <strong>Transmitted packets</strong>—Number of transmitted packets.</td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td>• <strong>Dropped packets</strong>—Number of packets dropped by the ASIC’s RED mechanism.</td>
<td>extensive</td>
</tr>
</tbody>
</table>
Table 39: show interfaces xe- Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active alarms and</td>
<td>Ethernet-specific defects that can prevent the interface from passing packets.</td>
<td>detail</td>
</tr>
<tr>
<td>Active defects</td>
<td>When a defect persists for a certain amount of time, it is promoted to an alarm.</td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td>Based on the switch configuration, an alarm can ring the red or yellow alarm</td>
<td>none</td>
</tr>
<tr>
<td></td>
<td>bell on the switch or turn on the red or yellow alarm LED on the front of the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>switch. These fields can contain the value None or Link.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• None—There are no active defects or alarms.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Link—Interface has lost its link state, which usually means that the cable is</td>
<td></td>
</tr>
<tr>
<td></td>
<td>unplugged, the far-end system has been turned off, or the PIC is</td>
<td></td>
</tr>
<tr>
<td></td>
<td>malfunctioning.</td>
<td></td>
</tr>
<tr>
<td>MAC statistics</td>
<td>Receive and Transmit statistics reported by the PIC’s MAC subsystem.</td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td>• Total octets and total packets—Total number of octets and packets.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Unicast packets, Broadcast packets, and Multicast packets—Number of unicast,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>broadcast, and multicast packets.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• CRC/Align errors—Total number of packets received that had a length (excluding</td>
<td></td>
</tr>
<tr>
<td></td>
<td>framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and had either a bad FCS with an integral number of octets (FCS Error) or a bad</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FCS with a nonintegral number of octets (Alignment Error).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• FIFO error—Number of FIFO errors that are reported by the ASIC on the PIC.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If this value is ever nonzero, the PIC is probably malfunctioning.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• MAC control frames—Number of MAC control frames.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• MAC pause frames—Number of MAC control frames with pause operational code.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Oversized frames—Number of frames that exceed 1518 octets.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Jabber frames—Number of frames that were longer than 1518 octets (excluding</td>
<td></td>
</tr>
<tr>
<td></td>
<td>framing bits, but including FCS octets), and had either an FCS error or an</td>
<td></td>
</tr>
<tr>
<td></td>
<td>alignment error. This definition of jabber is different from the definition in</td>
<td></td>
</tr>
<tr>
<td></td>
<td>IEEE-802.3 section 8.2.1.5 (10BASE5) and section 10.3.1.4 (10BASE2). These</td>
<td></td>
</tr>
<tr>
<td></td>
<td>documents define jabber as the condition in which any packet exceeds 20 ms. The</td>
<td></td>
</tr>
<tr>
<td></td>
<td>allowed range to detect jabber is from 20 ms to 150 ms.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Fragment frames—Total number of packets that were less than 64 octets in</td>
<td></td>
</tr>
<tr>
<td></td>
<td>length (excluding framing bits, but including FCS octets), and had either an FCS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>error or an alignment error. Fragment frames normally increment because both</td>
<td></td>
</tr>
<tr>
<td></td>
<td>runts (which are normal occurrences caused by collisions) and noise hits are</td>
<td></td>
</tr>
<tr>
<td></td>
<td>counted.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Code violations—Number of times an event caused the PHY to indicate “Data</td>
<td></td>
</tr>
<tr>
<td></td>
<td>reception error” or “invalid data symbol error.”</td>
<td></td>
</tr>
<tr>
<td>Packet Forwarding</td>
<td>Information about the configuration of the Packet Forwarding Engine:</td>
<td>extensive</td>
</tr>
<tr>
<td>Engine configuration</td>
<td>• Destination slot—FPC slot number:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• On standalone switches with built-in interfaces, the slot number refers to</td>
<td></td>
</tr>
<tr>
<td></td>
<td>the switch itself and is always 0.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• On Virtual Chassis composed of switches with built-in interfaces, the slot</td>
<td></td>
</tr>
<tr>
<td></td>
<td>number refers to the member ID of the switch.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• On switches with line cards or on Virtual Chassis composed of switches with</td>
<td></td>
</tr>
<tr>
<td></td>
<td>line cards, the slot number refers to the line card slot number on the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>switch or Virtual Chassis.</td>
<td></td>
</tr>
</tbody>
</table>
### Table 39: show interfaces xe- Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CoS Information</strong></td>
<td>Scheduler information for the CoS egress queues on the physical interface:</td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td>• <strong>Direction</strong>—Queue direction, always <strong>Output</strong>.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>CoS transmit queue</strong>—Queue number and its associated user-configured forwarding class name.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Bandwidth</strong>—Information about bandwidth allocated to the queue:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• %—Bandwidth allocated to the queue as a percentage</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>bps</strong>—Bandwidth allocated to the queue in bps</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Buffer</strong>—Information about buffer space allocated to the queue:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• %—Buffer space allocated to the queue as a percentage</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>usec</strong>—Buffer space allocated to the queue in microseconds. This value is nonzero only if the buffer size is configured in terms of time.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Priority</strong>—Queue priority: <strong>low</strong> or <strong>high</strong>.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Limit</strong>—Displayed if rate limiting is configured for the queue. Possible values are <strong>none</strong> and <strong>exact</strong>. If <strong>exact</strong> is configured, the queue transmits only up to the configured bandwidth, even if excess bandwidth is available. If <strong>none</strong> is configured, the queue transmits beyond the configured bandwidth if bandwidth is available.</td>
<td></td>
</tr>
</tbody>
</table>

