



Junos[®] OS

Layer 2 Bridging Interfaces Feature Guide for Routing Devices

Release

14.1



Published: 2014-05-15

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Junos[®] OS Layer 2 Bridging Interfaces Feature Guide for Routing Devices

14.1

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About the Documentation

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Documentation and Release Notes

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Supported Platforms

For the features described in this document, the following platforms are supported:

- [M Series](#)
- [MX Series](#)
- [T Series](#)
- [J Series](#)

Using the Examples in This Manual

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

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

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

Merging a Full Example

To merge a full example, follow these steps:

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

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

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

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

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

Merging a Snippet

To merge a snippet, follow these steps:

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

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

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

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

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

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

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

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

Documentation Conventions

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

Table 1: Notice Icons







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

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

Table 2: Text and Syntax Conventions

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

GUI Conventions

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

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

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- Document or topic name
- URL or page number
- Software release version (if applicable)

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- Find solutions and answer questions using our Knowledge Base: <http://kb.juniper.net/>
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- Search technical bulletins for relevant hardware and software notifications:
<http://kb.juniper.net/InfoCenter/>
- Join and participate in the Juniper Networks Community Forum:
<http://www.juniper.net/company/communities/>
- Open a case online in the CSC Case Management tool: <http://www.juniper.net/cm/>

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

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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

Overview

- [Layer 2 Bridging Interfaces on page 3](#)

CHAPTER 1

Layer 2 Bridging Interfaces

- [Layer 2 Bridging Interfaces Overview on page 3](#)

Layer 2 Bridging Interfaces Overview

Bridging operates at Layer 2 of the OSI reference model while routing operates at Layer 3. A set of logical ports configured for bridging can be said to constitute a bridging domain.

A bridging domain can be created by configuring a routing instance and specifying the instance-type as **bridge**.

Integrated routing and bridging (IRB) is the ability to:

- Route a packet if the destination MAC address is the MAC address of the router and the packet **ethertype** is IPv4, IPv6, or MPLS.
- Switch all multicast and broadcast packets within a bridging domain at layer 2.
- Route a copy of the packet if the destination MAC address is a multicast address and the **ethertype** is IPv4 or IPv6.
- Switch all other unicast packets at Layer 2.
- Handle supported Layer 2 control packets such as STP and LACP.
- Handle supported Layer 3 control packets such as OSPF and RIP.

Related Documentation

- [Configuring Layer 2 Bridging Interfaces on page 7](#)
- *Ethernet Interfaces*

PART 2

Configuration

- [Layer 2 Bridging Interfaces on page 7](#)
- [Network Interfaces Configuration Statements and Hierarchy on page 17](#)
- [Statement Summary on page 39](#)

CHAPTER 2

Layer 2 Bridging Interfaces

- [Configuring Layer 2 Bridging Interfaces on page 7](#)
- [Example: Configuring the MAC Address of an IRB Interface on page 8](#)

Configuring Layer 2 Bridging Interfaces

You can configure an IRB logical interface at the `[edit interfaces ge-fpc/pic/port unit logical-unit-number]` hierarchy level:

```
[edit interfaces ge-fpc/pic/port]
unit logical-unit-number {
}
```

You can configure Layer 3 information on the IRB logical interface by including the `irb` statement at the `[edit interfaces]` hierarchy level:

```
[edit interfaces]
irb {
  unit logical-unit-number {
    family inet {
      address address {
      }
    }
  }
}
```

For examples of Layer 2 bridging configuration, see the *Junos OS Routing Protocols Library for Routing Devices*.

Example: Configuring Layer 2 Bridging Interfaces

The following example configures an IRB logical interface and Layer 3 information on the interface.

```
[edit interfaces]
ge-1/0/0 {
  unit 0 {
  }
}
irb {
  unit 0 {
    family inet {
```

```
        address 192.168.12.1/28;
    }
}
```

**Related
Documentation**

- [family on page 40](#)
- [unit on page 46](#)
- [Layer 2 Bridging Interfaces Overview on page 3](#)
- [Ethernet Interfaces](#)

Example: Configuring the MAC Address of an IRB Interface

This example shows how to configure the media access control (MAC) address of an integrated routing and bridging (IRB) interface for devices with Modular Port Concentrator (MPC) cards. An IRB interface is a Layer 3 routing interface that is used in a bridge domain or virtual private LAN service (VPLS) routing.

- [Requirements on page 8](#)
- [Overview on page 8](#)
- [Configuration on page 9](#)
- [Verification on page 14](#)

Requirements

This example requires the following hardware and software components:

- MX Series routers with MPC cards.
- Junos OS Release 13.2 or later running on all devices.

Overview

Junos OS Release 13.2 and later support the assignment of MAC addresses to IRB logical interfaces. The IRB logical interfaces provide support for simultaneous Layer 2 bridging and Layer 3 routing within the same bridge domain. Packets that arrive on an interface of the bridge domain are either switched or routed, based on the destination MAC address of the packet. The packets with the router's Layer 2 virtual MAC address, which is manually configured, are switched to Layer 2 interfaces.

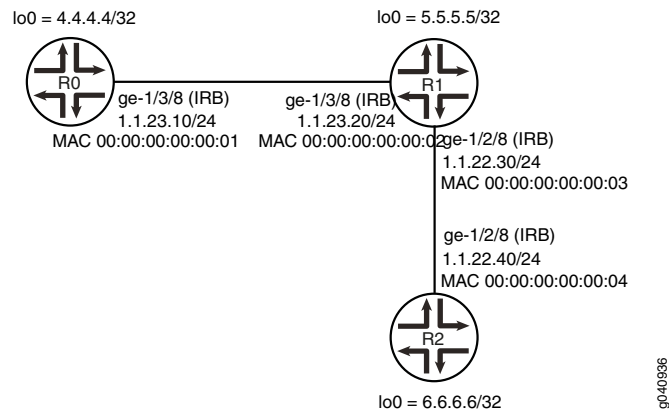
Configuring a MAC address of an IRB logical interface allows the use of a transparent firewall between two VLANs on the same switch. When both VLANs are on the same subnet and traffic from one VLAN needs to go through the firewall to the host on the other VLAN, then the VLAN tag is changed to communicate with the host on the other VLAN.

Before the introduction of this feature, if the MAC address of an IRB logical interface was the same for both VLANs, the firewall dropped the traffic. This new feature allows you to configure distinct MAC addresses for different VLANs, which facilitates the exchange of traffic between two VLANs on the same switch.

In case of VPLS multihoming, if there is a failover of the primary provider edge (PE) router to a secondary PE router, the MAC address of an IRB changes. The hosts connected to the customer edge (CE) router must change their Address Resolution Protocol (ARP) for IRB's IP and MAC address. This feature allows you to configure the same MAC address for IRB interfaces in both the primary and secondary PE routers and eliminates the need for changing the ARP binding of the IRB logical interface in CE routers, in case of a failover.

Figure 1 on page 9 shows the sample topology.

Figure 1: Configuring the MAC Address of an IRB Interface



In this example you configure MAC address of IRB logical interfaces.

Configuration

CLI Quick Configuration To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, and then copy and paste the commands into the CLI at the **[edit]** hierarchy level.

Router R0

```

set interfaces ge-1/3/8 vlan-tagging
set interfaces ge-1/3/8 encapsulation flexible-ethernet-services
set interfaces ge-1/3/8 unit 10 encapsulation vlan-bridge
set interfaces ge-1/3/8 unit 10 vlan-id 10
set interfaces irb unit 10 family inet address 1.1.23.1/24
set interfaces irb unit 10 family mpls
set interfaces irb unit 10 mac 00:00:00:00:00:01
set interfaces lo0 unit 10 family inet address 4.4.4.4/32
set protocols rsvp interface irb.10
set protocols mpls label-switched-path R0-1-R2 to 6.6.6.6
set protocols mpls label-switched-path R0-1-R2 install 6.6.6.6/32 active
set protocols mpls label-switched-path R0-1-R2 no-cspf
set protocols mpls interface irb.10

```

```
set protocols bgp group ibgp type internal
set protocols bgp group ibgp local-address 4.4.4.4
set protocols bgp group ibgp neighbor 6.6.6.6
set protocols ospf area 0.0.0.0 interface irb.10
set protocols ospf area 0.0.0.0 interface lo0.10 passive
set protocols ldp interface irb.10
set protocols ldp interface lo0.10
set routing-options autonomous-system 400
set bridge-domains lsbd1 vlan-id 10
set bridge-domains lsbd1 interface ge-1/3/8.10
set bridge-domains lsbd1 routing-interface irb.10
```

```
Router R1  set interfaces ge-1/3/8 vlan-tagging
            set interfaces ge-1/3/8 encapsulation flexible-ethernet-services
            set interfaces ge-1/3/8 unit 10 encapsulation vlan-bridge
            set interfaces ge-1/3/8 unit 10 vlan-id 10
            set interfaces ge-1/2/8 vlan-tagging
            set interfaces ge-1/2/8 encapsulation flexible-ethernet-services
            set interfaces ge-1/2/8 unit 40 encapsulation vlan-bridge
            set interfaces ge-1/2/8 unit 40 vlan-id 40
            set interfaces irb unit 20 family inet address 1.1.23.2/24
            set interfaces irb unit 20 family mpls
            set interfaces irb unit 20 mac 00:00:00:00:00:02
            set interfaces irb unit 30 family inet address 1.1.22.2/24
            set interfaces irb unit 30 family mpls
            set interfaces irb unit 30 mac 00:00:00:00:00:03
            set interfaces lo0 unit 20 family inet address 5.5.5.5/32
            set protocols rsvp interface irb.20
            set protocols rsvp interface irb.30
            set protocols mpls interface irb.30
            set protocols mpls interface irb.20
            set protocols ospf area 0.0.0.0 interface irb.20
            set protocols ospf area 0.0.0.0 interface irb.30
            set protocols ospf area 0.0.0.0 interface lo0.20 passive
            set protocols ldp interface irb.20
            set protocols ldp interface irb.30
            set protocols ldp interface lo0.20
            set routing-options autonomous-system 400
            set bridge-domains lsbd2 vlan-id 10
            set bridge-domains lsbd2 interface ge-1/3/8.10
            set bridge-domains lsbd2 routing-interface irb.20
            set bridge-domains lsbd3 vlan-id 40
            set bridge-domains lsbd3 interface ge-1/2/8.40
            set bridge-domains lsbd3 routing-interface irb.30
```

```
Router R2  set interfaces ge-1/2/8 vlan-tagging
            set interfaces ge-1/2/8 encapsulation flexible-ethernet-services
            set interfaces ge-1/2/8 unit 40 encapsulation vlan-bridge
            set interfaces ge-1/2/8 unit 40 vlan-id 40
            set interfaces irb unit 40 family inet address 1.1.22.1/24
            set interfaces irb unit 40 family mpls
            set interfaces irb unit 40 mac 00:00:00:00:00:04
            set interfaces lo0 unit 30 family inet address 6.6.6.6/32
            set protocols rsvp interface irb.40
            set protocols mpls label-switched-path R2-1-R0 to 4.4.4.4
```

```

set protocols mpls label-switched-path R2-1-R0 no-cspf
set protocols mpls interface irb.40
set protocols bgp group ibgp type internal
set protocols bgp group ibgp local-address 6.6.6.6
set protocols bgp group ibgp neighbor 4.4.4.4
set protocols ospf area 0.0.0.0 interface irb.40
set protocols ospf area 0.0.0.0 interface lo0.30 passive
set protocols ldp interface irb.40
set protocols ldp interface lo0.30
set routing-options autonomous-system 400
set bridge-domains lsbd4 vlan-id 40
set bridge-domains lsbd4 interface ge-1/2/8.40
set bridge-domains lsbd4 routing-interface irb.40

```

Configuring the MAC Address of an IRB Interface

Step-by-Step Procedure

The following example requires that you navigate various levels in the configuration hierarchy. For information about navigating the CLI, see *Using the CLI Editor in Configuration Mode* in the *CLI User Guide*.



NOTE: Repeat this procedure for Juniper Networks Routers R1 and R2, modifying the appropriate interface names, addresses, and any other parameters for each router.

To configure the MAC address of an IRB interface on Router R0:

1. Configure the physical interfaces.

```

[edit interfaces ge-1/3/8]
user@R0# set vlan-tagging
user@R0# set encapsulation flexible-ethernet-services
user@R0# set unit 10 encapsulation vlan-bridge
user@R0# set unit 10 vlan-id 10

```

2. Configure the IRB logical interface.

```

[edit interfaces irb]
user@R0# set unit 10 family inet address 1.1.23.1/24
user@R0# set unit 10 family mpls
user@R0# set unit 10 mac 00:00:00:00:00:01

[edit interfaces]
user@R0# set lo0 unit 10 family inet address 4.4.4.4/32

```

3. Configure the RSVP protocol.

```

[edit protocols rsvp]
user@R0# set interface irb.10

```

4. Configure the MPLS protocol.

```

[edit protocols mpls]
user@R0# set label-switched-path R0-1-R2 to 6.6.6.6

```

```
user@R0# set label-switched-path R0-1-R2 install 6.6.6.6/32 active
user@R0# set label-switched-path R0-1-R2 no-cspf
user@R0# set interface irb.10
user@R0# set interface irb.10
```

5. Configure the BGP protocol.

```
[edit protocols bgp]
user@R0# set group ibgp type internal
user@R0# set group ibgp local-address 4.4.4.4
user@R0# set group ibgp neighbor 6.6.6.6
```

6. Configure the OSPF protocol.

```
[edit protocols ospf]
user@R0# set area 0.0.0.0 interface irb.10
user@R0# set area 0.0.0.0 interface lo0.10 passive
```

7. Configure the LDP protocol.

```
[edit protocols ldp]
user@R0# set interface irb.10
user@R0# set interface lo0.10
```

8. Configure the autonomous system (AS) number.

```
[edit routing-options]
user@R0# set autonomous-system 400
```

9. Configure the bridge domains.

```
[edit]
user@R0# set bridge-domains lsbd1 vlan-id 10
user@R0# set bridge-domains lsbd1 interface ge-1/3/8.10
user@R0# set bridge-domains lsbd1 routing-interface irb.10
```

Results

From configuration mode, enter the **show interfaces**, **show protocols** and **show bridge-domains**, commands and confirm your configuration. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

```
user@R0# show interfaces
ge-1/3/8 {
  unit 10 {
    encapsulation vlan-bridge;
    vlan-id 10;
  }
}
irb {
  unit 10 {
    family inet {
      mtu 1450;
      address 1.1.1.1/24;
      address 1.1.23.1/24;
    }
    family mpls;
  }
}
```

```

        mac 00:00:00:00:00:01;
    }
}
lo0 {
    unit 10 {
        family inet {
            address 4.4.4.4/32;
        }
    }
}
user@R0# show protocols
rsvp {
    interface irb.10;
}
mpls {
    label-switched-path R0-1-R2 {
        to 6.6.6.6;
        install 6.6.6.6/32 active;
        no-cspf;
    }
    interface irb.10;
}
bgp {
    group ibgp {
        type internal;
        local-address 4.4.4.4;
        neighbor 6.6.6.6;
    }
}
ospf {
    area 0.0.0.0 {
        interface irb.10;
        interface lo0.10 {
            passive;
        }
    }
}
ldp {
    interface irb.10;
    interface lo0.10;
}
user@R0# show bridge-domains
lsbd1 {
    vlan-id 10;
    interface ge-1/3/8.10;
    routing-interface irb.10;
}

```

If you are done configuring the devices, commit the configuration.

```
user@host# commit
```

Verification

Confirm that the configuration is working properly.

- [Verifying the MAC Address of the IRB Interface on page 14](#)

Verifying the MAC Address of the IRB Interface

Purpose Verify that the specified MAC address is assigned to the IRB interface.

Action From operational mode, run the **show interfaces irb** command on the device.

```
user@host# show interfaces irb
```

```
Physical interface: irb, Enabled, Physical link is Up
Interface index: 132, SNMP ifIndex: 505
Type: Ethernet, Link-level type: Ethernet, MTU: 1514
Device flags : Present Running
Interface flags: SNMP-Traps
Link type : Full-Duplex
Link flags : None
Current address: 80:71:1f:c2:58:f0, Hardware address: 80:71:1f:c2:58:f0
Last flapped : Never
Input packets : 0
Output packets: 0
```

```
Logical interface irb.10 (Index 326) (SNMP ifIndex 634)
Flags: SNMP-Traps 0x0 Encapsulation: ENET2
MAC: 00:00:00:00:00:01
Bandwidth: 1000mbps
Routing Instance: LS1/default Bridging Domain: lsbd1+10
Input packets : 55202
Output packets: 69286
Protocol inet, MTU: 1450
  Flags: Sendbcst-pkt-to-re, Is-Primary, User-MTU
  Addresses, Flags: Is-Preferred Is-Primary
    Destination: 1.1.1/24, Local: 1.1.1.1, Broadcast: 1.1.1.255
  Addresses, Flags: Is-Preferred
    Destination: 1.1.23/24, Local: 1.1.23.1, Broadcast: 1.1.23.255
Protocol mpls, MTU: 1500, Maximum labels: 3
  Flags: Is-Primary
Protocol multiservice, MTU: 1500
```

```
Logical interface irb.20 (Index 358) (SNMP ifIndex 635)
Flags: SNMP-Traps 0x0 Encapsulation: ENET2
MAC: 00:00:00:00:00:02
Bandwidth: 1000mbps
Routing Instance: LS2/default Bridging Domain: lsbd2+10
Input packets : 66044
Output packets: 68464
Protocol inet, MTU: 1450
  Flags: Sendbcst-pkt-to-re, Is-Primary, User-MTU
  Addresses, Flags: Is-Preferred Is-Primary
    Destination: 1.1.1/24, Local: 1.1.1.2, Broadcast: 1.1.1.255
  Addresses, Flags: Is-Preferred
    Destination: 1.1.23/24, Local: 1.1.23.2, Broadcast: 1.1.23.255
Protocol mpls, MTU: 1500, Maximum labels: 3
  Flags: Is-Primary
Protocol multiservice, MTU: 1500
```

```
Logical interface irb.30 (Index 360) (SNMP ifIndex 636)
Flags: SNMP-Traps 0x0 Encapsulation: ENET2
MAC: 00:00:00:00:00:03
Bandwidth: 1000mbps
Routing Instance: LS2/default Bridging Domain: lsbd3+40
Input packets : 26948
Output packets: 53605
Protocol inet, MTU: 1500
  Flags: Sendbcst-pkt-to-re
  Addresses, Flags: Is-Preferred Is-Primary
```

```
      Destination: 1.1.22/24, Local: 1.1.22.2, Broadcast: 1.1.22.255
      Addresses, Flags: Is-Preferred
      Destination: 2.2.2/24, Local: 2.2.2.1, Broadcast: 2.2.2.255
      Protocol mpls, MTU: 1500, Maximum labels: 3
      Protocol multiservice, MTU: 1500

Logical interface irb.40 (Index 355) (SNMP ifIndex 632)
  Flags: SNMP-Traps 0x0 Encapsulation: ENET2
  MAC: 00:00:00:00:00:04
  Bandwidth: 1000mbps
  Routing Instance: LS3/default Bridging Domain: lsbd4+40
  Input packets : 40575
  Output packets: 31128
  Protocol inet, MTU: 1500
    Flags: Sendbcst-pkt-to-re, Is-Primary
    Addresses, Flags: Is-Preferred Is-Primary
      Destination: 1.1.22/24, Local: 1.1.22.1, Broadcast: 1.1.22.255
    Protocol mpls, MTU: 1500, Maximum labels: 3
    Flags: Is-Primary
    Protocol multiservice, MTU: 1500
```

Meaning The output shows the manually configured MAC address in the MAC field.



NOTE: If you did not configure the MAC address for a logical interface, the output does not include this value. However, the device uses the MAC address of the physical interface during data transmission.

- Related Documentation**
- [mac on page 45](#)
 - *Active-Active Bridging and VRRP over IRB Functionality on MX Series Routers Overview*

CHAPTER 3

Network Interfaces Configuration Statements and Hierarchy

- [\[edit interfaces\] Hierarchy Level on page 17](#)
- [\[edit logical-systems\] Hierarchy Level on page 33](#)

[\[edit interfaces\] Hierarchy Level](#)

The statements at the `[edit interfaces interface-name unit logical-unit-number]` hierarchy level can also be configured at the `[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number]` hierarchy level.



NOTE: The *accounting-profile* statement is an exception to this rule. The *accounting-profile* statement can be configured at the `[edit interfaces interface-name unit logical-unit-number]` hierarchy level, but it cannot be configured at the `[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number]` hierarchy level.

```
interfaces {
  traceoptions {
    file filename <files number> <match regular-expression> <size size> <world-readable |
      no-world-readable> ;
    flag flag <disable>;
  }
  interface-name {
    accounting-profile name;
    aggregated-ether-options {
      (flow-control | no-flow-control);
      lacp {
        (active | passive);
        link-protection {
          disable;
          (revertive | non-revertive);
          periodic interval;
          system-priority priority;
        }
      }
      link-protection;
      link-speed speed;
```

```
(loopback | no-loopback);
mc-ae{
  chassis-id chassis-id;
  mc-ae-id mc-ae-id;
  mode (active-active | active-standby);
  redundancy-group group-id;
  status-control (active | standby);
}
minimum-links number;
source-address-filter {
  mac-address;
}
(source-filtering | no-source-filtering);
}
shared-scheduler;
aggregated-sonet-options {
  link-speed speed | mixed;
  minimum-links number;
}
atm-options {
  cell-bundle-size cells;
  ilmi;
  linear-red-profiles profile-name {
    high-plp-max-threshold percent;
    low-plp-max-threshold percent;
    queue-depth cells high-plp-threshold percent low-plp-threshold percent;
  }
}
mpls {
  pop-all-labels {
    required-depth number;
  }
}
pic-type (atm1 | atm2);
plp-to-clp;
promiscuous-mode {
  vpi vpi-identifier;
}
scheduler-maps map-name {
  forwarding-class class-name {
    epd-threshold cells plp1 cells;
    linear-red-profile profile-name;
    priority (high | low);
    transmit-weight (cells number | percent number);
  }
  vc-cos-mode (alternate | strict);
}
use-null-cw;
vpi vpi-identifier {
  maximum-vcs maximum-vcs;
  oam-liveness {
    down-count cells;
    up-count cells;
  }
  oam-period (seconds | disable);
  shaping {
```

```

        (cbr rate | rtvbr peak rate sustained rate burst length | vbr peak rate sustained rate
         burst length);
        queue-length number;
    }
}
clocking clock-source;
damping {
    enable;
    half-life seconds;
    max-suppress seconds;
    reuse number;
    suppress number;
}
data-input (system | interface interface-name);
dce;
serial-options {
    clock-rate rate;
    clocking-mode (dce | internal | loop);
    control-polarity (negative | positive);
    cts-polarity (negative | positive);
    dcd-polarity (negative | positive);
    dce-options {
        control-signal (assert | de-assert | normal);
        cts (ignore | normal | require);
        dcd (ignore | normal | require);
        dsr (ignore | normal | require);
        dtr signal-handling-option;
        ignore-all;
        indication (ignore | normal | require);
        rts (assert | de-assert | normal);
        tm (ignore | normal | require);
    }
    dsr-polarity (negative | positive);
    dte-options {
        control-signal (assert | de-assert | normal);
        cts (ignore | normal | require);
        dcd (ignore | normal | require);
        dsr (ignore | normal | require);
        dtr signal-handling-option;
        ignore-all;
        indication (ignore | normal | require);
        rts (assert | de-assert | normal);
        tm (ignore | normal | require);
    }
    dtr-circuit (balanced | unbalanced);
    dtr-polarity (negative | positive);
    encoding (nrz | nrzi);
    indication-polarity (negative | positive);
    line-protocol protocol;
    loopback mode;
    rts-polarity (negative | positive);
    tm-polarity (negative | positive);
    transmit-clock invert;
}
description text;

```

```
alias alias-name;
dialer-options {
    pool pool-name <priority priority>;
}
disable;
ds0-options {
    bert-algorithm algorithm;
    bert-error-rate rate;
    bert-period seconds;
    byte-encoding (nx56 | nx64);
    fcs (16 | 32);
    idle-cycle-flag (flags | ones);
    invert-data;
    loopback payload;
    start-end-flag (filler | shared);
}
e1-options {
    bert-error-rate rate;
    bert-period seconds;
    fcs (16 | 32);
    framing (g704 | g704-no-crc4 | unframed);
    idle-cycle-flag (flags | ones);
    invert-data;
    loopback (local | remote);
    start-end-flag (filler | shared);
    timeslots time-slot-range;
}
e3-options {
    atm-encapsulation (direct | plcp);
    bert-algorithm algorithm;
    bert-error-rate rate;
    bert-period seconds;
    framing feet;
    compatibility-mode (digital-link | kentrox | larscom) <subrate value>;
    fcs (16 | 32);
    framing (g.751 | g.832);
    idle-cycle-flag (filler | shared);
    invert-data;
    loopback (local | remote);
    (payload-scrambler | no-payload-scrambler);
    start-end-flag (filler | shared);
    (unframed | no-unframed);
}
encapsulation type;
es-options {
    backup-interface es-fpc/pic/port;
}
fastether-options {
    802.3ad aex;
    (flow-control | no-flow-control);
    ignore-l3-incompletes;
    ingress-rate-limit rate;
    (loopback | no-loopback);
    mpls {
        pop-all-labels {
            required-depth number;
        }
    }
}
```

```

    }
  }
  source-address-filter {
    mac-address;
  }
  (source-filtering | no-source-filtering);
}
flexible-vlan-tagging;
gigether-options {
  802.3ad aex;
  (asynchronous-notification | no-asynchronous-notification);
  (auto-negotiation | no-auto-negotiation) remote-fault <local-interface-online |
    local-interface-offline>;
  auto-reconnect seconds;
  (flow-control | no-flow-control);
  ignore-l3-incompletes;
  (loopback | no-loopback);
  mpls {
    pop-all-labels {
      required-depth number;
    }
  }
  no-auto-mdix;
  source-address-filter {
    mac-address;
  }
  (source-filtering | no-source-filtering);
  ethernet-switch-profile {
    (mac-learn-enable | no-mac-learn-enable);
    tag-protocol-id [ tpids ];
    ethernet-policer-profile {
      input-priority-map {
        ieee802.1p premium [ values ];
      }
      output-priority-map {
        classifier {
          premium {
            forwarding-class class-name {
              loss-priority (high | low);
            }
          }
        }
      }
    }
  }
  policer cos-policer-name {
    aggregate {
      bandwidth-limit bps;
      burst-size-limit bytes;
    }
    premium {
      bandwidth-limit bps;
      burst-size-limit bytes;
    }
  }
}
}
}
}

```

```
(gratuitous-arp-reply | no-gratuitous-arp-reply);
hold-time up milliseconds down milliseconds;
ima-group-options {
    differential-delay number;
    frame-length (32 | 64 | 128 | 256);
    frame-synchronization {
        alpha number;
        beta number;
        gamma number;
    }
    minimum-links number;
    symmetry (symmetrical-config-and-operation |
        symmetrical-config-asymmetrical-operation);
    test-procedure {
        ima-test-start;
        ima-test-stop;
        interface name;
        pattern number;
        period number;
    }
    transmit-clock (common | independent);
    version (1.0 | 1.1);
}
ima-link-options group-id group-id;
interface-set interface-set-name {
    interface ethernet-interface-name {
        (unit unit-number | vlan-tags-outer vlan-tag);
    }
    interface interface-name {
        (unit unit-number);
    }
}
isdn-options {
    bchannel-allocation (ascending | descending);
    calling-number number;
    pool pool-name <priority priority>;
    spid1 spid-string;
    spid2 spid-string;
    static-tei-val value;
    switch-type (att5e | etsi | nil | ntdms100 | ntt);
    t310 seconds;
    tei-option (first-call | power-up);
}
keepalives <down-count number> <interval seconds> <up-count number>;
link-mode mode;
lmi {
    lmi-type (ansi | itu | c-lmi);
    n391dte number;
    n392dce number;
    n392dte number;
    n393dce number;
    n393dte number;
    t391dte seconds;
    t392dce seconds;
}
lsq-failure-options {
```

```

no-termination-request;
[ trigger-link-failure interface-name ];
}
mac mac-address;
mlfr-uni-nni-bundle-options {
    acknowledge-retries number;
    acknowledge-timer milliseconds;
    action-red-differential-delay (disable-tx | remove-link);
    drop-timeout milliseconds;
    fragment-threshold bytes;
    cisco-interoperability send-lip-remove-link-for-link-reject;
    hello-timer milliseconds;
    link-layer-overhead percent;
    lmi-type (ansi | itu | c-lmi);
    minimum-links number;
    mrru bytes;
    n391 number;
    n392 number;
    n393 number;
    red-differential-delay milliseconds;
    t391 seconds;
    t392 seconds;
    yellow-differential-delay milliseconds;
}
modem-options {
    dialin (console | routable);
    init-command-string initialization-command-string;
}
mtu bytes;
multi-chassis-protection {
    peer a.b.c.d {
        interface interface-name;
    }
}
multiservice-options {
    (core-dump | no-core-dump);
    (syslog | no-syslog);
}
native-vlan-id number;
no-gratuitous-arp-request;
no-keepalives;
no-partition {
    interface-type type;
}
no-vpivci-swapping;
otn-options {
    fec (efec | gfec | none);
    (laser-enable | no-laser-enable);
    (line-loopback | no-line-loopback);
    pass-thru;
    rate (fixed-stuff-bytes | no-fixed-stuff-bytes | pass-thru);
    transmit-payload-type number;
    trigger (oc-lof | oc-lom | oc-los | oc-wavelength-lock | odu-ais | odu-bbe-th | odu-bdi
        | odu-es-th | odu-lck | odu-oci | odu-sd | odu-ses-th | odu-ttim | odu-uas-th |
        opu-ptm | otu-ais | otu-bbe-th | otu-bdi | otu-es-th | otu-fec-deg | otu-fec-exe |
        otu-iae | otu-sd | otu-ses-th | otu-ttim | otu-uas-th);
}

```

```
tti;
}
optics-options {
  wavelength nm;
  alarm alarm-name {
    (syslog | link-down);
  }
  warning warning-name {
    (syslog | link-down);
  }
}
partition partition-number oc-slice oc-slice-range interface-type type;
timeslots time-slot-range;
passive-monitor-mode;
per-unit-scheduler;
ppp-options {
  chap {
    access-profile name;
    default-chap-secret name;
    local-name name;
    passive;
  }
  compression {
    acfc;
    pfc;
  }
  dynamic-profile profile-name;
  no-termination-request;
  pap {
    access-profile name;
    local-name name;
    local-password password;
    compression;
  }
}
psn-vcip psn-vci-identifier;
psn-vpip psn-vpi-identifier;
receive-bucket {
  overflow (discard | tag);
  rate percentage;
  threshold bytes;
}
redundancy-options {
  priority sp-fpc/pic/port;
  secondary sp-fpc/pic/port;
  hot-standby;
}
satop-options {
  payload-size n;
}
schedulers number;
serial-options {
  clock-rate rate;
  clocking-mode (dce | internal | loop);
  control-polarity (negative | positive);
  cts-polarity (negative | positive);
```

```

dcd-polarity (negative | positive);
dce-options {
    control-signal (assert | de-assert | normal);
    cts (ignore | normal | require);
    dcd (ignore | normal | require);
    dsr (ignore | normal | require);
    dtr signal-handling-option;
    ignore-all;
    indication (ignore | normal | require);
    rts (assert | de-assert | normal);
    tm (ignore | normal | require);
}
dsr-polarity (negative | positive);
dte-options {
    control-signal (assert | de-assert | normal);
    cts (ignore | normal | require);
    dcd (ignore | normal | require);
    dsr (ignore | normal | require);
    dtr signal-handling-option;
    ignore-all;
    indication (ignore | normal | require);
    rts (assert | de-assert | normal);
    tm (ignore | normal | require);
}
dtr-circuit (balanced | unbalanced);
dtr-polarity (negative | positive);
encoding (nrz | nrzi);
indication-polarity (negative | positive);
line-protocol protocol;
loopback mode;
rts-polarity (negative | positive);
tm-polarity (negative | positive);
transmit-clock invert;
}
services-options {
    inactivity-timeout seconds;
    open-timeout seconds;
    session-limit {
        maximum number;
        rate new-sessions-per-second;
    }
    syslog {
        host hostname {
            facility-override facility-name;
            log-prefix prefix-number;
            services priority-level;
        }
    }
}
shdsl-options {
    annex (annex-a | annex-b);
    line-rate line-rate;
    loopback (local | remote);
    snr-margin {
        current margin;
        snext margin;
    }
}

```

```

    }
  }
  sonet-options {
    aggregate asx;
    aps {
      advertise-interval milliseconds;
      annex-b;
      authentication-key key;
      fast-aps-switch;
      force;
      hold-time milliseconds;
      lockout;
      neighbor address;
      paired-group group-name;
      preserve-interface;
      protect-circuit group-name;
      request;
      revert-time seconds;
      switching-mode (bidirectional | unidirectional);
      working-circuit group-name;
    }
    bytes {
      c2 value;
      e1-quiet value;
      f1 value;
      f2 value;
      s1 value;
      z3 value;
      z4 value;
    }
    fcs (16 | 32);
    loopback (local | remote);
    mpls {
      pop-all-labels {
        required-depth number;
      }
    }
    path-trace trace-string;
    (payload-scrambler | no-payload-scrambler);
    rfc-2615;
    trigger {
      defect ignore;
      hold-time up milliseconds down milliseconds;
    }
    vtmapping (itu-t | klm);
    (z0-increment | no-z0-increment);
  }
  speed (10m | 100m | 1g | oc3 | oc12 | oc48);
  stacked-vlan-tagging;
  switch-options {
    switch-port port-number {
      (auto-negotiation | no-auto-negotiation);
      speed (10m | 100m | 1g);
      link-mode (full-duplex | half-duplex);
    }
  }
}

```

```

t1-options {
    bert-algorithm algorithm;
    bert-error-rate rate;
    bert-period seconds;
    buildout value;
    byte-encoding (nx56 | nx64);
    crc-major-alarm-threshold (1e-3 | 5e-4 | 1e-4 | 5e-5 | 1e-5);
    crc-minor-alarm-threshold (1e-3 | 5e-4 | 1e-4 | 5e-5 | 1e-5 | 5e-6 | 1e-6);
    fcs (16 | 32);
    framing (esf | sf);
    idle-cycle-flag (flags | ones);
    invert-data;
    line-encoding (ami | b8zs);
    loopback (local | payload | remote);
    remote-loopback-respond;
    start-end-flag (filler | shared);
    timeslots time-slot-range;
}
t3-options {
    atm-encapsulation (direct | plcp);
    bert-algorithm algorithm;
    bert-error-rate rate;
    bert-period seconds;
    buildout feet;
    (cbit-parity | no-cbit-parity);
    compatibility-mode (adtran | digital-link | kentrox | larscom | verilink) <subrate
        value>;
    fcs (16 | 32);
    (feac-loop-respond | no-feac-loop-respond);
    idle-cycle-flag value;
    (long-buildout | no-long-buildout);
    (loop-timing | no-loop-timing);
    loopback (local | payload | remote);
    (mac | no-mac);
    (payload-scrambler | no-payload-scrambler);
    start-end-flag (filler | shared);
}
traceoptions {
    flag flag <flag-modifier> <disable>;
}
transmit-bucket {
    overflow discard;
    rate percentage;
    threshold bytes;
}
(traps | no-traps);
unidirectional;
vlan-tagging;
vlan-vci-tagging;
unit logical-unit-number {
    accept-source-mac {
        mac-address mac-address {
            policer {
                input cos-policer-name;
                output cos-policer-name;
            }
        }
    }
}

```

```
    }
  }
  accounting-profile name;
  advisory-options {
    downstream-rate rate;
    upstream-rate rate;
  }
  allow-any-vci;
  atm-scheduler-map (map-name | default);
  backup-options {
    interface interface-name;
  }
  bandwidth rate;
  cell-bundle-size cells;
  clear-dont-fragment-bit;
  compression {
    rtp {
      f-max-period number;
      maximum-contexts number <force>;
      queues [ queue-numbers ];
      port {
        minimum port-number;
        maximum port-number;
      }
    }
  }
}
compression-device interface-name;
copy-tos-to-outer-ip-header;
demux-destination family;
demux-source family;
demux-options {
  underlying-interface interface-name;
}
description text;
alias alias-name;
interface {
  l2tp-interface-id name;
  (dedicated | shared);
}
dialer-options {
  activation-delay seconds;
  callback;
  callback-wait-period time;
  deactivation-delay seconds;
  dial-string [ dial-string-numbers ];
  idle-timeout seconds;
  incoming-map {
    caller (caller-id | accept-all);
    initial-route-check seconds;
    load-interval seconds;
    load-threshold percent;
    pool pool-name;
    redial-delay time;
    watch-list {
      [ routes ];
    }
  }
}
```

```

    }
}
disable;
disable-mlppp-inner-ppp-pfc;
dlci dlci-identifier;
drop-timeout milliseconds;
dynamic-call-admission-control {
    activation-priority priority;
    bearer-bandwidth-limit kilobits-per-second;
}
encapsulation type;
epd-threshold cells plp1 cells;
fragment-threshold bytes;
inner-vlan-id-range start start-id end end-id;
input-vlan-map {
    (pop | pop-pop | pop-swap | push | push-push | swap | swap-push | swap-swap);
    inner-tag-protocol-id tpid;
    inner-vlan-id number;
    tag-protocol-id tpid;
    vlan-id number;
}
interleave-fragments;
inverse-arp;
layer2-policer {
    input-policer policer-name;
    input-three-color policer-name;
    output-policer policer-name;
    output-three-color policer-name;
}
link-layer-overhead percent;
minimum-links number;
mrru bytes;
multicast-dlci dlci-identifier;
multicast-vci vpi-identifier.vci-identifier;
multilink-max-classes number;
multipoint;
oam-liveness {
    down-count cells;
    up-count cells;
}
oam-period (seconds | disable);
output-vlan-map {
    (pop | pop-pop | pop-swap | push | push-push | swap | swap-push | swap-swap);
    inner-tag-protocol-id tpid;
    inner-vlan-id number;
    tag-protocol-id tpid;
    vlan-id number;
}
passive-monitor-mode;
peer-unit unit-number;
plp-to-clp;
point-to-point;
ppp-options {
    chap {
        access-profile name;
        default-chap-secret name;
    }
}

```

```
    local-name name;  
    passive;  
}  
compression {  
    acfc;  
    pfc;  
    pap;  
    default-pap-password password;  
    local-name name;  
    local-password password;  
    passive;  
}  
dynamic-profile profile-name;  
lcp-max-conf-req number;  
lcp-restart-timer milliseconds;  
loopback-clear-timer seconds;  
ncp-max-conf-req number;  
ncp-restart-timer milliseconds;  
}  
pppoe-options {  
    access-concentrator name;  
    auto-reconnect seconds;  
    (client | server);  
    service-name name;  
    underlying-interface interface-name;  
}  
proxy-arp;  
service-domain (inside | outside);  
shaping {  
    (cbr rate | rtvbr peak rate sustained rate burst length | vbr peak rate sustained rate  
    burst length);  
    queue-length number;  
}  
short-sequence;  
transmit-weight number;  
(traps | no-traps);  
trunk-bandwidth rate;  
trunk-id number;  
tunnel {  
    backup-destination address;  
    destination address;  
    key number;  
    routing-instance {  
        destination routing-instance-name;  
    }  
    source source-address;  
    ttl number;  
}  
vci vpi-identifier.vci-identifier;  
vci-range start start-vci end end-vci;  
vpi vpi-identifier;  
vlan-id number;  
vlan-id-list [vlan-id vlan-id-vlan-id];  
vlan-id-range number-number;  
vlan-tags inner tpid.vlan-id outer tpid.vlan-id;  
vlan-tags-outer tpid.vlan-id inner-list [vlan-id vlan-id-vlan-id];
```

```

family family {
  accounting {
    destination-class-usage;
    source-class-usage {
      direction;
    }
  }
  access-concentrator name;
  address address {
    destination address;
  }
  bundle ml-fpc/pic/port | ls-fpc/pic/port);
  direct-connect;
  duplicate-protection;
  dynamic-profile profile-name;
  filter {
    group filter-group-number;
    input filter-name;
    input-list {
      [ filter-names ];
      output filter-name;
    }
    output-list {
      [ filter-names ];
    }
  }
  ipsec-sa sa-name;
  keep-address-and-control;
  max-sessions number;
  max-sessions-vsa-ignore;
  mtu bytes;
  multicast-only;
  negotiate-address;
  no-redirects;
  policer {
    arp policer-template-name;
    disable-arp-policer
    input policer-template-name;
    output policer-template-name;
  }
  primary;
  proxy inet-address address;
  receive-options-packets;
  receive-ttl-exceeded;
  remote (inet-address address | mac-address address);
  rpf-check {
    fail-filter filter-name;
    mode loose;
  }
  sampling {
    direction;
  }
  service {
    input {
      service-set service-set-name <service-filter filter-name>;
      post-service-filter filter-name;
    }
  }
}

```

```

    }
    output {
        service-set service-set-names <service-filter filter-name>;
    }
}
service-name-table table-name;
short-cycle-protection <lockout-time-min minimum-seconds lockout-time-max
    maximum-seconds>;
targeted-broadcast {
    forward-and-send-to-re;
    forward-only;
}
(translate-discard-eligible | no-translate-discard-eligible);
(translate-fecn-and-becn | no-translate-fecn-and-becn);
translate-plp-control-word-de;
unnumbered-address interface-name <destination address destination-profile
    profile-name | preferred-source-address address>;
address address {
    arp ip-address (mac | multicast-mac) mac-address <publish>;
    broadcast address;
    destination address;
    destination-profile name;
    eui-64;
    multipoint-destination address (dlci dlci-identifier | vci vci-identifier);
    multipoint-destination address {
        epd-threshold cells plp1 cells;
        inverse-arp;
        oam-liveness {
            up-count cells;
            down-count cells;
        }
        oam-period (seconds | disable);
        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;
    }
    preferred;
    primary;
    (vrp-group | vrp-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 {
            bandwidth-threshold bits-per-second {
                priority;
            }
        }
    }
}

```

```

    }
    interface priority;
  }
  route ip-address/mask routing-instance instance-name priority-cost cost;
}
virtual-address [ addresses ];
}
}
}
}
}
}
}
}

```

Related Documentation

- *Junos OS Hierarchy and RFC Reference*
- *Ethernet Interfaces*
- *Junos OS Network Interfaces Library for Routing Devices*

[edit logical-systems] Hierarchy Level

The following lists the statements that can be configured at the **[edit logical-systems]** hierarchy level that are also documented in this manual. For more information about logical systems, see the *Logical Systems Feature Guide for Routing Devices*.

```

logical-systems logical-system-name {
  interfaces interface-name {
    unit logical-unit-number {
      accept-source-mac {
        mac-address mac-address {
          policer {
            input cos-policer-name;
            output cos-policer-name;
          }
        }
      }
    }
  }
  allow-any-vci;
  atm-scheduler-map (map-name | default);
  bandwidth rate;
  backup-options {
    interface interface-name;
  }
  cell-bundle-size cells;
  clear-dont-fragment-bit;
  compression {
    rtp {
      f-max-period number;
      port {
        minimum port-number;
        maximum port-number;
      }
      queues [ queue-numbers ];
    }
  }
  compression-device interface-name;
}

```

```
description text;  
interface {  
    l2tp-interface-id name;  
    (dedicated | shared);  
}  
dialer-options {  
    activation-delay seconds;  
    deactivation-delay seconds;  
    dial-string [ dial-string-numbers ];  
    idle-timeout seconds;  
    initial-route-check seconds;  
    load-threshold number;  
    pool pool;  
    remote-name remote-callers;  
    watch-list {  
        [ routes ];  
    }  
}  
disable;  
dlci dlci-identifier;  
drop-timeout milliseconds;  
dynamic-call-admission-control {  
    activation-priority priority;  
    bearer-bandwidth-limit kilobits-per-second;  
}  
encapsulation type;  
epd-threshold cells plp1 cells;  
fragment-threshold bytes;  
input-vlan-map {  
    inner-tag-protocol-id;  
    inner-vlan-id;  
    (pop | pop-pop | pop-swap | push | push-push | swap | swap-push | swap-swap);  
    tag-protocol-id tpid;  
    vlan-id number;  
}  
interleave-fragments;  
inverse-arp;  
layer2-policer {  
    input-policer policer-name;  
    input-three-color policer-name;  
    output-policer policer-name;  
    output-three-color policer-name;  
}  
link-layer-overhead percent;  
minimum-links number;  
mrru bytes;  
multicast-dlci dlci-identifier;  
multicast-vci vpi-identifier.vci-identifier;  
multilink-max-classes number;  
multipoint;  
oam-liveness {  
    up-count cells;  
    down-count cells;  
}  
oam-period (seconds | disable);  
output-vlan-map {
```

```

    inner-tag-protocol-id;
    inner-vlan-id;
    (pop | pop-pop | pop-swap | push | push-push | swap | swap-swap);
    tag-protocol-id tpid;
    vlan-id number;
}
passive-monitor-mode;
peer-unit unit-number;
plp-to-clp;
point-to-point;
ppp-options {
    chap {
        access-profile name;
        default-chap-secret name;
        local-name name;
        passive;
    }
    compression {
        acfc;
        pfc;
    }
}
dynamic-profile profile-name;
pap {
    default-pap-password password;
    local-name name;
    local-password password;
    passive;
}
}
proxy-arp;
service-domain (inside | outside);
shaping {
    (cbr rate | rtvbr peak rate sustained rate burst length | vbr peak rate sustained rate
    burst length);
    queue-length number;
}
short-sequence;
transmit-weight number;
(traps | no-traps);
trunk-bandwidth rate;
trunk-id number;
tunnel {
    backup-destination address;
    destination address;
    key number;
    routing-instance {
        destination routing-instance-name;
    }
    source source-address;
    ttl number;
}
vci vpi-identifier.vci-identifier;
vlan-id number;
vlan-id-list [vlan-id vlan-id-vlan-id]
vlan-tags inner tpid.vlan-id outer tpid.vlan-id;

```

```

vlan-tags outer tpid.vlan-id inner-list [vlan-id vlan-id--vlan-id]
vpi vpi-identifier;
family family {
    accounting {
        destination-class-usage;
        source-class-usage {
            direction;
        }
    }
}
bundle interface-name;
filter {
    group filter-group-number;
    input filter-name;
    input-list {
        [ filter-names ];
    }
    output filter-name;
    output-list {
        [ filter-names ];
    }
}
ipsec-sa sa-name;
keep-address-and-control;
mtu bytes;
multicast-only;
no-redirects;
policer {
    arp policer-template-name;
    input policer-template-name;
    output policer-template-name;
}
primary;
proxy inet-address address;
receive-options-packets;
receive-ttl-exceeded;
remote (inet-address address | mac-address address);
rpf-check <fail-filter filter-name> {
    <mode loose>;
}
sampling {
    direction;
}
service {
    input {
        service-set service-set-name <service-filter filter-name>;
        post-service-filter filter-name;
    }
    output {
        service-set service-set-name <service-filter filter-name>;
    }
}
(translate-discard-eligible | no-translate-discard-eligible);
(translate-fecn-and-becn | no-translate-fecn-and-becn);
unnumbered-address interface-name destination address destination-profile
    profile-name;
address address {

```

Documentation

- *Ethernet Interfaces*

CHAPTER 4

Statement Summary

- [family](#) on page 40
- [fast-aps-switch](#) on page 44
- [mac \(IRB\)](#) on page 45
- [unit](#) on page 46

family

Syntax family *family* {
 accounting {
 destination-class-usage;
 source-class-usage {
 (input | output | input output);
 }
 }
 access-concentrator *name*;
 address *address* {
 ... *the address subhierarchy appears after the main* [edit interfaces *interface-name* unit
 logical-unit-number family *family-name*] *hierarchy* ...
 }
 bundle *interface-name*;
 core-facing;
 demux-destination {
 destination-prefix;
 }
 demux-source {
 source-prefix;
 }
 direct-connect;
 duplicate-protection;
 dynamic-profile *profile-name*;
 filter {
 group *filter-group-number*;
 input *filter-name*;
 input-list [*filter-names*];
 output *filter-name*;
 output-list [*filter-names*];
 }
 interface-mode (access | trunk);
 ipsec-sa *sa-name*;
 keep-address-and-control;
 mac-validate (loose | strict);
 max-sessions *number*;
 max-sessions-vsa-ignore;
 mtu *bytes*;
 multicast-only;
 negotiate-address;
 no-redirects;
 policer {
 arp *policer-template-name*;
 input *policer-template-name*;
 output *policer-template-name*;
 }
 primary;
 protocols [inet iso mpls];
 proxy inet-address *address*;
 receive-options-packets;
 receive-ttl-exceeded;
 remote (inet-address *address* | mac-address *address*);
 rpf-check {

```

fail-filter filter-name
mode loose;
}
sampling {
input;
output;
}
service {
input {
post-service-filter filter-name;
service-set service-set-name <service-filter filter-name>;
}
output {
service-set service-set-name <service-filter filter-name>;
}
}
service-name-table table-name
short-cycle-protection <lockout-time-min minimum-seconds lockout-time-max
maximum-seconds>;
(translate-discard-eligible | no-translate-discard-eligible);
(translate-fecn-and-becn | no-translate-fecn-and-becn);
translate-plp-control-word-de;
unnumbered-address interface-name destination address destination-profile profile-name;
vlan-id number;
vlan-id-list [number number-number];
address address {
arp ip-address (mac | multicast-mac) mac-address <publish>;
broadcast address;
destination address;
destination-profile name;
eui-64;
master-only;
multipoint-destination address dlci dlci-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 burst length peak rate sustained rate | vbr burst length peak rate
sustained rate);
queue-length number;
}
vci vpi-identifier.vci-identifier;
}
preferred;
primary;
vrrp-group group-id {
(accept-data | no-accept-data);
advertise-interval seconds;
authentication-key key;
authentication-type authentication;
fast-interval milliseconds;

```

```
(preempt | no-preempt) {  
    hold-time seconds;  
}  
priority number;  
track {  
    interface interface-name {  
        bandwidth-threshold bits-per-second priority-cost priority;  
        priority-cost priority;  
    }  
    priority-hold-time seconds;  
    route prefix routing-instance instance-name priority-cost priority;  
}  
}  
virtual-address [ addresses ];  
}  
virtual-link-local-address ipv6-address;  
}
```

Hierarchy Level	[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i>], [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i>]
Release Information	Statement introduced before Junos OS Release 7.4. Option max-sessions-vs-a-ignore introduced in Junos OS Release 11.4.
Description	Configure protocol family information for the logical interface.