### Fields for Logical Interfaces

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Logical interface</strong></td>
<td>Name of the logical interface.</td>
<td>brief</td>
</tr>
<tr>
<td><strong>Index</strong></td>
<td>Index number of the logical interface, which reflects its initialization sequence.</td>
<td>detail</td>
</tr>
<tr>
<td><strong>SNMP ifIndex</strong></td>
<td>SNMP interface index number for the logical interface.</td>
<td>extensive</td>
</tr>
<tr>
<td><strong>Generation</strong></td>
<td>Unique number for use by Juniper Networks technical support only.</td>
<td>detail</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>User-configured description of the interface.</td>
<td>brief</td>
</tr>
<tr>
<td><strong>Flags</strong></td>
<td>Information about the logical interface.</td>
<td>brief</td>
</tr>
<tr>
<td><strong>Encapsulation</strong></td>
<td>Encapsulation on the logical interface.</td>
<td>brief</td>
</tr>
</tbody>
</table>
Table 39: show interfaces xe- Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic statistics</td>
<td>Number and rate of bytes and packets received (input) and transmitted (output) on the specified interface.</td>
<td>detail extensive</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> For logical interfaces on EX Series switches, the traffic statistics fields in show interfaces commands show only control traffic; the traffic statistics do not include data traffic.</td>
<td></td>
</tr>
<tr>
<td>Local statistics</td>
<td>Number and rate of bytes and packets destined to and from the switch.</td>
<td>extensive</td>
</tr>
<tr>
<td>Transit statistics</td>
<td>Number and rate of bytes and packets transiting the switch.</td>
<td>extensive</td>
</tr>
<tr>
<td>Protocol</td>
<td>Protocol family.</td>
<td>detailed extensive none</td>
</tr>
<tr>
<td>Generation</td>
<td>Unique number for use by Juniper Networks technical support only.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Route Table</td>
<td>Route table in which the logical interface address is located. For example, 0 refers to the routing table inet.0.</td>
<td>detail extensive none</td>
</tr>
<tr>
<td>Input Filters</td>
<td>Names of any input filters applied to this interface.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Output Filters</td>
<td>Names of any output filters applied to this interface.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Flags</td>
<td>Information about protocol family flags.</td>
<td>detail extensive</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>Addresses, Flags</td>
<td>Information about the address flags.</td>
<td>detail extensive none</td>
</tr>
<tr>
<td>protocol-family</td>
<td>Protocol family configured on the logical interface. If the protocol is inet, the IP address of the interface is also displayed.</td>
<td>brief</td>
</tr>
<tr>
<td>Flags</td>
<td>Information about the address flags.</td>
<td>detail extensive none</td>
</tr>
<tr>
<td>Destination</td>
<td>IP address of the remote side of the connection.</td>
<td>detail extensive none</td>
</tr>
</tbody>
</table>
Table 39: show interfaces xe- Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local</td>
<td>IP address of the logical interface.</td>
<td>detail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
<tr>
<td>Broadcast</td>
<td>Broadcast address of the logical interface.</td>
<td>detail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
<tr>
<td>Generation</td>
<td>Unique number for use by Juniper Networks technical support only.</td>
<td>detail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
</tbody>
</table>

Sample Output

```
show interfaces xe-4/1/0
user@switch show interfaces xe-4/1/0
Physical interface: xe-4/1/0, Enabled, Physical link is Up
  Interface index: 387, SNMP ifIndex: 369
  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
  Device flags   : Present Running
  Interface flags: SNMP-Traps Internal: 0x0
  Link flags     : None
  CoS queues     : 8 supported, 8 maximum usable queues
  Current address: 00:23:9c:03:8e:70, Hardware address: 00:23:9c:03:8e:70
  Last flapped   : 2009-05-12 08:01:04 UTC (00:13:44 ago)
  Input rate     : 36432 bps (3 pps)
  Output rate    : 0 bps (0 pps)
  Active alarms  : None
  Active defects : None
  Logical interface xe-4/1/0.0 (Index 66) (SNMP ifIndex 417)
    Flags: SNMP-Traps Encapsulation: ENET2
    Input packets : 0
    Output packets: 0
    Protocol eth-switch
    Flags: None

show interfaces xe-0/1/0 brief
user@switch> show interfaces xe-0/1/0 brief
Physical interface: xe-0/1/0, 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-0/1/0.0
    Flags: SNMP-Traps Encapsulation: ENET2
    eth-switch

show interfaces xe-4/1/0 detail
user@switch> show interfaces xe-4/1/0 detail
Physical interface: xe-4/1/0, Enabled, Physical link is Up
  Interface index: 387, SNMP ifIndex: 369, Generation: 390
  Link-level type: Ethernet, MTU: 1514, Speed: 10Gbps, Duplex: Full-Duplex,
```
show interfaces xe-4/1/0.0

Logical interface xe-4/1/0.0 (Index 66) (SNMP ifIndex 417) (Generation 158)

Traffic statistics:
  Input bytes : 4945644  48576 bps
  Output bytes : 0  0 bps
  Input packets: 3258  4 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-forward 0 0 0
  5 expedited-forward 0 0 0
  7 network-continue 0 0 0

Active alarms : None
Active defects : None

Logical interface xe-6/0/39

Physical interface: xe-6/0/39, Enabled, Physical link is Up
Interface index: 291, SNMP ifIndex: 1641, Generation: 316
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
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: 00:19:e2:72:f2:88, Hardware address: 00:19:e2:72:f2:88
Last flapped : 2010-05-13 14:49:43 PDT (1d 00:14 ago)
Statistics last cleared: Never
Traffic statistics:
Input bytes : 49625962140160 4391057408 bps
Output bytes : 47686985710805 4258984960 bps
Input packets: 387702829264 4288139 pps
Output packets: 372554570944 4159166 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
Ingress queues: 2 supported, 2 in use
Queue counters: Queued packets Transmitted packets Dropped packets
Low priority 336342805223 798662358
High priority 0 0 0
Egress queues: 8 supported, 8 in use
Queue counters: Queued packets Transmitted packets Dropped packets
0 best-effort 33760130103 0
1 assured-forward 0 0
2 mcast-be 274948977 0
3 queue3 0 0
4 mcast-ef 0 0
5 expedited-forward 0 0
6 mcast-aff 0 0
7 network-cont 46613 0
PFE Egress queues: 8 supported, 8 in use
Queue counters: Queued packets Transmitted packets Dropped packets
0 best-effort 737867061290 5595302082
1 assured-forward 0 0
2 mcast-be 0 0
3 queue3 0 0
4 mcast-ef 0 0
5 expedited-forward 0 0
6 mcast-aff 0 0
7 network-cont 97800 0
Active alarms : None
Active defects : None
MAC statistics:
<table>
<thead>
<tr>
<th></th>
<th>Receive</th>
<th>Transmit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total octets</td>
<td>49625962140160</td>
<td>47686985710805</td>
</tr>
<tr>
<td>Total packets</td>
<td>387702829264</td>
<td>372554570944</td>
</tr>
<tr>
<td>Unicast packets</td>
<td>387702829264</td>
<td>372554518472</td>
</tr>
<tr>
<td>Broadcast packets</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Multicast packets</td>
<td>0</td>
<td>52470</td>
</tr>
<tr>
<td>CRC/Align errors</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>FIFO errors</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
MAC control frames 0 0
MAC pause frames 0 0
Oversized frames 0
Jabber frames 0
Fragment frames 0
Code violations 0