NOTE: Not all subordinate stanzas are available to every protocol family.

Options *family*—Protocol family:

- **any**—Protocol-independent family used for Layer 2 packet filtering



NOTE: This option is not supported on T4000 Type 5 FPCs.

- **bridge**—(M Series and T Series routers only) Configure only when the physical interface is configured with **ethernet-bridge** type encapsulation or when the logical interface is configured with **vlan-bridge** type encapsulation
- **ethernet-switching**—(M Series and T Series routers only) Configure only when the physical interface is configured with **ethernet-bridge** type encapsulation or when the logical interface is configured with **vlan-bridge** type encapsulation
- **ccc**—Circuit cross-connect protocol suite
- **inet**—Internet Protocol version 4 suite
- **inet6**—Internet Protocol version 6 suite
- **iso**—International Organization for Standardization Open Systems Interconnection (ISO OSI) protocol suite
- **mlfr-end-to-end**—Multilink Frame Relay FRF.15
- **mlfr-uni-nni**—Multilink Frame Relay FRF.16
- **multilink-ppp**—Multilink Point-to-Point Protocol
- **mpls**—Multiprotocol Label Switching (MPLS)
- **pppoe**—Point-to-Point Protocol over Ethernet
- **tcc**—Translational cross-connect protocol suite
- **tnp**—Trivial Network Protocol
- **vpls**—(M Series and T Series routers only) Virtual private LAN service

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	• <i>Configuring the Protocol Family</i>
	• <i>Junos OS Services Interfaces Library for Routing Devices</i>

fast-aps-switch

Syntax	fast-aps-switch;
Hierarchy Level	[edit interfaces <i>interface-name</i> sonet-options aps]
Release Information	Statement introduced in Junos OS Release 12.1.
Description	(M320 routers with Channelized OC3/STM1 Circuit Emulation PIC with SFP only and EX Series switches) Reduce the Automatic Protection Switching (APS) switchover time in Layer 2 circuits.

**NOTE:**

- Configuring this statement reduces the APS switchover time only when the Layer 2 circuit encapsulation type for the interface receiving traffic from a Layer 2 circuit neighbor is SAToP.
 - When the fast-aps-switch statement is configured in revertive APS mode, you must configure an appropriate value for revert time to achieve reduction in APS switchover time.
 - To prevent the logical interfaces in the data path from being shut down, configure appropriate hold-time values on all the interfaces in the data path that support TDM.
 - The fast-aps-switch statement cannot be configured when the APS annex-b option is configured.
 - The interfaces that have the fast-aps-switch statement configured cannot be used in virtual private LAN service (VPLS) environments.
-

Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• <i>Reducing APS Switchover Time in Layer 2 Circuits</i>

mac (IRB)

Syntax	<code>mac mac-address;</code>
Hierarchy Level	[edit interfaces <i>irb</i> unit <i>logical-unit-number</i>]
Release Information	Statement introduced in Junos OS Release 13.2.
Description	Specify the MAC address of the IRB interface in devices that have Modular Port Concentrator (MPC) cards.
Options	mac-address — Specify the MAC address as six hexadecimal bytes in one of the following hexadecimal formats: <i>nnnn:nnnn:nnnn</i> or <i>nn:nn:nn:nn:nn:nn</i> .
Required Privilege Level	interface—To view this statement in the configuration. interface-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Example: Configuring the MAC Address of an IRB Interface on page 8• Example: Configuring an IRB Interface

unit

```

Syntax  unit logical-unit-number {
    accept-source-mac {
        mac-address mac-address {
            policer {
                input cos-policer-name;
                output cos-policer-name;
            }
        }
    }
    accounting-profile name;
    advisory-options {
        downstream-rate rate;
        upstream-rate rate;
    }
    allow-any-vci;
    atm-scheduler-map (map-name | default);
    backup-options {
        interface interface-name;
    }
    bandwidth rate;
    cell-bundle-size cells;
    clear-dont-fragment-bit;
    compression {
        rtp {
            maximum-contexts number <force>;
            f-max-period number;
            queues [queue-numbers];
            port {
                minimum port-number;
                maximum port-number;
            }
        }
    }
    compression-device interface-name;
    copy-tos-to-outer-ip-header;
    demux-destination family;
    demux-source family;
    demux-options {
        underlying-interface interface-name;
    }
    description text;
    interface {
        l2tp-interface-id name;
        (dedicated | shared);
    }
    dialer-options {
        activation-delay seconds;
        callback;
        callback-wait-period time;
        deactivation-delay seconds;
        dial-string [dial-string-numbers];
        idle-timeout seconds;
    }
  }

```

```

incoming-map {
  caller caller-id | accept-all;
  initial-route-check seconds;
  load-interval seconds;
  load-threshold percent;
  pool pool-name;
  redial-delay time;
  watch-list {
    [routes];
  }
}
}
disable;
disable-mlppp-inner-ppp-pfc;
dlci dlci-identifier;
drop-timeout milliseconds;
dynamic-call-admission-control {
  activation-priority priority;
  bearer-bandwidth-limit kilobits-per-second;
}
encapsulation type;
epd-threshold cells plp1 cells;
family family-name {
  ... the family subhierarchy appears after the main [edit interfaces interface-name unit
    logical-unit-number] hierarchy ...
}
fragment-threshold bytes;
inner-vlan-id-range start start-id end end-id;
input-vlan-map {
  (pop | pop-pop | pop-swap | push | push-push | swap |
  swap-push | swap-swap);
  inner-tag-protocol-id tpid;
  inner-vlan-id number;
  tag-protocol-id tpid;
  vlan-id number;
}
interleave-fragments;
inverse-arp;
layer2-policer {
  input-policer policer-name;
  input-three-color policer-name;
  output-policer policer-name;
  output-three-color policer-name;
}
link-layer-overhead percent;
minimum-links number;
mrru bytes;
multicast-dlci dlci-identifier;
multicast-vci vpi-identifier.vci-identifier;
multilink-max-classes number;
multipoint;
oam-liveness {
  up-count cells;
  down-count cells;
}
oam-period (disable | seconds);

```

```
output-vlan-map {
    (pop | pop-pop | pop-swap | push | push-push | swap |
    swap-push | swap-swap);
    inner-tag-protocol-id tpid;
    inner-vlan-id number;
    tag-protocol-id tpid;
    vlan-id number;
}
passive-monitor-mode;
peer-unit unit-number;
plp-to-clp;
point-to-point;
ppp-options {
    chap {
        access-profile name;
        default-chap-secret name;
        local-name name;
        passive;
    }
    compression {
        acfc;
        pfc;
    }
    dynamic-profile profile-name;
    lcp-restart-timer milliseconds;
    loopback-clear-timer seconds;
    ncp-restart-timer milliseconds;
    pap {
        access-profile name;
        default-pap-password password;
        local-name name;
        local-password password;
        passive;
    }
}
pppoe-options {
    access-concentrator name;
    auto-reconnect seconds;
    (client | server);
    service-name name;
    underlying-interface interface-name;
}
pppoe-underlying-options {
    access-concentrator name;
    direct-connect;
    dynamic-profile profile-name;
    max-sessions number;
}
proxy-arp;
service-domain (inside | outside);
shaping {
    (cbr rate | rtvbr peak rate sustained rate burst length | vbr peak rate sustained rate burst
    length);
    queue-length number;
}
short-sequence;
```

```

targeted-distribution;
transmit-weight number;
(traps | no-traps);
trunk-bandwidth rate;
trunk-id number;
tunnel {
    backup-destination address;
    destination address;
    key number;
    routing-instance {
        destination routing-instance-name;
    }
    source source-address;
    ttl number;
}
vci vpi-identifier.vci-identifier;
vci-range start start-vci end end-vci;
vpi vpi-identifier;
vlan-id number;
vlan-id-range number-number;
vlan-tags inner tpid.vlan-id outer tpid.vlan-id;
family family {
    accounting {
        destination-class-usage;
        source-class-usage {
            (input | output | input output);
        }
    }
}
access-concentrator name;
address address {
    ... the address subhierarchy appears after the main [edit interfaces interface-name unit
        logical-unit-number family family-name] hierarchy ...
}
bundle interface-name;
core-facing;
demux-destination {
    destination-prefix;
}
demux-source {
    source-prefix;
}
direct-connect;
duplicate-protection;
dynamic-profile profile-name;
filter {
    group filter-group-number;
    input filter-name;
    input-list [filter-names];
    output filter-name;
    output-list [filter-names];
}
interface-mode (access | trunk);
ipsec-sa sa-name;
keep-address-and-control;
mac-validate (loose | strict);
max-sessions number;

```

```
mtu bytes;  
multicast-only;  
no-redirects;  
policer {  
    arp policer-template-name;  
    input policer-template-name;  
    output policer-template-name;  
}  
primary;  
protocols [inet iso mpls];  
proxy inet-address address;  
receive-options-packets;  
receive-ttl-exceeded;  
remote (inet-address address | mac-address address);  
rpf-check {  
    fail-filter filter-name  
    mode loose;  
}  
sampling {  
    input;  
    output;  
}  
service {  
    input {  
        post-service-filter filter-name;  
        service-set service-set-name <service-filter filter-name>;  
    }  
    output {  
        service-set service-set-name <service-filter filter-name>;  
    }  
}  
service-name-table table-name  
(translate-discard-eligible | no-translate-discard-eligible);  
(translate-fecn-and-becn | no-translate-fecn-and-becn);  
translate-plp-control-word-de;  
unnumbered-address interface-name destination address destination-profile profile-name;  
vlan-id number;  
vlan-id-list [number number-number];  
address address {  
    arp ip-address (mac | multicast-mac) mac-address <publish>;  
    broadcast address;  
    destination address;  
    destination-profile name;  
    eui-64;  
    master-only;  
    multipoint-destination address {  
        dlci dlci-identifier;  
        epd-threshold cells <plp1 cells>;  
        inverse-arp;  
        oam-liveness {  
            up-count cells;  
            down-count cells;  
        }  
        oam-period (disable | seconds);  
        shaping {
```

```

        (cbr rate | rtvbr burst length peak rate sustained rate | vbr burst length peak rate
         sustained rate);
        queue-length number;
    }
    vci vpi-identifier.vci-identifier;
}
preferred;
primary;
(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;
    track {
        interface interface-name {
            bandwidth-threshold bits-per-second priority-cost number;
        }
        priority-hold-time seconds;
        route ip-address/prefix-length routing-instance instance-name priority-cost cost;
    }
    virtual-address [addresses];
    virtual-link-local-address ipv6-address;
    vrrp-inherit-from {
        active-interface interface-name;
        active-group group-number;
    }
}
}
}
}

```

Hierarchy Level [edit interfaces *interface-name*],
 [edit logical-systems *logical-system-name* interfaces *interface-name*],
 [edit interfaces interface-set *interface-set-name* interface *interface-name*]

Release Information Statement introduced before Junos OS Release 7.4.

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 1,073,741,823 for demux and PPPoE static interfaces. 0 through 16,385 for all other static 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 Logical Interface Properties*
 - *Junos OS Services Interfaces Library for Routing Devices*

PART 3

Administration

- [Monitoring Commands on page 55](#)

CHAPTER 5

Monitoring Commands

- `show interfaces` (Aggregated Ethernet)
- `show interfaces demux0` (Demux Interfaces)
- `show interfaces diagnostics optics` (Gigabit Ethernet, 10-Gigabit Ethernet, 40-Gigabit Ethernet, and 100-Gigabit Ethernet)
- `show interfaces` (Fast Ethernet)
- `show interfaces` (10-Gigabit Ethernet)
- `show interfaces interface-set` (Ethernet Interface Set)
- `show interfaces interface-set queue`
- `show interfaces irb`
- `show lacp interfaces`
- `show interfaces mac-database` (Gigabit Ethernet)
- `show interfaces mc-ae`
- `show oam ethernet connectivity-fault-management delay-statistics`
- `show oam ethernet connectivity-fault-management forwarding-state`
- `show oam ethernet connectivity-fault-management interfaces`
- `show oam ethernet connectivity-fault-management linktrace path-database`
- `show oam ethernet connectivity-fault-management mep-database`
- `show oam ethernet connectivity-fault-management mep-statistics`
- `show oam ethernet connectivity-fault-management path-database`
- `show oam ethernet evc`
- `show oam ethernet link-fault-management`
- `show oam ethernet lmi`
- `show oam ethernet lmi statistics`
- `show protection-group ethernet-ring aps`
- `show protection-group ethernet-ring data-channel`
- `show protection-group ethernet-ring interface`
- `show protection-group ethernet-ring node-state`

- `show protection-group ethernet-ring statistics`
- `show protection-group ethernet-ring vlan`

show interfaces (Aggregated Ethernet)

Syntax	<pre>show interfaces ae <i>number</i> <brief detail extensive terse> <descriptions> <media> <snmp-index <i>snmp-index</i>> <statistics></pre>
Release Information	<p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 14.1 for PTX Series Packet Transport Routers.</p>
Description	(M Series, T Series, MX Series, and PTX Series routers and EX Series switches) Display status information about the specified aggregated Fast Ethernet or Gigabit Ethernet interface.
Options	<p>ae <i>number</i>—Display standard information about the specified aggregated Fast Ethernet or Gigabit Ethernet interface.</p> <p>brief detail extensive terse—(Optional) Display the specified level of output.</p> <p>descriptions—(Optional) Display interface description strings.</p> <p>media—(Optional) Display media-specific information.</p> <p>snmp-index <i>snmp-index</i>—(Optional) Display information about the specified SNMP index of the interface.</p> <p>statistics—(Optional) Display static interface statistics.</p>
Required Privilege Level	view
List of Sample Output	<p>show interfaces (Aggregated Ethernet) on page 62</p> <p>show interfaces brief (Aggregated Ethernet) on page 63</p> <p>show interfaces detail (Aggregated Ethernet) on page 63</p> <p>show interfaces extensive (Aggregated Ethernet) on page 64</p> <p>show interfaces extensive (Aggregated Ethernet with VLAN Stacking) on page 65</p>
Output Fields	Table 3 on page 57 lists the output fields for the show interfaces (Aggregated Ethernet) command. Output fields are listed in the approximate order in which they appear.

Table 3: show interfaces (Aggregated Ethernet) Output Fields

Field Name	Field Description	Level of Output
Physical Interface		
Physical interface	Name of the physical interface and state of the interface.	All levels
Enabled	State of the physical interface. Possible values are described in the “Enabled Field” section under <i>Common Output Fields Description</i> .	All levels

Table 3: show interfaces (Aggregated Ethernet) Output Fields (*continued*)

Field Name	Field Description	Level of Output
Interface index	Index number of the physical interface, which reflects its initialization sequence.	All levels
SNMP ifIndex	SNMP index number for the physical interface.	detail extensive none
Generation	Unique number for use by Juniper Networks technical support only.	detail extensive
Link-level type	Encapsulation being used on the physical interface.	All levels
MTU	Maximum transmission unit size on the physical interface.	All levels
Speed	Speed at which the interface is running.	All levels
Loopback	Loopback status: Enabled or Disabled . If loopback is enabled, type of loopback: Local or Remote .	All levels
Source filtering	Source filtering status: Enabled or Disabled .	All levels
Flow control	Flow control status: Enabled or Disabled .	All levels
Minimum links needed	Number of child links that must be operational for the aggregate interface to be operational.	All levels
Device flags	Information about the physical device. Possible values are described in the "Device Flags" section under <i>Common Output Fields Description</i> .	All levels
Interface flags	Information about the interface. Possible values are described in the "Interfaces Flags" section under <i>Common Output Fields Description</i> .	All levels
Current address	Configured MAC address.	detail extensive
Hardware address	Hardware MAC address.	detail extensive
Last flapped	Date, time, and how long ago the interface went from down to up or from up to down. The format is Last flapped: year-month-day hours:minutes:seconds timezone (hours:minutes:seconds ago) . For example, Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago) .	detail extensive
Input Rate	Input rate in bits per second (bps) and packets per second (pps).	None specified
Output Rate	Output rate in bps and pps.	None specified
Statistics last cleared	Time when the statistics for the interface were last set to zero.	detail extensive

Table 3: show interfaces (Aggregated Ethernet) Output Fields (*continued*)

Field Name	Field Description	Level of Output
Traffic statistics	<p>Number of and rate at which bytes and packets are received and transmitted on the physical interface.</p> <ul style="list-style-type: none"> • Input bytes—Number of bytes and rate, in bps, at which bytes are received on the interface. • Output bytes—Number of bytes and rate, in bps, at which bytes are transmitted on the interface. • Input packets—Number of packets and rate, in pps, at which packets are received on the interface. • Output packets—Number of packets and rate, in pps, at which packets are transmitted on the interface. 	detail extensive
Input errors	<p>Input errors on the interface:</p> <ul style="list-style-type: none"> • Errors—Sum of incoming frame aborts and frame check sequence (FCS) errors. • Drops—Number of packets dropped by the input queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's random early detection (RED) mechanism. • Framing errors—Number of packets received with an invalid FCS. • Runts—Number of frames received that are smaller than the runt threshold. • Giants—Number of frames received that are larger than the giant threshold. • Policed discards—Number of frames that the incoming packet match code discarded because they were not recognized or were not of interest. Usually, this field reports protocols that Junos OS does not handle. • Resource errors—Sum of transmit drops. 	detail extensive
Output errors	<p>Output errors on the interface:</p> <ul style="list-style-type: none"> • Carrier transitions —Number of times the interface has gone from down to up. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and then up, or another problem occurs. If the number of carrier transitions increments quickly (perhaps once every 10 seconds), then the cable, the far-end system, or the PIC is malfunctioning. • Errors—Sum of the outgoing frame aborts and FCS errors. • Drops—Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism. • MTU errors—Number of packets whose size exceeded the MTU of the interface. • Resource errors—Sum of transmit drops. 	detail extensive
IPv6 transit statistics	<p>Number of IPv6 transit bytes and packets received and transmitted on the physical interface if IPv6 statistics tracking is enabled.</p> <ul style="list-style-type: none"> • Input bytes—Number of bytes received on the interface. • Output bytes—Number of bytes transmitted on the interface. • Input packets—Number of packets received on the interface. • Output packets—Number of packets transmitted on the interface. 	detail extensive

Table 3: show interfaces (Aggregated Ethernet) Output Fields (*continued*)

Field Name	Field Description	Level of Output
Queue counters	CoS queue number and its associated user-configured forwarding class name. <ul style="list-style-type: none"> Queued packets—Number of queued packets. Transmitted packets—Number of transmitted packets. Dropped packets—Number of packets dropped by the ASIC's RED mechanism. 	detail extensive
Logical Interface		
Logical interface	Name of the logical interface.	All levels
Index	Index number of the logical interface (which reflects its initialization sequence).	detail extensive none
SNMP ifIndex	SNMP interface index number of the logical interface.	detail extensive none
Generation	Unique number for use by Juniper Networks technical support only.	detail extensive
Flags	Information about the logical interface. Possible values are described in the "Logical Interface Flags Field" section under <i>Common Output Fields Description</i> .	All levels
VLAN-Tag	Tag Protocol Identifier (TPID) and VLAN identifier.	All levels
Demux	IP demultiplexing (demux) value that appears if this interface is used as the demux underlying interface. The output is one of the following: <ul style="list-style-type: none"> Source Family Inet Destination Family Inet 	detail extensive none
Encapsulation	Encapsulation on the logical interface.	All levels

Table 3: show interfaces (Aggregated Ethernet) Output Fields (*continued*)

Field Name	Field Description	Level of Output
Statistics	<p>Information about the number of packets, packets per second, number of bytes, and bytes per second on this aggregate interface.</p> <ul style="list-style-type: none"> • Bundle—Information about input and output bundle rates. • Link—(detail and extensive only) Information about specific links in the aggregate, including link state and input and output rates. • Adaptive Statistics—(extensive only) Information about adaptive load balancing counter statistics. <ul style="list-style-type: none"> • Adaptive Adjusts—Number of times traffic flow imbalance was corrected by implementation of adaptive load balancing. • Adaptive Scans—Number of times the link utilization on each member link of the AE bundle was scanned by for adaptive load balancing • Adaptive Tolerance—Tolerance level, in percentage, for load imbalance on link utilization on each member link of the AE bundle. • Adaptive Updates—Number of times traffic flow load have been updated on an AE bundle. • Marker Statistics—(detail and extensive only) Information about 802.3ad marker protocol statistics on the specified links. <ul style="list-style-type: none"> • Marker Rx—Number of valid marker protocol data units (PDUs) received on this aggregation port. • Resp Tx—Number of marker response PDUs transmitted on this aggregation port. • Unknown Rx—Number of frames received that either carry the slow protocols Ethernet type value (43B.4) but contain an unknown PDU, or are addressed to the slow protocols group MAC address (43B.3) but do not carry the slow protocols Ethernet type. • Illegal Rx—Number of frames received that carry the slow protocols Ethernet type value (43B.4) but contain a badly formed PDU or an illegal value of protocol subtype (43B.4). 	detail extensive none
LACP info	<p>Link Aggregation Control Protocol (LACP) information for each aggregated interface.</p> <ul style="list-style-type: none"> • Role can be one of the following: <ul style="list-style-type: none"> • Actor—Local device participating in LACP negotiation. • Partner—Remote device participating in LACP negotiation. • System priority—Priority assigned to the system (by management or administrative policy), encoded as an unsigned integer. • System identifier—Actor or partner system ID, encoded as a MAC address. • Port priority—Priority assigned to the port by the actor or partner (by management or administrative policy), encoded as an unsigned integer. • Port number—Port number assigned to the port by the actor or partner, encoded as an unsigned integer. • Port key—Operational key value assigned to the port by the actor or partner, encoded as an unsigned integer. 	

Table 3: show interfaces (Aggregated Ethernet) Output Fields (*continued*)

Field Name	Field Description	Level of Output
LACP Statistics	<p>LACP statistics for each aggregated interface.</p> <ul style="list-style-type: none"> • LACP Rx—LACP received counter that increments for each normal hello. • LACP Tx—Number of LACP transmit packet errors logged. • Unknown Rx—Number of unrecognized packet errors logged. • Illegal Rx—Number of invalid packets received. <p>NOTE: For LACP Rx and LACP Tx, Packet count is updated only on snmp timer expiry (30 secs).</p>	
<i>protocol-family</i>	Protocol family configured on the logical interface. Possible values are described in the "Protocol Field" section under <i>Common Output Fields Description</i> .	brief
Protocol	Protocol family configured on the logical interface. Possible values are described in the "Protocol Field" section under <i>Common Output Fields Description</i> .	detail extensive none
MTU	Maximum transmission unit size on the logical interface.	detail extensive none
Maximum labels	Maximum number of MPLS labels configured for the MPLS protocol family on the logical interface.	detail extensive none
Generation	Unique number for use by Juniper Networks technical support only.	detail extensive
Route Table	Routing table in which the logical interface address is located. For example, 0 refers to the routing table inet.0.	detail extensive
Flags	Information about protocol family flags. Possible values are described in the "Family Flags Field" section under <i>Common Output Fields Description</i> .	detail extensive none
Mac-Validate Failures	Number of MAC address validation failures for packets and bytes. This field is displayed when MAC address validation is enabled for the logical interface.	detail extensive none
Addresses, Flags	Information about address flags. Possible values are described in the "Addresses Flags" section under <i>Common Output Fields Description</i> .	detail extensive none
Destination	IP address of the remote side of the connection.	detail extensive none
Local	IP address of the logical interface.	detail extensive none
Broadcast	Broadcast address of the logical interface.	detail extensive none
Generation	Unique number for use by Juniper Networks technical support only.	detail extensive

Sample Output

show interfaces (Aggregated Ethernet)

```
user@host> show interfaces ae0
```

```

Physical interface: ae0, Enabled, Physical link is Up
Interface index: 153, SNMP ifIndex: 59
Link-level type: Ethernet, MTU: 1514, Speed: 300mbps, Loopback: Disabled,
Source filtering: Disabled, Flow control: Disabled, Minimum links needed: 1
Device flags : Present Running
Interface flags: SNMP-Traps 16384
Current address: 00:05:85:8b:bf:f0, Hardware address: 00:05:85:8b:bf:f0
Last flapped : Never
Input rate : 0 bps (0 pps)
Output rate : 0 bps (0 pps)

```

```

Logical interface ae0.0 (Index 72) (SNMP ifIndex 60)
Flags: SNMP-Traps 16384 Encapsulation: ENET2
Statistics
Bundle:
  Input :      0      0      0      0
  Output:      0      0      0      0
Protocol inet, MTU: 1500
Flags: None
Addresses, Flags: Is-Preferred Is-Primary
Destination: 10.100.1/24, Local: 10.100.1.2, Broadcast: 10.100.1.255

```

show interfaces brief (Aggregated Ethernet)

```

user@host> show interfaces ae0 brief
Physical interface: ae0, Enabled, Physical link is Up
Link-level type: Ethernet, MTU: 1514, Speed: 300mbps, Loopback: Disabled,
Source filtering: Disabled, Flow control: Disabled
Device flags : Present Running
Interface flags: SNMP-Traps 16384

Logical interface ae0.0
Flags: SNMP-Traps 16384 Encapsulation: ENET2
inet 10.100.1.2/24

```

show interfaces detail (Aggregated Ethernet)

```

user@host> show interfaces ae0 detail
Physical interface: ae0, Enabled, Physical link is Up
Interface index: 153, SNMP ifIndex: 59, Generation: 36
Link-level type: Ethernet, MTU: 1514, Speed: 300mbps, Loopback: Disabled,
Source filtering: Disabled, Flow control: Disabled, Minimum links needed: 1
Device flags : Present Running
Interface flags: SNMP-Traps 16384
Current address: 00:05:85:8b:bf:f0, Hardware address: 00:05:85:8b:bf:f0
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
Queue counters:      Queued packets  Transmitted packets  Dropped packets

0 best-effort      7375      7375      0
1 expedited-fo      0      0      0
2 assured-forw      0      0      0
3 network-cont     2268      2268      0

```

```

Logical interface ae0.0 (Index 72) (SNMP ifIndex 60) (Generation 18)
Flags: SNMP-Traps 16384 Encapsulation: ENET2
Statistics
Bundle:
  Input :      0      0      0      0
  Output:      0      0      0      0
Link:
  fe-0/1/0.0
    Input :      0      0      0      0
    Output:      0      0      0      0
  fe-0/1/2.0
    Input :      0      0      0      0
    Output:      0      0      0      0
  fe-0/1/3.0
    Input :      0      0      0      0
    Output:      0      0      0      0
Marker Statistics:  Marker Rx      Resp Tx      Unknown Rx      Illegal Rx
fe-0/1/0.0          0          0          0          0
fe-0/1/2.0          0          0          0          0
fe-0/1/3.0          0          0          0          0
Protocol inet, MTU: 1500, Generation: 37, Route table: 0
Flags: Is-Primary, Mac-Validate-Strict
Mac-Validate Failures: Packets: 0, Bytes: 0
  Destination: 10.100.1/24, Local: 10.100.1.2, Broadcast: 10.100.1.255,
  Generation: 49

```

show interfaces extensive (Aggregated Ethernet)

```

user@host> show interfaces ae0 extensive
Physical interface: ae0, Enabled, Physical link is Up
Interface index: 153, SNMP ifIndex: 59, Generation: 36
Link-level type: Ethernet, MTU: 1514, Speed: 300mbps, Loopback: Disabled,
Source filtering: Disabled, Flow control: Disabled, Minimum links needed: 1
Device flags : Present Running
Interface flags: SNMP-Traps 16384
Current address: 00:05:85:8b:bf:f0, Hardware address: 00:05:85:8b:bf:f0
Last flapped : Never
Statistics last cleared: Never
Traffic statistics:
  Input bytes :      60      0 bps
  Output bytes :      0      0 bps
  Input packets:      1      0 pps
  Output packets:      0      0 pps
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
Queue counters:      Queued packets      Transmitted packets      Dropped packets
0 best-effort          7375          7375          0
1 expedited-fo          0          0          0
2 assured-forw          0          0          0
3 network-cont        2268          2268          0

```

```

Logical interface ae0.0 (Index 73) (SNMP ifIndex 563) (Generation 176)
Flags: Up SNMP-Traps 0x4000 Encapsulation: ENET2
Statistics          Packets          pps          Bytes          bps
Bundle:
  Input :           0           0           0           0
  Output:           0           0           0           0
Adaptive Statistics:
  Adaptive Adjusts:           0
  Adaptive Scans  :           0
  Adaptive Updates:           0
Link:
  fe-1/0/3.0
    Input :           0           0           0           0
    Output:           0           0           0           0
LACP info:          Role      System          System      Port      Port      Port
                  priority          identifier priority number  key

  fe-1/0/3.0      Actor          127  00:24:dc:85:af:f0          127      2      1
  fe-1/0/3.0      Partner          127  00:23:9c:c3:1f:f0          127      1      1

LACP Statistics:      LACP Rx      LACP Tx      Unknown Rx      Illegal Rx
  fe-1/0/3.0          3188          3186           0           0
Marker Statistics:      Marker Rx      Resp Tx      Unknown Rx      Illegal Rx
  fe-1/0/3.0           0           0           0           0
Protocol inet, MTU: 1500, Generation: 224, Route table: 0
Flags: Sendbcst-pkt-to-re
Addresses, Flags: Is-Preferred Is-Primary
  Destination: 10.40.1.0/30, Local: 10.40.1.1, Broadcast: 10.40.1.3,
Generation: 187
Protocol multiservice, MTU: Unlimited, Generation: 225, Route table: 0
Flags: Is-Primary
Policer: Input: __default_arp_policer__

```

show interfaces extensive (Aggregated Ethernet with VLAN Stacking)

```

user@host> show interfaces ae0 extensive
Physical interface: ae0, Enabled, Physical link is Up
  Interface index: 155, SNMP ifIndex: 48, Generation: 186
  Link-level type: 52, MTU: 1518, Speed: 2000mbps, Loopback: Disabled, Source
  filtering: Disabled,
  Flow control: Disabled, Minimum links needed: 1, Minimum bandwidth needed: 0
  Device flags   : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000
  Current address: 00:12:1e:19:3f:f0, Hardware address: 00:12:1e:19:3f:f0
  Last flapped   : Never
  Statistics last cleared: Never
Traffic statistics:
  Input bytes :           2406875          40152 bps
  Output bytes :          1124470          22056 bps
  Input packets:           5307           5 pps
  Output packets:          13295          21 pps
IPv6 transit statistics:
  Input bytes :           0
  Output bytes :           0
  Input packets:           0
  Output packets:           0

```

Input errors:
 Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0, Policed discards:
 0, Resource errors: 0

Output errors:
 Carrier transitions: 0, Errors: 0, Drops: 0, MTU errors: 0, Resource errors:
 0

Ingress queues: 4 supported, 4 in use

Queue counters:	Queued packets	Transmitted packets	Dropped packets
0 best-effort	0	859777	0
1 expedited-fo	0	0	0
2 assured-forw	0	0	0
3 network-cont	0	0	0

Egress queues: 4 supported, 4 in use

Queue counters:	Queued packets	Transmitted packets	Dropped packets
0 best-effort	0	1897615	0
1 expedited-fo	0	0	0
2 assured-forw	0	0	0
3 network-cont	0	662505	0

Logical interface ae0.451 (Index 69) (SNMP ifIndex 167) (Generation 601)

Flags: SNMP-Traps VLAN-Tag [0x8100.451] Encapsulation: VLAN-VPLS

Statistics	Packets	pps	Bytes	bps
Bundle:				
Input :	289	0	25685	376
Output:	1698	4	130375	3096

Link:

ge-1/2/0.451

Input :	289	0	25685	376
Output:	0	0	0	0

ge-1/2/1.451

Input :	0	0	0	0
Output:	1698	4	130375	3096

Marker Statistics:	Marker	Rx	Resp	Tx	Unknown	Rx	Illegal	Rx
ge-1/2/0.451		0		0		0		0
ge-1/2/1.451		0		0		0		0

Protocol vpls, MTU: 1518, Generation: 849, Route table: 3

Flags: Is-Primary

Logical interface ae0.452 (Index 70) (SNMP ifIndex 170) (Generation 602)

Flags: SNMP-Traps VLAN-Tag [0x8100.452] Encapsulation: VLAN-VPLS

Statistics	Packets	pps	Bytes	bps
Bundle:				
Input :	293	1	26003	1072
Output:	1694	3	130057	2400

Link:

ge-1/2/0.452

Input :	293	1	26003	1072
Output:	1694	3	130057	2400

ge-1/2/1.452

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

```
Marker Statistics:  Marker Rx      Resp Tx      Unknown Rx      Illegal Rx
ge-1/2/0.452       0          0          0          0
ge-1/2/1.452       0          0          0          0
Protocol vpls, MTU: 1518, Generation: 850, Route table: 3
Flags: None
...
```

show interfaces demux0 (Demux Interfaces)

Syntax	<pre>show interfaces demux0.logical-interface-number <brief detail extensive terse> <descriptions> <media> <snmp-index snmp-index> <statistics></pre>
Release Information	Command introduced in Junos OS Release 9.0.
Description	(MX Series and M Series routers only) Display status information about the specified demux interface.
Options	<p>none—Display standard information about the specified demux interface.</p> <p>brief detail extensive terse—(Optional) Display the specified level of output.</p> <p>descriptions—(Optional) Display interface description strings.</p> <p>media—(Optional) Display media-specific information about network interfaces.</p> <p>snmp-index snmp-index—(Optional) Display information for the specified SNMP index of the interface.</p> <p>statistics—(Optional) Display static interface statistics.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> Verifying and Managing Agent Circuit Identifier-Based Dynamic VLAN Configuration
List of Sample Output	show interfaces (Demux) on page 74 show interfaces (PPPoE over Aggregated Ethernet) on page 75 show interfaces extensive (Targeted Distribution for Aggregated Ethernet Links) on page 75 show interfaces demux0 (ACI Interface Set Configured) on page 76
Output Fields	Table 4 on page 68 lists the output fields for the show interfaces (demux interfaces) command. Output fields are listed in the approximate order in which they appear.

Table 4: Demux show interfaces Output Fields

Field Name	Field Description	Level of Output
Physical Interface		
Physical interface	Name of the physical interface.	brief detail extensive none
Interface index	Index number of the physical interface, which reflects its initialization sequence.	brief detail extensive none

Table 4: Demux show interfaces Output Fields (*continued*)

Field Name	Field Description	Level of Output
Enabled	State of the interface. Possible values are described in the “Enabled Field” section under <i>Common Output Fields Description</i> .	brief detail extensive none
Physical link	Status of the physical link (Up or Down).	detail extensive none
Admin	Administrative state of the interface (Up or Down).	terse
Interface index	Index number of the physical interface, which reflects its initialization sequence.	detail extensive none
Link	Status of the physical link (Up or Down).	terse
Targeting summary	Status of aggregated Ethernet links that are configured with targeted distribution (primary or backup)	extensive
Bandwidth	Bandwidth allocated to the aggregated Ethernet links that are configured with targeted distribution.	extensive
Proto	Protocol family configured on the interface.	terse
SNMP ifIndex	SNMP index number for the physical interface.	detail extensive none
Generation	Unique number for use by Juniper Networks technical support only.	detail extensive
Type	Type of interface. Software-Pseudo indicates a standard software interface with no associated hardware device.	brief detail extensive none
Link-level type	Encapsulation being used on the physical interface.	brief detail extensive
MTU	Maximum transmission unit size on the physical interface.	brief detail extensive
Clocking	Reference clock source: Internal (1) or External (2).	brief detail extensive
Speed	Speed at which the interface is running.	brief detail extensive
Device flags	Information about the physical device. Possible values are described in the “Device Flags” section under <i>Common Output Fields Description</i> .	brief detail extensive none
Interface flags	Information about the interface. Possible values are described in the “Interface Flags” section under <i>Common Output Fields Description</i> .	brief detail extensive none
Link type	Data transmission type.	detail extensive none
Link flags	Information about the link. Possible values are described in the “Link Flags” section under <i>Common Output Fields Description</i> .	detail extensive none
Physical info	Information about the physical interface.	detail extensive
Hold-times	Current interface hold-time up and hold-time down, in milliseconds.	detail extensive

Table 4: Demux show interfaces Output Fields (*continued*)

Field Name	Field Description	Level of Output
Current address	Configured MAC address.	detail extensive
Hardware address	Hardware MAC address.	detail extensive
Alternate link address	Backup address of the link.	detail extensive
Last flapped	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: 2002-04-26 10:52:40 PDT (04:33:20 ago) .	detail extensive none
Statistics last cleared	Time when the statistics for the interface were last set to zero.	detail extensive
Traffic statistics	<p>Number and rate of bytes and packets received and transmitted on the physical interface.</p> <ul style="list-style-type: none"> • Input bytes—Number of bytes received on the interface. • Output bytes—Number of bytes transmitted on the interface. • Input packets—Number of packets received on the interface. • Output packets—Number of packets transmitted on the interface. • IPv6 transit statistics—Number of IPv6 transit bytes and packets received and transmitted on the physical interface if IPv6 statistics tracking is enabled. <p>NOTE: These fields include dropped traffic and exception traffic, as those fields are not separately defined.</p> <ul style="list-style-type: none"> • Input bytes—Number of bytes received on the interface • Output bytes—Number of bytes transmitted on the interface. • Input packets—Number of packets received on the interface. • Output packets—Number of packets transmitted on the interface. 	detail extensive
Input errors	<p>Input errors on the interface whose definitions are as follows:</p> <ul style="list-style-type: none"> • Errors—Sum of the incoming frame aborts and FCS errors. • Drops—Number of packets dropped by the input queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism. • Framing errors—Number of packets received with an invalid frame checksum (FCS). • Runts—Number of frames received that are smaller than the runt threshold. • Giants—Number of frames received that are larger than the giant packet threshold. • Policed discards—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle. • Resource errors—Sum of transmit drops. 	extensive
Input Rate	Input rate in bits per second (bps) and packets per second (pps).	none

Table 4: Demux show interfaces Output Fields (*continued*)

Field Name	Field Description	Level of Output
Output errors	<p>Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> • Carrier transitions—Number of times the interface has gone from down to up. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and then up, or another problem occurs. If the number of carrier transitions increments quickly (perhaps once every 10 seconds), the cable, the far-end system, or the PIC or PIM is malfunctioning. • Errors—Sum of the outgoing frame aborts and FCS errors. • Drops—Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism. • MTU errors—Number of packets whose size exceeded the MTU of the interface. • Resource errors—Sum of transmit drops. 	extensive
Output Rate	Output rate in bps and pps.	none
Logical Interface		
Logical interface	Name of the logical interface.	brief detail extensive none
Index	Index number of the logical interface, which reflects its initialization sequence.	detail extensive none
SNMP ifIndex	SNMP interface index number for the logical interface.	detail extensive none
Generation	Unique number for use by Juniper Networks technical support only.	detail
Flags	Information about the logical interface. Possible values are described in the "Logical Interface Flags" section under <i>Common Output Fields Description</i> .	brief detail extensive none
Encapsulation	Encapsulation on the logical interface.	brief extensive none
ACI VLAN: Dynamic Profile	Name of the dynamic profile that defines the agent circuit identifier (ACI) interface set. If configured, the ACI interface set enables the underlying demux interface to create dynamic VLAN subscriber interfaces based on ACI information.	brief detail extensive none
Demux	<p>Specific IP demultiplexing (demux) values:</p> <ul style="list-style-type: none"> • Underlying interface—The underlying interface that the demux interface uses. • Index—Index number of the logical interface. • Family—Protocol family configured on the logical interface. • Source prefixes, total—Total number of source prefixes for the underlying interface. • Destination prefixes, total—Total number of destination prefixes for the underlying interface. • Prefix—inet family prefix. 	detail extensive none

Table 4: Demux show interfaces Output Fields (*continued*)

Field Name	Field Description	Level of Output
<i>protocol-family</i>	Protocol family configured on the logical interface.	brief
Traffic statistics	<p>Number and rate of bytes and packets received and transmitted on the specified interface set.</p> <ul style="list-style-type: none"> • Input bytes, Output bytes—Number of bytes received and transmitted on the interface set. • Input packets, Output packets—Number of packets received and transmitted on the interface set. • IPv6 transit statistics—Number of IPv6 transit bytes and packets received and transmitted on the logical interface if IPv6 statistics tracking is enabled. <p>NOTE: The packet and byte counts in these fields include traffic that is dropped and does not leave the router.</p> <ul style="list-style-type: none"> • Input bytes—Number of bytes received on the interface. • Output bytes—Number of bytes transmitted on the interface. • Input packets—Number of packets received on the interface. • Output packets—Number of packets transmitted on the interface. 	detail extensive
Local statistics	<p>Number of transit bytes and packets received and transmitted on the local interface.</p> <ul style="list-style-type: none"> • Input bytes—Number of bytes received on the interface. • Output bytes—Number of bytes transmitted on the interface. • Input packets—Number of packets received on the interface. • Output packets—Number of packets transmitted on the interface. 	detail extensive
Transit statistics	<p>Number and rate of bytes and packets transiting the switch.</p> <p>NOTE: The packet and byte counts in these fields include traffic that is dropped and does not leave the router.</p> <ul style="list-style-type: none"> • Input bytes—Number of bytes received on the interface. • Output bytes—Number of bytes transmitted on the interface. • Input packets—Number of packets received on the interface. • Output packets—Number of packets transmitted on the interface. 	detail extensive
IPv6 Transit statistics	<p>Number of IPv6 transit bytes and packets received and transmitted on the logical interface if IPv6 statistics tracking is enabled.</p> <p>NOTE: The packet and byte counts in these fields include traffic that is dropped and does not leave the router.</p> <ul style="list-style-type: none"> • Input bytes—Number of bytes received on the interface. • Output bytes—Number of bytes transmitted on the interface. • Input packets—Number of packets received on the interface. • Output packets—Number of packets transmitted on the interface. 	detail extensive
Input packets	Number of packets received on the interface.	none

Table 4: Demux show interfaces Output Fields (*continued*)

Field Name	Field Description	Level of Output
Output packets	Number of packets transmitted on the interface.	none
Protocol	Protocol family. Possible values are described in the “Protocol Field” section under <i>Common Output Fields Description</i> .	detail extensive none
MTU	Maximum transmission unit size on the logical interface.	detail extensive none
Maximum labels	Maximum number of MPLS labels configured for the MPLS protocol family on the logical interface.	detail extensive none
Generation	Unique number for use by Juniper Networks technical support only.	detail extensive
Route table	Route table in which the logical interface address is located. For example, 0 refers to the routing table inet.0.	detail extensive
Flags	Information about protocol family flags. Possible values are described in the “Family Flags” section under <i>Common Output Fields Description</i> .	detail extensive none
Mac-Validate Failures	Number of MAC address validation failures for packets and bytes. This field is displayed when MAC address validation is enabled for the logical interface.	detail extensive none
Addresses, Flags	Information about the address flags. Possible values are described in the “Addresses Flags” section under <i>Common Output Fields Description</i> .	detail extensive none
Destination	IP address of the remote side of the connection.	detail extensive statistics none
Local	IP address of the logical interface.	detail extensive terse none
Remote	IP address of the remote interface.	terse
Broadcast	Broadcast address of the logical interface.	detail extensive none
Generation	Unique number for use by Juniper Networks technical support only.	detail extensive
Link	Name of the physical interfaces for member links in an aggregated Ethernet bundle for a PPPoE over aggregated Ethernet configuration. PPPoE traffic goes out on these interfaces.	detail extensive none
Dynamic-profile	Name of the PPPoE dynamic profile assigned to the underlying interface.	detail extensive none
Service Name Table	Name of the PPPoE service name table assigned to the PPPoE underlying interface.	detail extensive none
Max Sessions	Maximum number of dynamic PPPoE logical interfaces that the router can activate on the underlying interface.	detail extensive none

Table 4: Demux show interfaces Output Fields (*continued*)

Field Name	Field Description	Level of Output
Duplicate Protection	State of duplicate protection: On or Off . Duplicate protection prevents the activation of another dynamic PPPoE logical interface on the same underlying interface when a dynamic PPPoE logical interface for a client with the same MAC address is already active on that interface.	detail extensive none
Direct Connect	State of the configuration to ignore DSL Forum VSAs: On or Off . When configured, the router ignores any of these VSAs received from a directly connected CPE device on the interface.	detail extensive none
AC Name	Name of the access concentrator.	detail extensive none

Sample Output

show interfaces (Demux)

```

user@host> show interfaces demux0
Physical interface: demux0, Enabled, Physical link is Up
  Interface index: 128, SNMP ifIndex: 79, Generation: 129
  Type: Software-Pseudo, Link-level type: Unspecified, MTU: 9192, Clocking: 1,
  Speed: Unspecified
  Device flags   : Present Running
  Interface flags: Point-To-Point SNMP-Traps
  Link type      : Full-Duplex
  Link flags     : None
  Physical info  : Unspecified
  Hold-times    : Up 0 ms, Down 0 ms
  Current address: Unspecified, Hardware address: Unspecified
  Alternate link address: Unspecified
  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, 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 demux0.0 (Index 87) (SNMP ifIndex 84) (Generation 312)
  Flags: SNMP-Traps 0x4000 Encapsulation: ENET2
  Demux:
    Underlying interface: ge-2/0/1.0 (Index 74)
    Family Inet Source prefixes, total 1
    Prefix: 1.1.1/24
    Traffic statistics:
      Input bytes   :                0

```

```

Output bytes :          1554
Input packets:           0
Output packets:         37
IPv6 transit statistics:
  Input bytes :          0
  Output bytes :          0
  Input packets:         0
  Output packets:        0
Local statistics:
  Input bytes :          0
  Output bytes :         1554
  Input packets:           0
  Output packets:         37
Transit statistics:
  Input bytes :          0          0 bps
  Output bytes :          0          0 bps
  Input packets:         0          0 pps
  Output packets:        0          0 pps
IPv6 transit statistics:
  Input bytes :          0
  Output bytes :          0
  Input packets:         0
  Output packets:        0
Protocol inet, MTU: 1500, Generation: 395, Route table: 0
  Flags: Is-Primary, Mac-Validate-Strict
  Mac-Validate Failures: Packets: 0, Bytes: 0
  Addresses, Flags: Is-Preferred Is-Primary
    Destination: 11.1.1/24, Local: 11.1.1.1, Broadcast: 11.1.1.255,
    Generation: 434

```

show interfaces (PPPoE over Aggregated Ethernet)

```

user@host> show interfaces demux0.100
Logical interface demux0.100 (Index 76) (SNMP ifIndex 61160)
  Flags: SNMP-Traps 0x4000 VLAN-Tag [ 0x8100.100 ]
  Encapsulation: ENET2
  Demux:
    Underlying interface: ae0 (Index 199)
  Link:
    ge-1/0/0
    ge-1/1/0
  Input packets : 0
  Output packets: 0
  Protocol pppoe
    Dynamic Profile: pppoe-profile,
    Service Name Table: service-table1,
    Max Sessions: 100, Duplicate Protection: On,
    Direct Connect: Off,
    AC Name: pppoe-server-1

```

show interfaces extensive (Targeted Distribution for Aggregated Ethernet Links)

```

user@host> show interfaces demux0.1073741824 extensive

Logical interface demux0.1073741824 (Index 75) (SNMP ifIndex 558) (Generation
346)
  Flags: SNMP-Traps 0x4000 VLAN-Tag [ 0x8100.1 ] Encapsulation: ENET2
  Demux:
    Underlying interface: ae0 (Index 201)
  Link:
    ge-1/0/0


```

```
ge-1/1/0
ge-2/0/7
ge-2/0/8
Targeting summary:
ge-1/1/0, primary, Physical link is Up
ge-2/0/8, backup, Physical link is Up
Bandwidth: 1000mbps
```

show interfaces demux0 (ACI Interface Set Configured)

```
user@host> show interfaces demux0.1073741827
Logical interface demux0.1073741827 (Index 346) (SNMP ifIndex 527)
Flags: SNMP-Traps 0x4000 VLAN-Tag [ 0x8100.1802 0x8100.302 ] Encapsulation:
ENET2
Demux: Source Family Inet
ACI VLAN:
  Dynamic Profile: aci-vlan-set-profile
Demux:
  Underlying interface: ge-1/0/0 (Index 138)
Input packets : 18
Output packets: 16
Protocol inet, MTU: 1500
  Flags: Sendbcst-pkt-to-re, Unnumbered
  Donor interface: lo0.0 (Index 322)
  Preferred source address: 100.20.200.202
  Addresses, Flags: Primary Is-Default Is-Primary
    Local: 10.4.12.119
Protocol pppoe
  Dynamic Profile: aci-vlan-pppoe-profile,
  Service Name Table: None,
  Max Sessions: 32000, Max Sessions VSA Ignore: Off,
  Duplicate Protection: On, Short Cycle Protection: Off,
  Direct Connect: Off,
  AC Name: nbc
```

show interfaces diagnostics optics (Gigabit Ethernet, 10-Gigabit Ethernet, 40-Gigabit Ethernet, and 100-Gigabit Ethernet)

Syntax	show interfaces diagnostics optics <i>interface-name</i>
Release Information	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 12.1 for PTX Series routers.
Description	Display diagnostics data, warnings, and alarms for Gigabit Ethernet, 10-Gigabit Ethernet, 40-Gigabit Ethernet, or 100-Gigabit Ethernet interfaces.
Options	<i>interface-name</i> —Interface name. For example: <i>ge-fpc/pic/port</i> <i>et-fpc/pic/port</i> <i>xe-fpc/pic/port</i>
Additional Information	<p>The transceivers are polled in 1-second intervals for diagnostics data, warnings, and alarms. The alarms do not cause the links to go down or the LEDs to change color, nor generate SNMP traps. Changes in alarm and warning status will generate system log messages.</p> <p>Thresholds that trigger a high alarm, low alarm, high warning, or low warning are set by the transceiver 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 device is not working.</p>
	<div>  <p>NOTE: Some transceivers do not support all optical diagnostics features described in the output fields.</p> <p>The show interfaces diagnostics optics command for optical interfaces does not report the decibel (dBm) value of the received signal if the received power is zero milliwatts (0.0000 mW).</p> </div>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> Supported Network Interface Standards by Transceiver Supported Network Interface Standards by Transceiver for PTX Series Packet Transport Routers
List of Sample Output	show interfaces diagnostics optics (DWDM and DWDM OTN) on page 90 show interfaces diagnostics optics (Bidirectional SFP) on page 90 show interfaces diagnostics optics (SFP) on page 91 show interfaces diagnostics optics (SFP) on page 91

[show interfaces diagnostics optics \(XFP and CFP Optics\) on page 92](#)
[show interfaces diagnostics optics for 10-Gigabit Ethernet \(PTX 24-10GE-SFPP\) on page 93](#)
[show interfaces diagnostics optics for 40-Gigabit Ethernet on page 94](#)

Output Fields [Table 5 on page 78](#) lists the output fields for the **show interfaces diagnostics optics** command for DWDM and DWDM OTN PICs. Output fields are listed in the approximate order in which they appear.