Packet Forwarding Engine configuration:
  Destination slot: 6

CoS information:
  Direction : Output
  CoS transmit queue  Bandwidth  Buffer Priority  Limit
  %         bps     %      usec
  0 best-effort    75  7500000000    75           0     low    none
  2 mcast-be       20  2000000000    20           0     low    none
  7 network-cont   5   500000000     5            0     low    none

Logical interface xe-6/0/39.0 (Index 1810) (SNMP ifIndex 2238) (Generation 1923)

Flags: SNMP-Traps 0x0 Encapsulation: ENET2
Traffic statistics:
  Input bytes : 0
  Output bytes : 9375416
  Input packets: 0
  Output packets: 48901
Local statistics:
  Input bytes : 0
  Output bytes : 9375416
  Input packets: 0
  Output packets: 48901
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: 1937, Route table: 0
  Flags: Trunk-Mode
show ipv6 neighbors

Syntax
show ipv6 neighbors

Release Information
Command introduced before Junos OS Release 7.4.
Command introduced in Junos OS Release 9.3 for EX Series switches.

Description
Display information about the IPv6 neighbor cache.

Options
This command has no options.

Required Privilege
view

Related Documentation
• clear ipv6 neighbors on page 202

List of Sample Output
show ipv6 neighbors on page 277
show ipv6 neighbors on page 277

Output Fields
Table 40 on page 277 describes the output fields for the show ipv6 neighbors command. Output fields are listed in the approximate order in which they appear.

Table 40: show ipv6 neighbors Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPv6 Address</td>
<td>Name of the IPv6 interface.</td>
</tr>
<tr>
<td>Linklayer Address</td>
<td>Link-layer address.</td>
</tr>
<tr>
<td>State</td>
<td>State of the link: up, down, incomplete, reachable, stale, or unreachable.</td>
</tr>
<tr>
<td>Exp</td>
<td>Number of seconds until the entry expires.</td>
</tr>
<tr>
<td>Rtr</td>
<td>Whether the neighbor is a routing device: yes or no.</td>
</tr>
<tr>
<td>Secure</td>
<td>Whether this entry was created using the Secure Neighbor Discovery (SEND) protocol: yes or no.</td>
</tr>
<tr>
<td>Interface</td>
<td>Name of the interface.</td>
</tr>
</tbody>
</table>

Sample Output

show ipv6 neighbors  user@host>  show ipv6 neighbors
IPv6 Address Linklayer Address  State  Exp  Rtr  Interface
fe80::2a0:c9ff:fe5b:4c1e 00:a0:c9:5b:4c:1e reachable 15 yes fxp0.0

show ipv6 neighbors  user@host> show ipv6 neighbors
<table>
<thead>
<tr>
<th>IPv6 Address</th>
<th>Linklayer Address</th>
<th>State</th>
<th>Exp Rtr Secure</th>
</tr>
</thead>
<tbody>
<tr>
<td>fe80::14fb:5dce:ff76</td>
<td>00:90:69:a0:a8:bc</td>
<td>stale</td>
<td>1113 yes yes</td>
</tr>
<tr>
<td>ge-3/2/0.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
show lACP interfaces

Syntax show lACP interfaces interface-name

Release Information Command introduced in Junos 10.0 for EX Series switches. Command introduced in Junos OS Release 11.1 for the QFX Series.

Description Display Link Aggregation Control Protocol (LACP) information about the specified aggregated Ethernet or Gigabit Ethernet interface.

Options

- none—Display LACP information for all interfaces.
- interface-name—(Optional) Display LACP information for the specified interface:
  - Aggregated Ethernet—ae
  - Gigabit Ethernet—ge-fpc/pic/port
  - 10-Gigabit Ethernet—xe-fpc/pic/port

Required Privilege Level view

Related Documentation

- Example: Configuring Aggregated Ethernet High-Speed Uplinks Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch on page 21
- Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch on page 27
- Example: Configuring Link Aggregation Between a QFX Series Product and an Aggregation Switch
- Configuring Aggregated Ethernet Interfaces (CLI Procedure) on page 97
- Configuring Link Aggregation
- Configuring Aggregated Ethernet LACP (CLI Procedure) on page 101
- Configuring Aggregated Ethernet LACP
- Understanding Aggregated Ethernet Interfaces and LACP on page 8
- Understanding Aggregated Ethernet Interfaces and LACP
- Junos OS Interfaces Fundamentals Configuration Guide

List of Sample Output

- show lACP interfaces (Aggregated Ethernet) on page 282
- show lACP interfaces (QFX Series) on page 282
- show lACP interfaces (QFabric Switches) on page 282

Output Fields Table 41 on page 280 lists the output fields for the show lACP interfaces command. Output fields are listed in the approximate order in which they appear.
### Table 41: show lacp interfaces Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggregated interface</td>
<td>Aggregated Ethernet interface value.</td>
</tr>
<tr>
<td>LACP State</td>
<td>LACP state information for each aggregated Ethernet interface:</td>
</tr>
<tr>
<td></td>
<td>• For a child interface configured with force-up, LACP state displays FUP along with the interface name.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Role</strong>—Role played by the interface. It can be one of the following:</td>
</tr>
<tr>
<td></td>
<td>• <strong>Actor</strong>—Local device participating in LACP negotiation.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Partner</strong>—Remote device participating in LACP negotiation.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Exp</strong>—Expired state. <strong>Yes</strong> indicates the actor or partner is in an expired state. <strong>No</strong> indicates the actor or partner is not in an expired state.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Def</strong>—Default. <strong>Yes</strong> indicates that the actor’s receive machine is using the default operational partner information, administratively configured for the partner. <strong>No</strong> indicates the operational partner information in use has been received in an LACP PDU.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Dist</strong>—Distribution of outgoing frames. <strong>No</strong> indicates distribution of outgoing frames on the link is currently disabled and is not expected to be enabled. Otherwise, the value is <strong>Yes</strong>.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Col</strong>—Collection of incoming frames. <strong>Yes</strong> indicates collection of incoming frames on the link is currently enabled and is not expected to be disabled. Otherwise, the value is <strong>No</strong>.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Syn</strong>—Synchronization. If the value is <strong>Yes</strong>, 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 <strong>No</strong>, the link is not synchronized. It is currently not in the right aggregation.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Aggr</strong>—Ability of aggregation port to aggregate (<strong>Yes</strong>) or to operate only as an individual link (<strong>No</strong>).</td>
</tr>
<tr>
<td></td>
<td>• <strong>Timeout</strong>—LACP timeout preference. Periodic transmissions of LACP PDUs occur at either a slow or fast transmission rate, depending upon the expressed LACP timeout preference (<strong>Long Timeout</strong> or <strong>Short Timeout</strong>).</td>
</tr>
<tr>
<td></td>
<td>• <strong>Activity</strong>—Actor or partner’s port activity. <strong>Passive</strong> indicates the port’s preference for not transmitting LACP PDUs unless its partner’s control value is <strong>Active</strong>. <strong>Active</strong> indicates the port’s preference to participate in the protocol regardless of the partner’s control value.</td>
</tr>
</tbody>
</table>
Table 41: show lACP interfaces Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LACP Protocol</td>
<td>LACP protocol information for each aggregated interface:</td>
</tr>
<tr>
<td></td>
<td>• Link state (active or standby) indicated in parentheses next to the interface when link protection is configured.</td>
</tr>
<tr>
<td></td>
<td>• Receive State—One of the following values:</td>
</tr>
<tr>
<td></td>
<td>• Current—The state machine receives an LACP PDU and enters the Current state.</td>
</tr>
<tr>
<td></td>
<td>• Defaulted—If no LACP PDU is received before the timer for the Current state expires a second time, the state machine enters the Defaulted state.</td>
</tr>
<tr>
<td></td>
<td>• Expired—If no LACP PDU is received before the timer for the Current state expires once, the state machine enters the Expired state.</td>
</tr>
<tr>
<td></td>
<td>• Initialize—When the physical connectivity of a link changes or a Begin event occurs, the state machine enters the Initialize state.</td>
</tr>
<tr>
<td></td>
<td>• LACP Disabled—If the port is operating in half duplex, the operation of LACP is disabled on the port, forcing the state to LACP Disabled. This state is similar to the Defaulted state, except that the port is forced to operate as an individual port.</td>
</tr>
<tr>
<td></td>
<td>• Port Disabled—If the port becomes inoperable and a Begin event has not occurred, the state machine enters the Port Disabled state.</td>
</tr>
<tr>
<td></td>
<td>• Transmit State—Transmit state of the state machine. One of the following values:</td>
</tr>
<tr>
<td></td>
<td>• Fast Periodic—Periodic transmissions are enabled at a fast transmission rate.</td>
</tr>
<tr>
<td></td>
<td>• No Periodic—Periodic transmissions are disabled.</td>
</tr>
<tr>
<td></td>
<td>• Periodic Timer—Transitory state entered when the periodic timer expires.</td>
</tr>
<tr>
<td></td>
<td>• Slow Periodic—Periodic transmissions are enabled at a slow transmission rate.</td>
</tr>
<tr>
<td></td>
<td>• Mux State—State of the multiplexer state machine for the aggregation port. The state is one of the following values:</td>
</tr>
<tr>
<td></td>
<td>• Attached—Multiplexer state machine initiates the process of attaching the port to the selected aggregator.</td>
</tr>
<tr>
<td></td>
<td>• Collecting—Yes 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. No indicates the receive function of this link is not enabled.</td>
</tr>
<tr>
<td></td>
<td>• Collecting Distributing—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.</td>
</tr>
<tr>
<td></td>
<td>• Detached—Process of detaching the port from the aggregator is in progress.</td>
</tr>
<tr>
<td></td>
<td>• Distributing—Yes 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. No indicates the transmit function of this link is not enabled.</td>
</tr>
<tr>
<td></td>
<td>• Waiting—Multiplexer state machine is in a holding process, awaiting an outcome.</td>
</tr>
<tr>
<td>LACP Statistics</td>
<td>LACP statistics are returned when the extensive option is used and provides the following information:</td>
</tr>
<tr>
<td></td>
<td>• LACP Rx—LACP received counter that increments for each normal hello.</td>
</tr>
<tr>
<td></td>
<td>• LACP Tx—Number of LACP transmit packet errors logged.</td>
</tr>
<tr>
<td></td>
<td>• Unknown Rx—Number of unrecognized packet errors logged.</td>
</tr>
<tr>
<td></td>
<td>• Illegal Rx—Number of invalid packets received.</td>
</tr>
</tbody>
</table>
### Sample Output