Table 5: show interfaces diagnostics optics Output Fields for 10-Gigabit Ethernet DWDM and DWDM OTN PICs

Field Name	Field Description
Physical interface	Name of the physical interface.
Laser bias current	Magnitude of the laser bias power setting current, in milliamperes (mA). The laser bias provides direct modulation of laser diodes and modulates currents.
Laser output power	Laser output power, in milliwatts (mW) and decibels, referenced to 1.0 mW (dBm). This is a software equivalent to the LsPOWMON pin in hardware.
Receiver signal average optical power	Average received optical power, in mW and dBm. This indicator is a software equivalent to the RxPOWMON pin in hardware. Average optical power is vendor-specific.
Laser end-of-life alarm	Laser end-of-life alarm: On or Off .
Laser wavelength alarm	Laser wavelength alarm: On or Off .
Laser bias current alarm	Laser bias current alarm: On or Off .
Laser temperature alarm	Laser temperature alarm: On or Off .
Laser power alarm	Laser power alarm: On or Off .
Modulator temperature alarm	Modulator temperature alarm: On or Off . Transceivers from some vendors do not support this field.
Modulator bias alarm	Modulator bias alarm: On or Off .
Tx multiplexer FIFO error alarm	Transmit multiplexer first in, first out (FIFO) error alarm: On or Off .
Tx loss of PLL lock alarm	Transmit loss of phase-locked loop (PLL) lock alarm: On or Off .
Rx loss of average optical power alarm	Receive loss of average optical power alarm: On or Off .

Table 5: show interfaces diagnostics optics Output Fields for 10-Gigabit Ethernet DWDM and DWDM OTN PICs (*continued*)

Field Name	Field Description
Rx loss of AC power alarm	Receive loss of AC power alarm: On or Off . Transceivers from some vendors do not support this field.
Rx loss of PLL lock alarm	Receive loss of phase-locked loop (PLL) lock alarm: On or Off .

Table 6 on page 79 lists the output fields for the **show interfaces diagnostics optics** command when the router is operating with bidirectional SFP optics. Output fields are listed in the approximate order in which they appear.

Table 6: show interfaces diagnostics optics Output Fields for Gigabit Ethernet Bidirectional SFP Optics

Field Name	Field Description
Physical interface	Name of the physical interface.
Laser bias current	Magnitude of the laser bias power setting current, in milliamperes (mA). The laser bias provides direct modulation of laser diodes and modulates currents.
Laser output power	Laser output power, in milliwatts (mW) and decibels, referenced to 1.0 mW (dBm).
Module temperature	Temperature of the optics module, in Celsius and Fahrenheit.
Module voltage	Internally measured module voltage.
Receiver signal average optical power	Average received optical power, in mW and dBm.
Laser bias current high alarm	Laser bias power setting high alarm. Displays on or off .
Laser bias current low alarm	Laser bias power setting low alarm. Displays on or off .
Laser bias current high warning	Laser bias power setting high warning. Displays on or off .
Laser bias current low warning	Laser bias power setting low warning. Displays on or off .
Laser output power high alarm	Laser output power high alarm. Displays on or off .
Laser output power low alarm	Laser output power low alarm. Displays on or off .

Table 6: show interfaces diagnostics optics Output Fields for Gigabit Ethernet Bidirectional SFP Optics (*continued*)

Field Name	Field Description
Laser output power high warning	Laser output power high warning. Displays on or off .
Laser output power low warning	Laser output power low warning. Displays on or off .
Module temperature high alarm	Module temperature high alarm. Displays on or off .
Module temperature low alarm	Module temperature low alarm. Displays on or off .
Module temperature high warning	Module temperature high warning. Displays on or off .
Module temperature low warning	Module temperature low warning. Displays on or off .
Module voltage high alarm	Module voltage high alarm. Displays on or off .
Module voltage low alarm	Module voltage low alarm. Displays on or off .
Module voltage high warning	Module voltage high warning. Displays on or off .
Module voltage low warning	Module voltage high warning. Displays on or off .
Laser rx power high alarm	Receive laser power high alarm. Displays on or off .
Laser rx power low alarm	Receive laser power low alarm. Displays on or off .
Laser rx power high warning	Receive laser power high warning. Displays on or off .
Laser rx power low warning	Receive laser power low warning. Displays on or off .
Laser bias current high alarm threshold	Vendor-specified threshold for the laser bias current high alarm: 70.000 mA .
Laser bias current low alarm threshold	Vendor-specified threshold for the laser bias current low alarm: 0.0002 mA .

Table 6: show interfaces diagnostics optics Output Fields for Gigabit Ethernet Bidirectional SFP Optics (continued)

Field Name	Field Description
Laser bias current high warning threshold	Vendor-specified threshold for the laser bias current high warning: 65.000 mA .
Laser bias current low warning threshold	Vendor-specified threshold for the laser bias current low warning: 0.0002 mA .
Laser output power high alarm threshold	Vendor-specified threshold for the laser output power high alarm: 1.0000 mW or 0.00 dBm .
Laser output power low alarm threshold	Vendor-specified threshold for the laser output power low alarm: 0.0560 mW or -12.52 dBm .
Laser output power high warning threshold	Vendor-specified threshold for the laser output power high warning: 0.6300 mW or -2.01 dBm .
Laser output power low warning threshold	Vendor-specified threshold for the laser output power low warning: 0.0890 mW or -10.51 dBm .
Module temperature high alarm threshold	Vendor-specified threshold for the module temperature high alarm: 100° C or 212° F .
Module temperature low alarm threshold	Vendor-specified threshold for the module temperature low alarm: -50° C or -58° F .
Module temperature high warning threshold	Vendor-specified threshold for the module temperature high warning: 95 ° C or 203 ° F .
Module temperature low warning threshold	Vendor-specified threshold for the module temperature low warning: -48° C or -54° F .
Module voltage high alarm threshold	Module voltage high alarm threshold: 3.700 v .
Module voltage low alarm threshold	Module voltage low alarm threshold: 2.900 v .
Module voltage high warning threshold	Module voltage high warning threshold: 3.7600 v .
Module voltage low warning threshold	Module voltage low warning threshold: 3.000 v .
Laser rx power high alarm threshold	Vendor-specified threshold for the laser Rx power high alarm: 1.9953 mW or 3.00 dBm .
Laser rx power low alarm threshold	Vendor-specified threshold for the laser Rx power low alarm: 0.0001 mW or -40.00 dBm .

Table 6: show interfaces diagnostics optics Output Fields for Gigabit Ethernet Bidirectional SFP Optics (*continued*)

Field Name	Field Description
Laser rx power high warning threshold	Vendor-specified threshold for the laser Rx power high warning: 1.0000 mW or 0.00 dBm.
Laser rx power low warning threshold	Vendor-specified threshold for the laser Rx power low warning: 0.0010 mW or -30.00 dBm.

Table 7 on page 82 lists the output fields for the **show interfaces diagnostics optics** command for SFP transceivers. Output fields are listed in the approximate order in which they appear.

Table 7: show interfaces diagnostics Output Fields for Gigabit Ethernet SFP Transceivers

Field Name	Field Description
Physical interface	Name of the physical interface.
Laser bias current	Measured laser bias current in uA.
Laser output power	Measured laser output power in mW.
Module temperature	Internally measured module temperature.
Module voltage	Internally measured module voltage.
Laser rx power	Measured receive optical power in mW.
Laser bias current high alarm	Laser bias current high alarm: On or Off . Alarm ranges are vendor-specific.
Laser bias current low alarm	Laser bias current low alarm: On or Off . Alarm ranges are vendor-specific.
Laser output power high alarm	Laser output power high alarm: On or Off . Alarm ranges are vendor-specific.
Laser output power low alarm	Laser output power low alarm: On or Off . Alarm ranges are vendor-specific.
Module temp high alarm	Module temperature high alarm: On or Off . Alarm ranges are vendor-specific.
Module temp low alarm	Module temperature low alarm: On or Off . Alarm ranges are vendor-specific.
Laser rx power high alarm	Laser receive power high alarm: On or Off . Alarm ranges are vendor-specific.
Laser rx power low alarm	Laser receive power low alarm: On or Off . Alarm ranges are vendor-specific.

Table 7: show interfaces diagnostics Output Fields for Gigabit Ethernet SFP Transceivers (*continued*)

Field Name	Field Description
Laser bias current high warning	Laser bias current high warning: On or Off . Warning ranges are vendor-specific.
Laser bias current low warning	Laser bias current low warning: On or Off . Warning ranges are vendor-specific.
Laser output power high warning	Laser output power high warning: On or Off . Warning ranges are vendor-specific.
Laser output power low warning	Laser output power low warning: On or Off . Warning ranges are vendor-specific.
Module temperature high warning	Module temperature high warning: On or Off . Warning ranges are vendor-specific.
Module temperature low warning	Module temperature low warning: On or Off . Warning ranges are vendor-specific.
Laser rx power high warning	Laser receive power high warning: On or Off . Warning ranges are vendor-specific.
Laser rx power low warning	Laser receive power low warning: On or Off . Warning ranges are vendor-specific.
Laser bias current high alarm threshold	Laser bias current high alarm threshold. Alarm threshold ranges are vendor-specific.
Laser bias current low alarm threshold	Laser bias current low alarm threshold. Alarm threshold ranges are vendor-specific.
Laser bias current high warning threshold	Laser bias current high warning threshold. Warning ranges are vendor-specific.
Laser bias current low warning threshold	Laser bias current low warning threshold. Warning ranges are vendor-specific.
Laser output power high alarm threshold	Laser output power high alarm threshold. Alarm threshold ranges are vendor-specific.
Laser output power low alarm threshold	Laser output power low alarm threshold. Alarm threshold ranges are vendor-specific.
Laser output power high warning threshold	Laser output power high warning threshold. Warning ranges are vendor-specific.
Laser output power low warning threshold	Laser output power low warning threshold. Warning ranges are vendor-specific.

Table 7: show interfaces diagnostics Output Fields for Gigabit Ethernet SFP Transceivers (*continued*)

Field Name	Field Description
Module temperature high alarm threshold	Module temperature high alarm threshold. Alarm threshold ranges are vendor-specific.
Module temperature low alarm threshold	Module temperature low alarm threshold. Alarm threshold ranges are vendor-specific.
Module temperature high warning threshold	Module temperature high warning threshold. Warning ranges are vendor-specific.
Module temperature low warning threshold	Module temperature low warning threshold. Warning ranges are vendor-specific.
Module voltage high alarm threshold	Module voltage high alarm threshold. Alarm ranges are vendor-specific.
Module voltage low alarm threshold	Module voltage low alarm threshold. Alarm ranges are vendor-specific.
Module voltage high warning threshold	Module voltage high warning threshold. Warning ranges are vendor-specific.
Module voltage low warning threshold	Module voltage low warning threshold. Warning ranges are vendor-specific.
Laser rx power high alarm threshold	Laser receive power high alarm threshold. Alarm threshold ranges are vendor-specific.
Laser rx power low alarm threshold	Laser receive power low alarm threshold. Alarm threshold ranges are vendor-specific.
Laser rx power high warning threshold	Laser receive power high warning threshold. Warning threshold ranges are vendor-specific.
Laser rx power high low threshold	Laser receive power high warning threshold. Warning threshold ranges are vendor-specific.

[Table 8 on page 84](#) lists the output fields for the **show interfaces diagnostics optics** command for 10-Gigabit Ethernet transceivers. Output fields are listed in the approximate order in which they appear.

Table 8: show interfaces diagnostics optics Output Fields for 10-Gigabit Ethernet Transceivers

Field Name	Field Description
Physical interface	Name of the physical interface.
Laser bias current	Measured laser bias current in mA.

Table 8: show interfaces diagnostics optics Output Fields for 10-Gigabit Ethernet Transceivers (*continued*)

Field Name	Field Description
Laser output power	Measured laser output power in mW.
Module temperature	Internally measured module temperature.
Laser rx power	Measured receive optical power in mW.
Laser bias current high alarm	Laser bias current high alarm: On or Off . Alarm ranges are vendor-specific.
Laser bias current low alarm	Laser bias current low alarm: On or Off . Alarm ranges are vendor-specific.
Laser output power high alarm	Laser output power high alarm: On or Off . Alarm ranges are vendor-specific.
Laser output power low alarm	Laser output power low alarm: On or Off . Alarm ranges are vendor-specific.
Module temp high alarm	Module temperature high alarm: On or Off . Alarm ranges are vendor-specific.
Module temp low alarm	Module temperature low alarm: On or Off . Alarm ranges are vendor-specific.
Laser rx power high alarm	Laser receive power high alarm: On or Off . Alarm ranges are vendor-specific.
Laser rx power low alarm	Laser receive power low alarm: On or Off . Alarm ranges are vendor-specific.
Laser bias current high warning	Laser bias current high warning: On or Off . Warning ranges are vendor-specific.
Laser bias current low warning	Laser bias current low warning: On or Off . Warning ranges are vendor-specific.
Laser output power high warning	Laser output power high warning: On or Off . Warning ranges are vendor-specific.
Laser output power low warning	Laser output power low warning: On or Off . Warning ranges are vendor-specific.
Module temperature high warning	Module temperature high warning: On or Off . Warning ranges are vendor-specific.
Module temperature low warning	Module temperature low warning: On or Off . Warning ranges are vendor-specific.

Table 8: show interfaces diagnostics optics Output Fields for 10-Gigabit Ethernet Transceivers (*continued*)

Field Name	Field Description
Laser rx power high warning	Laser receive power high warning: On or Off . Warning ranges are vendor-specific.
Laser rx power low warning	Laser receive power low warning: On or Off . Warning ranges are vendor-specific.
Laser bias current high alarm threshold	Laser bias current high alarm threshold. Alarm threshold ranges are vendor-specific.
Laser bias current low alarm threshold	Laser bias current low alarm threshold. Alarm threshold ranges are vendor-specific.
Laser output power high alarm threshold	Laser output power high alarm threshold. Alarm threshold ranges are vendor-specific.
Laser output power low alarm threshold	Laser output power low alarm threshold. Alarm threshold ranges are vendor-specific.
Module temperature high alarm threshold	Module temperature high alarm threshold. Alarm threshold ranges are vendor-specific.
Module temperature low alarm threshold	Module temperature low alarm threshold. Alarm threshold ranges are vendor-specific.
Laser rx power high alarm threshold	Laser receive power high alarm threshold. Alarm threshold ranges are vendor-specific.
Laser rx power low alarm threshold	Laser receive power low alarm threshold. Alarm threshold ranges are vendor-specific.
Laser bias current high warning threshold	Laser bias current high warning threshold. Warning ranges are vendor-specific.
Laser bias current low warning threshold	Laser bias current low warning threshold. Warning ranges are vendor-specific.
Laser output power high warning threshold	Laser output power high warning threshold. Warning ranges are vendor-specific.
Laser output power low warning threshold	Laser output power low warning threshold. Warning ranges are vendor-specific.
Module temperature high warning threshold	Module temperature high warning threshold. Warning ranges are vendor-specific.
Module temperature low warning threshold	Module temperature low warning threshold. Warning ranges are vendor-specific.

Table 8: show interfaces diagnostics optics Output Fields for 10-Gigabit Ethernet Transceivers (*continued*)

Field Name	Field Description
Laser rx power high warning threshold	Laser receive power high warning threshold. Warning threshold ranges are vendor-specific.
Laser rx power low warning threshold	Laser receive power low warning threshold. Warning threshold ranges are vendor-specific.

[Table 9 on page 87](#) lists the output fields for the **show interfaces diagnostics optics** command for XFP transceivers. Output fields are listed in the approximate order in which they appear.

Table 9: show interfaces diagnostics optics Output Fields for 10-Gigabit Ethernet XFP Transceivers

Field Name	Field Description
Physical interface	Name of the physical interface.
Laser bias current	Magnitude of the laser bias power setting current, in milliamperes (mA). The laser bias provides direct modulation of laser diodes and modulates currents.
Laser output power	Laser output power, in milliwatts (mW) and decibels, referenced to 1.0 mW (dBm). This is a software equivalent to the LsPOWMON pin in hardware.
Module temperature	Temperature of the XFP optics module, in Celsius and Fahrenheit.
Laser rx power	Laser received optical power, in mW and dBm.
Laser bias current high alarm	Laser bias power setting high alarm. Displays on or off .
Laser bias current low alarm	Laser bias power setting low alarm. Displays on or off .
Laser bias current high warning	Laser bias power setting high warning. Displays on or off .
Laser bias current low warning	Laser bias power setting low warning. Displays on or off .
Laser output power high alarm	Laser output power high alarm. Displays on or off .
Laser output power low alarm	Laser output power low alarm. Displays on or off .
Laser output power high warning	Laser output power high warning. Displays on or off .

Table 9: show interfaces diagnostics optics Output Fields for 10-Gigabit Ethernet XFP Transceivers (*continued*)

Field Name	Field Description
Laser output power low warning	Laser output power low warning. Displays on or off .
Module temperature high alarm	Module temperature high alarm. Displays on or off .
Module temperature low alarm	Module temperature low alarm. Displays on or off .
Module temperature high warning	Module temperature high warning. Displays on or off .
Module temperature low warning	Module temperature low warning. Displays on or off .
Laser rx power high alarm	Receive laser power high alarm. Displays on or off .
Laser rx power low alarm	Receive laser power low alarm. Displays on or off .
Laser rx power high warning	Receive laser power high warning. Displays on or off .
Laser rx power low warning	Receive laser power low warning. Displays on or off .
Module not ready alarm	Module not ready alarm. When on , indicates the module has an operational fault. Displays on or off .
Module power down alarm	Module power down alarm. When on , module is in a limited power mode, low for normal operation. Displays on or off .
Tx data not ready alarm	Any condition leading to invalid data on the transmit path. Displays on or off .
Tx not ready alarm	Any condition leading to invalid data on the transmit path. Displays on or off .
Tx laser fault alarm	Laser fault condition. Displays on or off .
Tx CDR loss of lock alarm	Transmit clock and data recovery (CDR) loss of lock. Loss of lock on the transmit side of the CDR. Displays on or off .
Rx not ready alarm	Any condition leading to invalid data on the receive path. Displays on or off .
Rx loss of signal alarm	Receive Loss of Signal alarm. When on , indicates insufficient optical input power to the module. Displays on or off .
Rx CDR loss of lock alarm	Receive CDR loss of lock. Loss of lock on the receive side of the CDR. Displays on or off .

Table 9: show interfaces diagnostics optics Output Fields for 10-Gigabit Ethernet XFP Transceivers (continued)

Field Name	Field Description
Laser bias current high alarm threshold	Vendor-specified threshold for the laser bias current high alarm: 130.000 mA .
Laser bias current low alarm threshold	Vendor-specified threshold for the laser bias current low alarm: 10.000 mA .
Laser bias current high warning threshold	Vendor-specified threshold for the laser bias current high warning: 120.000 mA .
Laser bias current low warning threshold	Vendor-specified threshold for the laser bias current low warning: 12.000 mA .
Laser output power high alarm threshold	Vendor-specified threshold for the laser output power high alarm: 0.8910 mW or -0.50 dBm .
Laser output power low alarm threshold	Vendor-specified threshold for the laser output power low alarm: 0.2230 mW or -6.52 dBm .
Laser output power high warning threshold	Vendor-specified threshold for the laser output power high warning: 0.7940 mW or -100 dBm .
Laser output power low warning threshold	Vendor-specified threshold for the laser output power low warning: 0.2510 mW or -600 dBm .
Module temperature high alarm threshold	Vendor-specified threshold for the module temperature high alarm: 90° C or 194° F .
Module temperature low alarm threshold	Vendor-specified threshold for the module temperature low alarm: -5° C or 23° F .
Module temperature high warning threshold	Vendor-specified threshold for the module temperature high warning: 85 ° C or 185 ° F .
Module temperature low warning threshold	Vendor-specified threshold for the module temperature low warning: 0° C or 32° F .
Laser rx power high alarm threshold	Vendor-specified threshold for the laser Rx power high alarm: 1.2589 mW or 1.00 dBm .
Laser rx power low alarm threshold	Vendor-specified threshold for the laser Rx power low alarm: 0.0323 mW or -14.91 dBm .
Laser rx power high warning threshold	Vendor-specified threshold for the laser Rx power high warning: 1.1220 mW or 0.50 dBm .
Laser rx power low warning threshold	Vendor-specified threshold for the laser Rx power low warning: 0.0363 mW or -14.40 dBm .

Sample Output

show interfaces diagnostics optics (DWDM and DWDM OTN)

```

user@host> show interfaces diagnostics optics ge-5/0/0
Physical interface: ge-5/0/0
Laser bias current           : 79.938 mA
Laser output power          : 1.592 mW / 2.02 dBm
Receiver signal average optical power : 1.3854 mW / 1.42 dBm
Laser end-of-life alarm     : Off
Laser wavelength alarm      : Off
Laser bias current alarm    : Off
Laser temperature alarm     : Off
Laser power alarm           : Off
Modulator temperature alarm : Off
Modulator bias alarm        : Off
Tx multiplexer FIFO error alarm : Off
Tx loss of PLL lock alarm   : Off
Rx loss of average optical power alarm: Off
Rx loss of AC power alarm   : Off
Rx loss of PLL lock alarm   : Off

```

show interfaces diagnostics optics (Bidirectional SFP)

```

user@host> show interfaces diagnostics optics ge-3/0/6
Physical interface: ge-3/0/6
Laser bias current           : 13.356 mA
Laser output power          : 0.2210 mW / -6.56 dBm
Module temperature          : 36 degrees C / 96 degrees F
Module voltage              : 3.2180 V
Receiver signal average optical power : 0.2429 mW / -6.15 dBm
Laser bias current high alarm : Off
Laser bias current low alarm  : Off
Laser bias current high warning : Off
Laser bias current low warning : Off
Laser 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 : 70.000 mA
Laser bias current low alarm threshold : 0.002 mA
Laser bias current high warning threshold : 65.000 mA
Laser bias current low warning threshold : 0.002 mA
Laser output power high alarm threshold : 1.0000 mW / 0.00 dBm
Laser output power low alarm threshold : 0.0560 mW / -12.52 dBm
Laser output power high warning threshold : 0.6300 mW / -2.01 dBm
Laser output power low warning threshold : 0.0890 mW / -10.51 dBm
Module temperature high alarm threshold : 100 degrees C / 212 degrees F
Module temperature low alarm threshold : -50 degrees C / -58 degrees F

```

```

Module temperature high warning threshold : 95 degrees C / 203 degrees F
Module temperature low warning threshold : -48 degrees C / -54 degrees F
Module voltage high alarm threshold      : 3.700 V
Module voltage low alarm threshold       : 2.900 V
Module voltage high warning threshold    : 3.600 V
Module voltage low warning threshold     : 3.000 V
Laser rx power high alarm threshold      : 1.9953 mW / 3.00 dBm
Laser rx power low alarm threshold       : 0.0001 mW / -40.00 dBm
Laser rx power high warning threshold    : 1.0000 mW / 0.00 dBm
Laser rx power low warning threshold     : 0.0010 mW / -30.00 dBm

```

show interfaces diagnostics optics (SFP)

```
user@host> show interfaces diagnostics optics ge-0/3/0
```

```
Physical interface: ge-0/3/0
```

```

Laser bias current          : 23.408 mA
Laser output power          : 1.479 mW / 1.70 dBm
Module temperature          : 37 degrees C / 99 degrees F
Laser rx power              : 0.121 mW / -9.16 dBm
Laser bias current high alarm : Off
Laser bias current low alarm  : Off
Laser output power high alarm : Off
Laser output power low alarm  : Off
Module temperature high alarm : Off
Module temperature low alarm  : Off
Laser rx power high alarm     : Off
Laser rx power low alarm      : Off
Laser bias current high warning : Off
Laser bias current low warning : Off
Laser output power high warning : Off
Laser output power low warning : Off
Module temperature high warning : Off
Module temperature low warning : Off
Laser rx power high warning    : Off
Laser rx power low warning     : Off
Laser bias current high alarm threshold : 31.000 mA
Laser bias current low alarm threshold  : 10.000 mA
Laser output power high alarm threshold : 6.000 mW / 7.78 dBm
Laser output power low alarm threshold  : 0.100 mW / -10.00 dBm
Module temperature high alarm threshold : 85 degrees C / 185 degrees F
Module temperature low alarm threshold  : 0 degrees C / 32 degrees F
Laser rx power high alarm threshold     : 1.000 mW / 0.00 dBm
Laser rx power low alarm threshold       : 0.001 mW / -30.00 dBm
Laser bias current high warning threshold : 28.000 mA
Laser bias current low warning threshold  : 11.000 mA
Laser output power high warning threshold : 5.000 mW / 6.99 dBm
Laser output power low warning threshold  : 0.500 mW / -3.01 dBm
Module temperature high warning threshold : 70 degrees C / 158 degrees F
Module temperature low warning threshold  : 10 degrees C / 50 degrees F
Laser rx power high warning threshold     : 0.501 mW / -3.00 dBm
Laser rx power low warning threshold       : 0.001 mW / -28.86 dBm

```

show interfaces diagnostics optics (SFP)

```
user@host> show interfaces diagnostics optics ge-1/0/0
```

```
Physical interface: ge-1/0/0
```

```

Laser bias current          : 49.010 mA
Laser output power          : 1.263 mW / 1.01 dBm
Module temperature          : 17 degrees C / 62 degrees F

Module voltage              : 4.21 V

```

```

Laser rx power : 0.060 mW / -12.21 dBm
Laser bias current high alarm : Off
Laser bias current low alarm : Off
Laser output power high alarm : Off
Laser output power low alarm : Off
Module temperature high alarm : Off
Module temperature low alarm : Off
Module voltage high alarm : Off
Module voltage low alarm : Off
Laser rx power high alarm : Off
Laser rx power low alarm : Off
Laser bias current high warning : Off
Laser bias current low warning : Off
Laser output power high warning : Off
Laser output power low warning : Off
Module temperature high warning : Off
Module temperature low warning : Off
Module voltage high warning : Off
Module voltage low warning : Off
Laser rx power high warning : Off
Laser rx power low warning : Off
Laser bias current high alarm threshold : 70.000 mA
Laser bias current low alarm threshold : 20.000 mA
Laser bias current high warning threshold : 65.000 mA
Laser bias current low warning threshold : 25.000 mA
Laser output power high alarm threshold : 1.4120 mW / 1.50 dBm
Laser output power low alarm threshold : 0.1990 mW / -7.01 dBm
Laser output power high warning threshold : 1.2580 mW / 1.00 dBm
Laser output power low warning threshold : 0.2230 mW / -6.52 dBm
Module temperature high alarm threshold : 78 degrees C / 172 degrees F

Module temperature low alarm threshold : 13 degrees C / 9 degrees F
Module temperature high warning threshold : 75 degrees C / 167 degrees F

Module temperature low warning threshold : 10 degrees C / 14 degrees F

Module voltage high alarm threshold : 5.71 V
Module voltage low alarm threshold : 2.05 V
Module voltage high warning threshold : 5.20 V
Module voltage low warning threshold : 3.11 V
Laser rx power high alarm threshold : 1.7783 mW / 2.50 dBm
Laser rx power low alarm threshold : 0.0100 mW / -20.00 dBm
Laser rx power high warning threshold : 1.5849 mW / 2.00 dBm
Laser rx power low warning threshold : 0.0158 mW / -18.01 dBm

```

show interfaces diagnostics optics (XFP and CFP Optics)

```

user@host> show interfaces diagnostics optics xe-2/1/0
Physical interface: xe-2/1/0
Laser bias current : 52.060 mA
Laser output power : 0.5640 mW / -2.49 dBm
Module temperature : 31 degrees C / 88 degrees F
Laser rx power : 0.0844 mW / -10.74 dBm
Laser bias current high alarm : Off
Laser bias current low alarm : Off
Laser bias current high warning : Off
Laser bias current low warning : Off
Laser output power high alarm : Off
Laser output power low alarm : Off
Laser output power high warning : Off
Laser output power low warning : Off

```

```

Module temperature high alarm      : Off
Module temperature low alarm       : Off
Module temperature high warning    : Off
Module temperature low warning     : Off
Laser rx power high alarm          : Off
Laser rx power low alarm           : Off
Laser rx power high warning        : Off
Laser rx power low warning         : Off
Module not ready alarm             : Off
Module power down alarm            : Off
Tx data not ready alarm            : Off
Tx not ready alarm                 : Off
Tx laser fault alarm               : Off
Tx CDR loss of lock alarm          : Off
Rx not ready alarm                 : Off
Rx loss of signal alarm            : Off
Rx CDR loss of lock alarm          : Off
Laser bias current high alarm threshold : 130.000 mA
Laser bias current low alarm threshold : 10.000 mA
Laser bias current high warning threshold : 120.000 mA
Laser bias current low warning threshold : 12.000 mA
Laser output power high alarm threshold : 0.8910 mW / -0.50 dBm
Laser output power low alarm threshold : 0.2230 mW / -6.52 dBm
Laser output power high warning threshold : 0.7940 mW / -1.00 dBm
Laser output power low warning threshold : 0.2510 mW / -6.00 dBm
Module temperature high alarm threshold : 90 degrees C / 194 degrees F
Module temperature low alarm threshold : -5 degrees C / 23 degrees F
Module temperature high warning threshold : 85 degrees C / 185 degrees F
Module temperature low warning threshold : 0 degrees C / 32 degrees F
Laser rx power high alarm threshold : 1.2589 mW / 1.00 dBm
Laser rx power low alarm threshold : 0.0323 mW / -14.91 dBm
Laser rx power high warning threshold : 1.1220 mW / 0.50 dBm
Laser rx power low warning threshold : 0.0363 mW / -14.40 dBm

```

show interfaces diagnostics optics for 10-Gigabit Ethernet (PTX 24-10GE-SFPP)

```
user@host> show interfaces diagnostics optics et-2/0/23
```

```
Physical interface: et-2/0/23
```

```

Laser bias current      : 8.482 mA
Laser output power      : 0.5890 mW / -2.30 dBm
Module temperature      : 51 degrees C / 123 degrees F
Module voltage          : 3.2970 V
Receiver signal average optical power : 0.5574 mW / -2.54 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 : 11.800 mA
Laser bias current low alarm threshold  : 4.000 mA
Laser bias current high warning threshold : 10.800 mA
Laser bias current low warning threshold : 5.000 mA
Laser output power high alarm threshold : 0.8310 mW / -0.80 dBm
Laser output power low alarm threshold  : 0.2510 mW / -6.00 dBm
Laser output power high warning threshold : 0.6600 mW / -1.80 dBm
Laser output power low warning threshold : 0.3160 mW / -5.00 dBm
Module temperature high alarm threshold : 93 degrees C / 199 degrees F
Module temperature low alarm threshold  : -13 degrees C / 9 degrees F
Module temperature high warning threshold : 88 degrees C / 190 degrees F
Module temperature low warning threshold : -8 degrees C / 18 degrees F
Module voltage high alarm threshold     : 3.700 V
Module voltage low alarm threshold      : 2.900 V
Module voltage high warning threshold   : 3.600 V
Module voltage low warning threshold    : 3.000 V
Laser rx power high alarm threshold    : 1.0000 mW / 0.00 dBm
Laser rx power low alarm threshold     : 0.0100 mW / -20.00 dBm
Laser rx power high warning threshold  : 0.7943 mW / -1.00 dBm
Laser rx power low warning threshold   : 0.0158 mW / -18.01 dBm

```

show interfaces diagnostics optics for 40-Gigabit Ethernet

```

user@host> show interfaces diagnostics optics et-7/1/0
Physical interface: et-7/1/0
Module temperature      : 34 degrees C / 94 degrees F
Module voltage          : 3.4720 V
Module temperature high alarm : Off
Module temperature low alarm  : Off
Module temperature high warning : Off
Module temperature low warning : Off
Module voltage high alarm    : Off
Module voltage low alarm     : Off
Module voltage high warning  : Off
Module voltage low warning   : Off
Module not ready alarm      : Off
Module low power alarm      : Off
Module initialization incomplete alarm : Off
Module fault alarm         : Off
PLD Flash initialization fault alarm : Off
Power supply fault alarm   : Off
Checksum fault alarm       : Off
Tx laser disabled alarm    : Off
Tx loss of signal functionality alarm : Off
Tx CDR loss of lock alarm  : Off
Rx loss of signal alarm    : Off
Rx CDR loss of lock alarm  : Off
Module temperature high alarm threshold : 80 degrees C / 176 degrees F
Module temperature low alarm threshold  : -10 degrees C / 14 degrees F
Module temperature high warning threshold : 75 degrees C / 167 degrees F
Module temperature low warning threshold : -5 degrees C / 23 degrees F
Module voltage high alarm threshold     : 3.5990 V
Module voltage low alarm threshold      : 3.0000 V
Module voltage high warning threshold   : 3.5000 V
Module voltage low warning threshold    : 3.0990 V
Laser bias current high alarm threshold : 100.000 mA
Laser bias current low alarm threshold  : 10.000 mA
Laser bias current high warning threshold : 80.000 mA

```

```

Laser bias current low warning threshold : 15.000 mA
Laser output power high alarm threshold : 2.8180 mW / 4.50 dBm
Laser output power low alarm threshold : 0.2390 mW / -6.22 dBm
Laser output power high warning threshold : 2.2380 mW / 3.50 dBm
Laser output power low warning threshold : 0.3010 mW / -5.21 dBm
Laser rx power high alarm threshold : 2.5119 mW / 4.00 dBm
Laser rx power low alarm threshold : 0.0316 mW / -15.00 dBm
Laser rx power high warning threshold : 1.9953 mW / 3.00 dBm
Laser rx power low warning threshold : 0.0631 mW / -12.00 dBm
Laser temperature high alarm threshold : 80 degrees C / 176 degrees F
Laser temperature low alarm threshold : -10 degrees C / 14 degrees F
Laser temperature high warning threshold : 75 degrees C / 167 degrees F
Laser temperature low warning threshold : -5 degrees C / 23 degrees F
Lane 0
Laser bias current : 27.829 mA
Laser output power : 0.851 mW / -0.70 dBm
Laser temperature : 34 degrees C / 94 degrees F
Laser receiver power : 0.894 mW / -0.49 dBm
Laser bias current high alarm : Off
Laser bias current low alarm : Off
Laser bias current high warning : Off
Laser bias current low warning : Off
Laser output power high alarm : Off
Laser output power low alarm : Off
Laser output power high warning : Off
Laser output power low warning : Off
Laser temperature high alarm : Off
Laser temperature low alarm : Off
Laser temperature high warning : Off
Laser temperature low warning : Off
Laser receiver power high alarm : Off
Laser receiver power low alarm : Off
Laser receiver power high warning : Off
Laser receiver power low warning : Off
Tx loss of signal functionality alarm : Off
Tx CDR loss of lock alarm : Off
Rx loss of signal alarm : Off
Rx CDR loss of lock alarm : Off
APD supply fault alarm : Off
TEC fault alarm : Off
Wavelength unlocked alarm : Off
Lane 1
Laser bias current : 35.374 mA
Laser output power : 0.896 mW / -0.48 dBm
Laser temperature : 34 degrees C / 94 degrees F
Laser receiver power : 0.707 mW / -1.50 dBm
Laser bias current high alarm : Off
Laser bias current low alarm : Off
Laser bias current high warning : Off
Laser bias current low warning : Off
Laser output power high alarm : Off
Laser output power low alarm : Off
Laser output power high warning : Off
Laser output power low warning : Off
Laser temperature high alarm : Off
Laser temperature low alarm : Off
Laser temperature high warning : Off
Laser temperature low warning : Off
Laser receiver power high alarm : Off
Laser receiver power low alarm : Off
Laser receiver power high warning : Off

```

```

Laser receiver power low warning      : Off
Tx loss of signal functionality alarm  : Off
Tx CDR loss of lock alarm             : Off
Rx loss of signal alarm               : Off
Rx CDR loss of lock alarm             : Off
APD supply fault alarm                : Off
TEC fault alarm                      : Off
Wavelength unlocked alarm            : Off
Lane 2
Laser bias current                   : 29.173 mA
Laser output power                   : 0.890 mW / -0.51 dBm
Laser temperature                    : 34 degrees C / 94 degrees F
Laser receiver power                 : 0.704 mW / -1.52 dBm
Laser bias current high alarm        : Off
Laser bias current low alarm         : Off
Laser bias current high warning      : Off
Laser bias current low warning       : Off
Laser output power high alarm        : Off
Laser output power low alarm         : Off
Laser output power high warning      : Off
Laser output power low warning       : Off
Laser temperature high alarm         : Off
Laser temperature low alarm          : Off
Laser temperature high warning       : Off
Laser temperature low warning        : Off
Laser receiver power high alarm      : Off
Laser receiver power low alarm       : Off
Laser receiver power high warning    : Off
Laser receiver power low warning     : Off
Tx loss of signal functionality alarm : Off
Tx CDR loss of lock alarm            : Off
Rx loss of signal alarm              : Off
Rx CDR loss of lock alarm            : Off
APD supply fault alarm               : Off
TEC fault alarm                     : Off
Wavelength unlocked alarm            : Off
Lane 3
Laser bias current                   : 36.164 mA
Laser output power                   : 0.899 mW / -0.46 dBm
Laser temperature                    : 34 degrees C / 94 degrees F
Laser receiver power                 : 0.892 mW / -0.50 dBm
Laser bias current high alarm        : Off
Laser bias current low alarm         : Off
Laser bias current high warning      : Off
Laser bias current low warning       : Off
Laser output power high alarm        : Off
Laser output power low alarm         : Off
Laser output power high warning      : Off
Laser output power low warning       : Off
Laser temperature high alarm         : Off
Laser temperature low alarm          : Off
Laser temperature high warning       : Off
Laser temperature low warning        : Off
Laser receiver power high alarm      : Off
Laser receiver power low alarm       : Off
Laser receiver power high warning    : Off
Laser receiver power low warning     : Off
Tx loss of signal functionality alarm : Off
Tx CDR loss of lock alarm            : Off
Rx loss of signal alarm              : Off
Rx CDR loss of lock alarm            : Off

```

APD supply fault alarm	: Off
TEC fault alarm	: Off
Wavelength unlocked alarm	: Off

show interfaces (Fast Ethernet)

Syntax	<pre>show interfaces <i>interface-type</i> <brief detail extensive terse> <descriptions> <media> <snmp-index <i>snmp-index</i>> <statistics></pre>
Release Information	Command introduced before Junos OS Release 7.4.
Description	Display status information about the specified Fast Ethernet interface.
Options	<p><i>interface-type</i>—On M Series and T Series routers, the interface type is <i>fe-fpc/pic/port</i>. On the J Series routers, the interface type is <i>fe-pim/O/port</i>.</p> <p><i>brief detail extensive terse</i>—(Optional) Display the specified level of output.</p> <p><i>descriptions</i>—(Optional) Display interface description strings.</p> <p><i>media</i>—(Optional) Display media-specific information about network interfaces.</p> <p><i>snmp-index snmp-index</i>—(Optional) Display information for the specified SNMP index of the interface.</p> <p><i>statistics</i>—(Optional) Display static interface statistics.</p>
Required Privilege Level	view
List of Sample Output	<p>show interfaces (Fast Ethernet) on page 111</p> <p>show interfaces brief (Fast Ethernet) on page 112</p> <p>show interfaces detail (Fast Ethernet) on page 112</p> <p>show interfaces extensive (Fast Ethernet) on page 112</p>
Output Fields	<p>Table 10 on page 98 lists the output fields for the show interfaces Fast Ethernet command. Output fields are listed in the approximate order in which they appear.</p>

Table 10: show interfaces Fast Ethernet Output Fields

Field Name	Field Description	Level of Output
Physical Interface		
Physical interface	Name of the physical interface.	All levels
Enabled	State of the interface. Possible values are described in the “Enabled Field” section under <i>Common Output Fields Description</i> .	All levels
Interface index	Index number of the physical interface, which reflects its initialization sequence.	detail extensive none
SNMP ifIndex	SNMP index number for the physical interface.	detail extensive none

Table 10: show interfaces Fast Ethernet Output Fields (*continued*)

Field Name	Field Description	Level of Output
Generation	Unique number for use by Juniper Networks technical support only.	detail extensive
Link-level type	Encapsulation being used on the physical interface.	All levels
MTU	Maximum transmission unit size on the physical interface.	All levels
Link-mode	Type of link connection configured for the physical interface: Full-duplex or Half-duplex	extensive
Speed	Speed at which the interface is running.	All levels
Loopback	Loopback status: Enabled or Disabled . If loopback is enabled, type of loopback: Local or Remote .	All levels
Source filtering	Source filtering status: Enabled or Disabled .	All levels
LAN-PHY mode	10-Gigabit Ethernet interface operating in Local Area Network Physical Layer Device (LAN PHY) mode. LAN PHY allows 10-Gigabit Ethernet wide area links to use existing Ethernet applications.	All levels
WAN-PHY mode	10-Gigabit Ethernet interface operating in Wide Area Network Physical Layer Device (WAN PHY) mode. WAN PHY allows 10-Gigabit Ethernet wide area links to use fiber-optic cables and other devices intended for SONET/SDH.	All levels
Unidirectional	Unidirectional link mode status for 10-Gigabit Ethernet interface: Enabled or Disabled for parent interface; Rx-only or Tx-only for child interfaces.	All levels
Flow control	Flow control status: Enabled or Disabled .	All levels
Auto-negotiation	(Gigabit Ethernet interfaces) Autonegotiation status: Enabled or Disabled .	All levels
Remote-fault	(Gigabit Ethernet interfaces) Remote fault status: <ul style="list-style-type: none"> • Online—Autonegotiation is manually configured as online. • Offline—Autonegotiation is manually configured as offline. 	All levels
Device flags	Information about the physical device. Possible values are described in the "Device Flags" section under <i>Common Output Fields Description</i> .	All levels
Interface flags	Information about the interface. Possible values are described in the "Interface Flags" section under <i>Common Output Fields Description</i> .	All levels
Link flags	Information about the link. Possible values are described in the "Links Flags" section under <i>Common Output Fields Description</i> .	All levels
Wavelength	(10-Gigabit Ethernet dense wavelength-division multiplexing [DWDM] interfaces) Displays the configured wavelength, in nanometers (nm).	All levels

Table 10: show interfaces Fast Ethernet Output Fields (*continued*)

Field Name	Field Description	Level of Output
Frequency	(10-Gigabit Ethernet DWDM interfaces only) Displays the frequency associated with the configured wavelength, in terahertz (THz).	All levels
CoS queues	Number of CoS queues configured.	detail extensive none
Schedulers	(GigabitEthernet intelligent queuing 2 (IQ2) interfaces only) Number of CoS schedulers configured.	extensive
Hold-times	Current interface hold-time up and hold-time down, in milliseconds.	detail extensive
Current address	Configured MAC address.	detail extensive none
Hardware address	Hardware MAC address.	detail extensive none
Last flapped	Date, time, and how long ago the interface went from down to up. The format is Last flapped: year-month-day hour:minute:second:timezone (hour:minute:second ago) . For example, Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago) .	detail extensive none
Input Rate	Input rate in bits per second (bps) and packets per second (pps).	None specified
Output Rate	Output rate in bps and pps.	None specified
Statistics last cleared	Time when the statistics for the interface were last set to zero.	detail extensive
Traffic statistics	<p>Number and rate of bytes and packets received and transmitted on the physical interface.</p> <ul style="list-style-type: none"> • Input bytes—Number of bytes received on the interface • Output bytes—Number of bytes transmitted on the interface. • Input packets—Number of packets received on the interface. • Output packets—Number of packets transmitted on the interface. <p>Gigabit Ethernet and 10-Gigabit Ethernet IQ PICs count the overhead and CRC bytes.</p> <p>For Gigabit Ethernet IQ PICs, the input byte counts vary by interface type. For more information, see Table 31 under the show interfaces (10-Gigabit Ethernet) command.</p>	detail extensive