**show lacp interfaces**  
_user@host> show lacp interfaces ae0 extensive_

Aggregated interface: ae0  

<table>
<thead>
<tr>
<th>LACP state:</th>
<th>Role</th>
<th>Exp</th>
<th>Def</th>
<th>Dist</th>
<th>Col</th>
<th>Syn</th>
<th>Aggr</th>
<th>Timeout</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>ge-1/0/1FUP</td>
<td>Actor</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Fast</td>
<td>Active</td>
</tr>
<tr>
<td>ge-1/0/1FUP</td>
<td>Partner</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Fast</td>
<td>Passive</td>
</tr>
<tr>
<td>ge-1/0/2</td>
<td>Actor</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Fast</td>
<td>Active</td>
</tr>
<tr>
<td>ge-1/0/2</td>
<td>Partner</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Fast</td>
<td>Passive</td>
</tr>
</tbody>
</table>

LACP protocol:  
- Receive State: CURRENT  
- Transmit State: Fast periodic  
- Mux State: Collecting

<table>
<thead>
<tr>
<th>LACP Statistics:</th>
<th>LACP Rx</th>
<th>LACP Tx</th>
<th>Unknown Rx</th>
<th>Illegal Rx</th>
</tr>
</thead>
<tbody>
<tr>
<td>ge-1/0/1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>ge-1/0/2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**show lacp interfaces**  
_user@switch> show lacp interfaces ae0 extensive_

Aggregated interface: ae0  

<table>
<thead>
<tr>
<th>LACP state:</th>
<th>Role</th>
<th>Exp</th>
<th>Def</th>
<th>Dist</th>
<th>Col</th>
<th>Syn</th>
<th>Aggr</th>
<th>Timeout</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>xe-0/0/1FUP</td>
<td>Actor</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Fast</td>
<td>Active</td>
</tr>
<tr>
<td>xe-0/0/1FUP</td>
<td>Partner</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Fast</td>
<td>Passive</td>
</tr>
<tr>
<td>xe-0/0/2</td>
<td>Actor</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Fast</td>
<td>Active</td>
</tr>
<tr>
<td>xe-0/0/2</td>
<td>Partner</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Fast</td>
<td>Passive</td>
</tr>
</tbody>
</table>

LACP protocol:  
- Receive State: CURRENT  
- Transmit State: Fast periodic  
- Mux State: Collecting

<table>
<thead>
<tr>
<th>LACP Statistics:</th>
<th>LACP Rx</th>
<th>LACP Tx</th>
<th>Unknown Rx</th>
<th>Illegal Rx</th>
</tr>
</thead>
<tbody>
<tr>
<td>xe-0/0/1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>xe-0/0/2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**show lacp interfaces**  
_user@switch> show lacp interfaces nodegroup1:ae0 extensive_

Aggregated interface: nodegroup1:ae0  

<table>
<thead>
<tr>
<th>LACP state:</th>
<th>Role</th>
<th>Exp</th>
<th>Def</th>
<th>Dist</th>
<th>Col</th>
<th>Syn</th>
<th>Aggr</th>
<th>Timeout</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>node1:xe-0/0/1FUP</td>
<td>Actor</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Fast</td>
<td>Active</td>
</tr>
<tr>
<td>node1xe-0/0/1FUP</td>
<td>Partner</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Fast</td>
<td>Passive</td>
</tr>
</tbody>
</table>

LACP protocol:  
- Receive State: CURRENT  
- Transmit State: Fast periodic  
- Mux State: Collecting

<table>
<thead>
<tr>
<th>LACP Statistics:</th>
<th>LACP Rx</th>
<th>LACP Tx</th>
<th>Unknown Rx</th>
<th>Illegal Rx</th>
</tr>
</thead>
<tbody>
<tr>
<td>xe-0/0/1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>xe-0/0/2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Node</td>
<td>Actor</td>
<td>Partner</td>
<td>Receive State</td>
<td>Transmit State</td>
</tr>
<tr>
<td>----------</td>
<td>-------</td>
<td>---------</td>
<td>---------------</td>
<td>----------------</td>
</tr>
<tr>
<td>node2:xe-0/0/2</td>
<td>Yes</td>
<td>Yes</td>
<td>CURRENT</td>
<td>Fast periodic</td>
</tr>
<tr>
<td>node2:xe-0/0/2</td>
<td>No</td>
<td>No</td>
<td>CURRENT</td>
<td>Fast periodic</td>
</tr>
<tr>
<td>node1:xe-0/0/1</td>
<td>Yes</td>
<td>Yes</td>
<td>CURRENT</td>
<td>Fast periodic</td>
</tr>
<tr>
<td>node2:xe-0/0/2 (standby)</td>
<td>Yes</td>
<td>No</td>
<td>CURRENT</td>
<td>Fast periodic</td>
</tr>
</tbody>
</table>

**LACP Statistics:**

<table>
<thead>
<tr>
<th>Node</th>
<th>LACP Rx</th>
<th>LACP Tx</th>
<th>Unknown Rx</th>
<th>Illegal Rx</th>
</tr>
</thead>
<tbody>
<tr>
<td>node1:xe-0/0/1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>node2:xe-0/0/2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
test interface restart-auto-negotiation

Syntax  
test interface restart-auto-negotiation interface-name

Release Information  Command introduced in Junos OS Release 7.6.  
Command introduced in Junos OS Release 9.0 for EX Series switches.

Description  Restarts auto-negotiation on a Fast Ethernet or Gigabit Ethernet interface.

Options  interface-name—Interface name: fe-fpc/pic/port or ge-fpc/pic/port.

Required Privilege  view

List of Sample Output  test interface restart-auto-negotiation on page 284

Output Fields  Use the show interfaces extensive command to see the state for auto-negotiation.

Sample Output  
user@host> test interface restart-auto-negotiation fe-1/0/0