Table 10: show interfaces Fast Ethernet Output Fields (*continued*)

Field Name	Field Description	Level of Output
Input errors	<p>Input errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> • Errors—Sum of the incoming frame aborts and FCS errors. • Drops—Number of packets dropped by the input queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism. • Framing errors—Number of packets received with an invalid frame checksum (FCS). • Runts—Number of frames received that are smaller than the runt threshold. • 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. • L3 incompletes—Number of incoming packets discarded because they failed Layer 3 (usually IPv4) 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 by configuring the ignore-l3-incompletes statement. • L2 channel errors—Number of times the software did not find a valid logical interface for an incoming frame. • L2 mismatch timeouts—Number of malformed or short packets that caused the incoming packet handler to discard the frame as unreadable. • 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. • Resource errors—Sum of transmit drops. 	extensive

Table 10: show interfaces Fast Ethernet Output Fields (*continued*)

Field Name	Field Description	Level of Output
Output errors	<p>Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> • Carrier transitions—Number of times the interface has gone from down to up. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and then up, or another problem occurs. If the number of carrier transitions increments quickly (perhaps once every 10 seconds), the cable, the far-end system, or the PIC or PIM is malfunctioning. • Errors—Sum of the outgoing frame aborts and FCS errors. • Drops—Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism. • Collisions—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. • Aged packets—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. • FIFO errors—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. • HS link CRC errors—Number of errors on the high-speed links between the ASICs responsible for handling the router interfaces. • MTU errors—Number of packets whose size exceeded the MTU of the interface. • Resource errors—Sum of transmit drops. 	extensive
Egress queues	Total number of egress queues supported on the specified interface.	detail extensive
Queue counters (Egress)	<p>CoS queue number and its associated user-configured forwarding class name.</p> <ul style="list-style-type: none"> • Queued packets—Number of queued packets. • Transmitted packets—Number of transmitted packets. • Dropped packets—Number of packets dropped by the ASIC's RED mechanism. 	detail extensive
Ingress queues	Total number of ingress queues supported on the specified interface. Displayed on IQ2 interfaces.	extensive
Queue counters (Ingress)	<p>CoS queue number and its associated user-configured forwarding class name. Displayed on IQ2 interfaces.</p> <ul style="list-style-type: none"> • Queued packets—Number of queued packets. • Transmitted packets—Number of transmitted packets. • Dropped packets—Number of packets dropped by the ASIC's RED mechanism. 	extensive

Table 10: show interfaces Fast Ethernet Output Fields (*continued*)

Field Name	Field Description	Level of Output
Active alarms and Active defects	<p>Ethernet-specific defects that can prevent the interface from passing packets. When a defect persists for a certain amount of time, it is promoted to an alarm. Based on the routing device configuration, an alarm can ring the red or yellow alarm bell on the routing device, or turn on the red or yellow alarm LED on the craft interface. These fields can contain the value None or Link.</p> <ul style="list-style-type: none"> • None—There are no active defects or alarms. • Link—Interface has lost its link state, which usually means that the cable is unplugged, the far-end system has been turned off, or the PIC is malfunctioning. 	detail extensive none
OTN FEC statistics	<p>The forward error correction (FEC) counters provide the following statistics:</p> <ul style="list-style-type: none"> • Corrected Errors—The count of corrected errors in the last second. • Corrected Error Ratio—The corrected error ratio in the last 25 seconds. For example, 1e-7 is 1 error per 10 million bits. 	
PCS statistics	<p>(10-Gigabit Ethernet interfaces) Displays Physical Coding Sublayer (PCS) fault conditions from the WAN PHY or the LAN PHY device.</p> <ul style="list-style-type: none"> • Bit errors—High bit error rate. Indicates the number of bit errors when the PCS receiver is operating in normal mode. • Errored blocks—Loss of block lock. The number of errored blocks when PCS receiver is operating in normal mode. 	detail extensive

Table 10: show interfaces Fast Ethernet Output Fields (*continued*)

Field Name	Field Description	Level of Output
MAC statistics	<p>Receive and Transmit statistics reported by the PIC's MAC subsystem, including the following:</p> <ul style="list-style-type: none"> • Total octets and total packets—Total number of octets and packets. For Gigabit Ethernet IQ PICs, the received octets count varies by interface type. For more information, see Table 31 under the show interfaces (10-Gigabit Ethernet) command. • Unicast packets, Broadcast packets, and Multicast packets—Number of unicast, broadcast, and multicast packets. • CRC/Align errors—Total number of packets received that had a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, and had either a bad FCS with an integral number of octets (FCS Error) or a bad FCS with a nonintegral number of octets (Alignment Error). • FIFO error—Number of FIFO errors that are reported by the ASIC on the PIC. If this value is ever nonzero, the PIC or a cable is probably malfunctioning. • MAC control frames—Number of MAC control frames. • MAC pause frames—Number of MAC control frames with pause operational code. • Oversized frames—Number of frames that exceed 1518 octets. • Jabber frames—Number of frames that were longer than 1518 octets (excluding framing bits, but including FCS octets), and had either an FCS error or an alignment error. This definition of jabber is different from the definition in IEEE-802.3 section 8.2.1.5 (10BASE5) and section 10.3.1.4 (10BASE2). These documents define jabber as the condition in which any packet exceeds 20 ms. The allowed range to detect jabber is from 20 ms to 150 ms. • Fragment frames—Total number of packets that were less than 64 octets in length (excluding framing bits, but including FCS octets), and had either an FCS error or an alignment error. Fragment frames normally increment because both runts (which are normal occurrences caused by collisions) and noise hits are counted. • VLAN tagged frames—Number of frames that are VLAN tagged. The system uses the TPID of 0x8100 in the frame to determine whether a frame is tagged or not. • Code violations—Number of times an event caused the PHY to indicate "Data reception error" or "invalid data symbol error." 	extensive
OTN Received Overhead Bytes	APS/PCC0: 0x02, APS/PCC1: 0x11, APS/PCC2: 0x47, APS/PCC3: 0x58 Payload Type: 0x08	extensive
OTN Transmitted Overhead Bytes	APS/PCC0: 0x00, APS/PCC1: 0x00, APS/PCC2: 0x00, APS/PCC3: 0x00 Payload Type: 0x08	extensive

Table 10: show interfaces Fast Ethernet Output Fields (*continued*)

Field Name	Field Description	Level of Output
Filter statistics	<p>Receive and Transmit statistics reported by the PIC's MAC address filter subsystem. The filtering is done by the content-addressable memory (CAM) on the PIC. The filter examines a packet's source and destination MAC addresses to determine whether the packet should enter the system or be rejected.</p> <ul style="list-style-type: none"> • Input packet count—Number of packets received from the MAC hardware that the filter processed. • Input packet rejects—Number of packets that the filter rejected because of either the source MAC address or the destination MAC address. • Input DA rejects—Number of packets that the filter rejected because the destination MAC address of the packet is not on the accept list. It is normal for this value to increment. When it increments very quickly and no traffic is entering the routing device from the far-end system, either there is a bad ARP entry on the far-end system, or multicast routing is not on and the far-end system is sending many multicast packets to the local routing device (which the routing device is rejecting). • Input SA rejects—Number of packets that the filter rejected because the source MAC address of the packet is not on the accept list. The value in this field should increment only if source MAC address filtering has been enabled. If filtering is enabled, if the value increments quickly, and if the system is not receiving traffic that it should from the far-end system, it means that the user-configured source MAC addresses for this interface are incorrect. • Output packet count—Number of packets that the filter has given to the MAC hardware. • Output packet pad count—Number of packets the filter padded to the minimum Ethernet size (60 bytes) before giving the packet to the MAC hardware. Usually, padding is done only on small ARP packets, but some very small IP packets can also require padding. If this value increments rapidly, either the system is trying to find an ARP entry for a far-end system that does not exist or it is misconfigured. • Output packet error count—Number of packets with an indicated error that the filter was given to transmit. These packets are usually aged packets or are the result of a bandwidth problem on the FPC hardware. On a normal system, the value of this field should not increment. • CAM destination filters, CAM source filters—Number of entries in the CAM dedicated to destination and source MAC address filters. There can only be up to 64 source entries. If source filtering is disabled, which is the default, the values for these fields should be 0. 	extensive
PMA PHY	<p>(10-Gigabit Ethernet interfaces, WAN PHY mode) SONET error information:</p> <ul style="list-style-type: none"> • Seconds—Number of seconds the defect has been active. • Count—Number of times that the defect has gone from inactive to active. • State—State of the error. Any state other than OK indicates a problem. <p>Subfields are:</p> <ul style="list-style-type: none"> • PHY Lock—Phase-locked loop • PHY Light—Loss of optical signal 	extensive

Table 10: show interfaces Fast Ethernet Output Fields (*continued*)

Field Name	Field Description	Level of Output
WIS section	<p>(10-Gigabit Ethernet interfaces, WAN PHY mode) SONET error information:</p> <ul style="list-style-type: none"> • Seconds—Number of seconds the defect has been active. • Count—Number of times that the defect has gone from inactive to active. • State—State of the error. Any state other than OK indicates a problem. <p>Subfields are:</p> <ul style="list-style-type: none"> • BIP-B1—Bit interleaved parity for SONET section overhead • SEF—Severely errored framing • LOL—Loss of light • LOF—Loss of frame • ES-S—Errored seconds (section) • SES-S—Severely errored seconds (section) • SEFS-S—Severely errored framing seconds (section) 	extensive
WIS line	<p>(10-Gigabit Ethernet interfaces, WAN PHY mode) Active alarms and defects, plus counts of specific SONET errors with detailed information.</p> <ul style="list-style-type: none"> • Seconds—Number of seconds the defect has been active. • Count—Number of times that the defect has gone from inactive to active. • State—State of the error. State other than OK indicates a problem. <p>Subfields are:</p> <ul style="list-style-type: none"> • BIP-B2—Bit interleaved parity for SONET line overhead • REI-L—Remote error indication (near-end line) • RDI-L—Remote defect indication (near-end line) • AIS-L—Alarm indication signal (near-end line) • BERR-SF—Bit error rate fault (signal failure) • BERR-SD—Bit error rate defect (signal degradation) • ES-L—Errored seconds (near-end line) • SES-L—Severely errored seconds (near-end line) • UAS-L—Unavailable seconds (near-end line) • ES-LFE—Errored seconds (far-end line) • SES-LFE—Severely errored seconds (far-end line) • UAS-LFE—Unavailable seconds (far-end line) 	extensive

Table 10: show interfaces Fast Ethernet Output Fields (*continued*)

Field Name	Field Description	Level of Output
WIS path	<p>(10-Gigabit Ethernet interfaces, WAN PHY mode) Active alarms and defects, plus counts of specific SONET errors with detailed information.</p> <ul style="list-style-type: none"> • Seconds—Number of seconds the defect has been active. • Count—Number of times that the defect has gone from inactive to active. • State—State of the error. Any state other than OK indicates a problem. <p>Subfields are:</p> <ul style="list-style-type: none"> • BIP-B3—Bit interleaved parity for SONET section overhead • REI-P—Remote error indication • LOP-P—Loss of pointer (path) • AIS-P—Path alarm indication signal • RDI-P—Path remote defect indication • UNEQ-P—Path unequipped • PLM-P—Path payload (signal) label mismatch • ES-P—Errored seconds (near-end STS path) • SES-P—Severely errored seconds (near-end STS path) • UAS-P—Unavailable seconds (near-end STS path) • SES-PFE—Severely errored seconds (far-end STS path) • UAS-PFE—Unavailable seconds (far-end STS path) 	extensive

Table 10: show interfaces Fast Ethernet Output Fields (*continued*)

Field Name	Field Description	Level of Output
Autonegotiation information	<p>Information about link autonegotiation.</p> <ul style="list-style-type: none"> • Negotiation status: <ul style="list-style-type: none"> • Incomplete—Ethernet interface has the speed or link mode configured. • No autonegotiation—Remote Ethernet interface has the speed or link mode configured, or does not perform autonegotiation. • Complete—Ethernet interface is connected to a device that performs autonegotiation and the autonegotiation process is successful. • Link partner status—OK when Ethernet interface is connected to a device that performs autonegotiation and the autonegotiation process is successful. • Link partner: <ul style="list-style-type: none"> • Link mode—Depending on the capability of the attached Ethernet device, either Full-duplex or Half-duplex. • Flow control—Types of flow control supported by the remote Ethernet device. For Fast Ethernet interfaces, the type is None. For Gigabit Ethernet interfaces, types are Symmetric (link partner supports PAUSE on receive and transmit), Asymmetric (link partner supports PAUSE on transmit), and Symmetric/Asymmetric (link partner supports both PAUSE on receive and transmit or only PAUSE receive). • Remote fault—Remote fault information from the link partner—Failure indicates a receive link error. OK indicates that the link partner is receiving. Negotiation error indicates a negotiation error. Offline indicates that the link partner is going offline. • Local resolution—Information from the link partner: <ul style="list-style-type: none"> • Flow control—Types of flow control supported by the remote Ethernet device. For Gigabit Ethernet interfaces, types are Symmetric (link partner supports PAUSE on receive and transmit), Asymmetric (link partner supports PAUSE on transmit), and Symmetric/Asymmetric (link partner supports both PAUSE on receive and transmit or only PAUSE receive). • Remote fault—Remote fault information. Link OK (no error detected on receive), Offline (local interface is offline), and Link Failure (link error detected on receive). 	extensive
Received path trace, Transmitted path trace	<p>(10-Gigabit Ethernet interfaces, WAN PHY mode) SONET/SDH interfaces allow path trace bytes to be sent inband across the SONET/SDH link. Juniper Networks and other routing device manufacturers use these bytes to help diagnose misconfigurations and network errors by setting the transmitted path trace message so that it contains the system hostname and name of the physical interface. The received path trace value is the message received from the routing device at the other end of the fiber. The transmitted path trace value is the message that this routing device transmits.</p>	extensive
Packet Forwarding Engine configuration	<p>Information about the configuration of the Packet Forwarding Engine:</p> <ul style="list-style-type: none"> • Destination slot—FPC slot number. 	extensive

Table 10: show interfaces Fast Ethernet Output Fields (*continued*)

Field Name	Field Description	Level of Output
CoS information	Information about the CoS queue for the physical interface. <ul style="list-style-type: none"> • CoS transmit queue—Queue number and its associated user-configured forwarding class name. • Bandwidth %—Percentage of bandwidth allocated to the queue. • Bandwidth bps—Bandwidth allocated to the queue (in bps). • Buffer %—Percentage of buffer space allocated to the queue. • Buffer usec—Amount of buffer space allocated to the queue, in microseconds. This value is nonzero only if the buffer size is configured in terms of time. • Priority—Queue priority: low or high. • Limit—Displayed if rate limiting is configured for the queue. Possible values are none and exact. If exact is configured, the queue transmits only up to the configured bandwidth, even if excess bandwidth is available. If none is configured, the queue transmits beyond the configured bandwidth if bandwidth is available. 	extensive
Logical Interface		
Logical interface	Name of the logical interface.	All levels
Index	Index number of the logical interface, which reflects its initialization sequence.	detail extensive none
SNMP ifIndex	SNMP interface index number for the logical interface.	detail extensive none
Generation	Unique number for use by Juniper Networks technical support only.	detail extensive
Flags	Information about the logical interface. Possible values are described in the “Logical Interface Flags” section under <i>Common Output Fields Description</i> .	All levels
VLAN-Tag	Rewrite profile applied to incoming or outgoing frames on the outer (Out) VLAN tag or for both the outer and inner (In) VLAN tags. <ul style="list-style-type: none"> • push—An outer VLAN tag is pushed in front of the existing VLAN tag. • pop—The outer VLAN tag of the incoming frame is removed. • swap—The outer VLAN tag of the incoming frame is overwritten with the user specified VLAN tag information. • push-pop—An outer VLAN tag is pushed in front of the existing VLAN tag, and then removed. • push-push—Two VLAN tags are pushed in from the incoming frame. • swap-push—The outer VLAN tag of the incoming frame is replaced by a user-specified VLAN tag value. A user-specified outer VLAN tag is pushed in front. The outer tag becomes an inner tag in the final frame. • swap-swap—Both the inner and the outer VLAN tags of the incoming frame are replaced by the user specified VLAN tag value. • pop-swap—The outer VLAN tag of the incoming frame is removed, and the inner VLAN tag of the incoming frame is replaced by the user-specified VLAN tag value. The inner tag becomes the outer tag in the final frame. • pop-pop—Both the outer and inner VLAN tags of the incoming frame are removed. 	brief detail extensive none

Table 10: show interfaces Fast Ethernet Output Fields (*continued*)

Field Name	Field Description	Level of Output
Demux:	IP demultiplexing (demux) value that appears if this interface is used as the demux underlying interface. The output is one of the following: <ul style="list-style-type: none"> Source Family Inet Destination Family Inet 	detail extensive none
Encapsulation	Encapsulation on the logical interface.	All levels
Protocol	Protocol family. Possible values are described in the "Protocol Field" section under <i>Common Output Fields Description</i> .	detail extensive none
MTU	Maximum transmission unit size on the logical interface.	detail extensive none
Maximum labels	Maximum number of MPLS labels configured for the MPLS protocol family on the logical interface.	detail extensive none
Traffic statistics	Number and rate of bytes and packets received and transmitted on the specified interface set. <ul style="list-style-type: none"> Input bytes, Output bytes—Number of bytes received and transmitted on the interface set Input packets, Output packets—Number of packets received and transmitted on the interface set. 	detail extensive
IPv6 transit statistics	Number of IPv6 transit bytes and packets received and transmitted on the logical interface if IPv6 statistics tracking is enabled.	extensive
Local statistics	Number and rate of bytes and packets destined to the routing device.	extensive
Transit statistics	Number and rate of bytes and packets transiting the switch. <p>NOTE: For Gigabit Ethernet intelligent queuing 2 (IQ2) interfaces, the logical interface egress statistics might not accurately reflect the traffic on the wire when output shaping is applied. Traffic management output shaping might drop packets after they are tallied by the Output bytes and Output packets interface counters. However, correct values display for both of these egress statistics when per-unit scheduling is enabled for the Gigabit Ethernet IQ2 physical interface, or when a single logical interface is actively using a shared scheduler.</p>	extensive
Generation	Unique number for use by Juniper Networks technical support only.	detail extensive
Route Table	Route table in which the logical interface address is located. For example, 0 refers to the routing table inet.0.	detail extensive none
Flags	Information about protocol family flags. Possible values are described in the "Family Flags" section under <i>Common Output Fields Description</i> .	detail extensive
Donor interface	(Unnumbered Ethernet) Interface from which an unnumbered Ethernet interface borrows an IPv4 address.	detail extensive none

Table 10: show interfaces Fast Ethernet Output Fields (*continued*)

Field Name	Field Description	Level of Output
Preferred source address	(Unnumbered Ethernet) Secondary IPv4 address of the donor loopback interface that acts as the preferred source address for the unnumbered Ethernet interface.	detail extensive none
Input Filters	Names of any input filters applied to this interface. If you specify a precedence value for any filter in a dynamic profile, filter precedence values appear in parenthesis next to all interfaces.	detail extensive
Output Filters	Names of any output filters applied to this interface. If you specify a precedence value for any filter in a dynamic profile, filter precedence values appear in parenthesis next to all interfaces.	detail extensive
Mac-Validate Failures	Number of MAC address validation failures for packets and bytes. This field is displayed when MAC address validation is enabled for the logical interface.	detail extensive none
Addresses, Flags	Information about the address flags. Possible values are described in the “Addresses Flags” section under <i>Common Output Fields Description</i> .	detail extensive none
<i>protocol-family</i>	Protocol family configured on the logical interface. If the protocol is inet , the IP address of the interface is also displayed.	brief
Flags	Information about address flag (possible values are described in the “Addresses Flags” section under <i>Common Output Fields Description</i>).	detail extensive none
Destination	IP address of the remote side of the connection.	detail extensive none
Local	IP address of the logical interface.	detail extensive none
Broadcast	Broadcast address of the logical interface.	detail extensive none
Generation	Unique number for use by Juniper Networks technical support only.	detail extensive

Sample Output

show interfaces (Fast Ethernet)

```

user@host> show interfaces fe-0/0/0
Physical interface: fe-0/0/0, Enabled, Physical link is Up
  Interface index: 128, SNMP ifIndex: 22
  Link-level type: Ethernet, MTU: 1514, Speed: 100mbps, Loopback: Disabled,
  Source filtering: Disabled, Flow control: Enabled
  Device flags   : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000
  CoS queues     : 4 supported, 4 maximum usable queues
  Current address: 00:05:85:02:38:00, Hardware address: 00:05:85:02:38:00
  Last flapped   : 2006-01-20 14:50:58 PST (2w4d 00:44 ago)
  Input rate     : 0 bps (0 pps)
  Output rate    : 0 bps (0 pps)
  Active alarms  : None
  Active defects : None
  Logical interface fe-0/0/0.0 (Index 66) (SNMP ifIndex 198)
    Flags: SNMP-Traps Encapsulation: ENET2

```

```
Protocol inet, MTU: 1500
Flags: None
Addresses, Flags: Is-Preferred Is-Primary
Destination: 10.10.10/24, Local: 10.10.10.1, Broadcast: 10.10.10.255
```

show interfaces brief (Fast Ethernet)

```
user@host> show interfaces fe-0/0/0 brief
Physical interface: fe-0/0/0, Enabled, Physical link is Up
Link-level type: Ethernet, MTU: 1514, Speed: 100mbps, Loopback: Disabled,
Source filtering: Disabled, Flow control: Enabled
Device flags : Present Running
Interface flags: SNMP-Traps Internal: 0x4000
Logical interface fe-0/0/0.0
Flags: SNMP-Traps Encapsulation: ENET2
inet 10.10.10.1/24
```

show interfaces detail (Fast Ethernet)

```
user@host> show interfaces fe-0/0/0 detail
Physical interface: fe-0/0/0, Enabled, Physical link is Up
Interface index: 128, SNMP ifIndex: 22, Generation: 5391
Link-level type: Ethernet, MTU: 1514, Speed: 100mbps, Loopback: Disabled,
Source filtering: Disabled, Flow control: Enabled
Device flags : Present Running
Interface flags: SNMP-Traps Internal: 0x4000
CoS queues : 4 supported, 4 maximum usable queues
Hold-times : Up 0 ms, Down 0 ms
Current address: 00:05:85:02:38:00, Hardware address: 00:05:85:02:38:00
Last flapped : 2006-01-20 14:50:58 PST (2w4d 00:45 ago)
Statistics last cleared: Never
Traffic statistics:
Input bytes : 0 0 bps
Output bytes : 42 0 bps
Input packets: 0 0 pps
Output packets: 1 0 pps
Active alarms : None
Active defects : None
Logical interface fe-0/0/0.0 (Index 66) (SNMP ifIndex 198) (Generation 67)
Flags: SNMP-Traps Encapsulation: ENET2
Protocol inet, MTU: 1500, Generation: 105, Route table: 0
Flags: Is-Primary, Mac-Validate-Strict
Mac-Validate Failures: Packets: 0, Bytes: 0
Addresses, Flags: Is-Preferred Is-Primary
Destination: 10.10.10/24, Local: 10.10.10.1, Broadcast: 10.10.10.255,
Generation: 136
```

show interfaces extensive (Fast Ethernet)

```
user@host> show interfaces fe-0/0/0 extensive
Physical interface: fe-0/0/0, Enabled, Physical link is Up
Interface index: 128, SNMP ifIndex: 22, Generation: 5391
Link-level type: Ethernet, MTU: 1514, Link-mode: Full-duplex, Speed:
100mbps, Loopback: Disabled,
Source filtering: Disabled, Flow control: Enabled
Device flags : Present Running
Interface flags: SNMP-Traps Internal: 0x4000
CoS queues : 4 supported, 4 maximum usable queues
Hold-times : Up 0 ms, Down 0 ms
Current address: 00:05:85:02:38:00, Hardware address: 00:05:85:02:38:00
Last flapped : 2006-01-20 14:50:58 PST (2w4d 00:46 ago)
Statistics last cleared: Never
```

```

Traffic statistics:
Input bytes :          0          0 bps
Output bytes :         42          0 bps
Input packets:         0          0 pps
Output packets:        1          0 pps
Input errors:
  Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Policed discards: 0,
  L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0,
  FIFO errors: 0, Resource errors: 0
Output errors:
  Carrier transitions: 3, Errors: 0, Drops: 0, Collisions: 0, Aged packets: 0,

  FIFO errors: 0, HS link CRC errors: 0, MTU errors: 0, Resource errors: 0
Active alarms : None
Active defects : None
MAC statistics:
Total octets          Receive      Transmit
Total packets         0            1
Unicast packets       0            0
Broadcast packets     0            1
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   1
Output packet pad count 0
Output packet error count 0
CAM destination filters: 1, CAM source filters: 0
Autonegotiation information:
Negotiation status: Complete
Link partner:
  Link partner: Full-duplex, Flow control: None, Remote fault: Ok
Local resolution:
Packet Forwarding Engine configuration:
Destination slot: 0
CoS information:
      Bandwidth      Buffer Priority  Limit
      %             bps  %         usec
0 best-effort      95   950000000  95         0    low  none
3 network-control  5    50000000   5         0    low  none
Logical interface fe-0/0/0.0 (Index 66) (SNMP ifIndex 198) (Generation 67)
Flags: SNMP-Traps Encapsulation: ENET2
Protocol inet, MTU: 1500, Generation: 105, Route table: 0
Flags: None
Addresses, Flags: Is-Preferred Is-Primary
  Destination: 10.10.10/24, Local: 10.10.10.1, Broadcast: 10.10.10.255,
  Generation: 136

```

show interfaces (10-Gigabit Ethernet)

Syntax	<code>show interfaces <i>xe-fpc/pic/port</i></code> <code><brief detail extensive terse></code> <code><descriptions></code> <code><media></code> <code><snmp-index <i>snmp-index</i>></code> <code><statistics></code>
Release Information	Command introduced in Junos OS Release 8.0.
Description	(M320, M120, MX Series, and T Series routers and EX Series switches only) Display status information about the specified 10-Gigabit Ethernet interface.
Options	<p><code><i>xe-fpc/pic/port</i></code>—Display standard information about the specified 10-Gigabit Ethernet interface.</p> <p><code>brief detail extensive terse</code>—(Optional) Display the specified level of output.</p> <p><code>descriptions</code>—(Optional) Display interface description strings.</p> <p><code>media</code>—(Optional) Display media-specific information about network interfaces.</p> <p><code>snmp-index <i>snmp-index</i></code>—(Optional) Display information for the specified SNMP index of the interface.</p> <p><code>statistics</code>—(Optional) Display static interface statistics.</p>
Required Privilege Level	view
List of Sample Output	<p>show interfaces extensive (10-Gigabit Ethernet, LAN PHY Mode, IQ2) on page 129</p> <p>show interfaces extensive (10-Gigabit Ethernet, WAN PHY Mode) on page 132</p> <p>show interfaces extensive (10-Gigabit Ethernet, DWDM OTN PIC) on page 134</p> <p>show interfaces extensive (10-Gigabit Ethernet, LAN PHY Mode, Unidirectional Mode) on page 136</p> <p>show interfaces extensive (10-Gigabit Ethernet, LAN PHY Mode, Unidirectional Mode, Transmit-Only) on page 136</p> <p>show interfaces extensive (10-Gigabit Ethernet, LAN PHY Mode, Unidirectional Mode, Receive-Only) on page 137</p>
Output Fields	See Table 11 on page 115 for the output fields for the show interfaces (10-Gigabit Ethernet) command.

Table 11: show interfaces Gigabit Ethernet Output Fields

Field Name	Field Description	Level of Output
Physical Interface		
Physical interface	Name of the physical interface.	All levels
Enabled	State of the interface. Possible values are described in the “Enabled Field” section under <i>Common Output Fields Description</i> .	All levels
Interface index	Index number of the physical interface, which reflects its initialization sequence.	detail extensive none
SNMP ifIndex	SNMP index number for the physical interface.	detail extensive none
Generation	Unique number for use by Juniper Networks technical support only.	detail extensive
Link-level type	Encapsulation being used on the physical interface.	All levels
MTU	Maximum transmission unit size on the physical interface.	All levels
Speed	Speed at which the interface is running.	All levels
Loopback	Loopback status: Enabled or Disabled . If loopback is enabled, type of loopback: Local or Remote .	All levels
Source filtering	Source filtering status: Enabled or Disabled .	All levels
LAN-PHY mode	10-Gigabit Ethernet interface operating in Local Area Network Physical Layer Device (LAN PHY) mode. LAN PHY allows 10-Gigabit Ethernet wide area links to use existing Ethernet applications.	All levels
WAN-PHY mode	10-Gigabit Ethernet interface operating in Wide Area Network Physical Layer Device (WAN PHY) mode. WAN PHY allows 10-Gigabit Ethernet wide area links to use fiber-optic cables and other devices intended for SONET/SDH.	All levels
Unidirectional	Unidirectional link mode status for 10-Gigabit Ethernet interface: Enabled or Disabled for parent interface; Rx-only or Tx-only for child interfaces.	All levels
Flow control	Flow control status: Enabled or Disabled .	All levels
Auto-negotiation	(Gigabit Ethernet interfaces) Autonegotiation status: Enabled or Disabled .	All levels
Remote-fault	(Gigabit Ethernet interfaces) Remote fault status: <ul style="list-style-type: none"> • Online—Autonegotiation is manually configured as online. • Offline—Autonegotiation is manually configured as offline. 	All levels
Device flags	Information about the physical device. Possible values are described in the “Device Flags” section under <i>Common Output Fields Description</i> .	All levels
Interface flags	Information about the interface. Possible values are described in the “Interface Flags” section under <i>Common Output Fields Description</i> .	All levels

Table 11: show interfaces Gigabit Ethernet Output Fields (*continued*)

Field Name	Field Description	Level of Output	
Link flags	Information about the link. Possible values are described in the “Links Flags” section under <i>Common Output Fields Description</i> .	All levels	
Wavelength	(10-Gigabit Ethernet dense wavelength-division multiplexing [DWDM] interfaces) Displays the configured wavelength, in nanometers (nm).	All levels	
Frequency	(10-Gigabit Ethernet DWDM interfaces only) Displays the frequency associated with the configured wavelength, in terahertz (THz).	All levels	
CoS queues	Number of CoS queues configured.	detail extensive none	
Schedulers	(Gigabit Ethernet intelligent queuing 2 (IQ2) interfaces only) Number of CoS schedulers configured.	extensive	
Hold-times	Current interface hold-time up and hold-time down, in milliseconds.	detail extensive	
Current address	Configured MAC address.	detail extensive none	
Hardware address	Hardware MAC address.	detail extensive none	
Last flapped	Date, time, and how long ago the interface went from down to up. The format is Last flapped: year-month-day hour:minute:second:timezone (hour:minute:second ago) . For example, Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago) .	detail extensive none	
Input Rate	Input rate in bits per second (bps) and packets per second (pps). The value in this field also includes the Layer 2 overhead bytes for ingress traffic on Ethernet interfaces if you enable accounting of Layer 2 overhead at the PIC level or the logical interface level.	None specified	
Output Rate	Output rate in bps and pps. The value in this field also includes the Layer 2 overhead bytes for egress traffic on Ethernet interfaces if you enable accounting of Layer 2 overhead at the PIC level or the logical interface level.	None specified	
Statistics last cleared	Time when the statistics for the interface were last set to zero.	detail extensive	
Egress account overhead	Layer 2 overhead in bytes that is accounted in the interface statistics for egress traffic.	detail extensive	
Ingress account overhead	Layer 2 overhead in bytes that is accounted in the interface statistics for ingress traffic.	detail extensive	detail extensive

Table 11: show interfaces Gigabit Ethernet Output Fields (*continued*)

Field Name	Field Description	Level of Output
Traffic statistics	<p>Number and rate of bytes and packets received and transmitted on the physical interface.</p> <ul style="list-style-type: none"> • Input bytes—Number of bytes received on the interface. The value in this field also includes the Layer 2 overhead bytes for ingress traffic on Ethernet interfaces if you enable accounting of Layer 2 overhead at the PIC level or the logical interface level. • Output bytes—Number of bytes transmitted on the interface. The value in this field also includes the Layer 2 overhead bytes for egress traffic on Ethernet interfaces if you enable accounting of Layer 2 overhead at the PIC level or the logical interface level. • Input packets—Number of packets received on the interface. • Output packets—Number of packets transmitted on the interface. <p>Gigabit Ethernet and 10-Gigabit Ethernet IQ PICs count the overhead and CRC bytes.</p> <p>For Gigabit Ethernet IQ PICs, the input byte counts vary by interface type. For more information, see Table 11 on page 115.</p>	detail extensive
Input errors	<p>Input errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> • Errors—Sum of the incoming frame aborts and FCS errors. • Drops—Number of packets dropped by the input queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism. • Framing errors—Number of packets received with an invalid frame checksum (FCS). • Runts—Number of frames received that are smaller than the runt threshold. • 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. • L3 incompletes—Number of incoming packets discarded because they failed Layer 3 (usually IPv4) 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 by configuring the ignore-l3-incompletes statement. • L2 channel errors—Number of times the software did not find a valid logical interface for an incoming frame. • L2 mismatch timeouts—Number of malformed or short packets that caused the incoming packet handler to discard the frame as unreadable. • 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. • Resource errors—Sum of transmit drops. 	extensive

Table 11: show interfaces Gigabit Ethernet Output Fields (*continued*)

Field Name	Field Description	Level of Output
Output errors	<p>Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> • Carrier transitions—Number of times the interface has gone from down to up. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and then up, or another problem occurs. If the number of carrier transitions increments quickly (perhaps once every 10 seconds), the cable, the far-end system, or the PIC or PIM is malfunctioning. • Errors—Sum of the outgoing frame aborts and FCS errors. • Drops—Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism. • Collisions—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. • Aged packets—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. • FIFO errors—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. • HS link CRC errors—Number of errors on the high-speed links between the ASICs responsible for handling the router interfaces. • MTU errors—Number of packets whose size exceeded the MTU of the interface. • Resource errors—Sum of transmit drops. 	extensive
Egress queues	Total number of egress queues supported on the specified interface.	detail extensive
Queue counters (Egress)	<p>CoS queue number and its associated user-configured forwarding class name.</p> <ul style="list-style-type: none"> • Queued packets—Number of queued packets. • Transmitted packets—Number of transmitted packets. • Dropped packets—Number of packets dropped by the ASIC's RED mechanism. 	detail extensive
Ingress queues	Total number of ingress queues supported on the specified interface. Displayed on IQ2 interfaces.	extensive
Queue counters (Ingress)	<p>CoS queue number and its associated user-configured forwarding class name. Displayed on IQ2 interfaces.</p> <ul style="list-style-type: none"> • Queued packets—Number of queued packets. • Transmitted packets—Number of transmitted packets. • Dropped packets—Number of packets dropped by the ASIC's RED mechanism. 	extensive

Table 11: show interfaces Gigabit Ethernet Output Fields (*continued*)

Field Name	Field Description	Level of Output
Active alarms and Active defects	<p>Ethernet-specific defects that can prevent the interface from passing packets. When a defect persists for a certain amount of time, it is promoted to an alarm. Based on the routing device configuration, an alarm can ring the red or yellow alarm bell on the routing device, or turn on the red or yellow alarm LED on the craft interface. These fields can contain the value None or Link.</p> <ul style="list-style-type: none"> • None—There are no active defects or alarms. • Link—Interface has lost its link state, which usually means that the cable is unplugged, the far-end system has been turned off, or the PIC is malfunctioning. 	detail extensive none
OTN alarms	Active OTN alarms identified on the interface.	detail extensive
OTN defects	OTN defects received on the interface.	detail extensive
OTN FEC Mode	<p>The FECmode configured on the interface.</p> <ul style="list-style-type: none"> • efec—Enhanced forward error correction (EFEC) is configured to detect and correct bit errors. • gfec—G.709 Forward error correction (GFEC) mode is configured to detect and correct bit errors. • none—FEC mode is not configured. 	detail extensive
OTN Rate	<p>OTN mode.</p> <ul style="list-style-type: none"> • fixed-stuff-bytes—Fixed stuff bytes 11.0957 Gbps. • no-fixed-stuff-bytes—No fixed stuff bytes 11.0491 Gbps. • pass-through—Enable OTN passthrough mode. • no-pass-through—Do not enable OTN passthrough mode. 	detail extensive
OTN Line Loopback	Status of the line loopback, if configured for the DWDM OTN PIC. Its value can be: enabled or disabled .	detail extensive
OTN FEC statistics	<p>The forward error correction (FEC) counters for the DWDM OTN PIC.</p> <ul style="list-style-type: none"> • Corrected Errors—The count of corrected errors in the last second. • Corrected Error Ratio—The corrected error ratio in the last 25 seconds. For example, 1e-7 is 1 error per 10 million bits. 	detail extensive
OTN FEC alarms	<p>OTN FEC excessive or degraded error alarms triggered on the interface.</p> <ul style="list-style-type: none"> • FEC Degrade—OTU FEC Degrade defect. • FEC Excessive—OTU FEC Excessive Error defect. 	detail extensive
OTN OC	<p>OTN OC defects triggered on the interface.</p> <ul style="list-style-type: none"> • LOS—OC Loss of Signal defect. • LOF—OC Loss of Frame defect. • LOM—OC Loss of Multiframe defect. • Wavelength Lock—OC Wavelength Lock defect. 	detail extensive

Table 11: show interfaces Gigabit Ethernet Output Fields (*continued*)

Field Name	Field Description	Level of Output
OTN OTU	OTN OTU defects detected on the interface <ul style="list-style-type: none"> • AIS—OTN AIS alarm. • BDI—OTN OTU BDI alarm. • IAE—OTN OTU IAE alarm. • TTIM—OTN OTU TTIM alarm. • SF—OTN ODU bit error rate fault alarm. • SD—OTN ODU bit error rate defect alarm. • TCA-ES—OTN ODU ES threshold alarm. • TCA-SES—OTN ODU SES threshold alarm. • TCA-UAS—OTN ODU UAS threshold alarm. • TCA-BBE—OTN ODU BBE threshold alarm. • BIP—OTN ODU BIP threshold alarm. • BBE—OTN OTU BBE threshold alarm. • ES—OTN OTU ES threshold alarm. • SES—OTN OTU SES threshold alarm. • UAS—OTN OTU UAS threshold alarm. 	detail extensive
Received DAPI	Destination Access Port Interface (DAPI) from which the packets were received.	detail extensive
Received SAPI	Source Access Port Interface (SAPI) from which the packets were received.	detail extensive
Transmitted DAPI	Destination Access Port Interface (DAPI) to which the packets were transmitted.	detail extensive
Transmitted SAPI	Source Access Port Interface (SAPI) to which the packets were transmitted.	detail extensive
PCS statistics	(10-Gigabit Ethernet interfaces) Displays Physical Coding Sublayer (PCS) fault conditions from the WAN PHY or the LAN PHY device. <ul style="list-style-type: none"> • Bit errors—High bit error rate. Indicates the number of bit errors when the PCS receiver is operating in normal mode. • Errored blocks—Loss of block lock. The number of errored blocks when PCS receiver is operating in normal mode. 	detail extensive

Table 11: show interfaces Gigabit Ethernet Output Fields (*continued*)

Field Name	Field Description	Level of Output
MAC statistics	<p>Receive and Transmit statistics reported by the PIC's MAC subsystem, including the following:</p> <ul style="list-style-type: none"> • Total octets and total packets—Total number of octets and packets. For Gigabit Ethernet IQ PICs, the received octets count varies by interface type. For more information, see Table 12 on page 129 • Unicast packets, Broadcast packets, and Multicast packets—Number of unicast, broadcast, and multicast packets. • CRC/Align errors—Total number of packets received that had a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, and had either a bad FCS with an integral number of octets (FCS Error) or a bad FCS with a nonintegral number of octets (Alignment Error). • FIFO error—Number of FIFO errors that are reported by the ASIC on the PIC. If this value is ever nonzero, the PIC or a cable is probably malfunctioning. • MAC control frames—Number of MAC control frames. • MAC pause frames—Number of MAC control frames with pause operational code. • Oversized frames—Number of frames that exceed 1518 octets. • Jabber frames—Number of frames that were longer than 1518 octets (excluding framing bits, but including FCS octets), and had either an FCS error or an alignment error. This definition of jabber is different from the definition in IEEE-802.3 section 8.2.1.5 (10BASE5) and section 10.3.1.4 (10BASE2). These documents define jabber as the condition in which any packet exceeds 20 ms. The allowed range to detect jabber is from 20 ms to 150 ms. • Fragment frames—Total number of packets that were less than 64 octets in length (excluding framing bits, but including FCS octets), and had either an FCS error or an alignment error. Fragment frames normally increment because both runts (which are normal occurrences caused by collisions) and noise hits are counted. • VLAN tagged frames—Number of frames that are VLAN tagged. The system uses the TPID of 0x8100 in the frame to determine whether a frame is tagged or not. • Code violations—Number of times an event caused the PHY to indicate "Data reception error" or "invalid data symbol error." 	extensive
OTN Received Overhead Bytes	APS/PCC0: 0x02, APS/PCC1: 0x11, APS/PCC2: 0x47, APS/PCC3: 0x58 Payload Type: 0x08	extensive
OTN Transmitted Overhead Bytes	APS/PCC0: 0x00, APS/PCC1: 0x00, APS/PCC2: 0x00, APS/PCC3: 0x00 Payload Type: 0x08	extensive

Table 11: show interfaces Gigabit Ethernet Output Fields (*continued*)

Field Name	Field Description	Level of Output
Filter statistics	<p>Receive and Transmit statistics reported by the PIC's MAC address filter subsystem. The filtering is done by the content-addressable memory (CAM) on the PIC. The filter examines a packet's source and destination MAC addresses to determine whether the packet should enter the system or be rejected.</p> <ul style="list-style-type: none"> • Input packet count—Number of packets received from the MAC hardware that the filter processed. • Input packet rejects—Number of packets that the filter rejected because of either the source MAC address or the destination MAC address. • Input DA rejects—Number of packets that the filter rejected because the destination MAC address of the packet is not on the accept list. It is normal for this value to increment. When it increments very quickly and no traffic is entering the routing device from the far-end system, either there is a bad ARP entry on the far-end system, or multicast routing is not on and the far-end system is sending many multicast packets to the local routing device (which the routing device is rejecting). • Input SA rejects—Number of packets that the filter rejected because the source MAC address of the packet is not on the accept list. The value in this field should increment only if source MAC address filtering has been enabled. If filtering is enabled, if the value increments quickly, and if the system is not receiving traffic that it should from the far-end system, it means that the user-configured source MAC addresses for this interface are incorrect. • Output packet count—Number of packets that the filter has given to the MAC hardware. • Output packet pad count—Number of packets the filter padded to the minimum Ethernet size (60 bytes) before giving the packet to the MAC hardware. Usually, padding is done only on small ARP packets, but some very small IP packets can also require padding. If this value increments rapidly, either the system is trying to find an ARP entry for a far-end system that does not exist or it is misconfigured. • Output packet error count—Number of packets with an indicated error that the filter was given to transmit. These packets are usually aged packets or are the result of a bandwidth problem on the FPC hardware. On a normal system, the value of this field should not increment. • CAM destination filters, CAM source filters—Number of entries in the CAM dedicated to destination and source MAC address filters. There can only be up to 64 source entries. If source filtering is disabled, which is the default, the values for these fields should be 0. 	extensive
PMA PHY	<p>(10-Gigabit Ethernet interfaces, WAN PHY mode) SONET error information:</p> <ul style="list-style-type: none"> • Seconds—Number of seconds the defect has been active. • Count—Number of times that the defect has gone from inactive to active. • State—State of the error. Any state other than OK indicates a problem. <p>Subfields are:</p> <ul style="list-style-type: none"> • PHY Lock—Phase-locked loop • PHY Light—Loss of optical signal 	extensive

Table 11: show interfaces Gigabit Ethernet Output Fields (*continued*)

Field Name	Field Description	Level of Output
WIS section	<p>(10-Gigabit Ethernet interfaces, WAN PHY mode) SONET error information:</p> <ul style="list-style-type: none"> • Seconds—Number of seconds the defect has been active. • Count—Number of times that the defect has gone from inactive to active. • State—State of the error. Any state other than OK indicates a problem. <p>Subfields are:</p> <ul style="list-style-type: none"> • BIP-B1—Bit interleaved parity for SONET section overhead • SEF—Severely errored framing • LOL—Loss of light • LOF—Loss of frame • ES-S—Errored seconds (section) • SES-S—Severely errored seconds (section) • SEFS-S—Severely errored framing seconds (section) 	extensive
WIS line	<p>(10-Gigabit Ethernet interfaces, WAN PHY mode) Active alarms and defects, plus counts of specific SONET errors with detailed information.</p> <ul style="list-style-type: none"> • Seconds—Number of seconds the defect has been active. • Count—Number of times that the defect has gone from inactive to active. • State—State of the error. State other than OK indicates a problem. <p>Subfields are:</p> <ul style="list-style-type: none"> • BIP-B2—Bit interleaved parity for SONET line overhead • REI-L—Remote error indication (near-end line) • RDI-L—Remote defect indication (near-end line) • AIS-L—Alarm indication signal (near-end line) • BERR-SF—Bit error rate fault (signal failure) • BERR-SD—Bit error rate defect (signal degradation) • ES-L—Errored seconds (near-end line) • SES-L—Severely errored seconds (near-end line) • UAS-L—Unavailable seconds (near-end line) • ES-LFE—Errored seconds (far-end line) • SES-LFE—Severely errored seconds (far-end line) • UAS-LFE—Unavailable seconds (far-end line) 	extensive

Table 11: show interfaces Gigabit Ethernet Output Fields (*continued*)

Field Name	Field Description	Level of Output
WIS path	<p>(10-Gigabit Ethernet interfaces, WAN PHY mode) Active alarms and defects, plus counts of specific SONET errors with detailed information.</p> <ul style="list-style-type: none"> • Seconds—Number of seconds the defect has been active. • Count—Number of times that the defect has gone from inactive to active. • State—State of the error. Any state other than OK indicates a problem. <p>Subfields are:</p> <ul style="list-style-type: none"> • BIP-B3—Bit interleaved parity for SONET section overhead • REI-P—Remote error indication • LOP-P—Loss of pointer (path) • AIS-P—Path alarm indication signal • RDI-P—Path remote defect indication • UNEQ-P—Path unequipped • PLM-P—Path payload label mismatch • ES-P—Errored seconds (near-end STS path) • SES-P—Severely errored seconds (near-end STS path) • UAS-P—Unavailable seconds (near-end STS path) • SES-PFE—Severely errored seconds (far-end STS path) • UAS-PFE—Unavailable seconds (far-end STS path) 	extensive

Table 11: show interfaces Gigabit Ethernet Output Fields (*continued*)

Field Name	Field Description	Level of Output
Autonegotiation information	<p>Information about link autonegotiation.</p> <ul style="list-style-type: none"> • Negotiation status: <ul style="list-style-type: none"> • Incomplete—Ethernet interface has the speed or link mode configured. • No autonegotiation—Remote Ethernet interface has the speed or link mode configured, or does not perform autonegotiation. • Complete—Ethernet interface is connected to a device that performs autonegotiation and the autonegotiation process is successful. • Link partner status—OK when Ethernet interface is connected to a device that performs autonegotiation and the autonegotiation process is successful. • Link partner: <ul style="list-style-type: none"> • Link mode—Depending on the capability of the attached Ethernet device, either Full-duplex or Half-duplex. • Flow control—Types of flow control supported by the remote Ethernet device. For Fast Ethernet interfaces, the type is None. For Gigabit Ethernet interfaces, types are Symmetric (link partner supports PAUSE on receive and transmit), Asymmetric (link partner supports PAUSE on transmit), and Symmetric/Asymmetric (link partner supports both PAUSE on receive and transmit or only PAUSE receive). • Remote fault—Remote fault information from the link partner—Failure indicates a receive link error. OK indicates that the link partner is receiving. Negotiation error indicates a negotiation error. Offline indicates that the link partner is going offline. • Local resolution—Information from the link partner: <ul style="list-style-type: none"> • Flow control—Types of flow control supported by the remote Ethernet device. For Gigabit Ethernet interfaces, types are Symmetric (link partner supports PAUSE on receive and transmit), Asymmetric (link partner supports PAUSE on transmit), and Symmetric/Asymmetric (link partner supports both PAUSE on receive and transmit or only PAUSE receive). • Remote fault—Remote fault information. Link OK (no error detected on receive), Offline (local interface is offline), and Link Failure (link error detected on receive). 	extensive
Received path trace, Transmitted path trace	<p>(10-Gigabit Ethernet interfaces, WAN PHY mode) SONET/SDH interfaces allow path trace bytes to be sent inband across the SONET/SDH link. Juniper Networks and other router manufacturers use these bytes to help diagnose misconfigurations and network errors by setting the transmitted path trace message so that it contains the system hostname and name of the physical interface. The received path trace value is the message received from the routing device at the other end of the fiber. The transmitted path trace value is the message that this routing device transmits.</p>	extensive
Packet Forwarding Engine configuration	<p>Information about the configuration of the Packet Forwarding Engine:</p> <ul style="list-style-type: none"> • Destination slot—FPC slot number. 	extensive

Table 11: show interfaces Gigabit Ethernet Output Fields (*continued*)

Field Name	Field Description	Level of Output
CoS information	Information about the CoS queue for the physical interface. <ul style="list-style-type: none"> • CoS transmit queue—Queue number and its associated user-configured forwarding class name. • Bandwidth %—Percentage of bandwidth allocated to the queue. • Bandwidth bps—Bandwidth allocated to the queue (in bps). • Buffer %—Percentage of buffer space allocated to the queue. • Buffer usec—Amount of buffer space allocated to the queue, in microseconds. This value is nonzero only if the buffer size is configured in terms of time. • Priority—Queue priority: low or high. • Limit—Displayed if rate limiting is configured for the queue. Possible values are none and exact. If exact is configured, the queue transmits only up to the configured bandwidth, even if excess bandwidth is available. If none is configured, the queue transmits beyond the configured bandwidth if bandwidth is available. 	extensive
Logical Interface		
Logical interface	Name of the logical interface.	All levels
Index	Index number of the logical interface, which reflects its initialization sequence.	detail extensive none
SNMP ifIndex	SNMP interface index number for the logical interface.	detail extensive none
Generation	Unique number for use by Juniper Networks technical support only.	detail extensive
Flags	Information about the logical interface. Possible values are described in the "Logical Interface Flags" section under <i>Common Output Fields Description</i> .	All levels

Table 11: show interfaces Gigabit Ethernet Output Fields (*continued*)

Field Name	Field Description	Level of Output
VLAN-Tag	<p>Rewrite profile applied to incoming or outgoing frames on the outer (Out) VLAN tag or for both the outer and inner (In) VLAN tags.</p> <ul style="list-style-type: none"> push—An outer VLAN tag is pushed in front of the existing VLAN tag. pop—The outer VLAN tag of the incoming frame is removed. swap—The outer VLAN tag of the incoming frame is overwritten with the user specified VLAN tag information. push—An outer VLAN tag is pushed in front of the existing VLAN tag. push-push—Two VLAN tags are pushed in from the incoming frame. swap-push—The outer VLAN tag of the incoming frame is replaced by a user-specified VLAN tag value. A user-specified outer VLAN tag is pushed in front. The outer tag becomes an inner tag in the final frame. swap-swap—Both the inner and the outer VLAN tags of the incoming frame are replaced by the user specified VLAN tag value. pop-swap—The outer VLAN tag of the incoming frame is removed, and the inner VLAN tag of the incoming frame is replaced by the user-specified VLAN tag value. The inner tag becomes the outer tag in the final frame. pop-pop—Both the outer and inner VLAN tags of the incoming frame are removed. 	brief detail extensive none
Demux:	<p>IP demultiplexing (demux) value that appears if this interface is used as the demux underlying interface. The output is one of the following:</p> <ul style="list-style-type: none"> Source Family Inet Destination Family Inet 	detail extensive none
Encapsulation	Encapsulation on the logical interface.	All levels
Protocol	Protocol family. Possible values are described in the “Protocol Field” section under <i>Common Output Fields Description</i> .	detail extensive none
MTU	Maximum transmission unit size on the logical interface.	detail extensive none
Maximum labels	Maximum number of MPLS labels configured for the MPLS protocol family on the logical interface.	detail extensive none
Traffic statistics	<p>Number and rate of bytes and packets received and transmitted on the specified interface set.</p> <ul style="list-style-type: none"> Input bytes, Output bytes—Number of bytes received and transmitted on the interface set. The value in this field also includes the Layer 2 overhead bytes for ingress or egress traffic on Ethernet interfaces if you enable accounting of Layer 2 overhead at the PIC level or the logical interface level. Input packets, Output packets—Number of packets received and transmitted on the interface set. 	detail extensive
IPv6 transit statistics	Number of IPv6 transit bytes and packets received and transmitted on the logical interface if IPv6 statistics tracking is enabled.	extensive
Local statistics	Number and rate of bytes and packets destined to the routing device.	extensive

Table 11: show interfaces Gigabit Ethernet Output Fields (*continued*)

Field Name	Field Description	Level of Output
Transit statistics	Number and rate of bytes and packets transiting the switch. NOTE: For Gigabit Ethernet intelligent queuing 2 (IQ2) interfaces, the logical interface egress statistics might not accurately reflect the traffic on the wire when output shaping is applied. Traffic management output shaping might drop packets after they are tallied by the Output bytes and Output packets interface counters. However, correct values display for both of these egress statistics when per-unit scheduling is enabled for the Gigabit Ethernet IQ2 physical interface, or when a single logical interface is actively using a shared scheduler.	extensive
Generation	Unique number for use by Juniper Networks technical support only.	detail extensive
Route Table	Route table in which the logical interface address is located. For example, 0 refers to the routing table inet.0.	detail extensive none
Flags	Information about protocol family flags. Possible values are described in the “Family Flags” section under <i>Common Output Fields Description</i> .	detail extensive
Donor interface	(Unnumbered Ethernet) Interface from which an unnumbered Ethernet interface borrows an IPv4 address.	detail extensive none
Preferred source address	(Unnumbered Ethernet) Secondary IPv4 address of the donor loopback interface that acts as the preferred source address for the unnumbered Ethernet interface.	detail extensive none
Input Filters	Names of any input filters applied to this interface. If you specify a precedence value for any filter in a dynamic profile, filter precedence values appear in parenthesis next to all interfaces.	detail extensive
Output Filters	Names of any output filters applied to this interface. If you specify a precedence value for any filter in a dynamic profile, filter precedence values appear in parenthesis next to all interfaces.	detail extensive
Mac-Validate Failures	Number of MAC address validation failures for packets and bytes. This field is displayed when MAC address validation is enabled for the logical interface.	detail extensive none
Addresses, Flags	Information about the address flags. Possible values are described in the “Addresses Flags” section under <i>Common Output Fields Description</i> .	detail extensive none
<i>protocol-family</i>	Protocol family configured on the logical interface. If the protocol is inet , the IP address of the interface is also displayed.	brief
Flags	Information about address flag (possible values are described in the “Addresses Flags” section under <i>Common Output Fields Description</i> .	detail extensive none
Destination	IP address of the remote side of the connection.	detail extensive none
Local	IP address of the logical interface.	detail extensive none
Broadcast	Broadcast address of the logical interlace.	detail extensive none

Table 11: show interfaces Gigabit Ethernet Output Fields (*continued*)

Field Name	Field Description	Level of Output
Generation	Unique number for use by Juniper Networks technical support only.	detail extensive

For Gigabit Ethernet IQ PICs, traffic and MAC statistics output varies. [Table 12 on page 129](#) describes the traffic and MAC statistics for two sample interfaces, each of which is sending traffic in packets of 500 bytes (including 478 bytes for the Layer 3 packet, 18 bytes for the Layer 2 VLAN traffic header, and 4 bytes for cyclic redundancy check [CRC] information). In [Table 12 on page 129](#), the **ge-0/3/0** interface is the inbound physical interface, and the **ge-0/0/0** interface is the outbound physical interface. On both interfaces, traffic is carried on logical unit .50 (VLAN 50).

Table 12: Gigabit Ethernet IQ PIC Traffic and MAC Statistics by Interface Type

Interface Type	Sample Command	Byte and Octet Counts Include	Comments
Inbound physical interface	show interfaces ge-0/3/0 extensive	Traffic statistics: Input bytes: 496 bytes per packet, representing the Layer 2 packet MAC statistics: Received octets: 500 bytes per packet, representing the Layer 2 packet + 4 bytes	The additional 4 bytes are for the CRC.
Inbound logical interface	show interfaces ge-0/3/0.50 extensive	Traffic statistics: Input bytes: 478 bytes per packet, representing the Layer 3 packet	
Outbound physical interface	show interfaces ge-0/0/0 extensive	Traffic statistics: Input bytes: 490 bytes per packet, representing the Layer 3 packet + 12 bytes MAC statistics: Received octets: 478 bytes per packet, representing the Layer 3 packet	For input bytes, the additional 12 bytes includes 6 bytes for the destination MAC address + 4 bytes for VLAN + 2 bytes for the Ethernet type.
Outbound logical interface	show interfaces ge-0/0/0.50 extensive	Traffic statistics: Input bytes: 478 bytes per packet, representing the Layer 3 packet	

Sample Output

show interfaces extensive (10-Gigabit Ethernet, LAN PHY Mode, IQ2)

```

user@host> show interfaces xe-5/0/0 extensive
Physical interface: xe-5/0/0, Enabled, Physical link is Up
  Interface index: 177, SNMP ifIndex: 99, Generation: 178
  Link-level type: Ethernet, MTU: 1518, LAN-PHY mode, Speed: 10Gbps, Loopback:

```

```

None, Source filtering: Enabled,
Flow control: Enabled
Device flags   : Present Running
Interface flags: SNMP-Traps Internal: 0x4000
Link flags     : None
CoS queues    : 8 supported, 4 maximum usable queues
Schedulers    : 1024
Hold-times    : Up 0 ms, Down 0 ms
Current address: 00:14:f6:b9:f1:f6, Hardware address: 00:14:f6:b9:f1:f6
Last flapped   : Never
Statistics last cleared: Never
Traffic statistics:
Input bytes   :          6970332384          0 bps
Output bytes  :              0          0 bps
Input packets :          81050506          0 pps
Output packets:              0          0 pps
IPv6 transit statistics:
Input bytes   :              0
Output bytes  :              0
Input packets :              0
Output packets:              0
Ingress traffic statistics at Packet Forwarding Engine:
Input bytes   :          6970299398          0 bps
Input packets :          81049992          0 pps
Drop bytes    :              0          0 bps
Drop packets  :              0          0 pps
Input errors:
Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Policed discards: 0, L3
incompletes: 0, L2 channel errors: 0,
L2 mismatch timeouts: 0, FIFO errors: 0, Resource errors: 0
Output errors:
Carrier transitions: 0, Errors: 0, Drops: 0, Collisions: 0, Aged packets: 0,
FIFO errors: 0, HS link CRC errors: 0,
MTU errors: 0, Resource errors: 0
Ingress queues: 4 supported, 4 in use
Queue counters:      Queued packets  Transmitted packets      Dropped packets

0 best-effort          81049992          81049992          0

1 expedited-fo              0              0          0

2 assured-forw           0              0          0

3 network-cont           0              0          0

Egress queues: 4 supported, 4 in use
Queue counters:      Queued packets  Transmitted packets      Dropped packets

0 best-effort          0              0          0

1 expedited-fo          0              0          0

2 assured-forw          0              0          0

3 network-cont          0              0          0

Active alarms : None
Active defects : None
PCS statistics
Bit errors          Seconds
Errorred blocks          0
Errorred blocks          0

```

```

MAC statistics:
Total octets          6970332384
Total packets        81050506
Unicast packets      81050000
Broadcast packets    506
Multicast packets    0
CRC/Align errors     0
FIFO errors          0
MAC control frames   0
MAC pause frames     0
Oversized frames     0
Jabber frames        0
Fragment frames      0
VLAN tagged frames   0
Code violations       0

Filter statistics:
Input packet count    81050506
Input packet rejects  506
Input DA rejects      0
Input SA rejects      0
Output packet count   0
Output packet pad count 0
Output packet error count 0
CAM destination filters: 0, CAM source filters: 0

Packet Forwarding Engine configuration:
Destination slot: 5

CoS information:
Direction : Output
CoS transmit queue   Bandwidth      Buffer Priority Limit
                        %      bps      %      usec
0 best-effort        95    950000000  95      0      low  none
3 network-control    5     50000000   5      0      low  none

Direction : Input
CoS transmit queue   Bandwidth      Buffer Priority Limit
                        %      bps      %      usec
0 best-effort        95    950000000  95      0      low  none
3 network-control    5     50000000   5      0      low  none

Logical interface xe-5/0/0.0 (Index 71) (SNMP ifIndex 95) (Generation 195)
Flags: SNMP-Traps 0x4000 VLAN-Tag [ 0x8100.100 ] Encapsulation: ENET2
Egress account overhead: 100
Ingress account overhead: 90

Traffic statistics:
Input bytes : 0
Output bytes : 46
Input packets: 0
Output packets: 1

IPv6 transit statistics:
Input bytes : 0
Output bytes : 0
Input packets: 0
Output packets: 0

Local statistics:
Input bytes : 0
Output bytes : 46
Input packets: 0
Output packets: 1

Transit statistics:
Input bytes : 0
Output bytes : 0

```

```

Input packets:                0                0 pps
Output packets:               0                0 pps
IPv6 transit statistics:
  Input bytes :                0
  Output bytes :               0
  Input packets:              0
  Output packets:             0
Protocol inet, MTU: 1500, Generation: 253, Route table: 0
  Addresses, Flags: Is-Preferred Is-Primary
    Destination: 192.1.1/24, Local: 192.1.1.1, Broadcast: 192.1.1.255,
Generation: 265
Protocol multiservice, MTU: Unlimited, Generation: 254, Route table: 0
  Flags: None
  Policer: Input: __default_arp_policer__

```

show interfaces extensive (10-Gigabit Ethernet, WAN PHY Mode)

```

user@host> show interfaces xe-1/0/0 extensive
Physical interface: xe-1/0/0, Enabled, Physical link is Up
Interface index: 141, SNMP ifIndex: 34, Generation: 47
Link-level type: Ethernet, MTU: 1514, Speed: 10Gbps, Loopback: Disabled
WAN-PHY mode
Source filtering: Disabled, Flow control: Enabled
Device flags : Present Running
Interface flags: SNMP-Traps 16384
Link flags : None
CoS queues : 4 supported
Hold-times : Up 0 ms, Down 0 ms
Current address: 00:05:85:a2:10:9d, Hardware address: 00:05:85:a2:10:9d
Last flapped : 2005-07-07 11:22:34 PDT (3d 12:28 ago)
Statistics last cleared: Never
Traffic statistics:
  Input bytes :                0                0 bps
  Output bytes :               0                0 bps
  Input packets:              0                0 pps
  Output packets:             0                0 pps
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,
  HS Link CRC errors: 0, HS Link FIFO overflows: 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
Queue counters:
  Queued packets  Transmitted packets  Dropped packets
0 best-effort    0                0                0
1 expedited-fo   0                0                0
2 assured-forw   0                0                0
3 network-cont   0                0                0
Active alarms : LOL, LOS, LBL
Active defects: LOL, LOS, LBL, SEF, AIS-L, AIS-P
PCS statistics
  Seconds  Count
Bit errors 0        0
Errored blocks 0      0
MAC statistics:
  Receive  Transmit
Total octets 0        0
Total packets 0        0
Unicast packets 0        0
Broadcast packets 0        0
Multicast packets 0        0

```

```

CRC/Align errors                0          0
FIFO errors                     0          0
MAC control frames              0          0
MAC pause frames                0          0
Oversized frames               0
Jabber frames                  0
Fragment frames                0
VLAN tagged frames             0
Code violations                 0
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
PMA PHY:
  Seconds      Count  State
  PLL lock     0      0 OK
  PHY light    63159  1 Light Missing
WIS section:
  BIP-B1        0      0
  SEF           434430  434438 Defect Active
  LOS           434430  1 Defect Active
  LOF           434430  1 Defect Active
  ES-S          434430
  SES-S         434430
  SEFS-S        434430
WIS line:
  BIP-B2        0      0
  REI-L         0      0
  RDI-L         0      0 OK
  AIS-L         434430  1 Defect Active
  BERR-SF       0      0 OK
  BERR-SD       0      0 OK
  ES-L          434430
  SES-L         434430
  UAS-L         434420
  ES-LFE        0
  SES-LFE       0
  UAS-LFE       0
WIS path:
  BIP-B3        0      0
  REI-P         0      0
  LOP-P         0      0 OK
  AIS-P         434430  1 Defect Active
  RDI-P         0      0 OK
  UNEQ-P        0      0 OK
  PLM-P         0      0 OK
  ES-P          434430
  SES-P         434430
  UAS-P         434420
  ES-PFE        0
  SES-PFE       0
  UAS-PFE       0
Received path trace:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
Transmitted path trace: orissa so-1/0/0
6f 72 69 73 73 61 20 73 6f 2d 31 2f 30 2f 30 00 orissa so-1/0/0.
Packet Forwarding Engine configuration:

```

```

Destination slot: 1
CoS information:
  CoS transmit queue      Bandwidth      Buffer      Priority  Limit
                           %      bps      %      bytes
0 best-effort             95      950000000  95        0      low      none
3 network-control         5       50000000   5         0      low      none

```

show interfaces extensive (10-Gigabit Ethernet, DWDM OTN PIC)

```

user@host> show interfaces ge-7/0/0 extensive
Physical interface: ge-7/0/0, Enabled, Physical link is Down
Interface index: 143, SNMP ifIndex: 508, Generation: 208
Link-level type: Ethernet, MTU: 1514, Speed: 10Gbps, BPDU Error: None,
MAC-REWRITE Error: None, Loopback: Disabled, Source filtering: Disabled,
Flow control: Enabled
Device flags   : Present Running Down
Interface flags: Hardware-Down SNMP-Traps Internal: 0x4000
Link flags     : None
Wavelength     : 1550.12 nm, Frequency: 193.40 THz
CoS queues     : 8 supported, 8 maximum usable queues
Hold-times     : Up 0 ms, Down 0 ms
Current address: 00:05:85:70:2b:72, Hardware address: 00:05:85:70:2b:72
Last flapped   : 2011-04-20 15:48:54 PDT (18:39:49 ago)
Statistics last cleared: Never
Traffic statistics:
Input bytes   : 0          0 bps
Output bytes  : 0          0 bps
Input packets : 0          0 pps
Output packets: 0          0 pps
IPv6 transit statistics:
Input bytes   : 0
Output bytes  : 0
Input packets : 0
Output packets: 0
Input errors:
Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Policed discards: 0,
L3 incompletes: 0, L2 channel errors: 0, L2 mismatch timeouts: 0,
FIFO errors: 0, Resource errors: 0
Output errors:
Carrier transitions: 2, 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 expedited-fo       0          0          0

2 assured-forw       0          0          0

3 network-cont
Queue number:        Mapped forwarding classes
0                    best-effort
1                    expedited-forwarding
2                    assured-forwarding
3                    network-control
Active alarms : LINK
Active defects : LINK
MAC statistics:
Total octets         Receive      Transmit
Total packets        0          0

```

```

Unicast packets                0                0
Broadcast packets              0                0
Multicast packets              0                0
CRC/Align errors               0                0
FIFO errors                    0                0
MAC control frames             0                0
MAC pause frames               0                0
Oversized frames               0
Jabber frames                  0
Fragment frames                0
VLAN tagged frames             0
Code violations                 0
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
OTN alarms                     : None
OTN defects                    : None
OTN FEC Mode                   : GFEC
OTN Rate                       : Fixed Stuff Bytes 11.0957Gbps
OTN Line Loopback : Enabled
OTN FEC statistics :
  Corrected Errors              0
  Corrected Error Ratio (      0 sec average) 0e-0
OTN FEC alarms:                Seconds    Count  State
  FEC Degrade                   0          0  OK
  FEC Excessive                 0          0  OK
OTN OC:                        Seconds    Count  State
  LOS                           2          1  OK
  LOF                          67164       2  Defect Active
  LOM                          67164       71  Defect Active
  Wavelength Lock               0          0  OK
OTN OTU:
  AIS                           0          0  OK
  BDI                          65919      4814  Defect Active
  IAE                          67158       1  Defect Active
  TTIM                          7          1  OK
  SF                           67164       2  Defect Active
  SD                           67164       3  Defect Active
  TCA-ES                        0          0  OK
  TCA-SES                       0          0  OK
  TCA-UAS                       80         40  OK
  TCA-BBE                       0          0  OK
  BIP                           0          0  OK
  BBE                           0          0  OK
  ES                            0          0  OK
  SES                           0          0  OK
  UAS                           587         0  OK
Received DAPI:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
Received SAPI:

```

```

00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
Transmitted DAPI:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
Transmitted SAPI:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
OTN Received Overhead Bytes:
  APS/PCC0: 0x02, APS/PCC1: 0x42, APS/PCC2: 0xa2, APS/PCC3: 0x48
  Payload Type: 0x03
OTN Transmitted Overhead Bytes:
  APS/PCC0: 0x00, APS/PCC1: 0x00, APS/PCC2: 0x00, APS/PCC3: 0x00
  Payload Type: 0x03
Filter statistics:
  Input packet count                0
  Input packet rejects              0
  Input DA rejects                  0
  Input SA rejects                  0
  Output packet count                0
  Output packet pad count            0
  Output packet error count          0
  CAM destination filters: 0, CAM source filters: 0
Packet Forwarding Engine configuration:
  Destination slot: 7
CoS information:
  Direction : Output
  CoS transmit queue      Bandwidth      Buffer Priority
Limit
      0 best-effort        95      9500000000    95      0      low
none
      3 network-control    5       500000000    5       0      low
none
...

```

show interfaces extensive (10-Gigabit Ethernet, LAN PHY Mode, Unidirectional Mode)

```

user@host> show interfaces xe-7/0/0 extensive
Physical interface: xe-7/0/0, Enabled, Physical link is Up
  Interface index: 173, SNMP ifIndex: 212, Generation: 174
  Link-level type: Ethernet, MTU: 1514, LAN-PHY mode, Speed: 10Gbps,
  Unidirectional: Enabled,
  Loopback: None, Source filtering: Disabled, Flow control: Enabled
  Device flags   : Present Running
...

```

show interfaces extensive (10-Gigabit Ethernet, LAN PHY Mode, Unidirectional Mode, Transmit-Only)

```

user@host> show interfaces xe-7/0/0-tx extensive
Physical interface: xe-7/0/0-tx, Enabled, Physical link is Up
  Interface index: 176, SNMP ifIndex: 137, Generation: 177
  Link-level type: Ethernet, MTU: 1514, LAN-PHY mode, Speed: 10Gbps,
  Unidirectional: Tx-Only
  Device flags   : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000
  Link flags     : None
  CoS queues     : 8 supported, 8 maximum usable queues
  Hold-times     : Up 0 ms, Down 0 ms
  Current address: 00:05:85:73:e4:83, Hardware address: 00:05:85:73:e4:83
  Last flapped   : 2007-06-01 09:08:19 PDT (3d 02:31 ago)
  Statistics last cleared: Never
Traffic statistics:
  Input bytes :                0                0 bps

```

```

Output bytes :      322891152287160      9627472888 bps
Input packets:              0              0 pps
Output packets:    328809727380      1225492 pps

...

Filter statistics:
  Output packet count      328810554250
  Output packet pad count      0
  Output packet error count    0
...

Logical interface xe-7/0/0-tx.0 (Index 73) (SNMP ifIndex 138) (Generation 139)

Flags: SNMP-Traps Encapsulation: ENET2
Egress account overhead: 100
Ingress account overhead: 90
Traffic statistics:
  Input bytes :              0
  Output bytes :    322891152287160
  Input packets:              0
  Output packets:    328809727380
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 :    322891152287160      9627472888 bps
  Input packets:              0              0 pps
  Output packets:    328809727380      1225492 pps
IPv6 transit statistics:
  Input bytes :              0
  Output bytes :              0
  Input packets:              0
  Output packets:              0
Protocol inet, MTU: 1500, Generation: 147, Route table: 0
  Addresses, Flags: Is-Preferred Is-Primary
    Destination: 10.11.12/24, Local: 10.11.12.13, Broadcast: 10.11.12.255,
Generation: 141
  Protocol multiservice, MTU: Unlimited, Generation: 148, Route table: 0
  Flags: None
  Policer: Input: __default_arp_policer__

```

show interfaces extensive (10-Gigabit Ethernet, LAN PHY Mode, Unidirectional Mode, Receive-Only)

```

user@host> show interfaces xe-7/0/0-rx extensive
Physical interface: xe-7/0/0-rx, Enabled, Physical link is Up
  Interface index: 174, SNMP ifIndex: 118, Generation: 175
  Link-level type: Ethernet, MTU: 1514, LAN-PHY mode, Speed: 10Gbps,
Unidirectional: Rx-Only
  Device flags   : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000
  Link flags     : None
  CoS queues     : 8 supported, 8 maximum usable queues

```

```

Hold-times      : Up 0 ms, Down 0 ms
Current address: 00:05:85:73:e4:83, Hardware address: 00:05:85:73:e4:83
Last flapped   : 2007-06-01 09:08:22 PDT (3d 02:31 ago)
Statistics last cleared: Never
Traffic statistics:
  Input bytes :      322857456303482      9627496104 bps
  Output bytes :              0              0 bps
  Input packets:      328775413751      1225495 pps
  Output packets:              0              0 pps

...

Filter statistics:
  Input packet count      328775015056
  Input packet rejects    1
  Input DA rejects        0

...

Logical interface xe-7/0/0-rx.0 (Index 72) (SNMP ifIndex 120) (Generation 138)

Flags: SNMP-Traps Encapsulation: ENET2
Traffic statistics:
  Input bytes :      322857456303482
  Output bytes :              0
  Input packets:      328775413751
  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 :      322857456303482      9627496104 bps
  Output bytes :              0              0 bps
  Input packets:      328775413751      1225495 pps
  Output packets:              0              0 pps
IPv6 transit statistics:
  Input bytes :              0
  Output bytes :              0
  Input packets:              0
  Output packets:              0
Protocol inet, MTU: 1500, Generation: 145, Route table: 0
  Addresses, Flags: Is-Preferred Is-Primary
    Destination: 192.1.1/24, Local: 192.1.1.1, Broadcast: 192.1.1.255,
Generation: 139
Protocol multiservice, MTU: Unlimited, Generation: 146, Route table: 0
  Flags: None
  Policer: Input: __default_arp_policer__

```

show interfaces interface-set (Ethernet Interface Set)

Syntax	<code>show interfaces interface-set <i>interface-set-name</i></code> <detail terse>
Release Information	Command introduced in Junos OS Release 8.5.
Description	<p>Display information about the specified gigabit or 10-Gigabit Ethernet interface set. Supported in MX Series routers with enhanced queuing DPCs or MPCs.</p> <p>You can also use the show interfaces interface-set command to display information about agent circuit identifier (ACI) interface sets configured on MX Series routers with MPCs/MICs.</p>
Options	<p>interface-set <i>interface-set-name</i>—Display information about the specified Gigabit Ethernet, 10-Gigabit Ethernet, or ACI interface set.</p> <p>detail terse—(Optional) Display the specified level of output.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> <i>Verifying and Managing Agent Circuit Identifier-Based Dynamic VLAN Configuration</i>
List of Sample Output	<p>show interfaces interface-set terse on page 140</p> <p>show interfaces interface-set detail on page 140</p> <p>show interfaces interface-set (ACI Interface Set) on page 141</p>
Output Fields	Table 13 on page 139 describes the information for the show interfaces interface-set command.

Table 13: Ethernet show interfaces interface-set Output Fields

Field Name	Field Description	Level of Output
Physical Interface		
Interface set	Name of the interface set or sets.	All levels
Interface set index	<p>Index number of the interface set. For ACI interface sets, the following fields are displayed:</p> <ul style="list-style-type: none"> ACI VLAN—ACI interface set that the router uses to create dynamic VLAN subscriber interfaces based on the agent circuit identifier value. PPPoE—Dynamic PPPoE subscriber interface that the router creates using the ACI interface set. 	detail none
Agent Circuit ID	For ACI interface sets, string in DHCP or PPPoE control packets that uniquely identifies the subscriber's access node and the DSL line on the access node.	detail none
Max Sessions	For dynamic PPPoE subscriber interfaces, maximum number of PPPoE logical interfaces that that can be activated on the underlying interface.	detail none

Table 13: Ethernet show interfaces interface-set Output Fields (*continued*)

Field Name	Field Description	Level of Output
Max Sessions VSA Ignore	For dynamic PPPoE subscriber interfaces, whether the router is configured to ignore (clear) the PPPoE maximum session value returned by RADIUS in the Max-Clients-Per-Interface Juniper Networks VSA [26-143] and restore the PPPoE maximum session value on the underlying interface to the value configured with the max-sessions statement: Off (default) or On .	detail none
Traffic statistics	Number and rate of bytes and packets received and transmitted on the specified interface set. <ul style="list-style-type: none"> Input bytes, Output bytes—Number of bytes and number of bytes per second received and transmitted on the interface set Input packets, Output packets—Number of packets and number of packets per second received and transmitted on the interface set. 	detail
Egress queues supported	Total number of egress queues supported on the specified interface set.	detail
Egress queues in use	Total number of egress queues used on the specified interface set.	detail
Queue counters	Queued packets, Transmitted packets, and Dropped packets statistics for the four forwarding classes.	detail
Members	List of all interface sets or, for ACI interface sets, list of all subscriber interfaces belonging to the specified ACI interface set.	detail none

Sample Output

show interfaces interface-set terse

```

user@host> show interfaces interface-set terse
Interface set:
  iflset-xe-11/3/0-0
  ge-1/0/1-0
  ge-1/0/1-2

```

show interfaces interface-set detail

```

user@host> show interfaces interface-set iflset-xe-11/3/0-0 detail
Interface set: iflset-xe-11/3/0-0
Interface set index: 19
Traffic statistics:
  Output bytes :          751017840          401673504 bps
  Output packets:        11044380          738377 pps
Egress queues: 4 supported, 4 in use
Queue counters:
  Queued packets  Transmitted packets  Dropped packets
0 best-effort    211091327          11044380          199995746
1 expedited-fo           0              0              0
2 assured-forw           0              0              0
3 network-cont          0              0              0
Members:
  xe-11/3/0.0

```

show interfaces interface-set (ACI Interface Set)

```
user@host> show interfaces interface-set
Interface set: aci-1001-demux0.1073741826
Interface set index: 1
  ACI VLAN:
    Agent Circuit ID: aci-ppp-dhcp-dvlan-60
  PPPoE:
    Max Sessions: 3, Max Sessions VSA Ignore: Off
Members:
  pp0.1073741827
```

show interfaces interface-set queue

Syntax	show interfaces interface-set queue <i>interface-set-name</i> <aggregate remaining-traffic> <forwarding-class <i>class-name</i> >
Release Information	Command introduced in Junos OS Release 8.5.
Description	Display information about the gigabit or 10-Gigabit Ethernet interface set queue. Supported in MX Series routers with enhanced queuing DPCs.
Options	<p><i>interface-set-name</i>—(Optional) Display information about the specified gigabit or 10-Gigabit Ethernet interface set. Wildcard values can be used in the interface set name.</p> <p>aggregate—(Optional) Display the aggregated queuing statistics of all member logical interfaces for interface sets that have traffic-control profiles configured.</p> <p>both-ingress-egress—(Optional) On Gigabit Ethernet Intelligent Queuing 2 (IQ2) PICs, display both ingress and egress queue statistics.</p> <p>egress—(Optional) Display egress queue statistics.</p> <p>forwarding-class <i>class-name</i>—(Optional) Display queuing statistics for the specified forwarding class.</p> <p>ingress—(Optional) On Gigabit Ethernet IQ2 PICs, display ingress queue statistics.</p> <p>remaining-traffic—(Optional) Display the queuing statistics of all member logical interfaces for interface sets that do not have traffic-control profiles configured.</p>
Required Privilege Level	view
List of Sample Output	<p>show interfaces interface-set queue (Gigabit Ethernet) on page 143</p> <p>show interfaces interface-set queue both-ingress-egress (Enhanced DPC) on page 144</p> <p>show interfaces interface-set queue egress (Enhanced DPC) on page 146</p> <p>show interfaces interface-set queue forwarding-class (Gigabit Ethernet) on page 147</p> <p>show interfaces interface-set queue (Enhanced DPC) on page 148</p> <p>show interfaces interface-set queue remaining-traffic (Gigabit Ethernet) on page 148</p>
Output Fields	Table 14 on page 142 describes the information for the show interfaces interface-set queue command.

Table 14: Ethernet show interfaces interface-set queue Output Fields

Field Name	Field Description	Level of Output
Physical Interface		
Interface set	Name of the interface set.	All levels
Interface set index	Index number of the interface set.	All levels

Table 14: Ethernet show interfaces interface-set queue Output Fields (*continued*)

Field Name	Field Description	Level of Output
Forwarding classes supported	Total number of forwarding classes supported on the specified interface set.	All levels
Forwarding classes in use	Total number of forwarding classes used on the specified interface set.	All levels
Egress queues supported	Total number of egress queues supported on the specified interface set.	All levels
Egress queues in use	Total number of egress queues used on the specified interface set.	All levels
Ingress queues supported	Total number of ingress queues supported on the specified interface set.	All levels
Ingress queues in use	Total number of ingress queues used on the specified interface set.	All levels
Queue	Egress or ingress queue number for the statistics being displayed.	All levels
Forwarding classes	Forwarding class name for the statistics being displayed.	All levels
Queued	Packet and Byte statistics for the specified queue. <ul style="list-style-type: none"> Packets—Number of packets queued and input rate in packets per second. Bytes—Number of bytes queued and input rate in bytes per second. 	All levels
Transmitted	Packet and Byte statistics for the specified forwarding class. <ul style="list-style-type: none"> Packets—Number of packets transmitted and transmit rate in packets per second. Bytes—Number of bytes transmitted and transmit rate in bytes per second. Tail-dropped packets—Number of packets tail dropped. RED-dropped packets—Number of RED-dropped packets for the low, medium-low, medium-high, and high loss priorities. RED-dropped bytes—Number of RED-dropped bytes for the low, medium-low, medium-high, and high loss priorities. 	All levels

Sample Output

show interfaces interface-set queue (Gigabit Ethernet)

```

user@host> show interfaces interface-set queue ge-2/2/0-0
Interface set: ge-2/2/0-0
Interface set index: 3
Forwarding classes: 8 supported, 4 in use
Egress queues: 4 supported, 4 in use
Queue: 0, Forwarding classes: best-effort
Queued:
Packets           :           3998482           1 pps

```

```

      Bytes                :                271896884                688 bps
Transmitted:
  Packets                :                1077474                1 pps
  Bytes                  :                73268340                688 bps
  Tail-dropped packets :                0                0 pps
  RED-dropped packets  :                2921008                0 pps
    Low                 :                2921008                0 pps
    Medium-low          :                0                0 pps
    Medium-high         :                0                0 pps
    High                :                0                0 pps
  RED-dropped bytes    :                198628544                0 bps
    Low                 :                198628544                0 bps
    Medium-low          :                0                0 bps
    Medium-high         :                0                0 bps
    High                :                0                0 bps
Queue: 2, Forwarding classes: assured-forwarding
Queued:
  Packets                :                0                0 pps
  Bytes                  :                0                0 bps
Transmitted:
...

```

show interfaces interface-set queue both-ingress-egress (Enhanced DPC)

```

user@host> show interfaces interface-set queue ge-2/2/0-0 both-ingress-egress
Interface set: ge-2/2/0-0
Interface set index: 3
Forwarding classes: 16 supported, 4 in use
Ingress queues: 4 supported, 4 in use
Queue: 0, Forwarding classes: best-effort
Queued:
  Packets                :                185968478                473161 pps
  Bytes                  :                10042313520                204441336 bps
Transmitted:
  Packets                :                5441673                13780 pps
  Bytes                  :                293850342                5952960 bps
  Tail-dropped packets :                0                0 pps
  RED-dropped packets  :                180526772                459372 pps
  RED-dropped bytes    :                9748446282                198451512 bps
Queue: 1, Forwarding classes: expedited-forwarding
Queued:
  Packets                :                0                0 pps
  Bytes                  :                0                0 bps
Transmitted:
  Packets                :                0                0 pps
  Bytes                  :                0                0 bps
  Tail-dropped packets :                0                0 pps
  RED-dropped packets  :                0                0 pps
  RED-dropped bytes    :                0                0 bps
Queue: 2, Forwarding classes: assured-forwarding
Queued:
  Packets                :                522021472                473602 pps
  Bytes                  :                28190332480                204599944 bps
Transmitted:
  Packets                :                5791772                4055 pps
  Bytes                  :                312755688                1751976 bps
  Tail-dropped packets :                0                0 pps
  RED-dropped packets  :                516227139                469546 pps
  RED-dropped bytes    :                27876265560                202843872 bps
Queue: 3, Forwarding classes: network-control
Queued:

```

```

Packets          : 0 0 pps
Bytes            : 0 0 bps
Transmitted:
Packets          : 0 0 pps
Bytes            : 0 0 bps
Tail-dropped packets : 0 pps
RED-dropped packets : 0 pps
RED-dropped bytes  : 0 bps
Forwarding classes: 16 supported, 4 in use
Egress queues: 4 supported, 4 in use
Queue: 0, Forwarding classes: best-effort
Queued:
Packets          : 5417304 13797 pps
Bytes            : 368429508 7506096 bps
Transmitted:
Packets          : 5014996 12769 pps
Bytes            : 341019728 6946560 bps
Tail-dropped packets : 0 pps
RED-dropped packets : 402189 1028 pps
Low              : 402189 1028 pps
Medium-low       : 0 0 pps
Medium-high      : 0 0 pps
High             : 0 0 pps
RED-dropped bytes  : 27348852 559536 bps
Low              : 27348852 559536 bps
Medium-low       : 0 0 bps
Medium-high      : 0 0 bps
High             : 0 0 bps
Queue: 1, Forwarding classes: expedited-forwarding
Queued:
Packets          : 0 0 pps
Bytes            : 0 0 bps
Transmitted:
Packets          : 0 0 pps
Bytes            : 0 0 bps
Tail-dropped packets : 0 pps
RED-dropped packets : 0 pps
Low              : 0 0 pps
Medium-low       : 0 0 pps
Medium-high      : 0 0 pps
High             : 0 0 pps
RED-dropped bytes  : 0 0 bps
Low              : 0 0 bps
Medium-low       : 0 0 bps
Medium-high      : 0 0 bps
High             : 0 0 bps
Queue: 2, Forwarding classes: assured-forwarding
Queued:
Packets          : 5770534 3963 pps
Bytes            : 396943252 2156144 bps
Transmitted:
Packets          : 3945152 1457 pps
Bytes            : 268270336 792608 bps
Tail-dropped packets : 0 pps
RED-dropped packets : 1815141 2506 pps
Low              : 1815141 2506 pps
Medium-low       : 0 0 pps
Medium-high      : 0 0 pps
High             : 0 0 pps
RED-dropped bytes  : 123429524 1363536 bps
Low              : 123429524 1363536 bps

```

```

Medium-low      : 0 0 bps
Medium-high     : 0 0 bps
High            : 0 0 bps
Queue: 3, Forwarding classes: network-control
Queued:
Packets         : 0 0 pps
Bytes           : 0 0 bps
Transmitted:
Packets         : 0 0 pps
Bytes           : 0 0 bps
Tail-dropped packets : 0 0 pps
RED-dropped packets : 0 0 pps
Low             : 0 0 pps
Medium-low      : 0 0 pps
Medium-high     : 0 0 pps
High            : 0 0 pps
RED-dropped bytes : 0 0 bps
Low             : 0 0 bps
Medium-low      : 0 0 bps
Medium-high     : 0 0 bps
High            : 0 0 bps

```

show interfaces interface-set queue egress (Enhanced DPC)

```

user@host> show interfaces interface-set queue ge-2/2/0-0 egress
Interface set: ge-2/2/0-0
Interface set index: 3
Forwarding classes: 16 supported, 4 in use
Egress queues: 4 supported, 4 in use
Queue: 0, Forwarding classes: best-effort
Queued:
Packets         : 3958253 13822 pps
Bytes           : 269217592 7519712 bps
Transmitted:
Packets         : 3665035 12729 pps
Bytes           : 249222380 6924848 bps
Tail-dropped packets : 0 0 pps
RED-dropped packets : 293091 1093 pps
Low             : 293091 1093 pps
Medium-low      : 0 0 pps
Medium-high     : 0 0 pps
High            : 0 0 pps
RED-dropped bytes : 19930188 594864 bps
Low             : 19930188 594864 bps
Medium-low      : 0 0 bps
Medium-high     : 0 0 bps
High            : 0 0 bps
Queue: 1, Forwarding classes: expedited-forwarding
Queued:
Packets         : 0 0 pps
Bytes           : 0 0 bps
Transmitted:
Packets         : 0 0 pps
Bytes           : 0 0 bps
Tail-dropped packets : 0 0 pps
RED-dropped packets : 0 0 pps
Low             : 0 0 pps
Medium-low      : 0 0 pps
Medium-high     : 0 0 pps
High            : 0 0 pps
RED-dropped bytes : 0 0 bps

```

```

    Low                :                0                0 bps
    Medium-low         :                0                0 bps
    Medium-high        :                0                0 bps
    High               :                0                0 bps
Queue: 2, Forwarding classes: assured-forwarding
Queued:
  Packets             :            5350989            3904 pps
  Bytes               :          368412924          2124048 bps
Transmitted:
  Packets             :            3790469            1465 pps
  Bytes               :          257751892          796960 bps
  Tail-dropped packets :                0                0 pps
  RED-dropped packets :            1550282            2439 pps
    Low               :            1550282            2439 pps
    Medium-low        :                0                0 pps
    Medium-high       :                0                0 pps
    High              :                0                0 pps
  RED-dropped bytes   :          105419176          1327088 bps
    Low               :          105419176          1327088 bps
    Medium-low        :                0                0 bps
    Medium-high       :                0                0 bps
    High              :                0                0 bps
Queue: 3, Forwarding classes: network-control
Queued:
  Packets             :                0                0 pps
  Bytes               :                0                0 bps
Transmitted:
  Packets             :                0                0 pps
  Bytes               :                0                0 bps
  Tail-dropped packets :                0                0 pps
  RED-dropped packets :                0                0 pps
    Low               :                0                0 pps
    Medium-low        :                0                0 pps
    Medium-high       :                0                0 pps
    High              :                0                0 pps
  RED-dropped bytes   :                0                0 bps
    Low               :                0                0 bps
    Medium-low        :                0                0 bps
    Medium-high       :                0                0 bps
    High              :                0                0 bps

```

show interfaces interface-set queue forwarding-class (Gigabit Ethernet)

```

user@host> show interfaces interface-set queue ge-2/2/0-0 forwarding-class best-effort
Interface set: ge-2/2/0-0
Interface set index: 3
Forwarding classes: 8 supported, 4 in use
Egress queues: 4 supported, 4 in use
Queue: 0, Forwarding classes: best-effort
Queued:
  Packets             :            101857694            1420083 pps
  Bytes               :          6927234456          772532320 bps
Transmitted:
  Packets             :            3984693            55500 pps
  Bytes               :          270959592          30192512 bps
  Tail-dropped packets :                0                0 pps
  RED-dropped packets :            97870952          1364583 pps
    Low               :            97870952          1364583 pps
    Medium-low        :                0                0 pps
    Medium-high       :                0                0 pps
    High              :                0                0 pps

```

RED-dropped bytes	:	6655225776	742339808 bps
Low	:	6655225776	742339808 bps
Medium-low	:	0	0 bps
Medium-high	:	0	0 bps
High	:	0	0 bps

show interfaces interface-set queue (Enhanced DPC)

```

user@host> show interfaces interface-set queue ge-2/2/0-0 ingress
Interface set: foo
Interface set index: 3
Forwarding classes: 16 supported, 4 in use
Ingress queues: 4 supported, 4 in use
Queue: 0, Forwarding classes: best-effort
  Queued:
    Packets      :      149036817      473711 pps
    Bytes        :      8048003934    204642936 bps
  Transmitted:
    Packets      :      4360749      13891 pps
    Bytes        :      235480446    6000912 bps
    Tail-dropped packets :      0      0 pps
    RED-dropped packets :      144676035    459820 pps
    RED-dropped bytes  :      7812506592    198642024 bps
Queue: 1, Forwarding classes: expedited-forwarding
  Queued:
    Packets      :      0      0 pps
    Bytes        :      0      0 bps
  Transmitted:
    Packets      :      0      0 pps
    Bytes        :      0      0 bps
    Tail-dropped packets :      0      0 pps
    RED-dropped packets :      0      0 pps
    RED-dropped bytes  :      0      0 bps
Queue: 2, Forwarding classes: assured-forwarding
  Queued:
    Packets      :      485089207      473605 pps
    Bytes        :      26195987476    204597576 bps
  Transmitted:
    Packets      :      5480799      3959 pps
    Bytes        :      295963146    1710504 bps
    Tail-dropped packets :      0      0 pps
    RED-dropped packets :      479605853    469646 pps
    RED-dropped bytes  :      25898716170    202887072 bps
Queue: 3, Forwarding classes: network-control
  Queued:
    Packets      :      0      0 pps
    Bytes        :      0      0 bps
  Transmitted:
    Packets      :      0      0 pps
    Bytes        :      0      0 bps
    Tail-dropped packets :      0      0 pps
    RED-dropped packets :      0      0 pps
    RED-dropped bytes  :      0      0 bps

```

show interfaces interface-set queue remaining-traffic (Gigabit Ethernet)

```

user@host> show interfaces interface-set queue ge-2/2/0-0 remaining-traffic
Interface set: ge-2/2/0-0
Interface set index: 12
Forwarding classes: 8 supported, 4 in use
Egress queues: 4 supported, 4 in use

```

```
Queue: 0, Forwarding classes: best-effort
Queued:
  Packets          :          2201552          0 pps
  Bytes            :          149705536        0 bps
Transmitted:
  Packets          :           609765          0 pps
  Bytes            :          41464020         0 bps
Tail-dropped packets :           0          0 pps
RED-dropped packets :          1591787          0 pps
  Low              :          1591787          0 pps
  Medium-low       :           0          0 pps
  Medium-high      :           0          0 pps
  High             :           0          0 pps
RED-dropped bytes   :          108241516        0 bps
  Low              :          108241516        0 bps
  Medium-low       :           0          0 bps
  Medium-high      :           0          0 bps
  High             :           0          0 bps
```

show interfaces irb

Syntax	<pre>show interfaces irb <brief detail extensive terse> <descriptions> <media> <snmp-index <i>snmp-index</i>> <statistics></pre>
Release Information	Command introduced in Junos OS Release 8.4.
Description	Display integrated routing and bridging interfaces information.
Options	<p>brief detail extensive terse—(Optional) Display the specified level of output.</p> <p>descriptions—(Optional) Display interface description strings.</p> <p>mac—Display hardware MAC address</p> <p>media—(Optional) Display media-specific information about network interfaces.</p> <p>snmp-index <i>snmp-index</i>—(Optional) Display information for the interface with the specified SNMP index.</p> <p>statistics—(Optional) Display static interface statistics.</p>
Additional Information	Integrated routing and bridging (IRB) provides simultaneous support for Layer 2 bridging and Layer 3 IP routing on the same interface. IRB enables you to route local packets to another routed interface or to another bridging domain that has a Layer 3 protocol configured.
Required Privilege Level	view
List of Sample Output	show interfaces irb extensive on page 154 show interfaces irb snmp-index on page 155
Output Fields	Table 15 on page 150 lists the output fields for the show interfaces irb command. Output fields are listed in the approximate order in which they appear.

Table 15: show interfaces irb Output Fields

Field Name	Field Description	Level of Output
Physical Interface		
Physical interface	Name of the physical interface.	All levels
Enabled	State of the physical interface. Possible values are described in the “Enabled Field” section under <i>Common Output Fields Description</i> .	All levels
Proto	Protocol configured on the interface.	terse

Table 15: show interfaces irb Output Fields (*continued*)

Field Name	Field Description	Level of Output
Interface index	Physical interface index number, which reflects its initialization sequence.	detail extensive none
SNMP ifIndex	SNMP index number for the physical interface.	detail extensive none
Type	Physical interface type.	detail extensive none
Link-level type	Encapsulation being used on the physical interface.	detail extensive brief none
MTU	MTU size on the physical interface.	detail extensive brief none
Clocking	Reference clock source: Internal or External . Always unspecified on IRB interfaces.	detail extensive brief
Speed	Speed at which the interface is running. Always unspecified on IRB interfaces.	detail extensive brief
Device flags	Information about the physical device. Possible values are described in the “Device Flags” section under <i>Common Output Fields Description</i> .	detail extensive brief none
Interface flags	Information about the interface. Possible values are described in the “Interface Flags” section under <i>Common Output Fields Description</i> .	detail extensive brief none
Link type	Physical interface link type: full duplex or half duplex .	detail extensive none
Link flags	Information about the link. Possible values are described in the “Links Flags” section under <i>Common Output Fields Description</i> .	detail extensive none
Physical Info	Physical interface information.	All levels
Hold-times	Current interface hold-time up and hold-time down, in milliseconds.	detail extensive
Current address	Configured MAC address.	detail extensive none
Hardware address	MAC address of the hardware.	detail extensive none
Alternate link address	Backup address of the link.	detail extensive
Last flapped	Date, time, and how long ago the interface went from down to up. The format is Last flapped: year-month-day hours:minutes:seconds timezone (hours:minutes:seconds ago) . For example, Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago) .	detail extensive none
Statistics last cleared	Time when the statistics for the interface were last set to zero.	detail extensive

Table 15: show interfaces irb Output Fields (*continued*)

Field Name	Field Description	Level of Output
Traffic statistics	<p>Number and rate of bytes and packets received and transmitted on the physical interface.</p> <ul style="list-style-type: none"> • Input bytes—Number of bytes received on the interface. • Output bytes—Number of bytes transmitted on the interface. • Input packets—Number of packets received on the interface. • Output packets—Number of packets transmitted on the interface. 	detail extensive
IPv6 transit statistics	<p>Number of IPv6 transit bytes and packets received and transmitted on the physical interface if IPv6 statistics tracking is enabled.</p> <ul style="list-style-type: none"> • Input bytes—Number of bytes received on the interface. • Output bytes—Number of bytes transmitted on the interface. • Input packets—Number of packets received on the interface. • Output packets—Number of packets transmitted on the interface. 	detail extensive
Input errors	<p>Input errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> • Errors—Sum of the incoming frame aborts and FCS errors. • Drops—Number of packets dropped by the input queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism. • Framing errors—Number of packets received with an invalid frame checksum (FCS). • Runts—Number of frames received that are smaller than the runt threshold. • Giants—Number of frames received that are larger than the giant threshold. • Policed discards—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle. • Resource errors—Sum of transmit drops. 	detail extensive
Output errors	<p>Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</p> <ul style="list-style-type: none"> • Carrier transitions—Number of times the interface has gone from down to up. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and up, or another problem occurs. If the number of carrier transitions increments quickly (perhaps once every 10 seconds), the cable, the far-end system, or the DPC is malfunctioning. • Errors—Sum of the outgoing frame aborts and FCS errors. • Drops—Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC's RED mechanism. • MTU errors—Number of packets whose size exceeded the MTU of the interface. • Resource errors—Sum of transmit drops. 	detail extensive

Logical Interface

Table 15: show interfaces irb Output Fields (*continued*)

Field Name	Field Description	Level of Output
Logical interface	Name of the logical interface.	All levels
Index	Index number of the logical interface (which reflects its initialization sequence).	detail extensive none
SNMP ifIndex	SNMP interface index number of the logical interface.	detail extensive none
Generation	Unique number for use by Juniper Networks technical support only.	detail extensive
Flags	Information about the logical interface. Possible values are described in the "Logical Interface Flags" section under <i>Common Output Fields Description</i> .	detail extensive
Encapsulation	Encapsulation on the logical interface.	detail extensive
Bandwidth	Speed at which the interface is running.	detail extensive
Routing Instance	Routing instance IRB is configured under.	detail extensive
Bridging Domain	Bridging domain IRB is participating in.	detail extensive
Traffic statistics	<p>Number and rate of bytes and packets received and transmitted on the logical interface.</p> <ul style="list-style-type: none"> • Input bytes—Number of bytes received on the interface. • Output bytes—Number of bytes transmitted on the interface. • Input packets—Number of packets received on the interface • Output packets—Number of packets transmitted on the interface. 	detail extensive
IPv6 transit statistics	<p>Number of IPv6 transit bytes and packets received and transmitted on the logical interface if IPv6 statistics tracking is enabled.</p> <ul style="list-style-type: none"> • Input bytes—Number of bytes received on the interface. • Output bytes—Number of bytes transmitted on the interface. • Input packets—Number of packets received on the interface. • Output packets—Number of packets transmitted on the interface. 	detail extensive
Local statistics	Statistics for traffic received from and transmitted to the Routing Engine.	detail extensive
Transit statistics	Statistics for traffic transiting the router.	detail extensive
Protocol	Protocol family configured on the local interface. Possible values are described in the "Protocol Field" section under <i>Common Output Fields Description</i> .	detail extensive
MTU	Maximum transmission unit size on the logical interface.	detail extensive
Maximum labels	Maximum number of MPLS labels configured for the MPLS protocol family on the logical interface.	detail extensive none

Table 15: show interfaces irb Output Fields (*continued*)

Field Name	Field Description	Level of Output
Generation	Unique number for use by Juniper Networks technical support only.	detail extensive
Route table	Routing table in which the logical interface address is located. For example, 0 refers to the routing table inet.0.	detail extensive
Addresses, Flags	Information about address flags. Possible values are described in the “Addresses Flags” section under <i>Common Output Fields Description</i> .	detail extensive
Policer	The policer that is to be evaluated when packets are received or transmitted on the interface.	detail extensive
Flags	Information about the logical interface. Possible values are described in the “Logical Interface Flags” section under <i>Common Output Fields Description</i> .	detail extensive

Sample Output

show interfaces irb extensive

```

user@host> show interfaces irb extensive
Physical interface: irb, Enabled, Physical link is Up
  Interface index: 129, SNMP ifIndex: 23, Generation: 130
  Type: Ethernet, Link-level type: Ethernet, MTU: 1514, Clocking: Unspecified,
  Speed: Unspecified
  Device flags   : Present Running
  Interface flags: SNMP-Traps
  Link type      : Full-Duplex
  Link flags     : None
  Physical info  : Unspecified
  Hold-times     : Up 0 ms, Down 0 ms
  Current address: 02:00:00:00:00:30, Hardware address: 02:00:00:00:00:30
  Alternate link address: Unspecified
  Last flapped   : Never
  Statistics last cleared: Never
  Traffic statistics:
    Input bytes   : 0
    Output bytes  : 0
    Input packets : 0
    Output packets: 0
  IPv6 transit statistics:
    Input bytes   : 0
    Output bytes  : 0
    Input packets : 0
    Output packets: 0
  Input errors:
    Errors: 0, Drops: 0, Framing errors: 0, Runt: 0, Giants: 0, Policed discards:
0, Resource errors: 0
  Output errors:
    Carrier transitions: 0, Errors: 0, Drops: 0, MTU errors: 0, Resource errors:
0

Logical interface irb.0 (Index 68) (SNMP ifIndex 70) (Generation 143)
  Flags: Hardware-Down SNMP-Traps 0x4000 Encapsulation: ENET2
  Bandwidth: 1000mbps
  Routing Instance: customer_0 Bridging Domain: bd0

```

```

Traffic statistics:
  Input bytes : 0
  Output bytes : 0
  Input packets: 0
  Output packets: 0
IPv6 transit statistics:
  Input bytes : 0
  Output bytes : 0
  Input packets: 0
  Output packets: 0
Local statistics:
  Input bytes : 0
  Output bytes : 0
  Input packets: 0
  Output packets: 0
Transit statistics:
  Input bytes : 0 0 bps
  Output bytes : 0 0 bps
  Input packets: 0 0 pps
  Output packets: 0 0 pps
IPv6 transit statistics:
  Input bytes : 0
  Output bytes : 0
  Input packets: 0
  Output packets: 0
Protocol inet, MTU: 1500, Generation: 154, Route table: 0
  Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
    Destination: 10.51.1/24, Local: 10.51.1.2, Broadcast: 10.51.1.255,
    Generation: 155
Protocol multiservice, MTU: 1500, Generation: 155, Route table: 0
  Flags: Is-Primary
  Policer: Input: __default_arp_policer

```

show interfaces irb snmp-index

```

user@host> show interfaces snmp-index 25
Physical interface: irb, Enabled, Physical link is Up
  Interface index: 128, SNMP ifIndex: 25
  Type: Ethernet, Link-level type: Ethernet, MTU: 1514
  Device flags : Present Running
  Interface flags: SNMP-Traps
  Link type : Full-Duplex
  Link flags : None
  Current address: 02:00:00:00:00:30, Hardware address: 02:00:00:00:00:30
  Last flapped : Never
    Input packets : 0
    Output packets: 0

Logical interface irb.0 (Index 68) (SNMP ifIndex 70)
  Flags: Hardware-Down SNMP-Traps 0x4000 Encapsulation: ENET2
  Bandwidth: 1000mbps
  Routing Instance: customer_0 Bridging Domain: bd0
  Input packets : 0
  Output packets: 0
  Protocol inet, MTU: 1500
    Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
      Destination: 10.51.1/24, Local: 10.51.1.2, Broadcast: 10.51.1.255
  Protocol multiservice, MTU: 1500
    Flags: Is-Primary

```

show lacp interfaces

Syntax `show lacp interfaces`
`<interface-name>`

Release Information Command introduced in Junos OS Release 7.6.

Description Display Link Aggregation Control Protocol (LACP) information about the specified aggregated Ethernet, Fast 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—**aenumber**
- Fast Ethernet—**fe-fpc/pic/port**
- Gigabit Ethernet—**ge-fpc/pic/port**



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

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

Required Privilege Level view

List of Sample Output [show lacp interfaces \(Aggregated Ethernet\) on page 159](#)
[show lacp interfaces \(Gigabit Ethernet\) on page 159](#)

Output Fields [Table 16 on page 156](#) lists the output fields for the `show lacp interfaces` command. Output fields are listed in the approximate order in which they appear.

Table 16: show lacp interfaces Output Fields

Field Name	Field Description
Aggregated interface	Aggregated interface value.

Table 16: show lacp interfaces Output Fields (*continued*)

Field Name	Field Description
LACP State	<p>LACP state information for each aggregated interface:</p> <ul style="list-style-type: none"> • Role—Role played by the interface. It can be one of the following: <ul style="list-style-type: none"> • Actor—Local device participating in LACP negotiation. • Partner—Remote device participating in LACP negotiation. • Exp—Expired state. Yes indicates the actor or partner is in an expired state. No indicates the actor or partner is not in an expired state. • Def—Default. Yes indicates that the actor's receive machine is using the default operational partner information, administratively configured for the partner. No indicates the operational partner information in use has been received in an LACP PDU. • Dist—Distribution of outgoing frames. No indicates distribution of outgoing frames on the link is currently disabled and is not expected to be enabled. Otherwise, the value is Yes. • Col—Collection of incoming frames. Yes indicates collection of incoming frames on the link is currently enabled and is not expected to be disabled. Otherwise, the value is No. • Syn—Synchronization. If the value is Yes, 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 No, the link is not synchronized. It is currently not in the right aggregation. • Aggr—Ability of aggregation port to aggregate (Yes) or to operate only as an individual link (No). • Timeout—LACP timeout preference. Periodic transmissions of LACP PDUs occur at either a slow or fast transmission rate, depending upon the expressed LACP timeout preference (Long Timeout or Short Timeout). • Activity—Actor or partner's port activity. Passive indicates the port's preference for not transmitting LAC PDUs unless its partner's control value is Active. Active indicates the port's preference to participate in the protocol regardless of the partner's control value.

Table 16: show lacp interfaces Output Fields (*continued*)

Field Name	Field Description
LACP Protocol	<p>LACP protocol information for each aggregated interface:</p> <ul style="list-style-type: none"> Link state (active or standby) indicated in parentheses next to the interface when link protection is configured. Receive State—One of the following values: <ul style="list-style-type: none"> Current—The state machine receives an LACP PDU and enters the Current state. 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. Expired—If no LACP PDU is received before the timer for the Current state expires once, the state machine enters the Expired state. Initialize—When the physical connectivity of a link changes or a Begin event occurs, the state machine enters the Initialize state. 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. Port Disabled—If the port becomes inoperable and a Begin event has not occurred, the state machine enters the Port Disabled state. Transmit State—Transmit state of state machine. One of the following values: <ul style="list-style-type: none"> Fast Periodic—Periodic transmissions are enabled at a fast transmission rate. No Periodic—Periodic transmissions are disabled. Periodic Timer—Transitory state entered when the periodic timer expires. Slow Periodic—Periodic transmissions are enabled at a slow transmission rate. Mux State—State of the multiplexer state machine for the aggregation port. The state is one of the following values: <ul style="list-style-type: none"> Attached—Multiplexer state machine initiates the process of attaching the port to the selected aggregator. 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. 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. Detached—Process of detaching the port from the aggregator is in progress. 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. Waiting—Multiplexer state machine is in a holding process, awaiting an outcome.
LACP Statistics	<p>LACP statistics are returned when the extensive option is used and provides the following information:</p> <ul style="list-style-type: none"> LACP Rx—LACP received counter that increments for each normal hello. LACP Tx—Number of LACP transmit packet errors logged. Unknown Rx—Number of unrecognized packet errors logged. Illegal Rx—Number of invalid packets received.

Sample Output

show lacp interfaces (Aggregated Ethernet)

```

user@host> show lacp interfaces ae0 extensive
Aggregated interface: ae0
LACP state:      Role  Exp  Def  Dist  Col  Syn  Aggr  Timeout  Activity
ge-1/0/1        Actor  No   Yes  No   No   No   Yes    Fast    Active
ge-1/0/1        Partner No   Yes  No   No   No   Yes    Fast    Passive
ge-1/0/2        Actor  No   Yes  No   No   No   Yes    Fast    Active
ge-1/0/2        Partner No   Yes  No   No   No   Yes    Fast    Passive

LACP protocol:   Receive State   Transmit State   Mux State
ge-1/0/1        CURRENT          Fast periodic    Collecting
distributing
ge-1/0/2        CURRENT          Fast periodic    Collecting
distributing
ge-1/0/1 (active) CURRENT          Fast periodic    Collecting
distributing
ge-1/0/2 (standby) CURRENT          Fast periodic    WAITING
LACP Statistics: LACP Rx    LACP Tx    Unknown Rx  Illegal Rx
ge-1/0/1        0           0           0           0
ge-1/0/2        0           0           0           0

```

show lacp interfaces (Gigabit Ethernet)

```

user@host> show lacp interfaces ge-0/3/0
Aggregated interface: ae0
LACP State:      Role  Exp  Def  Dist  Col  Syn  Aggr  Timeout  Activity
ge-0/3/0        Actor  No   No   Yes  Yes  Yes  Yes    Fast    Active
ge-0/3/0        Partner No   No   Yes  Yes  Yes  Yes    Fast    Active
LACP Protocol:   Receive State   Transmit State   Mux State
ge-0/3/0        Current          Fast periodic    Collecting distributing

```

show interfaces mac-database (Gigabit Ethernet)

Syntax	<code>show interfaces mac-database (ge-fpc/pic/port ge-fpc/pic/port.n) <mac-address mac-address></code>
Release Information	Command introduced before Junos OS Release 7.4. Command introduced on PTX Series Packet Transport Routers for Junos OS Release 12.1.
Description	(M Series, T Series, MX Series routers, and PTX Series Packet Transport Routers only) Display media access control (MAC) address information for the specified Gigabit Ethernet interface.
Options	<p>ge-fpc/pic/port—Display MAC addresses that have been learned on all logical interfaces on a particular physical interface.</p> <p>ge-fpc/pic/port.n—Display MAC addresses that have been learned on a particular logical interface.</p> <p>mac-address mac-address—(Optional) Display detailed MAC address statistics, including policer information.</p>
Additional Information	On IQ2 PIC interfaces, the default value for maximum retention of entries in the MAC address table has changed, for cases in which the table is not full. The new holding time is 12 hours. The previous retention time of 3 minutes is still in effect when the table is full.
Required Privilege Level	view
List of Sample Output	show interfaces mac-database (All MAC Addresses on a Port) on page 162 show interfaces mac-database (All MAC Addresses on a Service) on page 163 show interfaces mac-database mac-address on page 163
Output Fields	Table 17 on page 160 lists the output fields for the show interfaces mac-database command. Output fields are listed in the approximate order in which they appear.

Table 17: show interfaces mac-database Output Fields

Field Name	Field Description
Physical Interface	
Physical interface	Name of the physical interface.
Enabled	State of the physical interface. Possible values are described in the "Enabled Field" section under <i>Common Output Fields Description</i> .
Interface index	Physical interface index number, which reflects its initialization sequence.
SNMP ifIndex	SNMP index number for the physical interface.
Description	Description and name of the interface.

Table 17: show interfaces mac-database Output Fields (*continued*)

Field Name	Field Description
Link-level type	Encapsulation being used on the physical interface.
MTU	MTU size on the physical interface.
Speed	Speed at which the interface is running.
Loopback	Whether loopback is enabled and the type of loopback: local or remote .
Source filtering	Whether source filtering is configured.
Flow control	Whether flow control is enabled or disabled.
Device flags	Information about the physical device. Possible values are described in the “Device Flags” section under <i>Common Output Fields Description</i> .
Interface flags	Information about the interface. Possible values are described in the “Links Flags” section under <i>Common Output Fields Description</i> .
Link flags	Information about the link. Possible values are described in the “Device Flags” section under <i>Common Output Fields Description</i> .
Logical Interface	
Logical interface	Name of the logical interface.
Index	Logical interface index number, which reflects its initialization sequence.
SNMP ifIndex	Logical interface SNMP interface index number.
Flags	Information about the logical interface (possible values are described in the “Logical Interface Flags” section under <i>Common Output Fields Description</i>).
Encapsulation	Encapsulation on the logical interface.
MAC address, Input frames, Input bytes, Output frames, Output bytes	MAC address and corresponding number of input frames, input bytes, output frames, and output bytes.
Number of MAC addresses	Number of MAC addresses configured.

Table 17: show interfaces mac-database Output Fields (*continued*)

Field Name	Field Description
Policer Statistics	<p>(Displayed for mac-address option only) Display information about policers applied to a logical interface-MAC pair.</p> <ul style="list-style-type: none"> • Policer type—Type of policer that is out of spec with respect to the configuration. It can be one or more of the following: <ul style="list-style-type: none"> • Input premium—Number of high-priority rating out-of-spec frames or bytes received. • Output premium—Number of high-priority rating out-of-spec frames or bytes sent. • Input aggregate—Total number of out-of-spec frames or bytes received. • Output aggregate—Total number of out-of-spec frames or bytes sent. • Discarded Frames—Number of discarded frames. • Discarded Bytes—Number of discarded bytes.

Sample Output

show interfaces mac-database (All MAC Addresses on a Port)

```

user@host> show interfaces mac-database xe-0/3/3
Physical interface: xe-0/3/3, Enabled, Physical link is Up
  Interface index: 372, SNMP ifIndex: 788
  Link-level type: Ethernet, MTU: 1514, LAN-PHY mode, Speed: 10Gbps, Loopback:
None, Source filtering: Disabled, Flow control: Enabled
  Device flags      : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000
  Link flags       : None

Logical interface xe-0/3/3.0 (Index 364) (SNMP ifIndex 829)
  Flags: SNMP-Traps 0x4004000 Encapsulation: ENET2
MAC address      Input frames  Input bytes  Output frames  Output bytes
00:00:00:00:00:00      1           56           0             0
00:00:c0:01:01:02    7023810     323095260    0             0
00:00:c0:01:01:03    7023810     323095260    0             0
00:00:c0:01:01:04    7023810     323095260    0             0
00:00:c0:01:01:05    7023810     323095260    0             0
00:00:c0:01:01:06    7023810     323095260    0             0
00:00:c0:01:01:07    7023810     323095260    0             0
00:00:c0:01:01:08    7023809     323095214    0             0
00:00:c0:01:01:09    7023809     323095214    0             0
00:00:c0:01:01:0a    7023809     323095214    0             0
00:00:c0:01:01:0b    7023809     323095214    0             0
00:00:c8:01:01:02    30424784    1399540064    37448598      1722635508
00:00:c8:01:01:03    30424784    1399540064    37448598      1722635508
00:00:c8:01:01:04    30424716    1399536936    37448523      1722632058
00:00:c8:01:01:05    30424789    1399540294    37448598      1722635508
00:00:c8:01:01:06    30424788    1399540248    37448597      1722635462
00:00:c8:01:01:07    30424783    1399540018    37448597      1722635462
00:00:c8:01:01:08    30424783    1399540018    37448596      1722635416
00:00:c8:01:01:09    8836796     406492616    8836795       406492570
00:00:c8:01:01:0a    30424712    1399536752    37448521      1722631966
00:00:c8:01:01:0b    30424715    1399536890    37448523      1722632058
Number of MAC addresses : 21

```

show interfaces mac-database (All MAC Addresses on a Service)

```

user@host> show interfaces mac-database xe-0/3/3
Logical interface xe-0/3/3.0 (Index 364) (SNMP ifIndex 829)
  Flags: SNMP-Traps 0x4004000 Encapsulation: ENET2

```

MAC address	Input frames	Input bytes	Output frames	Output bytes
00:00:00:00:00:00	1	56	0	0
00:00:c0:01:01:02	7023810	323095260	0	0
00:00:c0:01:01:03	7023810	323095260	0	0
00:00:c0:01:01:04	7023810	323095260	0	0
00:00:c0:01:01:05	7023810	323095260	0	0
00:00:c0:01:01:06	7023810	323095260	0	0
00:00:c0:01:01:07	7023810	323095260	0	0
00:00:c0:01:01:08	7023809	323095214	0	0
00:00:c0:01:01:09	7023809	323095214	0	0
00:00:c0:01:01:0a	7023809	323095214	0	0
00:00:c0:01:01:0b	7023809	323095214	0	0
00:00:c8:01:01:02	31016568	1426762128	38040381	1749857526
00:00:c8:01:01:03	31016568	1426762128	38040382	1749857572
00:00:c8:01:01:04	31016499	1426758954	38040306	1749854076
00:00:c8:01:01:05	31016573	1426762358	38040381	1749857526
00:00:c8:01:01:06	31016573	1426762358	38040381	1749857526
00:00:c8:01:01:07	31016567	1426762082	38040380	1749857480
00:00:c8:01:01:08	31016567	1426762082	38040379	1749857434
00:00:c8:01:01:09	9428580	433714680	9428580	433714680
00:00:c8:01:01:0a	31016496	1426758816	38040304	1749853984
00:00:c8:01:01:0b	31016498	1426758908	38040307	1749854122

show interfaces mac-database mac-address

```

user@host> show interfaces mac-database xe-0/3/3 mac-address 00:00:c8:01:01:09
Physical interface: xe-0/3/3, Enabled, Physical link is Up
  Interface index: 372, SNMP ifIndex: 788
  Link-level type: Ethernet, MTU: 1514, LAN-PHY mode, Speed: 10Gbps, Loopback:
None, Source filtering: Disabled, Flow control: Enabled
  Device flags   : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000
  Link flags     : None

Logical interface xe-0/3/3.0 (Index 364) (SNMP ifIndex 829)
  Flags: SNMP-Traps 0x4004000 Encapsulation: ENET2
MAC address: 00:00:c8:01:01:09, Type: Configured,
  Input bytes   : 202324652
  Output bytes  : 202324560
  Input frames  : 4398362
  Output frames : 4398360
Policer statistics:
Policer type    Discarded frames  Discarded bytes
Output aggregate      3992386        183649756

```

show interfaces mc-ae

Syntax	show interfaces mc-ae <revertive-info> <id identifier unit number>
Release Information	Command introduced in Junos OS Release 9.6. revertive-info statement introduced in Junos OS Release 13.3
Description	On MX Series routers with multichassis aggregated Ethernet (aeX) interfaces, displaya information about the aeX interfaces.
Options	revertive-info —(Optional) Display revertive mode information for multichassis aggregated Ethernet interface. identifier —(Optional) Identifier of the multichassis aggregated Ethernet interface. number —(Optional) Specify the logical interface by unit number.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • <i>Configuring Multichassis Link Aggregation</i>
List of Sample Output	show interfaces mc-ae on page 165 show interfaces mc-ae (Active/Active Bridging and VRRP over IRB on MX Series Routers) on page 165 show interfaces mc-ae revertive-info on page 166
Output Fields	Table 18 on page 164 lists the output fields for the show interfaces mc-ae command. Output fields are listed in the approximate order in which they appear.

Table 18: show interfaces mc-ae Output Fields

Output Field Name	Field Description
Member Link	Identifiers of the configured multichassis link aggregate interfaces configured interfaces.
Local Status	Status of the local link: active or standby .
Peer Status	Status of the peer link: active or standby .
Local State	Up or down state of the local device.

Table 18: show interfaces mc-ae Output Fields (*continued*)

Output Field Name	Field Description
Peer State	<p>Status of the local and peer links in an active/active bridge or VRRP over integrated routing and bridging (IRB) configuration on MX Series routers, including:</p> <p>Logical Interface—Aggregated Ethernet (AE) aggregate number and unit number.</p> <p>Topology Type—The bridge or VRRP topology type configured on the AE.</p> <p>Local State—Up or down state of the local device.</p> <p>Peer State—Up or down state of the peer device.</p> <p>Peer Ip/ICL-PL/State—Address, interface and state of the peer device.</p>
Logical Interface	Identifier and unit of the multichassis aggregated Ethernet interface.
Core Facing Interface	Label: pseudowire interface or Ethernet interface .
ICL-PL	Label: pseudowire interface or Ethernet interface .
switchover mode	The configured switchover mode for the multichassis aggregated Ethernet interface: revertive or non-revertive .
switchover status	Status of the switchover if the revert-time statement is configured at the [edit interfaces aex mc-ae] hierarchy level.
revert time	Revert time configured for the multichassis aggregated Ethernet interface.
switchover time remaining	Seconds left to trigger the switchover if the switchover is in progress.

Sample Output

show interfaces mc-ae

```

user@host> show interfaces mc-ae ae0 unit 512
  Member Links   : ae0
  Local Status   : active
  Peer Status     : active
  Logical Interface      : ae0.512
  Core Facing Interface : Label Ethernet Interface
  ICL-PL          : Label Ethernet Interface

```

show interfaces mc-ae (Active/Active Bridging and VRRP over IRB on MX Series Routers)

```

user@host# show interfaces mc-ae ge-0/0/0.0
  Member Link      : ae0
  Current State Machine's State: active

```

```
Local Status      : active
Local State       : up
Peer Status       : active
Peer State        : up
  Logical Interface : ae0.0
  Topology Type     : bridge
  Local State       : up
  Peer State        : up
  Peer Ip/ICL-PL/State : 192.168.100.10 ge-0/0/0.0 up
```

show interfaces mc-ae revertive-info

```
user@host> show interfaces mc-ae revertive-info id 2
Member Link      : ae1
Current State Machine's State: mcae active state
Local Status     : active
Local State      : up
Peer Status      : standby
Peer State       : up
Switchover Mode  : Non Revertive
Switchover Status : N/A
Revert Time      : 1 Minutes
Switchover Remaining Time : N/A
  Logical Interface : ae1.1024
  Topology Type     : bridge
  Local State       : up
  Peer State        : up
  Peer Ip/MCP/State : N/A
```

show oam ethernet connectivity-fault-management delay-statistics

Syntax	<pre>show oam ethernet connectivity-fault-management delay-statistics <count <i>entry-count</i>> <local-mep <i>local-mep-id</i>> maintenance-association <i>ma-name</i> maintenance-domain <i>md-name</i> <remote-mep <i>remote-mep-id</i>></pre>
Release Information	<p>Command introduced in Junos OS Release 9.5.</p> <p>Command introduced in Junos OS Release 11.4 for EX Series switches.</p>
Description	<p>On MX Series routers with Ethernet interfaces on Dense Port Concentrators (DPCs), display ETH-DM delay statistics.</p> <p>On EX Series switches, display delay measurement results.</p>
Options	<p>count <i>entry-count</i>—(Optional) Number of entries to display from the statistics table. The range of values is 1 through 100. The default value is 100 entries.</p> <p>local-mep <i>local-mep-id</i>—(Optional) Numeric identifier of the local MEP. On MX Series routers, the range of values is 1 through 8192. On EX Series switches, the range of values is 1 through 8191.</p> <p>maintenance-association <i>ma-name</i>—Name of an existing CFM maintenance association.</p> <p>maintenance-domain <i>md-name</i>—Name of an existing connectivity fault management (CFM) maintenance domain.</p> <p>remote-mep <i>remote-mep-id</i>—(Optional) Numeric identifier of the remote MEP. On MX Series routers, the range of values is 1 through 8192. On EX Series switches, the range of values is 1 through 8191.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • clear oam ethernet connectivity-fault-management statistics • clear oam ethernet connectivity-fault-management delay-statistics • show oam ethernet connectivity-fault-management interfaces on page 175 • show oam ethernet connectivity-fault-management mep-database on page 188 • show oam ethernet connectivity-fault-management mep-statistics on page 199
List of Sample Output	<p>show oam ethernet connectivity-fault-management delay-statistics on page 169</p> <p>show oam ethernet connectivity-fault-management delay-statistics remote-mep on page 169</p>
Output Fields	<p>Table 19 on page 168 lists the output fields for the show oam ethernet connectivity-fault-management delay-statistics command and the show oam ethernet</p>

connectivity-fault-management mep-statistics command. Output fields are listed in the approximate order in which they appear.

Table 19: show oam ethernet connectivity-fault-management delay-statistics and mep-statistics Output Fields

Output Field Name	Field Description
MEP identifier	Maintenance association end point (MEP) numeric identifier.
MAC address	Unicast MAC address configured for the MEP.
Remote MEP count	Number of remote MEPs (unless you specify the remote-mep option).
Remote MEP identifier	Numeric identifier of the remote MEP.
Remote MAC address	Unicast MAC address of the remote MEP.
Index	Index number that corresponds to the ETH-DM entry in the CFM database.
One-way delay (usec)	<p>For a one-way ETH-DM session, the frame delay time, in microseconds, measured at the receiver MEP.</p> <p>For a detailed description of one-way Ethernet frame delay measurement, see the <i>ITU-T Y.1731 Ethernet Service OAM</i> topics in the <i>Junos OS Network Interfaces Library for Routing Devices</i>.</p>
Two-way delay (usec)	<p>For a two-way ETH-DM session, the frame delay time, in microseconds, measured at the initiator MEP.</p> <p>For a detailed description of two-way Ethernet frame delay measurement, see the <i>ITU-T Y.1731 Ethernet Service OAM</i> topics in the <i>Junos OS Network Interfaces Library for Routing Devices</i>.</p>
Average one-way delay	Average one-way frame delay for the statistics displayed.
Average one-way delay variation	Average one-way “frame jitter” for the statistics displayed.
Best-case one-way delay	Lowest one-way frame delay for the statistics displayed.
Worst-case one-way delay	Highest one-way frame delay for the statistics displayed.
Average two-way delay	Average two-way frame delay for the statistics displayed.
Average two-way delay variation	Average two-way “frame jitter” for the statistics displayed.
Best-case two-way delay	Lowest two-way frame delay for the statistics displayed.
Worst-case two-way delay	Highest two-way frame delay calculated in this session.

Sample Output

show oam ethernet connectivity-fault-
management
delay-statistics

```
user@switch> show oam ethernet connectivity-fault-management delay-statistics
maintenance-domain md6 maintenance-association ma6
MEP identifier: 100, MAC address: 00:05:85:73:7b:39
Remote MEP count: 2
Remote MEP identifier: 101
Remote MAC address: 00:05:85:73:39:4a
Delay measurement statistics:
Index  One-way delay  Two-way delay
      (usec)      (usec)
    1      259        519
    2      273        550
    3      287        571
    4      299        610
    5      313        650
Average one-way delay      : 286 usec
Average one-way delay variation: 62 usec
Best case one-way delay    : 259 usec
Worst case one-way delay   : 313 usec
Average two-way delay      : 580 usec
Average two-way delay variation: 26 usec
Best case two-way delay    : 519 usec
Worst case two-way delay   : 650 usec

Remote MEP identifier: 102
Remote MAC address: 00:04:55:63:39:5a
Delay measurement statistics:
Index  One-way delay  Two-way delay
      (usec)      (usec)
    1      29        58
    2      23        59
    3      27        56
    4      29        62
    5      33        68
Average one-way delay      : 28 usec
Average one-way delay variation: 3 usec
Best case one-way delay    : 23 usec
Worst case one-way delay   : 33 usec
Average two-way delay      : 60 usec
Average two-way delay variation: 3 usec
Best case two-way delay    : 56 usec
Worst case two-way delay   : 68 usec
```

show oam ethernet connectivity-fault-
management delay-statistics remote-mep

```
user@switch> show oam ethernet connectivity-fault-management delay-statistics
maintenance-domain md6 maintenance-association ma6 remote-mep 101
MEP identifier: 100, MAC address: 00:05:85:73:7b:39

Remote MEP identifier: 101
Remote MAC address: 00:05:85:73:39:4a
Delay measurement statistics:
Index  One-way delay  Two-way delay
      (usec)      (usec)
    1      259        519
```

2	273	550
3	287	571
4	299	610
5	313	650

Average one-way delay : 286 usec
 Average one-way delay variation: 62 usec
 Best case one-way delay : 259 usec
 Worst case one-way delay : 313 usec
 Average two-way delay : 580 usec
 Average two-way delay variation: 26 usec
 Best case two-way delay : 519 usec
 Worst case two-way delay : 650 usec

show oam ethernet connectivity-fault-management forwarding-state

Syntax	show oam ethernet connectivity-fault-management forwarding-state interface <i>interface-name</i> instance <i>instance-name</i> <brief detail extensive>
Release Information	Command introduced in Junos OS Release 8.4.
Description	On M7i and M10i with the Enhanced CFEB (CFEB-E), M320, MX Series, T320, and T640 routers, display IEEE 802.1ag Operation, Administration, and Management (OAM) connectivity fault management forwarding state information for Ethernet interfaces.
Options	<p>interface <i>interface-name</i>—Display forwarding state information for the specified Ethernet interface only.</p> <p>instance <i>instance-name</i>—Display forwarding state information for the specified forwarding instance only.</p> <p>brief detail extensive—(Optional) Display the specified level of output.</p>
Required Privilege Level	view
List of Sample Output	<p>show oam ethernet connectivity-fault-management forwarding-state instance on page 172</p> <p>show oam ethernet connectivity-fault-management forwarding-state interface on page 172</p> <p>show oam ethernet connectivity-fault-management forwarding-state interface detail on page 173</p> <p>show oam ethernet connectivity-fault-management forwarding-state interfaceinterface-name on page 174</p>
Output Fields	Table 20 on page 171 lists the output fields for the show oam ethernet connectivity-fault-management forwarding-state command. Output fields are listed in the approximate order in which they appear.

Table 20: show oam ethernet connectivity-fault-management forwarding-state Output Fields

Field Name	Field Description	Level of Output
Interface name	Interface identifier.	All levels
Link (Status)	Local link status.	All levels
Filter action	Filter action for messages at the level.	All levels
Next hop type	Next-hop type.	All levels
Next index	Next-hop index number.	brief
Level	Maintenance domain (MD) level.	detail

Table 20: show oam ethernet connectivity-fault-management forwarding-state Output Fields (*continued*)

Field Name	Field Description	Level of Output
Direction	MEP direction configured.	none
Instance name	Forwarding instance name.	All levels
CEs	Number of customer edge (CE) interfaces.	All levels
VEs	Number of VPN endpoint (VE) interfaces.	All levels

Sample Output

show oam ethernet
connectivity-fault-
management forwarding-
state instance

```
user@host> show oam ethernet connectivity-fault-management forwarding-state instance
Instance name: __+bd1__
CEs: 3
VEs: 0
Maintenance domain forwarding state:

Level   Direction   Filter action   Nexthop
                     type
0               Drop           none
1               Drop           none
2               Drop           none
3               Drop           none
4               Drop           none
5               Drop           none
6               Drop           none
7               Drop           none
```

show oam ethernet
connectivity-fault-
management forwarding-
state interface

```
user@host> show oam ethernet connectivity-fault-management forwarding-state interface
Interface name: ge-3/0/0.0
Instance name: __+bd1__
Maintenance domain forwarding state:

Level   Direction   Filter action   Nexthop
                     type
0               Drop           none
1               Drop           none
2               Drop           none
3               Drop           none
4               Drop           none
5               Drop           none
6               Drop           none
7       down   Receive        none
```

Interface name: xe-0/0/0.0

Instance name: __+bd1__

Maintenance domain forwarding state:

Level	Direction	Filter action	Nexthop type	Nexthop index
0		Drop	none	
1		Drop	none	
2		Drop	none	
3		Drop	none	
4		Drop	none	
5		Drop	none	
6		Drop	none	
7	down	Receive	none	

show oam ethernet
connectivity-fault-
management forwarding-
state interface detail

user@host> show oam ethernet connectivity-fault-management forwarding-state interface detail

Interface name: ge-3/0/0.0

Instance name: __+bd1__

Level: 0
Filter action: Drop
Nexthop type: none

Level: 1
Filter action: Drop
Nexthop type: none

Level: 2
Filter action: Drop
Nexthop type: none

Level: 3
Filter action: Drop
Nexthop type: none

Level: 4
Filter action: Drop
Nexthop type: none

Level: 5
Filter action: Drop
Nexthop type: none

Level: 6
Filter action: Drop
Nexthop type: none

Level: 7
Direction: down
Filter action: Receive
Nexthop type: none

Interface name: xe-0/0/0.0

Instance name: __+bd1__

```
Level: 0
Filter action: Drop
Nexthop type: none
```

```
Level: 1
Filter action: Drop
Nexthop type: none
```

```
...
```

```
show oam ethernet
connectivity-fault-
management forwarding-
state interface
interface-name
```

```
user@host> show oam ethernet connectivity-fault-management forwarding-state interface
interface-name ge-3/0/0/0.0
Interface name: ge-3/0/0.0
Instance name: __+bd1__
Maintenance domain forwarding state:
```

Level	Direction	Filter action	Nexthop type	Nexthop index
0		Drop	none	
1		Drop	none	
2		Drop	none	
3		Drop	none	
4		Drop	none	
5		Drop	none	
6		Drop	none	
7	down	Receive	none	

show oam ethernet connectivity-fault-management interfaces

Syntax	show oam ethernet connectivity-fault-management interfaces <ethernet-interface-name> <level md-level> <brief detail extensive>
Release Information	<p>Command introduced in Junos OS Release 8.4.</p> <p>Support for ITU-T Y.1731 frame delay measurement added in Junos OS Release 9.5.</p> <p>Support for ITU-T Y.1731 Ethernet synthetic frame loss measurement (ETH-SLM) added in Junos OS Release 13.2 for ACX Series and MX Series routers.</p>
Description	<p>On M7i and M10i routers with Enhanced CFEB (CFEB-E), and on M320, MX Series, ACX Series, T320, and T640 routers, display IEEE 802.1ag Operation, Administration, and Management (OAM) connectivity fault management (CFM) database information for Ethernet interfaces.</p> <p>In addition, for Ethernet interfaces on MX Series routers, also display any ITU-T Y.1731 frame delay measurement (ETH-DM) frame counts when detail or extensive mode is specified.</p> <p>For Ethernet interfaces on MX Series routers, display any ITU-T Y.1731 synthetic frame loss measurement (ETH-SLM) statistics and frame counts.</p>
Options	<p>brief detail extensive—(Optional) Specified level of output.</p> <p>ethernet-interface-name—(Optional) CFM information only for CFM entities attached to the specified Ethernet interface.</p> <p>level md-level—(Optional) CFM information for CFM identities enclosed within a maintenance domain of the specified level.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • clear oam ethernet connectivity-fault-management statistics • show oam ethernet connectivity-fault-management delay-statistics on page 167 • show oam ethernet connectivity-fault-management mep-database on page 188 • show oam ethernet connectivity-fault-management mep-statistics on page 199
List of Sample Output	<p>show oam ethernet connectivity-fault-management interfaces on page 180</p> <p>show oam ethernet connectivity-fault-management interfaces detail on page 180</p> <p>show oam ethernet connectivity-fault-management interfaces detail (One-Way ETH-DM) on page 181</p> <p>show oam ethernet connectivity-fault-management interfaces detail (Connection Protection TLV Configured) on page 182</p> <p>show oam ethernet connectivity-fault-management interfaces extensive on page 183</p> <p>show oam ethernet connectivity-fault-management interfaces level on page 184</p>

[show oam ethernet connectivity-fault-management interfaces \(trunk ports\) on page 184](#)

Output Fields Table 21 on page 176 lists the output fields for the **show oam ethernet connectivity-fault-management interfaces** command. Output fields are listed in the approximate order in which they appear.

Table 21: show oam ethernet connectivity-fault-management interfaces Output Fields

Field Name	Field Description	Level of Output
Interface	Interface identifier.	All levels
Interface status	Local interface status.	All levels
Link status	Local link status. Up , down , or oam-down .	All levels
Maintenance domain name	Maintenance domain name.	detail extensive
Format (Maintenance domain)	Maintenance domain name format configured.	detail extensive
Level	Maintenance domain level configured.	All levels
Maintenance association name	Maintenance association name.	detail extensive
Format (Maintenance association)	Maintenance association name format configured.	detail extensive
Continuity-check status	Continuity-check status.	detail extensive
Interval	Continuity-check message interval.	detail extensive
Loss-threshold	Lost continuity-check message threshold.	detail extensive
Interface status TLV	Status of the interface status TLV, if configured on the MEP interface: none , up , down , testing , unknown , dormant , notPresent , lowerLayerDown	detail extensive
Port status TLV	Status of the port status TLV, if configured on the MEP interface: none , no , yes	detail extensive
Connection Protection TLV	Status of the connection protection TLV if configured on the MEP interface: no , yes If yes , then the transmitted connection protection TLV is decoded and the following three fields are displayed: Prefer me , Protection in use , FRR Flag	detail extensive

Table 21: show oam ethernet connectivity-fault-management interfaces Output Fields (*continued*)

Field Name	Field Description	Level of Output
Prefer me	If set to yes , the path through which CCM was transmitted is preferred (unless the path fails). It is used for signaling a manual-switch command to the remote side. Its value can be yes or no .	detail extensive
Protection in use	Used for protection decision coordination. Its value is set to yes if the endpoint transmitting the CCM is currently transmitting the user traffic to protection path. Its value can be yes or no .	detail extensive
FRR Flag	LSR/LER forwarding the CCM Frame into a bypass tunnel is set. Its value can be yes or no .	detail extensive
MEP identifier	Maintenance association end point (MEP) identifier.	All levels
Neighbors	Number of MEP neighbors.	All levels
Direction	MEP direction configured.	detail extensive
MAC address	MAC address configured for the MEP.	detail extensive
MEP status	Indicates the status of the connectivity fault management (CFM) protocol running on the MEP: Running , inactive , disabled , or unsupported .	detail extensive
Remote MEP not receiving CCM	Whether the remote MEP is not receiving connectivity check messages (CCMs).	detail extensive
Erroneous CCM received	Whether erroneous CCMs have been received.	detail extensive
Cross-connect CCM received	Whether cross-connect CCMs have been received.	detail extensive
RDI sent by some MEP	Whether the remote defect indication (RDI) bit is set in messages that have been received. The absence of the RDI bit in a CCM indicates that the transmitting MEP is receiving CCMs from all configured MEPs.	detail extensive
CCMs sent	Number of CCMs transmitted.	detail extensive
CCMs received out of sequence	Number of CCMs received out of sequence.	detail extensive
LBMs sent	Number of loopback request messages (LBMs) sent.	detail extensive
Valid in-order LBRs received	Number of loopback response messages (LBRs) received that were valid messages and in sequence.	detail extensive

Table 21: show oam ethernet connectivity-fault-management interfaces Output Fields (*continued*)

Field Name	Field Description	Level of Output
Valid out-of-order LBRs received	Number of LBRs received that were valid messages and not in sequence.	detail extensive
LBRs received with corrupted data	Number of LBRs received that were corrupted.	detail extensive
LBRs sent	Number of LBRs transmitted.	detail extensive
LTM sent	Linktrace messages (LTMs) transmitted.	detail extensive
LTM received	Linktrace messages received.	detail extensive
LTR sent	Linktrace responses (LTRs) transmitted.	detail extensive
LTR received	Linktrace responses received.	detail extensive
Sequence number of next LTM request	Sequence number of next LTM request to be transmitted.	detail extensive
1DMs sent	If the interface is attached to an initiator MEP for a one-way ETH-DM session: Number of one-way delay measurement (1DM) PDU frames sent to the peer MEP in this session. For all other cases, this field displays 0.	detail extensive
Valid 1DMs received	If the interface is attached to a receiver MEP for a one-way ETH-DM session: Number of valid 1DM frames received. For all other cases, this field displays 0.	detail extensive
Invalid 1DMs received	If the interface is attached to a receiver MEP for a one-way ETH-DM session: Number of invalid 1DM frames received. For all other cases, this field displays 0.	detail extensive
Out of sync 1DMs received	If the interface is attached to a receiver MEP for a one-way ETH-DM session: Number of out-of-sync one-way delay measurement request packets received.	detail extensive
DMMs sent	If the interface is attached to an initiator MEP for a two-way ETH-DM session: Number of Delay Measurement Message (DMM) PDU frames sent to the peer MEP in this session. For all other cases, this field displays 0.	detail extensive
Valid DMMs received	If the interface is attached to an initiator MEP for a two-way ETH-DM session: Number of valid two-way delay measurement request packets received.	detail extensive
Invalid DMMs received	If the interface is attached to an initiator MEP for a two-way ETH-DM session: Number of invalid two-way delay measurement request packets received.	detail extensive

Table 21: show oam ethernet connectivity-fault-management interfaces Output Fields (*continued*)

Field Name	Field Description	Level of Output
DMRs sent	If the interface is attached to a responder MEP for a two-way ETH-DM session: Number of delay measurement reply (DMR) frames sent. For all other cases, this field displays 0.	detail extensive
Valid DMRs received	If the interface is attached to an initiator MEP for a two-way ETH-DM session: Number of valid DMRs received. For all other cases, this field displays 0.	detail extensive
Invalid DMRs received	If the interface is attached to an initiator MEP for a two-way ETH-DM session: Number of invalid DMRs received. For all other cases, this field displays 0.	detail extensive
LMM sent	If the interface is attached to an initiator MEP for a ETH-LM session: Number of loss measurement message (LMM) PDU frames sent to the peer MEP in this session.	detail extensive
Valid LMM received	If the interface is attached to an initiator MEP for a ETH-LM session: Number of valid loss measurement request packets received.	detail extensive
Invalid LMM received	If the interface is attached to an initiator MEP for a ETH-LM session: Number of invalid loss measurement request packets received.	detail extensive
LMR sent	If the interface is attached to a responder MEP for a ETH-LM session: Number of loss measurement reply (LMR) frames sent.	detail extensive
Valid LMR received	If the interface is attached to an initiator MEP for a ETH-LM session: Number of valid LMR frames received.	detail extensive
Invalid LMR received	If the interface is attached to an initiator MEP for a ETH-LM session: Number of invalid LMR frames received.	detail extensive
SLM sent	If the interface is attached to an initiator MEP for a ETH-SLM session: Number of synthetic loss measurement (SLM) request packets transmitted from the source MEP to the remote or destination MEP in this session.	detail extensive
Valid SLM received	If the interface is attached to a responder MEP for a ETH-SLM session: Number of valid SLM PDUs transmitted from the source MEP to the remote or destination MEP.	detail extensive
Invalid SLM received	If the interface is attached to a responder MEP for a ETH-SLM session: Number of invalid SLM PDUs transmitted from the source MEP to the remote or destination MEP.	detail extensive
SLR sent	If the interface is attached to a responder MEP for a ETH-SLM session: Number detail extensive of synthetic loss reply (SLR) frames sent.	detail extensive

Table 21: show oam ethernet connectivity-fault-management interfaces Output Fields (*continued*)

Field Name	Field Description	Level of Output
Valid SLR received	If the interface is attached to an initiator MEP for a ETH-SLM session: Number of valid SLR PDUs that the source MEP received from the remote or destination MEP.	detail extensive
Invalid SLR received	If the interface is attached to an initiator MEP for a ETH-SLM session: Number of invalid SLR PDUs that the source MEP received from the remote or destination MEP.	detail extensive
Remote MEP count	Number of remote MEPs.	extensive
Identifier (remote MEP)	MEP identifier of the remote MEP.	extensive
MAC address (remote MEP)	MAC address of the remote MEP.	extensive
State (remote MEP)	State of the remote MEP.	extensive
Interface (remote MEP)	Interface of the remote MEP.	extensive

Sample Output

show oam ethernet connectivity-fault-management interfaces

```

user@host> show oam ethernet connectivity-fault-management interfaces
Interface      Link      Status      Level      MEP      Neighbors
               Identifier
ge-1/1/0.0     Up        Active      0          2        1
ge-1/1/0.1     Up        Active      0          2        1
ge-1/1/0.10    Up        Active      0          2        1
ge-1/1/0.100   Up        Active      0          2        1
ge-1/1/0.101   Up        Active      0          2        1
ge-1/1/0.102   Up        Active      0          2        1
ge-1/1/0.103   Up        Active      0          2        1
ge-1/1/0.104   Up        Active      0          2        1
ge-1/1/0.105   Up        Active      0          2        1
ge-1/1/0.106   Up        Active      0          2        1
...

```

show oam ethernet connectivity-fault-management interfaces detail

```

user@host> show oam ethernet connectivity-fault-management interfaces detail
Interface name: ge-5/2/9.0, Interface status: Active, Link status: Up
Maintenance domain name: md0, Format: string, Level: 5
Maintenance association name: ma1, Format: string
Continuity-check status: enabled, Interval: 100ms, Loss-threshold: 3 frames
MEP identifier: 1, Direction: down, MAC address: 00:90:69:0b:4b:94

```

```

MEP status: running
Defects:
  Remote MEP not receiving CCM          : no
  Erroneous CCM received                 : yes
  Cross-connect CCM received            : no
  RDI sent by some MEP                  : yes
Statistics:
  CCMs sent                             : 76
  CCMs received out of sequence          : 0
  LBMs sent                             : 0
  Valid in-order LBRs received           : 0
  Valid out-of-order LBRs received       : 0
  LBRs received with corrupted data      : 0
  LBRs sent                             : 0
  LTMs sent                             : 0
  LTMs received                         : 0
  LTRs sent                             : 0
  LTRs received                         : 0
  Sequence number of next LTM request    : 0
  1DMs sent                             : 0
  Valid 1DMs received                   : 0
  Invalid 1DMs received                  : 0
  DMMs sent                             : 0
  DMRs sent                             : 0
  Valid DMRs received                   : 0
  Invalid DMRs received                  : 0
  LMM sent                             : 10
  Valid LMM received                    : 20
  Invalid LMM received                   : 0
  LMR sent                             : 20
  Valid LMR received                    : 10
  Invalid LMR received                   : 0
  SLM sent                             : 10
  Valid SLM received                    : 20
  Invalid SLM received                   : 0
  SLR sent                             : 20
  Valid SLR received                    : 10
  Invalid SLR received                   : 0
Remote MEP count: 2
  Identifier  MAC address  State  Interface
  2001       00:90:69:0b:7f:71  ok    ge-5/2/9.0
  4001       00:90:69:0b:09:c5  ok    ge-5/2/9.0

```

show oam ethernet connectivity-fault-management interfaces detail (One-Way ETH-DM)

```

user@host show oam ethernet connectivity-fault-management interfaces detail
Interface name: ge-0/2/5.0, Interface status: Active, Link status: Up
Maintenance domain name: md6, Format: string, Level: 6
Maintenance association name: ma6, Format: string
Continuity-check status: enabled, Interval: 100ms, Loss-threshold: 3 frames
MEP identifier: 101, Direction: down, MAC address: 00:90:69:0a:48:57
MEP status: running
Defects:
  Remote MEP not receiving CCM          : no
  Erroneous CCM received                 : no
  Cross-connect CCM received            : no
  RDI sent by some MEP                  : no
Statistics:
  CCMs sent                             : 1590
  CCMs received out of sequence          : 0

```

```

LBMs sent : 0
Valid in-order LBRs received : 0
Valid out-of-order LBRs received : 0
LBRs received with corrupted data : 0
LBRs sent : 0
LTMs sent : 0
LTMs received : 0
LTRs sent : 0
LTRs received : 0
Sequence number of next LTM request : 0
1DMs sent : 10
Valid 1DMs received : 0
Invalid 1DMs received : 0
DMMs sent : 0
DMRs sent : 0
Valid DMRs received : 0
Invalid DMRs received : 0
Remote MEP count: 1
Identifier MAC address State Interface
201 00:90:69:0a:43:94 ok ge-0/2/5.0

```

**show oam ethernet connectivity-fault-
management interfaces detail
(Connection Protection TLV Configured)**

user@hostshow oam ethernet connectivity-fault-management interfaces detail

```

Interface name: xe-6/2/0.0 , Interface status: Active, Link status: Up
Maintenance domain name: md6, Format: string, Level: 6
Maintenance association name: ma6, Format: string
Continuity-check status: enabled, Interval: 1s, Loss-threshold: 3 frames
Interface status TLV: none, Port status TLV: none
Connection Protection TLV: yes
  Prefer me: no, Protection in use: no, FRR Flag: no
MEP identifier: 1, Direction: down, MAC address: 00:19:e2:b1:14:30
MEP status: running
Defects:
  Remote MEP not receiving CCM : no
  Erroneous CCM received : no
  Cross-connect CCM received : no
  RDI sent by some MEP : no
  Some remote MEP's MAC in error state : no
Statistics:
  CCMs sent : 225
  CCMs received out of sequence : 0
  LBMs sent : 0
  Valid in-order LBRs received : 0
  Valid out-of-order LBRs received : 0
  LBRs received with corrupted data : 0
  LBRs sent : 0
  LTMs sent : 0
  LTMs received : 0
  LTRs sent : 0
  LTRs received : 0
  Sequence number of next LTM request : 0
  1DMs sent : 0
  Valid 1DMs received : 0
  Invalid 1DMs received : 0
  Out of sync 1DMs received : 0
  DMMs sent : 0
  Valid DMMs received : 0

```

```

Invalid DMMs received          : 0
DMRs sent                     : 0
Valid DMRs received           : 0
Invalid DMRs received         : 0
LMMs sent                     : 0
Valid LMMs received           : 0
Invalid LMMs received         : 0
LMRs sent                     : 0
Valid LMRs received           : 0
Invalid LMRs received         : 0
Remote MEP count: 1
  Identifier  MAC address      State  Interface
    2        00:90:69:7F:e4:30

```

show oam ethernet connectivity-fault-management interfaces extensive

```

user@host> show oam ethernet connectivity-fault-management interfaces extensive
Interface name: ge-5/2/9.0, Interface status: Active, Link status: Up
Maintenance domain name: md0, Format: string, Level: 5
Maintenance association name: ma1, Format: string
Continuity-check status: enabled, Interval: 100ms, Loss-threshold: 3 frames
Interface status TLV: none, Port status TLV: none
Connection Protection TLV: no
MEP identifier: 1, Direction: down, MAC address: 00:90:69:0b:4b:94
MEP status: running
Defects:
  Remote MEP not receiving CCM          : no
  Erroneous CCM received                 : yes
  Cross-connect CCM received            : no
  RDI sent by some MEP                  : yes
Statistics:
  CCMs sent                            : 76
  CCMs received out of sequence         : 0
  LBMs sent                            : 0
  Valid in-order LBRs received          : 0
  Valid out-of-order LBRs received     : 0
  LBRs received with corrupted data    : 0
  LBRs sent                            : 0
  LTMs sent                            : 0
  LTMs received                        : 0
  LTRs sent                            : 0
  LTRs received                        : 0
  Sequence number of next LTM request  : 0
  1DMs sent                            : 0
  Valid 1DMs received                  : 0
  Invalid 1DMs received                 : 0
  DMMs sent                            : 0
  DMRs sent                            : 0
  Valid DMRs received                  : 0
  Invalid DMRs received                 : 0
  SLM sent                             : 10
  Valid SLM received                   : 20
  Invalid SLM received                 : 0
  SLR sent                             : 20
  Valid SLR received                   : 10
  Invalid SLR received                 : 0
Remote MEP count: 2
  Identifier  MAC address      State  Interface

```

```

2001    00:90:69:0b:7f:71    ok    ge-5/2/9.0
4001    00:90:69:0b:09:c5    ok    ge-5/2/9.0

```

show oam ethernet connectivity-fault-management interfaces level

```

user@host> show oam ethernet connectivity-fault-management interfaces level 7
Interface      Link      Status      Level      MEP      Neighbors
                Identifier
ge-3/0/0.0     Up        Active      7          201      0
xe-0/0/0.0     Up        Active      7          203      1

```

show oam ethernet connectivity-fault-management interfaces (trunk ports)

```
user@host> show oam ethernet connectivity-fault-management interfaces
```

```

Interface      Link      Status      Level      MEP      Neighbors
                Identifier
ge-4/0/1.0, vln 100    Up        Active      5          100      0
ge-10/3/10.4091, vln 4091 Down      Inactive    4          400      0
ge-4/0/0.0       Up        Active      6          200      0

```

```
user@host> show oam ethernet connectivity-fault-management interfaces ge-4/0/0.0
```

```

Interface      Link      Status      Level      MEP      Neighbors
                Identifier
ge-4/0/0.0     Up        Active      6          200      0

```

```
user@host> show oam ethernet connectivity-fault-management interfaces ge-4/0/1.0 vln 100
```

```

Interface      Link      Status      Level      MEP      Neighbors
                Identifier
ge-4/0/1.0, vln 100    Up        Active      5          100      0

```

```
user@host> show oam ethernet connectivity-fault-management interfaces ge-10/3/10.4091 vln 4091
```

```

Interface      Link      Status      Level      MEP      Neighbors
                Identifier
ge-10/3/10.4091, vln 4091 Down      Inactive    4          400      0

```

show oam ethernet connectivity-fault-management linktrace path-database

Syntax	show oam ethernet connectivity-fault-management linktrace path-database mac-address maintenance-association <i>ma-name</i> maintenance-domain <i>md-name</i>
Release Information	Command introduced in Junos OS Release 9.0.
Description	On M320, MX Series, T320, and T640 routers, display IEEE 802.1ag Operation, Administration, and Management (OAM) connectivity fault management maintenance linktrace database information.
Options	<p>mac-address—Display connectivity fault management path database information for the specified MAC address of the remote host.</p> <p>maintenance-association <i>ma-name</i>—Display connectivity fault management path database information for the specified maintenance association.</p> <p>maintenance-domain <i>md-name</i>—Display connectivity fault management path database information for the specified maintenance domain.</p>
Required Privilege Level	view
List of Sample Output	<p>show oam ethernet connectivity-fault-management linktrace path-database on page 186</p> <p>show oam ethernet connectivity-fault-management linktrace path-database (Two traceroute Commands) on page 186</p>
Output Fields	Table 22 on page 185 lists the output fields for the show oam ethernet connectivity-fault-management linktrace path-database command. Output fields are listed in the approximate order in which they appear.

Table 22: show oam ethernet connectivity-fault-management linktrace path-database Output Fields

Field Name	Field Description
Linktrace to	MAC address of the 802.1ag node to which the linktrace message is targeted.
Interface	Interface used by the local MEP to send the linktrace message (LTM).
Maintenance Domain	Maintenance domain identifier specified in the traceroute command.
Maintenance Association	Maintenance association identifier specified in the traceroute command.
Level	Maintenance domain level configured for the maintenance domain.
Local Mep	MEP identifier of the local MEP originating the linktrace.
Hop	Sequential hop count of the linktrace path.

Table 22: show oam ethernet connectivity-fault-management linktrace path-database Output Fields (*continued*)

Field Name	Field Description
TTL	Number of hops remaining in the linktrace message (LTM). The time to live (TTL) is decremented at each hop.
Source MAC address	MAC address of the 802.1ag node responding to the LTM or the source MAC address of the LTR.
Next hop MAC address	MAC address of the egress interface of the node to which the LTM is forwarded or the next-hop MAC address derived from the next egress identifier in the Egress-ID TLV of the LTR PDU.
Transaction Identifier	4-byte identifier maintained by the MEP. Each LTM uses a transaction identifier. The transaction identifier is maintained globally across all maintenance domains. Use the transaction identifier to match an incoming linktrace responses (LTR), with a previously sent LTM.

Sample Output

show oam ethernet connectivity-fault-management linktrace path-database

```

user@host> show oam ethernet connectivity-fault-management linktrace path-database
maintenance-domain MD1 maintenance-association MA1 00:01:02:03:04:05
Linktrace to 00:01:02:03:04:05, Interface : ge-5/0/0.0
Maintenance Domain: MD1, Level: 7
Maintenance Association: MA1, Local Mep: 1

Hop      TTL      Source MAC address      Next hop MAC address
Transaction Identifier:100001
1         63      00:00:aa:aa:aa:aa      00:00:ab:ab:ab:ab
2         62      00:00:bb:bb:bb:bb      00:00:bc:bc:bc:bc
3         61      00:00:cc:cc:cc:cc      00:00:cd:cd:cd:cd
4         60      00:01:02:03:04:05      00:00:00:00:00:00

```

show oam ethernet connectivity-fault-management linktrace path-database (Two traceroute Commands)

```

user@host> traceroute ethernet maintenance-domain md1 maintenance-association ma1
00:01:02:03:04:05
Linktrace to 00:01:02:03:04:05, Interface : ge-5/0/0.0
Maintenance Domain: MD1, Level: 7
Maintenance Association: MA1, Local Mep: 1

Hop      TTL      Source MAC address      Next hop MAC address
Transaction Identifier:100002
1         63      00:00:aa:aa:aa:aa      00:00:ab:ab:ab:ab
2         62      00:00:bb:bb:bb:bb      00:00:bc:bc:bc:bc
3         61      00:00:cc:cc:cc:cc      00:00:cd:cd:cd:cd
4         60      00:01:02:03:04:05      00:00:00:00:00:00

Transaction Identifier:100003
1         63      00:00:aa:aa:aa:aa      00:00:ab:ab:ab:ab

```

2	62	00:00:bb:bb:bb:bb	00:00:bc:bc:bc:bc
3	61	00:00:cc:cc:cc:cc	00:00:cd:cd:cd:cd
4	60	00:01:02:03:04:05	00:00:00:00:00:00

show oam ethernet connectivity-fault-management mep-database

Syntax	<pre>show oam ethernet connectivity-fault-management mep-database maintenance-domain <i>domain-name</i> maintenance-association <i>ma-name</i> <local-mep <i>local-mep-id</i>> <remote-mep <i>remote-mep-id</i>></pre>
Release Information	<p>Command introduced in Junos OS Release 8.4.</p> <p>Support for ITU-T Y.1731 frame delay measurement added in Junos OS Release 9.5.</p> <p>Support for ITU-T Y.1731 synthetic frame loss measurement added in Junos OS Release 13.2 for MX Series routers.</p>
Description	<p>On M7i and M10i routers with Enhanced CFEB (CFEB-E), and on M320, M120, MX Series, ACX Series, T320, and T640 routers, display IEEE 802.1ag Operation, Administration, and Management (OAM) connectivity fault management (CFM) database information for CFM maintenance association end points (MEPs) in a CFM session.</p> <p>In addition, on M120, M320, and MX series routers, also display port status TLV, interface status TLV, and action profile information.</p> <p>In addition, for Ethernet interfaces on MX Series routers, also display any ITU-T Y.1731 frame delay measurement (ETH-DM) frame counts.</p> <p>For Ethernet interfaces on MX Series routers, display any ITU-T Y.1731 synthetic frame loss measurement (ETH-SLM) statistics and frame counts.</p>
Options	<p>maintenance-association <i>ma-name</i>—Name of the maintenance association.</p> <p>maintenance-domain <i>domain-name</i>—Name of the maintenance domain.</p> <p><i>local-mep-id</i>—(Optional) Numeric identifier of local MEP.</p> <p><i>remote-mep-id</i>—(Optional) Numeric identifier of the remote MEP.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • clear oam ethernet connectivity-fault-management statistics • show oam ethernet connectivity-fault-management delay-statistics on page 167 • show oam ethernet connectivity-fault-management interfaces on page 175 • show oam ethernet connectivity-fault-management mep-statistics on page 199
List of Sample Output	<p>show oam ethernet connectivity-fault-management mep-database on page 193</p> <p>show oam ethernet connectivity-fault-management mep-database (One-Way ETH-DM) on page 194</p> <p>show oam ethernet connectivity-fault-management mep-database local-mep remote-mep on page 195</p>

[show oam ethernet connectivity-fault-management mep-database remote-mep \(Action Profile Event\) on page 195](#)

[show oam ethernet connectivity-fault-management mep-database \(Connection Protection TLV Configured\) on page 195](#)

[show oam ethernet connectivity-fault-management mep-database on page 196](#)

[show oam ethernet connectivity-fault-management mep-database \(enhanced continuity measurement\) on page 197](#)

Output Fields Table 23 on page 189 lists the output fields for the **show oam ethernet connectivity-fault-management mep-database** command. Output fields are listed in the approximate order in which they appear.

Table 23: show oam ethernet connectivity-fault-management mep-database Output Fields

Field Name	Field Description
Maintenance domain name	Maintenance domain name.
Format (Maintenance domain)	Maintenance domain name format configured.
Level	Maintenance domain level configured.
Maintenance association name	Maintenance association name.
Format (Maintenance association)	Maintenance association name format configured.
Continuity-check status	Continuity-check status.
Interval	Continuity-check message interval.
Loss-threshold	Lost continuity-check message threshold.
Connection Protection TLV	Status of the connection protection TLV, if configured on the MEP interface: no , yes If yes , then the transmitted connection protection TLV is decoded and the following three fields are displayed: Prefer me , Protection in use , FRR Flag
Prefer me	If set to yes , the path through which CCM was transmitted is preferred (unless the path fails). It is used for signaling a manual-switch command to remote side. Its value can be yes or no .
Protection in use	Used for protection decision coordination. Its value is set to yes if the endpoint transmitting the CCM is currently transmitting the user traffic to protection path. Its value can be yes or no .
FRR Flag	LSR/LER forwarding the CCM Frame into a bypass tunnel is set. Its value can be yes or no .

Table 23: show oam ethernet connectivity-fault-management mep-database Output Fields (*continued*)

Field Name	Field Description
MEP identifier	Maintenance association end point (MEP) identifier.
Direction	MEP direction configured.
MAC address	MAC address configured for the MEP.
Auto-discovery	Whether automatic discovery is enabled or disabled.
Priority	Priority used for CCMs and linktrace messages transmitted by the MEP.
Interface name	Interface identifier.
Interface status	Local interface status.
Link status	Local link status.
Remote MEP not receiving CCM	Whether the remote MEP is not receiving CCMs.
Erroneous CCM received	Whether erroneous CCMs have been received.
Cross-connect CCM received	Whether cross-connect CCMs have been received.
RDI sent by some MEP	Whether the remote defect indication (RDI) bit is set in messages that have been received. The absence of the RDI bit in a CCM indicates that the transmitting MEP is receiving CCMs from all configured MEPs.
CCMs sent	Number of CCMs transmitted.
CCMs received out of sequence	Number of CCMs received out of sequence.
LBMs sent	Number of loopback messages (LBMs) sent.
Valid in-order LBRs received	Number of loopback response messages (LBRs) received that were valid messages and in sequence.
1DMs sent	<p>If the MEP is an initiator for a one-way ETH-DM session: Number of one-way delay measurement (1DM) PDU frames sent to the peer MEP in this session.</p> <p>For all other cases, this field displays 0.</p>
Valid 1DMs received	<p>If the MEP is a receiver for a one-way ETH-DM session: Number of valid 1DM frames received.</p> <p>For all other cases, this field displays 0.</p>

Table 23: show oam ethernet connectivity-fault-management mep-database Output Fields (*continued*)

Field Name	Field Description
Invalid 1DMs received	If the MEP is a receiver for a one-way ETH-DM session: Number of invalid 1DM frames received. For all other cases, this field displays 0.
Out of sync 1DMs received	If the MEP is a receiver for a one-way ETH-DM session: Number of out-of-sync one-way delay measurement request packets received.
DMMs sent	If the MEP is an initiator for a two-way ETH-DM session: Number of Delay Measurement Message (DMM) PDU frames sent to the peer MEP in this session. For all other cases, this field displays 0.
Valid DMMs received	If the MEP is an initiator for a two-way ETH-DM session: Number of valid two-way delay measurement packets received.
Invalid DMMs received	If the MEP is an initiator for a two-way ETH-DM session: Number of invalid two-way delay measurement packets received.
DMRs sent	If the MEP is a responder for a ETH-DM session: Number of Delay Measurement Reply (DMR) frames sent. For all other cases, this field displays 0.
Valid DMRs received	If the MEP is an initiator for a two-way ETH-DM session: Number of valid DMRs received. For all other cases, this field displays 0.
Invalid DMRs received	If the MEP is an initiator for a two-way ETH-DM session: Number of invalid DMRs received. For all other cases, this field displays 0.
Valid out-of-order LBRs received	Number of LBRs received that were valid messages and not in sequence.
LBRs received with corrupted data	Number of LBRs received that were corrupted.
LBRs sent	Number of LBRs transmitted.
LTMs sent	Linktrace messages (LTMs) transmitted.
LTMs received	Linktrace messages received.
LTRs sent	Linktrace responses (LTRs) transmitted.
LTRs received	Linktrace responses received.
Sequence number of next LTM request	Sequence number of the next linktrace message request to be transmitted.

Table 23: show oam ethernet connectivity-fault-management mep-database Output Fields (*continued*)

Field Name	Field Description
LMM sent	If the interface is attached to an initiator MEP for a ETH-LM session: Number of loss measurement message (LMM) PDU frames sent to the peer MEP in this session.
Valid LMM received	If the interface is attached to an initiator MEP for a ETH-LM session: Number of valid loss measurement request packets received.
Invalid LMM received	If the interface is attached to an initiator MEP for a ETH LM session: Number of invalid loss measurement request packets received.
LMR sent	If the interface is attached to a responder MEP for a ETH-LM session: Number of loss measurement reply (LMR) frames sent.
Valid LMR received	If the interface is attached to an initiator MEP for a ETH LM session: Number of valid LMR frames received.
Invalid LMR received	If the interface is attached to an initiator MEP for a ETH-LM session: Number of invalid LMR frames received.
SLM sent	If the interface is attached to an initiator MEP for a ETH-SLM session: Number of synthetic loss measurement (SLM) request packets transmitted from the source MEP to the remote or destination MEP in this session.
Valid SLM received	If the interface is attached to a responder MEP for a ETH-SLM session: Number of valid SLM PDUs transmitted from the source MEP to the remote or destination MEP.
Invalid SLM received	If the interface is attached to a responder MEP for a ETH-SLM session: Number of invalid SLM PDUs transmitted from the source MEP to the remote or destination MEP.
SLR sent	If the interface is attached to a responder MEP for a ETH-SLM session: Number detail extensive of synthetic loss reply (SLR) frames sent.
Valid SLR received	If the interface is attached to an initiator MEP for a ETH-SLM session: Number of valid SLR PDUs that the source MEP received from the remote or destination MEP.
Invalid SLR received	If the interface is attached to an initiator MEP for a ETH-SLM session: Number of invalid SLR PDUs that the source MEP received from the remote or destination MEP.
Remote MEP identifier	MEP identifier of the remote MEP.
State (remote MEP)	State of the remote MEP: idle , start , ok , or failed .
MAC address	MAC address of the remote MEP.
Type	Whether the remote MEP MAC address was learned using automatic discovery or configured.
Interface	Interface of the remote MEP. A seven-digit number is appended if CFM is configured to run on a routing instance of type VPLS.

Table 23: show oam ethernet connectivity-fault-management mep-database Output Fields (*continued*)

Field Name	Field Description
Last flapped	Date, time, and how long ago the remote MEP interface went from down to up. The format is Last flapped: year-month-day hours:minutes:seconds timezone (hours:minutes:seconds ago) . For example, Last flapped: 2002-04-26 10:52:40 PDT (04:33:20 ago).
Remote defect indication	Whether the remote defect indication (RDI) bit is set in messages that have been received or transmitted.
Port status TLV	<ul style="list-style-type: none"> In the Maintenance domain section, displays the last transmitted port status TLV value. In the Remote MEP section, displays the last value of port status TLV received from the remote MEP. <p>In the Action profile section, displays, the last occurred event port-status-tlv blocked event. This event occurred due to the reception of blocked value in the port status TLV from remote MEP.</p>
Interface status TLV	<ul style="list-style-type: none"> In the Maintenance domain section, displays the last transmitted interface status TLV value. In the Remote MEP section, displays the last value of interface status TLV received from the remote MEP. <p>In the Action profile section, if displays, the last occurred event interface-status-tlv event (either lower-layer-down or down). This event occurred due to the reception of either lower or down value in the interface status TLV from remote MEP.</p>
Action profile	Name of the action profile occurrence associated with a remote MEP.
Last event	When an action profile occurs, displays the last event that triggered it.
Last event cleared	When all the configured and occurred events (under action profile) are cleared, then the action taken gets reverted (such as down interface is made up) and the corresponding time is noted and displayed.
Action	Action taken and the corresponding time of the action occurrence.

Sample Output

show oam ethernet connectivity-fault-management mep-database

```

user@host> show oam ethernet connectivity-fault-management mep-database
maintenance-domain vpls-vlan2000 maintenance-association vpls-vlan200
Maintenance domain name: vpls-vlan2000, Format: string, Level: 5
Maintenance association name: vpls-vlan200, Format: string
Continuity-check status: enabled, Interval: 100ms, Loss-threshold: 3 frames
MEP identifier: 200, Direction: up, MAC address: 00:19:e2:b0:74:01
Auto-discovery: enabled, Priority: 0
Interface status TLV: none, Port status TLV: none
Connection Protection TLV: no Interface name: ge-0/0/1.0, Interface status:
Active, Link status: Up
Defects:
  Remote MEP not receiving CCM                : no
  Erroneous CCM received                      : no
  Cross-connect CCM received                  : no
  RDI sent by some MEP                       : no
Statistics:

```

```

CCMs sent : 1476
CCMs received out of sequence : 0
LBMs sent : 85
Valid in-order LBRs received : 78
Valid out-of-order LBRs received : 0
LBRs received with corrupted data : 0
LBRs sent : 0
LTMs sent : 1
LTMs received : 0
LTRs sent : 0
LTRs received : 1
Sequence number of next LTM request : 1
IDMs sent : 0
Valid IDMs received : 0
Invalid IDMs received : 0
DMMs sent : 0
DMRs sent : 0
Valid DMRs received : 0
Invalid DMRs received : 0
Remote MEP count: 1
Identifier   MAC address      State   Interface
100         00:19:e2:b2:81:4b    ok     vt-0/1/10.1049088

```

show oam ethernet connectivity-fault- management mep-database (One-Way ETH-DM)

```

user@host> show oam ethernet connectivity-fault-management mep-database
maintenance-domain md6 maintenance-domain ma6
Maintenance domain name: md6, Format: string, Level: 6
Maintenance association name: ma6, Format: string
Continuity-check status: enabled, Interval: 100ms, Loss-threshold: 3 frames
MEP identifier: 101, Direction: down, MAC address: 00:90:69:0a:48:57
Auto-discovery: enabled, Priority: 0
Interface name: ge-0/2/5.0, Interface status: Active, Link status: Up
Defects:
Remote MEP not receiving CCM : no
Erroneous CCM received : no
Cross-connect CCM received : no
RDI sent by some MEP : no
Statistics:
CCMs sent : 1590
CCMs received out of sequence : 0
LBMs sent : 0
Valid in-order LBRs received : 0
Valid out-of-order LBRs received : 0
LBRs received with corrupted data : 0
LBRs sent : 0
LTMs sent : 0
LTMs received : 0
LTRs sent : 0
LTRs received : 0
Sequence number of next LTM request : 0
IDMs sent : 10
Valid IDMs received : 0
Invalid IDMs received : 0
DMMs sent : 0
DMRs sent : 0
Valid DMRs received : 0
Invalid DMRs received : 0
Remote MEP count: 1

```

Identifier	MAC address	State	Interface
201	00:90:69:0a:43:94	ok	ge-0/2/5.0

show oam ethernet connectivity-fault-management mep-database local-mep remote-mep

```
user@host> show oam ethernet connectivity-fault-management mep-database
maintenance-domain vpls-vlan2000 maintenance-association vpls-vlan200 local-mep 200
remote-mep 100
Maintenance domain name: vpls-vlan2000, Format: string, Level: 5
Maintenance association name: vpls-vlan200, Format: string
Continuity-check status: enabled, Interval: 100ms, Loss-threshold: 3 frames
MEP identifier: 200, Direction: up, MAC address: 00:19:e2:b0:74:01
Auto-discovery: enabled, Priority: 0
Interface name: ge-0/0/1.0, Interface status: Active, Link status: Up

Remote MEP identifier: 100, State: ok
MAC address: 00:19:e2:b2:81:4b, Type: Learned
Interface: vt-0/1/10.1049088
Last flapped: Never
Remote defect indication: false
Port status TLV: none
Interface status TLV: none
```

show oam ethernet connectivity-fault-management mep-database remote-mep (Action Profile Event)

```
user@host> show oam ethernet connectivity-fault-management mep-database
maintenance-domain md5 maintenance-association ma5 remote-mep 200
Maintenance domain name: md5, Format: string, Level: 5
Maintenance association name: ma5, Format: string
Continuity-check status: enabled, Interval: 1s, Loss-threshold: 3 frames
MEP identifier: 100, Direction: down, MAC address: 00:05:85:73:e8:ad
Auto-discovery: enabled, Priority: 0
Interface status TLV: none, Port status TLV: none
Interface name: ge-1/0/8.0, Interface status: Active, Link status: Up

Remote MEP identifier: 200, State: ok
MAC address: 00:05:85:73:96:1f, Type: Configured
Interface: ge-1/0/8.0
Last flapped: Never
Remote defect indication: false
Port status TLV: none
Interface status TLV: lower-layer-down
Action profile: juniper
  Last event: Interface-status-tlv lower-layer-down
  Action: Interface-down, Time: 2009-03-27 14:25:10 PDT (00:00:02 ago)
```

show oam ethernet connectivity-fault-management mep-database (Connection Protection TLV Configured)

```
user@host> show oam ethernet connectivity-fault-management mep-database
maintenance-domain md5 maintenance-association ma5
```

If connection-protection is not enabled on down MEPs, but connection-protection TLV is used, MX always sets the protection-in-use flag in connection-protection tlv, while CCMs are sent out. During reversion, this is an indicator to the receiver that protect-path is in use, otherwise the peer (receiver) assumes working is active and reversion does not work as expected. Setting this bit does not affect protection-switching/traffic-loss.

```

Maintenance domain name: md5, Format: string, Level: 5
Maintenance association name: ma5, Format: string
Continuity-check status: enabled, Interval: 1s, Loss-threshold: 3 frames
MEP identifier: 1, Direction: down, MAC address: 00:19:e2:b1:14:30
Auto-discovery: enabled, Priority: 0
Interface status TLV: none, Port status TLV: none
Connection Protection TLV: yes
  Prefer me: no, Protection in use: no, FRR Flag: no
Interface name: xe-6/2/0.0, Interface status: Active, Link status: Up
Defects:
  Remote MEP not receiving CCM                : no
  Erroneous CCM received                      : no
  Cross-connect CCM received                  : no
  RDI sent by some MEP                       : no
  Some remote MEP's MAC in error state        : no
Statistics:
  CCMs sent                                  : 251
  CCMs received out of sequence               : 0
  LBMs sent                                  : 0
  Valid in-order LBRs received                : 0
  Valid out-of-order LBRs received            : 0
  LBRs received with corrupted data           : 0
  LBRs sent                                  : 0
  LTMs sent                                  : 0
  LTMs received                              : 0
  LTRs sent                                  : 0
  LTRs received                              : 0
  Sequence number of next LTM request         : 0
  1DMs sent                                  : 0
  Valid 1DMs received                        : 0
  Invalid 1DMs received                      : 0
  Out of sync 1DMs received                  : 0
  DMMs sent                                  : 0
  Valid DMMs received                        : 0
  Invalid DMMs received                      : 0
  DMRs sent                                  : 0
  Valid DMRs received                        : 0
  Invalid DMRs received                      : 0
  LMMs sent                                  : 0
  Valid LMMs received                        : 0
  Invalid LMMs received                      : 0
  LMRs sent                                  : 0
  Valid LMRs received                        : 0
  Invalid LMRs received                      : 0
Remote MEP count: 1
  Identifier  MAC address  State  Interface
    2         00:90:69:7f:e4:30

```

show oam ethernet connectivity-fault-management mep-database

```

user@host> show oam ethernet connectivity-fault-management mep-database
maintenance-domain md5 maintenance-association ma5
Maintenance association name: ma1, Format: string
Continuity-check status: enabled, Interval: 1s, Loss-threshold: 3 frames
MEP identifier: 1, Direction: down, MAC address: 00:14:f6:b6:01:fe
Auto-discovery: enabled, Priority: 0
Interface name: ge-1/0/0.0, Interface status: Active, Link status: Up

Defects:
Remote MEP not receiving CCM                : no

```

```

Erroneous CCM received           : no
Cross-connect CCM received      : no
RDI sent by some MEP           : no

Statistics:
CCMs sent                       : 328703
CCMs received out of sequence   : 0
LBMs sent                       : 85
Valid in-order LBRs received    : 78
Valid out-of-order LBRs received : 0
LBRs received with corrupted data : 0
LBRs sent                       : 0
LTMs sent                       : 0
LTMs received                   : 0
LTRs sent                       : 0
LTRs received                   : 0
Sequence number of next LTM request : 0
1DMs sent                       : 10
Valid 1DMs received             : 10
Invalid 1DMs received           : 0
DMMs sent                       : 20
DMRs sent                       : 0
Valid DMRs received             : 10
Invalid DMRs received           : 0
LMM sent                        : 10
Valid LMM received              : 20
Invalid LMM received            : 0
LMR sent                        : 20
Valid LMR received              : 10
Invalid LMR received            : 0
SLM sent                        : 10
Valid SLM received              : 20
Invalid SLM received            : 0
SLR sent                        : 20
Valid SLR received              : 10
Invalid SLR received            : 0

Remote MEP count                : 1

Identifier    MAC address    State    Interface
  2          00:12:1e:fb:ea:7d    ok      ge-1/0/0.0

```

show oam ethernet connectivity-fault- management mep-database (enhanced continuity measurement)

```

user@host> show oam ethernet connectivity-fault-management mep-database
maintenance-domain md5 maintenance-association ma5 local-mep 2001 remote-mep 1001
Maintenance domain name: md5, Format: string, Level: 5
Maintenance association name: ma5, Format: string
Continuity-check status: enabled, Interval: 100ms, Loss-threshold: 3 frames
MEP identifier: 2001, Direction: down, MAC address: 00:19:e2:b2:81:4a
Auto-discovery: enabled, Priority: 0
Interface status TLV: up, Port status TLV: up
Interface name: ge-2/0/0.0, Interface status: Active, Link status: Up

Remote MEP identifier: 1001, State: ok
MAC address   : 00:19:e2:b0:74:00, Type: Learned
Interface     : ge-2/0/0.0
Last flapped  : Never
+ Continuity  : 91%, Admin-enable duration: 2100sec, Oper-down duration: 100sec
Remote defect indication: false

```

Port status TLV: none
Interface status TLV: none

show oam ethernet connectivity-fault-management mep-statistics

Syntax	<pre>show oam ethernet connectivity-fault-management mep-statistics maintenance-domain <i>md-name</i> maintenance-association <i>ma-name</i> <mep <i>mep-id</i>> <remote-mep <i>remote-mep-id</i>> <count <i>entry-count</i>></pre>
Release Information	<p>Command introduced in Junos OS Release 9.5.</p> <p>Command introduced in Junos OS Release 11.4 for EX Series switches.</p> <p>Support for ITU-T Y.1731 Ethernet synthetic frame loss measurement (ETH-SLM) added in Junos OS Release 13.2 for MX Series routers.</p>
Description	<p>On MX Series and ACX Series routers and EX Series switches with Ethernet interfaces, display ETH-DM statistics and ETH-DM frame counts.</p> <p>For Ethernet interfaces on MX Series routers, display any ITU-T Y.1731 synthetic frame loss measurement (ETH-SLM) statistics and frame counts.</p>
Options	<p>maintenance-domain <i>md-name</i>—Name of an existing CFM maintenance domain.</p> <p>maintenance-association <i>ma-name</i>—Name of an existing CFM maintenance association.</p> <p>mep <i>mep-id</i>—(Optional) Numeric identifier of the local MEP. The range of values is 1 through 8192. On EX Series switches, the range of values is 1 through 8191.</p> <p>remote-mep <i>remote-mep-id</i>—(Optional) Numeric identifier of the remote MEP. The range of values is 1 through 8192. On EX Series switches, the range of values is 1 through 8191.</p> <p>count <i>entry-count</i>—(Optional) Number of entries to display from the statistics table. The range of values is 1 through 100. The default value is 100 entries.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • clear oam ethernet connectivity-fault-management statistics • show oam ethernet connectivity-fault-management delay-statistics on page 167 • show oam ethernet connectivity-fault-management interfaces on page 175 • show oam ethernet connectivity-fault-management mep-database on page 188
List of Sample Output	<p>show oam ethernet connectivity-fault-management mep-statistics (CIR counters only) on page 201</p> <p>show oam ethernet connectivity-fault-management mep-statistics (CIR and EIR counters enabled) on page 203</p> <p>show oam ethernet connectivity-fault-management mep-statistics remote-mep (CIR counters only) on page 204</p>

[show oam ethernet connectivity-fault-management mep-statistics remote-mep \(CIR and EIR counters enabled\) on page 205](#)

[show oam ethernet connectivity-fault-management mep-statistics on page 207](#)

[show oam ethernet connectivity-fault-management mep-statistics remote-mep on page 208](#)

Output Fields [Table 24 on page 200](#) lists the output fields for the **show oam ethernet connectivity-fault-management mep-statistics** command. Output fields are listed in the approximate order in which they appear.

Table 24: show oam ethernet connectivity-fault-management delay-statistics and mep-statistics Output Fields

Output Field Name	Field Description
MEP identifier	Maintenance association end point (MEP) numeric identifier.
MAC address	Unicast MAC address configured for the MEP.
Remote MEP count	Number of remote MEPs (unless you specify the remote-mep option).
Remote MEP identifier	Numeric identifier of the remote MEP.
Remote MAC address	Unicast MAC address of the remote MEP.
Index	Index number that corresponds to the ETH-DM entry in the CFM database.
One-way delay (usec)	<p>For a one-way ETH-DM session, the frame delay time, in microseconds, measured at the receiver MEP.</p> <p>For a detailed description of one-way Ethernet frame delay measurement, see the <i>ITU-T Y.1731 Ethernet Service OAM</i> topics in the <i>Junos OS Network Interfaces Library for Routing Devices</i>.</p>
Two-way delay (usec)	<p>For a two-way ETH-DM session, the frame delay time, in microseconds, measured at the initiator MEP.</p> <p>For a detailed description of two-way Ethernet frame delay measurement, see the <i>ITU-T Y.1731 Ethernet Service OAM</i> topics in the <i>Junos OS Network Interfaces Library for Routing Devices</i>.</p>
Average one-way delay	Average one-way frame delay for the statistics displayed.
Average one-way delay variation	Average one-way “frame jitter” for the statistics displayed.
Best-case one-way delay	Lowest one-way frame delay for the statistics displayed.
Worst-case one-way delay	Highest one-way frame delay for the statistics displayed.
Average two-way delay	Average two-way frame delay for the statistics displayed.
Average two-way delay variation	Average two-way “frame jitter” for the statistics displayed.

Table 24: show oam ethernet connectivity-fault-management delay-statistics and mep-statistics Output Fields (*continued*)

Output Field Name	Field Description
Best-case two-way delay	Lowest two-way frame delay for the statistics displayed.
Worst-case two-way delay	Highest two-way frame delay calculated in this session.
SLM packets sent	Total number of synthetic loss message (SLM) PDU frames sent from the source MEP to the remote MEP during this ETH-SLM session.
SLM packets received	Total number of synthetic loss message (SLM) PDU frames that the remote MEP received from the source MEP during this ETH-SLM session.
SLR packets sent	Total number of synthetic loss reply (SLR) PDU frames that the remote MEP sent to the source MEP during this measurement session.
SLR packets received	Total number of synthetic loss reply (SLR) PDU frames that the source MEP received from the remote MEP during this measurement session.
Local TXFC1 value	Number of synthetic frames transmitted to the peer MEP for a test ID. A test ID is used to distinguish each synthetic loss measurement because multiple measurements can be simultaneously activated also on a given CoS and MEP pair. It must be unique at least within the context of any SLM for the MEG and initiating MEP.
Local RXFC1 value	Number of synthetic frames received from the peer MEP for a test ID. The MEP generates a unique Test ID for the session, adds the source MEP ID, and initializes the local counters for the session before SLM initiation. For each SLM PDU transmitted for the session (test ID), the local counter TXFC1 is sent in the packet.
Last Received SLR frame TXFCf(tc)	Value of the local counter TxFC1 at the time of SLM frame transmission.
Last Received SLR frame TXFCb(t)	Value of the local counter RxFC1 at the time of SLR frame transmission.
Frame loss (near-end)	Count of frame loss associated with ingress data frames.
Frame loss (far-end)	Count of frame loss associated with egress data frames.

Sample Output

show oam ethernet connectivity-fault-management mep-statistics (CIR counters only)

```

user@host> show oam ethernet connectivity-fault-management mep-statistics
maintenance-domain md1 maintenance-association ma-1 local-mep 3 remote-mep 103 count 3
MEP identifier: 100, MAC address: 00:05:85:73:7b:39
Remote MEP count                : 1
CCMs sent                       : 6550
CCMs received out of sequence   : 0
LBMs sent                       : 0
Valid in-order LBRs received    : 0
Valid out-of-order LBRs received : 0
LBRs received with corrupted data : 0

```

```

LBRs sent : 0
LTMs sent : 0
LTMs received : 0
LTRs sent : 0
LTRs received : 0
Sequence number of next LTM request : 0
1DMs sent : 5
Valid 1DMs received : 0
Invalid 1DMs received : 0
DMMs sent : 5
DMRs sent : 0
Valid DMRs received : 5
Invalid DMRs received : 0
LMM sent : 5
Valid LMM received : 5
Invalid LMM received : 0
LMR sent : 0
Valid LMR received : 5
Invalid LMR received : 0
Remote MEP identifier : 101
Remote MAC address : 00:05:85:73:39:4a

```

Delay measurement statistics:

Index	One-way delay (usec)	Two-way delay (usec)
1	259	519
2	273	550
3	287	571
4	299	610
5	313	650

```

Average one-way delay : 286 usec
Average one-way delay variation : 62 usec
Best case one-way delay : 259 usec
Average two-way delay : 580 usec
Average two-way delay variation : 26 usec
Best case two-way delay : 519 usec
Worst case two-way delay : 650 usec

```

Loss measurement statistics:

Index	Near-end Frame loss (CIR)	Far-end Frame loss (CIR)	Near-end Frame loss (EIR)	Far-end Frame loss (EIR)
1	9	9		
2	3	5		
3	7	5		
4	9	6		
5	3	6		

```

Average near-end loss (CIR) : 6.2
Average near-end loss ratio (CIR) : 6.2%
Average far-end loss (CIR) : 6.2
Average far-end loss ratio (CIR) : 6.2%
Near-end best case loss (CIR) : 3
Near-end best case loss ratio (CIR) : 3%
Near-end worst case loss (CIR) : 9
Near-end worst case loss ratio (CIR) : 9%
Far-end best case loss (CIR) : 5
Far-end best case loss ratio (CIR) : 5%
Far-end worst case loss (CIR) : 9
Far-end worst case loss ratio (CIR) : 9%

```

show oam ethernet connectivity-fault-management mep-statistics (CIR and EIR counters enabled)

```
user@host> show oam ethernet connectivity-fault-management mep-statistics
maintenance-domain md1 maintenance-association ma-1 local-mep 3 remote-mep 103 count 3
MEP identifier: 100, MAC address: 00:05:85:73:7b:39
```

```
Remote MEP count           : 1
CCMs sent                  : 6550
CCMs received out of sequence : 0
LBMs sent                  : 0
Valid in-order LBRs received : 0
Valid out-of-order LBRs received : 0
LBRs received with corrupted data : 0
LBRs sent                  : 0
LTMs sent                  : 0
LTMs received              : 0
LTRs sent                  : 0
LTRs received              : 0
Sequence number of next LTM request : 0
IDMs sent                  : 5
Valid IDMs received        : 0
Invalid IDMs received       : 0
DMMs sent                  : 5
DMRs sent                  : 0
Valid DMRs received        : 5
Invalid DMRs received       : 0
LMM sent                   : 5
Valid LMM received         : 5
Invalid LMM received        : 0
LMR sent                   : 0
Valid LMR received         : 5
Invalid LMR received        : 0
Remote MEP identifier       : 101
Remote MAC address          : 00:05:85:73:39:4a
```

```
Delay measurement statistics:
Index      One-way delay      Two-way delay
           (usec)           (usec)
1          259              519
2          273              550
3          287              571
4          299              610
5          313              650
```

```
Average one-way delay           : 286 usec
Average one-way delay variation  : 62 usec
Best case one-way delay         : 259 usec
Average two-way delay           : 580 usec
Average two-way delay variation  : 26 usec
Best case two-way delay         : 519 usec
Worst case two-way delay        : 650 usec
```

```
Loss measurement statistics:
Index      Near-end      Far-end      Near-end      Far-end
           Frame loss   Frame loss   Frame loss   Frame loss
           (CIR)        (CIR)        (EIR)        (EIR)
1          9            9            2            4
2          3            5            4            6
3          7            5            0            2
4          9            6            8            2
5          3            6            6            4
```

Average near-end loss (CIR)	: 6.2
Average near-end loss ratio (CIR)	: 6.2%
Average far-end loss (CIR)	: 6.2
Average far-end loss ratio (CIR)	: 6.2%
Near-end best case loss (CIR)	: 3
Near-end best case loss ratio (CIR)	: 3%
Near-end worst case loss (CIR)	: 9
Near-end worst case loss ratio (CIR)	: 9%
Far-end best case loss (CIR)	: 5
Far-end best case loss ratio (CIR)	: 5%
Far-end worst case loss (CIR)	: 9
Far-end worst case loss ratio (CIR)	: 9%
Average near-end loss (EIR)	: 4
Average near-end loss ratio (EIR)	: 4%
Average far-end loss (EIR)	: 3.4
Average far-end loss ratio (EIR)	: 3.4%
Near-end best case loss (EIR)	: 0
Near-end best case loss ratio (EIR)	: 0%
Near-end worst case loss (EIR)	: 8
Near-end worst case loss ratio (EIR)	: 8%
Far-end best case loss (EIR)	: 2
Far-end best case loss ratio (EIR)	: 2%
Far-end worst case loss (EIR)	: 6
Far-end worst case loss ratio (EIR)	: 6%

show oam ethernet connectivity-fault-management mep-statistics remote-mep (CIR counters only)

```

user@host> show oam ethernet connectivity-fault-management mep-statistics
maintenance-domain md1 maintenance-association ma-1 local-mep 3 remote-mep 103 count 3
remote-mep 101
MEP identifier: 100, MAC address: 00:05:85:73:7b:39
CCMs sent : 7762
CCMs received out of sequence : 0
LBMs sent : 0
Valid in-order LBRs received : 0
Valid out-of-order LBRs received : 0
LBRs received with corrupted data : 0
LBRs sent : 0
LTMs sent : 0
LTMs received : 0
LTRs sent : 0
LTRs received : 0
Sequence number of next LTM request : 0
IDMs sent : 5
Valid IDMs received : 0
Invalid IDMs received : 0
DMMs sent : 5
DMRs sent : 0
Valid DMRs received : 5
Invalid DMRs received : 0
LMM sent : 5
Valid LMM received : 5
Invalid LMM received : 0
LMR sent : 0
Valid LMR received : 5
Invalid LMR received : 0
Remote MEP identifier : 101
Remote MAC address : 00:05:85:73:39:4a

```

Delay measurement statistics:

Index	One-way delay (usec)	Two-way delay (usec)
1	259	519
2	273	550
3	287	571
4	299	610
5	313	650

Average one-way delay : 286 usec
 Average one-way delay variation : 62 usec
 Best case one-way delay : 259 usec
 Average two-way delay : 580 usec
 Average two-way delay variation : 26 usec
 Best case two-way delay : 519 usec
 Worst case two-way delay : 650 usec

Loss measurement statistics:

Index	Near-end Frame loss (CIR)	Far-end Frame loss (CIR)	Near-end Frame loss (EIR)	Far-end Frame loss (EIR)
1	9	9		
2	3	5		
3	7	5		
4	9	6		
5	3	6		

Average near-end loss (CIR) : 6.2
 Average near-end loss ratio (CIR) : 6.2%
 Average far-end loss (CIR) : 6.2
 Average far-end loss ratio (CIR) : 6.2%
 Near-end best case loss (CIR) : 3
 Near-end best case loss ratio (CIR) : 3%
 Near-end worst case loss (CIR) : 9
 Near-end worst case loss ratio (CIR) : 9%
 Far-end best case loss (CIR) : 5
 Far-end best case loss ratio (CIR) : 5%
 Far-end worst case loss (CIR) : 9
 Far-end worst case loss ratio (CIR) : 9%
 Average near-end loss (EIR) : 4
 Average near-end loss ratio (EIR) : 4%
 Average far-end loss (EIR) : 3.4
 Average far-end loss ratio (EIR) : 3.4%
 Near-end best case loss (EIR) : 0
 Near-end best case loss ratio (EIR) : 0%
 Near-end worst case loss (EIR) : 8
 Near-end worst case loss ratio (EIR) : 8%
 Far-end best case loss (EIR) : 2
 Far-end best case loss ratio (EIR) : 2%
 Far-end worst case loss (EIR) : 6
 Far-end worst case loss ratio (EIR) : 6%

show oam ethernet connectivity-fault-management mep-statistics remote-mep (CIR and EIR counters enabled)

```

user@host> show oam ethernet connectivity-fault-management mep-statistics
maintenance-domain md1 maintenance-association ma-1 local-mep 3 remote-mep 103 count 3
remote-mep 101
MEP identifier: 100, MAC address: 00:05:85:73:7b:39
CCMs sent : 7762
CCMs received out of sequence : 0
LBMs sent : 0
  
```

```

Valid in-order LBRs received      : 0
Valid out-of-order LBRs received : 0
LBRs received with corrupted data : 0
LBRs sent                        : 0
LTMs sent                       : 0
LTMs received                   : 0
LTRs sent                      : 0
LTRs received                   : 0
Sequence number of next LTM request : 0
1DMs sent                      : 5
Valid 1DMs received            : 0
Invalid 1DMs received          : 0
DMMs sent                     : 5
DMRs sent                     : 0
Valid DMRs received            : 5
Invalid DMRs received          : 0
LMM sent                      : 5
Valid LMM received             : 5
Invalid LMM received           : 0
LMR sent                      : 0
Valid LMR received             : 5
Invalid LMR received           : 0
Remote MEP identifier           : 101
Remote MAC address              : 00:05:85:73:39:4a

```

Delay measurement statistics:

Index	One-way delay (usec)	Two-way delay (usec)
1	259	519
2	273	550
3	287	571
4	299	610
5	313	650

```

Average one-way delay      : 286 usec
Average one-way delay variation : 62 usec
Best case one-way delay    : 259 usec
Average two-way delay      : 580 usec
Average two-way delay variation : 26 usec
Best case two-way delay    : 519 usec
Worst case two-way delay   : 650 usec

```

Loss measurement statistics:

Index	Near-end Frame loss (CIR)	Far-end Frame loss (CIR)	Near-end Frame loss (EIR)	Far-end Frame loss (EIR)
1	10	8	5	12
2	12	7	6	16
3	7	5	0	2
4	9	6	8	2
5	3	6	6	4

```

Average near-end loss (CIR)      : 6.2
Average near-end loss ratio (CIR) : 6.2%
Average far-end loss (CIR)       : 6.2
Average far-end loss ratio (CIR) : 6.2%
Near-end best case loss (CIR)    : 3
Near-end best case loss ratio (CIR) : 3%
Near-end worst case loss (CIR)   : 9
Near-end worst case loss ratio (CIR) : 9%
Far-end best case loss (CIR)     : 5

```

```

Far-end best case loss ratio (CIR)      : 5%
Far-end worst case loss (CIR)          : 9
Far-end worst case loss ratio (CIR)     : 9%
Average near-end loss (EIR)            : 4
Average near-end loss ratio (EIR)       : 4%
Average far-end loss (EIR)             : 3.4
Average far-end loss ratio (EIR)        : 3.4%
Near-end best case loss (EIR)           : 0
Near-end best case loss ratio (EIR)     : 0%
Near-end worst case loss (EIR)          : 8
Near-end worst case loss ratio (EIR)    : 8%
Far-end best case loss (EIR)            : 2
Far-end best case loss ratio (EIR)      : 2%
Far-end worst case loss (EIR)           : 6
Far-end worst case loss ratio (EIR)     : 6%

```

show oam ethernet connectivity-fault-management mep-statistics

```

user@host> show oam ethernet connectivity-fault-management mep-statistics
maintenance-domain md1 maintenance-association ma-1

```

```
MEP identifier: 100, MAC address: 00:05:85:73:7b:39
```

```
Remote MEP count: 1
```

```

CCMs sent                               : 6550
CCMs received out of sequence           : 0
LBMs sent                               : 0
Valid in-order LBRs received            : 0
Valid out-of-order LBRs received        : 0
LBRs received with corrupted data       : 0
LBRs sent                               : 0
LTMs sent                               : 0
LTMs received                           : 0
LTRs sent                               : 0
LTRs received                           : 0
Sequence number of next LTM request     : 0
1DMs sent                               : 5
Valid 1DMs received                     : 0
Invalid 1DMs received                   : 0
DMMs sent                               : 5
DMRs sent                               : 0
Valid DMRs received                     : 5
Invalid DMRs received                   : 0
SLM sent                                : 10
Valid SLM received                       : 20
Invalid SLM received                     : 0
SLR sent                                : 20
Valid SLR received                       : 10
Invalid SLR received                     : 0

```

```
Remote MEP identifier: 101
```

```
Remote MAC address: 00:05:85:73:39:4a
```

```
Delay measurement statistics:
```

Index	One-way delay (usec)	Two-way delay (usec)
1	259	519
2	273	550
3	287	571
4	299	610
5	313	650

```
Average one-way delay : 286 usec
```

```
Average one-way delay variation: 62 usec
```

```

Best case one-way delay      : 259 usec
Worst case one-way delay    : 313 usec
Average two-way delay       : 580 usec
Average two-way delay variation: 26 usec
Best case two-way delay     : 519 usec
Worst case two-way delay    : 650 usec
Synthetic Loss measurement
statistics:
  SLM packets sent          : 100
  SLM packets received      : 0
  SLR packets sent          : 100
  SLR packets received      : 0
  Accumulated SLM statistics:
    Local TXFC1 value       : 100
    Local RXFC1 value       : 100
    Last Received SLR frame TXFCftc : 100
    Last Received SLR frame TXFCbtc : 100
  SLM Frame Loss:
    Frame Loss (far-end)    : 0 (0.00 %)
    Frame Loss (near-end)   : 0 (0.00 %)

```

show oam ethernet connectivity-fault- management mep-statistics remote-mep

```

user@host> show oam ethernet connectivity-fault-management mep-statistics
maintenance-domain md1 maintenance-association ma1 remote-mep 101
MEP identifier: 100, MAC address: 00:05:85:73:7b:39
  CCMs sent                  : 7762
  CCMs received out of sequence : 0
  LBMs sent                  : 0
  Valid in-order LBRs received : 0
  Valid out-of-order LBRs received : 0
  LBRs received with corrupted data : 0
  LBRs sent                  : 0
  LTMs sent                  : 0
  LTMs received              : 0
  LTRs sent                  : 0
  LTRs received              : 0
  Sequence number of next LTM request : 0
  1DMs sent                  : 5
  Valid 1DMs received        : 0
  Invalid 1DMs received       : 0
  DMMs sent                  : 5
  DMRs sent                  : 0
  Valid DMRs received        : 5
  Invalid DMRs received       : 0
  SLM sent                   : 10
  Valid SLM received          : 20
  Invalid SLM received         : 0
  SLR sent                   : 20
  Valid SLR received          : 10
  Invalid SLR received         : 0

Remote MEP identifier: 101
Remote MAC address: 00:05:85:73:39:4a
Delay measurement statistics:
  Index  One-way delay  Two-way delay
         (usec)        (usec)
    1      259          519
    2      273          550
    3      287          571
    4      299          610

```

```

      5      313      650
Average one-way delay      : 286 usec
Average one-way delay variation: 62 usec
Best case one-way delay    : 259 usec
Worst case one-way delay   : 313 usec
Average two-way delay      : 580 usec
Average two-way delay variation: 26 usec
Best case two-way delay    : 519 usec
Worst case two-way delay   : 650 usec
Synthetic Loss measurement
statistics:
  SLM packets sent          : 100
  SLM packets received      : 0
  SLR packets sent          : 100
  SLR packets received      : 0
  Accumulated SLM statistics:
  Local TXFC1 value         : 100
  Local RXFC1 value         : 100
  Last Received SLR frame TXFCftc : 100
  Last Received SLR frame TXFCbtc : 100
  SLM Frame Loss:
  Frame Loss (far-end)      : 0 (0.00 %)
  Frame Loss (near-end)     : 0 (0.00 %)

```

show oam ethernet connectivity-fault-management path-database

Syntax	show oam ethernet connectivity-fault-management path-database <host-mac-address> <maintenance-association <i>ma-name</i> > <maintenance-domain <i>domain-name</i> >
Release Information	Command introduced in Junos OS Release 8.4.
Description	On M7i and M10i with Enhanced CFEB (CFEB-E), M320, MX Series, ACX Series, T320, and T640 routers, display IEEE 802.lag Operation, Administration, and Management (OAM) connectivity fault management path database information for a host configured with an MEP.
Options	<p>host-mac-address—(Optional) Display connectivity fault management path database information for a specified Ethernet host.</p> <p>maintenance-association <i>ma-name</i>—(Optional) Display connectivity fault management path database information for the specified maintenance association.</p> <p>maintenance-domain <i>domain-name</i>—(Optional) Display connectivity fault management path database information for the specified maintenance domain.</p>
Required Privilege Level	view
List of Sample Output	show oam ethernet connectivity-fault-management path-database on page 211
Output Fields	Table 25 on page 210 lists the output fields for the show oam ethernet connectivity-fault-management path-database command. Output fields are listed in the approximate order in which they appear.

Table 25: show oam ethernet connectivity-fault-management path-database Output Fields

Field Name	Field Description
Linktrace to	MAC address of the remote MEPs in the path.
Interface	Interface identifier.
Maintenance domain name	Maintenance domain name.
Format (Maintenance domain)	Maintenance domain name format configured.
Level	Maintenance domain level configured.
Maintenance association name	Maintenance association name.

Table 25: show oam ethernet connectivity-fault-management path-database Output Fields (*continued*)

Field Name	Field Description
Local Mep	Local MEP identifier.

Sample Output

show oam ethernet
connectivity-fault-
management
path-database

```
user@host> show oam ethernet connectivity-fault-management path-database
maintenance-domain md1 maintenance-association ma1 00:05:85:79:39:ef
Linktrace to 00:05:85:79:39:ef, Interface : ge-3/0/0
Maintenance Domain: md1, Level: 7
Maintenance Association: ma1, Local Mep: 201
```

show oam ethernet evc

Syntax	show oam ethernet evc <evc-id>
Release Information	Command introduced in Junos OS Release 9.5.
Description	On MX Series routers with OAM Ethernet Virtual Connection (EVC) configurations, displays the EVC configuration and status information.
Options	This command has no options.
Required Privilege Level	View
Output Fields	Table 26 on page 212 lists the output fields for the show oam ethernet evc command. Output fields are listed in the approximate order in which they appear.

Table 26: show oam ethernet evc Output Fields

Field Name	Field Description
EVC identifier	Header for the EVC information showing the EVC name, configuration, and active/inactive status.
UNI count	Number of configured and active UNIs.
Protocol	Protocol configured between the UNIs.
Local UNIs	Heading for the list of local UNIs
UNI Identifier	Name of the UNI.
Interface	Interface type-dpc/pic/port.unit-number.
Status	Status operational or not operational.

Sample Output

show oam ethernet evc

```

user@host> show oam ethernet evc
EVC identifier: evc1, Point-to-Point, Active
UNI count: Configured(2), Active(2)
Protocol: cfm, Management domain: md, Management association: ma
Local UNIs:
  UNI Identifier      Interface      Status
  uni1                ge-1/1/1      Operational
  uni2                ge-1/1/1      Not Operational

```

show oam ethernet link-fault-management

Syntax	show oam ethernet link-fault-management <brief detail> <interface-name>
Release Information	Command introduced in Junos OS Release 8.2.
Description	On EX Series switches and M320, M120, MX Series, T320, and T640 routers, display Operation, Administration, and Management (OAM) link fault management information for Ethernet interfaces.
Options	brief detail —(Optional) Display the specified level of output. interface-name —(Optional) Display link fault management information for the specified Ethernet interface only.
Required Privilege Level	view
List of Sample Output	show oam ethernet link-fault-management brief on page 217 show oam ethernet link-fault-management detail on page 217
Output Fields	Table 27 on page 213 lists the output fields for the show oam ethernet link-fault-management command. Output fields are listed in the approximate order in which they appear.

Table 27: show oam ethernet link-fault-management Output Fields

Field Name	Field Description	Level of Output
Status	Indicates the status of the established link. <ul style="list-style-type: none"> • Fail—A link fault condition exists. • Running—A link fault condition does not exist. • ISSU—The local end is in ISSU. 	All levels
Discovery state	State of the discovery mechanism: <ul style="list-style-type: none"> • Passive Wait • Send Any • Send Local Remote • Send Local Remote Ok • Fault 	All levels
Peer address	Address of the OAM peer.	All levels

Table 27: show oam ethernet link-fault-management Output Fields (*continued*)

Field Name	Field Description	Level of Output
Flags	<p>Information about the interface. Possible values are described in the “Link Flags” section under <i>Common Output Fields Description</i>.</p> <ul style="list-style-type: none"> • Remote-Stable—Indicates remote OAM client acknowledgment of and satisfaction with local OAM state information. False indicates that remote DTE either has not seen or is unsatisfied with local state information. True indicates that remote DTE has seen and is satisfied with local state information. • Local-Stable—Indicates local OAM client acknowledgment of and satisfaction with remote OAM state information. False indicates that local DTE either has not seen or is unsatisfied with remote state information. True indicates that local DTE has seen and is satisfied with remote state information. • Remote-State-Valid—Indicates the OAM client has received remote state information found within Local Information TLVs of received Information OAM PDUs. False indicates that OAM client has not seen remote state information. True indicates that the OAM client has seen remote state information. 	All levels
Remote loopback status	Indicates the remote loopback status. An OAM entity can put its remote peer into loopback mode using the Loopback control OAM PDU. In loopback mode, every frame received is transmitted back on the same port (except for OAM PDUs, which are needed to maintain the OAM session).	All levels
Remote entity information	<p>Remote entity information.</p> <ul style="list-style-type: none"> • Remote MUX action—Indicates the state of the multiplexer functions of the OAM sublayer. Device is forwarding non-OAM PDUs to the lower sublayer or discarding non-OAM PDUs. • Remote parser action—Indicates the state of the parser function of the OAM sublayer. Device is forwarding non-OAM PDUs to higher sublayer, looping back non-OAM PDUs to the lower sublayer, or discarding non-OAM PDUs. • Discovery mode—Indicates whether discovery mode is active or inactive. • Unidirectional mode—Indicates the ability to operate a link in a unidirectional mode for diagnostic purposes. • Remote loopback mode—Indicates whether remote loopback is supported or unsupported. • Link events—Indicates whether interpreting link events is supported or unsupported on the remote peer. • Variable requests—Indicates whether variable requests are supported. The Variable Request OAM PDU, is used to request one or more MIB variables from the remote peer. Also indicates if the remote end is in ISSU. 	All levels
OAM Receive Statistics		
Information	The total number of information PDUs received.	detail
Event	The total number of loopback control PDUs received.	detail
Variable request	The total number of variable request PDUs received.	detail
Variable response	The total number of variable response PDUs received.	detail

Table 27: show oam ethernet link-fault-management Output Fields (*continued*)

Field Name	Field Description	Level of Output
Loopback control	The total number of loopback control PDUs received.	detail
Organization specific	The total number of vendor organization specific PDUs received.	detail
OAM Transmit Statistics		
Information	The total number of information PDUs transmitted.	detail
Event	The total number of event notification PDUs transmitted.	detail
Variable request	The total number of variable request PDUs transmitted.	detail
Variable response	The total number of variable response PDUs transmitted.	detail
Loopback control	The total number of loopback control PDUs transmitted.	detail
Organization specific	The total number of vendor organization specific PDUs transmitted.	detail
OAM Received Symbol Error Event information		
Events	The number of symbol error event TLVs that have been received since the OAM sublayer was reset.	detail
Window	The symbol error event window in the received PDU. The protocol default value is the number of symbols that can be received in one second on the underlying physical layer.	detail
Threshold	The number of errored symbols in the period required for the event to be generated.	detail
Errors in period	The number of symbol errors in the period reported in the received event PDU.	detail
Total errors	The number of errored symbols that have been reported in received event TLVs since the OAM sublayer was reset. Symbol errors are coding symbol errors.	detail
OAM Received Frame Error Event Information		
Events	The number of errored frame event TLVs that have been received since the OAM sublayer was reset.	detail
Window	The duration of the window in terms of the number of 100 ms period intervals.	detail
Threshold	The number of detected errored frames required for the event to be generated.	detail
Errors in period	The number of detected errored frames in the period.	detail

Table 27: show oam ethernet link-fault-management Output Fields (*continued*)

Field Name	Field Description	Level of Output
Total errors	The number of errored frames that have been reported in received event TLVs since the OAM sublayer was reset. A frame error is any frame error on the underlying physical layer.	detail
OAM Received Frame Period Error Event Information		
Events	The number of frame seconds errors event TLVs that have been received since the OAM sublayer was reset.	detail
Window	The duration of the frame seconds window.	detail
Threshold	The number of frame seconds errors in the period.	detail
Errors in period	The number of frame seconds errors in the period.	detail
Total errors	The number of frame seconds errors that have been reported in received event TLVs since the OAM sublayer was reset.	detail
OAM Transmitted Symbol Error Event Information		
Events	The number of symbol error event TLVs that have been transmitted since the OAM sublayer was reset.	detail
Window	The symbol error event window in the transmitted PDU.	detail
Threshold	The number of errored symbols in the period required for the event to be generated.	detail
Errors in period	The number of symbol errors in the period reported in the transmitted event PDU.	detail
Total errors	The number of errored symbols reported in event TLVs that have been transmitted since the OAM sublayer was reset.	detail
OAM Current Symbol Error Event Information		
Events	The number of symbol error TLVs that have been generated regardless of whether the threshold for sending event TLVs has been crossed.	detail
Window	The symbol error event window in the transmitted PDU.	detail
Threshold	The number of errored symbols in the period required for the event to be generated.	detail
Errors in period	The total number of symbol errors in the period reported.	detail
Total errors	The number of errored symbols reported in event TLVs that have been generated regardless of whether the threshold for sending event TLVs has been crossed.	detail
OAM Transmitted Frame Error Event Information		

Table 27: show oam ethernet link-fault-management Output Fields (*continued*)

Field Name	Field Description	Level of Output
Events	The number of errored frame event TLVs that have been transmitted since the OAM sublayer was reset.	detail
Window	The duration of the window in terms of the number of 100 ms period intervals.	detail
Threshold	The number of detected errored frames required for the event to be generated.	detail
Errors in period	The number of detected errored frames in the period.	detail
Total errors	The number of errored frames that have been detected since the OAM sublayer was reset.	detail
OAM Current Frame Error Event Information		
Events	The number of errored frame event TLVs that have been generated regardless of whether the threshold for sending event TLVs has been crossed.	detail
Window	The duration of the window in terms of the number of 100 ms period intervals.	detail
Threshold	The number of detected errored frames required for the event to be generated.	detail
Errors in period	The number of errored frames in the period.	detail
Total errors	The number of errored frames detected regardless of whether the threshold for transmitting event TLVs has been crossed.	detail

Sample Output

show oam ethernet link-fault-management brief

```

user@host> show oam ethernet link-fault-management brief
Interface: ge-3/1/3
Status: Running, Discovery state: Send Any, ISSU
Peer address: 00:90:69:72:2c:83
Flags:Remote-Stable Remote-State-Valid Local-Stable 0x50
Remote loopback status: Disabled on local port, Enabled on peer port
Remote entity information:
  Remote MUX action: discarding, Remote parser action: loopback
  Discovery mode: active, Unidirectional mode: unsupported
  Remote loopback mode: supported, Link events: supported
  Variable requests: unsupported, Remote in ISSU

```

show oam ethernet link-fault-management detail

```

user@host> show oam ethernet link-fault-management detail
Interface: ge-6/1/0
Status: Running, Discovery state: Send Any, ISSU
Peer address: 00:90:69:0a:07:14
Flags:Remote-Stable Remote-State-Valid Local-Stable 0x50
OAM receive statistics:
  Information: 186365, Event: 0, Variable request: 0, Variable response: 0
  Loopback control: 0, Organization specific: 0

```

```

OAM transmit statistics:
  Information: 186347, Event: 0, Variable request: 0, Variable response: 0
  Loopback control: 0, Organization specific: 0
OAM received symbol error event information:
  Events: 0, Window: 0, Threshold: 0
  Errors in period: 0, Total errors: 0
OAM received frame error event information:
  Events: 0, Window: 0, Threshold: 0
  Errors in period: 0, Total errors: 0
OAM received frame period error event information:
  Events: 0, Window: 0, Threshold: 0
  Errors in period: 0, Total errors: 0
OAM transmitted symbol error event information:
  Events: 0, Window: 0, Threshold: 1
  Errors in period: 0, Total errors: 0
OAM current symbol error event information:
  Events: 0, Window: 0, Threshold: 1
  Errors in period: 0, Total errors: 0
OAM transmitted frame error event information:
  Events: 0, Window: 0, Threshold: 1
  Errors in period: 0, Total errors: 0
OAM current frame error event information:
  Events: 0, Window: 0, Threshold: 1
  Errors in period: 0, Total errors: 0
Remote entity information:
  Remote MUX action: forwarding, Remote parser action: forwarding
  Discovery mode: active, Unidirectional mode: unsupported
  Remote loopback mode: supported, Link events: supported
  Variable requests: unsupported, Remote in ISSU

```

show oam ethernet lmi

Syntax	show oam ethernet lmi (interface <interface-name>)
Release Information	Command introduced in Junos OS Release 9.5.
Description	On MX Series routers with Gigabit Ethernet, Fast Ethernet, or aggregated Ethernet, and OAM Ethernet Local Management Interface (LMI) configuration, display the LMI information for the configured interfaces or optionally for a specified interface.
Options	interface —(Optional) Display LMI information for a specified interface. interface-name —(Optional) Display Ethernet LMI information for the specified interface only.
Required Privilege Level	View
Output Fields	Table 28 on page 219 lists the output fields for the show oam ethernet lmi command. Output fields are listed in the approximate order in which they appear.

Table 28: show oam ethernet lmi Output Fields

Field Name	Field Description
Physical Interface	Header for the EVC information showing the Ethernet virtual circuit (EVC) name, configuration, and active/inactive status.
UNI Identifier	Name of the UNI.
EVC map type	EVC configuration.
Polling verification timer	Polling verification timer status.
E-LMI state	Operational status of the E-LMI configuration in the interfaces or specified interface.
Priority/Untagged VLAN ID	To be provided.
Default EVC	The EVC set as the default EVC.
Associated EVCs	Heading for the list of configured EVCs.
EVC Identifier	EVC name.
Reference ID	To be provided.
Status	Status active or not active.
CE VLAN IDs	Customer edge VLAN ID numbers.

Sample Output

show oam ethernet lmi interface

```
user@host> show oam ethernet lmi interface ge-1/1/1
Physical interface: ge-1/1/1, Physical link is Up
UNI identifier: uni-ce1, EVC map type: Bundling
Polling verification timer: Enabled, E-LMI state: Operational
Priority/Untagged VLAN ID: 20, Default EVC: evc1
Associated EVCs:
  EVC          Reference   Status          CE VLAN IDs
  Identifier   ID
  evc1         1       Active (New)    1-2048
  evc2         2       Not Active     2049-4096
```

show oam ethernet lmi statistics

Syntax	<code>show oam ethernet lmi statistics <interface <i>interface-name</i>></code>
Release Information	Command introduced in Junos OS Release 9.5.
Description	On MX Series routers with Gigabit Ethernet, Fast Ethernet, or aggregated Ethernet PICs, displays OAM Ethernet Local Management Interface (LMI) statistics.
Options	<p>interface—(Optional) Display LMI statistics for a specified interface.</p> <p>interface-name—(Optional) Display Ethernet LMI information for the specified Ethernet interface only.</p>
Required Privilege Level	view
List of Sample Output	show oam ethernet lmi statistics on page 221
Output Fields	Table 29 on page 221 lists the output fields for the show oam ethernet lmi statistics command. Output fields are listed in the approximate order in which they appear.

Table 29: show oam ethernet lmi statistics Output Fields

Field Name	Field Description
Physical interface	Name of the interface for the displayed statistics.
Reliability errors	Number of E-LMI reliability errors logged.
Protocol errors	Number of E-LMI protocol errors.
Status check received	Number of E-LMI status check receive errors.
Status check sent	Number of E-LMI status check sent errors.
Full status received	Number of E-LMI full status receive errors.
Full status sent	Number of E-LMI full status sent errors.
Full status continued received	Number of E-LMI status continued received errors.
Full status continued sent	Number of E-LMI full status continued sent errors.
Asynchronous status sent	Number of E-LMI asynchronous status sent errors.

Sample Output

show oam ethernet lmi statistics

```
user@host> show oam ethernet lmi statistics interface ge-1/1/1
```

Physical interface: ge-1/1/1	
Reliability errors	4 Protocol errors
0	
Status check received	0 Status check sent
0	
Full status received	694 Full status sent
694	
Full status continued received	0 Full status continued sent
0	
Asynchronous status sent	0

show protection-group ethernet-ring aps

Syntax	show protection-group ethernet-ring aps
Release Information	Command introduced in Junos OS Release 9.4. Command introduced in Junos OS Release 12.1 for EX Series switches.
Description	Display the status of the Automatic Protection Switching (APS) and Ring APS (RAPS) messages on an Ethernet ring.
Options	This command has no options.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • show protection-group ethernet-ring data-channel on page 225 • show protection-group ethernet-ring interface on page 227 • show protection-group ethernet-ring node-state on page 230 • show protection-group ethernet-ring statistics on page 233 • show protection-group ethernet-ring vlan on page 236
List of Sample Output	show protection-group ethernet-ring aps (EX Switches) on page 224 show protection-group ethernet-ring aps (Owner Node, Normal Operation on MX Routers) on page 224 show protection-group ethernet-ring aps (Ring Node, Normal Operation on MX Routers) on page 224 show protection-group ethernet-ring aps (Owner Node, Failure Condition on MX Routers) on page 224 show protection-group ethernet-ring aps (Ring Node, Failure Condition on MX Routers) on page 224
Output Fields	Table 30 on page 223 lists the output fields for the show protection-group ethernet-ring aps command. Output fields are listed in the approximate order in which they appear.

Table 30: show protection-group ethernet-ring aps Output Fields

Field Name	Field Description
Ethernet Ring Name	Name configured for the Ethernet ring.
Request/State	Status of the Ethernet ring RAPS messages. <ul style="list-style-type: none"> • NR—Indicates there is no request for APS on the ring. • SF—Indicates there is a signal failure on the ring.
No Flush	State of the ring flushing: No (normal) or Yes (failure).
Ring Protection Link Blocked	Blocking on the ring protection link: Yes or No .

Table 30: show protection-group ethernet-ring aps Output Fields (*continued*)

Field Name	Field Description
Originator	Whether this node is the ring originator: Yes or No .
Remote Node ID	Identifier (in MAC address format) of the remote node.

Sample Output

show protection-group ethernet-ring aps (EX Switches)

```
user@switch>> show protection-group ethernet-ring aps
Ring Name    Request/state  No Flush  RPL Blocked  Originator  Remote Node ID
erp1         NR             no        yes          no          00:1F:12:30:B8:81
```

Sample Output

show protection-group ethernet-ring aps (Owner Node, Normal Operation on MX Routers)

```
user@host> show protection-group ethernet-ring aps
Ethernet Ring Name  Request/state  No Flush  Ring Protection Link Blocked
pg101              NR             No        Yes

Originator  Remote Node ID
Yes
```

show protection-group ethernet-ring aps (Ring Node, Normal Operation on MX Routers)

```
user@host> show protection-group ethernet-ring aps
Ethernet Ring Name  Request/state  No Flush  Ring Protection Link Blocked
pg102              NR             No        Yes

Originator  Remote Node ID
No          00:01:01:00:00:01
```

show protection-group ethernet-ring aps (Owner Node, Failure Condition on MX Routers)

```
user@host> show protection-group ethernet-ring aps
Ethernet Ring Name  Request/state  No Flush  Ring Protection Link Blocked
pg101              SF             No        No

Originator  Remote Node ID
No          00:01:02:00:00:01
```

show protection-group ethernet-ring aps (Ring Node, Failure Condition on MX Routers)

```
user@host> show protection-group ethernet-ring aps
Ethernet Ring Name  Request/state  No Flush  Ring Protection Link Blocked
pg102              SF             No        Yes

Originator  Remote Node ID
Yes         00:00:00:00:00:00
```

show protection-group ethernet-ring data-channel

Syntax	show protection-group ethernet-ring data-channel <brief detail> <group-name <i>group-name</i> >
Release Information	Command introduced in Junos OS Release 10.2.
Description	On MX Series routers, display data channel information for all Ethernet ring protection groups or for a specific Ethernet ring protection group.
Options	brief detail —(Optional) Display the specified level of output. group-name —(Optional) Protection group for which to display statistics. If you omit this optional field, all protection group statistics for configured groups will be displayed.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • show protection-group ethernet-ring aps on page 223 • show protection-group ethernet-ring interface on page 227 • show protection-group ethernet-ring node-state on page 230 • show protection-group ethernet-ring statistics on page 233 • show protection-group ethernet-ring vlan on page 236
List of Sample Output	show protection-group ethernet-ring data-channel on page 226
Output Fields	Table 31 on page 225 lists the output fields for the show protection-group ethernet-ring data-channel command. Output fields are listed in the approximate order in which they appear.

Table 31: show protection-group ethernet-ring data-channel Output Fields

Field Name	Field Description
Interface	Name of the interface configured for the Ethernet ring.
STP index	The Spanning Tree Protocol (STP) index number used by each interface in an Ethernet ring. The STP index controls the forwarding behavior for a set of VLANs on a data channel on an Ethernet ring port. For multiple Ethernet ring instances on a physical ring port, there are multiple STP index numbers. Different ring instances will have different STP index numbers and may have different forwarding behavior.
Forward State	Forwarding state on the Ethernet ring. <ul style="list-style-type: none"> • fowarding—Indicates packets are being forwarded. • discarding—Indicates packets are being discarded.

Sample Output

show protection-group ethernet-ring data-channel

```
user@host> show protection-group ethernet-ring data-channel
Ethernet ring data channel information for protection group pg301
Interface    STP index    Forward State
ge-1/0/3     71           forwarding
ge-1/0/4     82           forwarding

Ethernet ring data channel information for protection group pg302
Interface    STP index    Forward State
ge-1/0/3     52           forwarding
ge-1/0/4     91           forwarding
```

show protection-group ethernet-ring interface

Syntax	show protection-group ethernet-ring interface
Release Information	Command introduced in Junos OS Release 9.4.
Description	Displays the status of the Automatic Protection Switching (APS) interfaces on an Ethernet ring.
Options	This command has no options.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • show protection-group ethernet-ring data-channel on page 225 • show protection-group ethernet-ring aps on page 223 • show protection-group ethernet-ring node-state on page 230 • show protection-group ethernet-ring statistics on page 233 • show protection-group ethernet-ring vlan on page 236
List of Sample Output	show protection-group ethernet-ring interface (EX Series Switch Owner Node) on page 228 show protection-group ethernet-ring interface (Owner Node MX Series Router) on page 228 show protection-group ethernet-ring interface (EX Series Switch Ring Node) on page 228 show protection-group ethernet-ring interface (MX Series Router Ring Node) on page 228
Output Fields	Table 32 on page 227 lists the output fields for both the EX Series switch and the MX Series router show protection-group ethernet-ring interface commands. Output fields are listed in the approximate order in which they appear.

Table 32: MX Series Routers show protection-group ethernet-ring interface Output Fields

Field Name	Field Description
Ethernet ring port parameters for protection group <i>group-name</i>	Output is organized by configured protection group.
Interface	Physical interfaces configured for the Ethernet ring.
Control Channel	(MX Series router only) Logical unit configured on the physical interface. <ul style="list-style-type: none"> • NR—Indicates there is no request for APS on the ring. • SF—Indicates there is a signal failure on the ring.
Forward State	State of the ring forwarding on the interface: discarding or forwarding .

Table 32: MX Series Routers show protection-group ethernet-ring interface Output Fields (*continued*)

Field Name	Field Description
Ring Protection Link End	Whether this interface is the end of the ring: Yes or No .
Signal Failure	Whether there a signal failure exists on the link: Clear or Set .
Admin State	State of the interface: For EX switches, ready , ifl ready , or waiting . For MX routers, IFF ready or IFF disabled .

Sample Output

show protection-group ethernet-ring interface (EX Series Switch Owner Node)

```
user@host> show protection-group ethernet-ring interface
Ethernet ring port parameters for protection group pg101

Interface      Forward State  RPL End  Signal Failure  Admin State
ge-0/0/3.0     discarding    Yes      Clear           ready
ge-0/0/9.0     forwarding    No       Clear           ready
```

show protection-group ethernet-ring interface (Owner Node MX Series Router)

```
user@host> show protection-group ethernet-ring interface
Ethernet ring port parameters for protection group pg101

Interface      Control Channel Forward State  Ring Protection Link End
ge-1/0/1       ge-1/0/1.1     discarding    Yes
ge-1/2/4       ge-1/2/4.1     forwarding    No

Signal Failure  Admin State
Clear           IFF ready
Clear           IFF ready
```

show protection-group ethernet-ring interface (EX Series Switch Ring Node)

```
user@host> show protection-group ethernet-ring interface
Ethernet ring port parameters for protection group pg102

Ethernet ring port parameters for protection group pg101

Interface      Forward State  RPL End  Signal Failure  Admin State
ge-0/0/3.0     discarding    Yes      Clear           ready
ge-0/0/9.0     forwarding    No       Clear           ready
```

show protection-group ethernet-ring interface (MX Series Router Ring Node)

```
user@host> show protection-group ethernet-ring interface
Ethernet ring port parameters for protection group pg102

Interface      Control Channel Forward State  Ring Protection Link End
ge-1/2/1       ge-1/2/1.1     forwarding    No
ge-1/0/2       ge-1/0/2.1     forwarding    No
```

Signal	Failure	Admin	State
Clear		IFF	ready
Clear		IFF	ready

show protection-group ethernet-ring node-state

Syntax	show protection-group ethernet-ring node-state
Release Information	Command introduced in Junos OS Release 9.4. Command introduced in Junos OS Release 12.1 for EX Series switches.
Description	Display the status of the Automatic Protection Switching (APS) nodes on an Ethernet ring.
Options	This command has no options.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • show protection-group ethernet-ring data-channel on page 225 • show protection-group ethernet-ring aps on page 223 • show protection-group ethernet-ring interface on page 227 • show protection-group ethernet-ring statistics on page 233 • show protection-group ethernet-ring vlan on page 236
List of Sample Output	show protection-group ethernet-ring node-state (EX Series Switch) on page 231 show protection-group ethernet-ring node-state (MX Series Router - Owner Node, Normal Operation) on page 231 show protection-group ethernet-ring node-state (MX Series Router - Ring Node, Normal Operation) on page 231 show protection-group ethernet-ring node-state (MX Series Router - Owner Node, Remote Signal Failure Condition) on page 232 show protection-group ethernet-ring node-state (MX Series Router - Ring Node, Local Signal Failure Condition) on page 232 show protection-group ethernet-ring node-state detail (MX Series Router - Node state at RPL-owner after signal failure condition is cleared in the ring and before reversion) on page 232
Output Fields	<p>Table 33 on page 230 lists the output fields for the show protection-group ethernet-ring node-state command. Output fields are listed in the approximate order in which they appear.</p>

Table 33: show protection-group ethernet-ring node-state Output Fields

Field Name	Field Description
Ring Name/Ethernet Ring	Name configured for the Ethernet ring.

Table 33: show protection-group ethernet-ring node-state Output Fields (continued)

Field Name	Field Description
APS State	<p>State of the Ethernet ring APS.</p> <ul style="list-style-type: none"> idle—Indicates that the ring is working in normal condition and no protection-switching request active or pending in the ring. When the ring is in idle state, it is blocked at RPL link. protected—Indicates that there is a protection switch on the ring due to signal failure condition on the ring link.
Event	<p>Events on the ring.</p> <ul style="list-style-type: none"> NR-RB—Indicates there is no APS request and the ring link is blocked on the ring owner node. NR—Indicates there is no APS request pending in the ring. local SF—Indicates there is signal failure on one or both the ring links of the node. remote SF—Indicates there is signal failure on ring links of any other node of the ring. WTR running—Indicates wait to restore timer is running on RPL-owner.
RPL Owner / Ring Protection Link Owner	Whether this node is the ring owner: Yes or No .
WTR Timer / Restore Timer	Restoration timer: running or disabled .
Guard Timer	Guard timer: running or disabled .
Op state / Operational State	State of the node: Operational or any internal wait state .

Sample Output

show protection-group ethernet-ring node-state (EX Series Switch)

```

user@switch> show protection-group ethernet-ring node-state
Ring Name APS State Event RPL Owner WTR Timer Guard Timer Op State
erp1      idle      NR-RB  yes    disabled disabled operational

```

show protection-group ethernet-ring node-state (MX Series Router - Owner Node, Normal Operation)

```

user@host> show protection-group ethernet-ring node-state
Ethernet ring   APS State   Event       Ring Protection Link Owner
pg101          idle        NR-RB       Yes

Restore Timer   Guard Timer  Operation state
disabled        disabled    operational

```

show protection-group ethernet-ring node-state (MX Series Router - Ring Node, Normal Operation)

```

user@host> show protection-group ethernet-ring node-state

```

Ethernet ring pg102	APS State idle	Event NR-RB	Ring Protection Link Owner No
Restore Timer disabled	Guard Timer disabled	Operation state operational	

show protection-group ethernet-ring node-state (MX Series Router - Owner Node, Remote Signal Failure Condition)

```
user@host> show protection-group ethernet-ring node-state
```

Ethernet ring pg101	APS State protected	Event remote SF	Ring Protection Link Owner Yes
Restore Timer disabled	Guard Timer disabled	Operation state operational	

show protection-group ethernet-ring node-state (MX Series Router - Ring Node, Local Signal Failure Condition)

```
user@host> show protection-group ethernet-ring node-state
```

Ethernet ring pg102	APS State protected	Event local SF	Ring Protection Link Owner No
Restore Timer disabled	Guard Timer disabled	Operation state operational	

show protection-group ethernet-ring node-state detail (MX Series Router - Node state at RPL-owner after signal failure condition is cleared in the ring and before reversion)

```
user@host> show protection-group ethernet-ring node-state detail
```

Ethernet-Ring name	: pg_major
APS State	: protected
Event	: WTR running
Ring Protection Link Owner	: Yes
Restore Timer	: running (time to expire: 269 sec)
Guard Timer	: disabled
Operation state	: operational

show protection-group ethernet-ring statistics

Syntax	show protection-group ethernet-ring statistics <group-name <i>group-name</i> >
Release Information	Command introduced in Junos OS Release 9.4. Command introduced in Junos OS Release 12.1 for EX Series switches.
Description	Display statistics regarding Automatic Protection Switching (APS) protection groups on an Ethernet ring.
Options	group-name —Protection group for which to display statistics. In you omit this optional field, all protection group statistics for configured groups will be displayed.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • show protection-group ethernet-ring data-channel on page 225 • show protection-group ethernet-ring aps on page 223 • show protection-group ethernet-ring node-state on page 230 • show protection-group ethernet-ring interface on page 227 • show protection-group ethernet-ring vlan on page 236
List of Sample Output	show protection-group ethernet-ring statistics (EX Switch) on page 234 show protection-group ethernet-ring statistics (Owner Node, Normal Operation on MX Router) on page 234 show protection-group ethernet-ring statistics (Ring Node, Normal Operation on MX Router) on page 234 show protection-group ethernet-ring statistics (Owner Node, Failure Condition on MX Router) on page 234 show protection-group ethernet-ring statistics (Ring Node, Failure Condition on MX Router) on page 235
Output Fields	Table 34 on page 233 lists the output fields for the show protection-group ethernet-ring statistics command. Output fields are listed in the approximate order in which they appear.

Table 34: show protection-group ethernet-ring statistics Output Fields

Field Name	Field Description
Ethernet Ring Statistics for PG	Name of the protection group for which statistics are displayed.
RAPS sent	Number of Ring Automatic Protection Switching (RAPS) messages sent. (On MX Series switches only)
RAPS received	Number of RAPS messages received. (On MX Series switches only)

Table 34: show protection-group ethernet-ring statistics Output Fields (*continued*)

Field Name	Field Description
Local SF	Number of times a signal failure (SF) has occurred locally.
Remote SF	Number of times a signal failure (SF) has occurred anywhere else on the ring.
NR event	Number of times a No Request (NR) event has occurred on the ring.
NR-RB event	Number of times a No Request, Ring Blocked (NR-RB) event has occurred on the ring.

Sample Output

show protection-group ethernet-ring statistics (EX Switch)

```

user@switch> show protection-group ethernet-ring statistics
Ring Name Local SF Remote SF NR Event NR-RB Event
erp1      2      1      2      3

```

show protection-group ethernet-ring statistics (Owner Node, Normal Operation on MX Router)

```

user@host> show protection-group ethernet-ring statistics group-name pg101
Ethernet Ring statistics for PG pg101
RAPS sent                : 1
RAPS received            : 0
Local SF happened        : 0
Remote SF happened       : 0
NR event happened        : 0
NR-RB event happened     : 1

```

show protection-group ethernet-ring statistics (Ring Node, Normal Operation on MX Router)

```

user@host> show protection-group ethernet-ring statistics group-name pg102
Ethernet Ring statistics for PG pg102
RAPS sent                : 0
RAPS received            : 1
Local SF happened        : 0
Remote SF happened       : 0
NR event happened        : 0
NR-RB event happened     : 1

```

show protection-group ethernet-ring statistics (Owner Node, Failure Condition on MX Router)

```

user@host> show protection-group ethernet-ring statistics group-name pg101
Ethernet Ring statistics for PG pg101
RAPS sent                : 1
RAPS received            : 1
Local SF happened        : 0
Remote SF happened       : 1
NR event happened        : 0
NR-RB event happened     : 1

```

show protection-group ethernet-ring statistics (Ring Node, Failure Condition on MX Router)

```
user@host> show protection-group ethernet-ring statistics group-name pg102
Ethernet Ring statistics for PG pg102
RAPS sent                : 1
RAPS received            : 1
Local SF happened        : 1
Remote SF happened       : 0
NR event happened        : 0
NR-RB event happened     : 1
```

show protection-group ethernet-ring vlan

Syntax	show protection-group ethernet-ring vlan <brief detail> <group-name <i>group-name</i> >
Release Information	Command introduced in Junos OS Release 10.2.
Description	On MX Series routers, display all data channel logical interfaces and the VLAN IDs controlled by a ring instance data channel.
Options	brief detail —(Optional) Display the specified level of output. group-name —(Optional) Protection group for which to display details such as data channel interfaces, vlan, and bridge-domain. If you omit this optional field, details for all configured protection groups will be displayed.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • show protection-group ethernet-ring aps on page 223 • show protection-group ethernet-ring data-channel on page 225 • show protection-group ethernet-ring interface on page 227 • show protection-group ethernet-ring node-state on page 230 • show protection-group ethernet-ring statistics on page 233
List of Sample Output	show protection-group ethernet-ring vlan on page 237 show protection-group ethernet-ring vlan brief on page 237 show protection-group ethernet-ring vlan detail on page 237 show protection-group ethernet-ring vlan group-name vkm01 on page 237
Output Fields	Table 35 on page 236 lists the output fields for the show protection-group ethernet-ring vlan command. Output fields are listed in the approximate order in which they appear.

Table 35: show protection-group ethernet-ring vlan Output Fields

Field Name	Field Description
Interface	Name of the interface configured for the Ethernet protection ring.
Vlan	Name of the VLAN associated with the interface configured for the Ethernet protection ring.
STP index	The Spanning Tree Protocol (STP) index number used by each interface in an Ethernet ring. The STP index controls the forwarding behavior for a set of VLANs on a data channel on an Ethernet ring port. For multiple Ethernet ring instances on a physical ring port, there are multiple STP index numbers. Different ring instances will have different STP index numbers and may have different forwarding behavior.

Table 35: show protection-group ethernet-ring vlan Output Fields (continued)

Field Name	Field Description
Bridge Domain	Name of the bridge domain that is associated with the VLAN configured for the Ethernet protection ring.

Sample Output

show protection-group ethernet-ring vlan

```
user@host> show protection-group ethernet-ring vlan
Ethernet ring IFBD parameters for protection group vkm01

Interface  Vlan    STP Index  Bridge Domain
ge-2/0/8   100     130       default-switch/bd100
ge-2/0/4   100     126       default-switch/bd100
```

show protection-group ethernet-ring vlan brief

```
user@host> show protection-group ethernet-ring vlan brief
Ethernet ring IFBD parameters for protection group vkm01

Interface  Vlan    STP Index  Bridge Domain
ge-2/0/8   100     130       default-switch/bd100
ge-2/0/4   100     126       default-switch/bd100
```

show protection-group ethernet-ring vlan detail

```
user@host> show protection-group ethernet-ring vlan detail
Ethernet ring IFBD parameters for protection group vkm01

Interface name      : ge-2/0/8
Vlan                 : 100
STP index            : 130
Bridge Domain        : default-switch/bd100

Interface name      : ge-2/0/4
Vlan                 : 100
STP index            : 126
Bridge Domain        : default-switch/bd100
```

show protection-group ethernet-ring vlan group-name vkm01

```
user@host> show protection-group ethernet-ring vlan vkm01
Ethernet ring IFBD parameters for protection group vkm01

Interface  Vlan    STP Index  Bridge Domain
ge-2/0/8   100     130       default-switch/bd100
ge-2/0/4   100     126       default-switch/bd100
```


PART 4

Troubleshooting

- [Ethernet on page 241](#)
- [Interface Diagnostics on page 245](#)

CHAPTER 6

Ethernet

- `traceroute ethernet`

traceroute ethernet

Syntax	traceroute ethernet (<i>mac-address</i> <i>mep-id</i>) maintenance-association <i>ma-name</i> maintenance-domain <i>md-name</i> ttl <i>value</i> <wait seconds>
Release Information	Command introduced in Junos OS Release 9.0. mep-id option introduced in Junos OS Release 9.1.
Description	<p>Triggers the linktrace protocol to trace the route between two maintenance points. The result of the traceroute protocol is stored in the path database. To display the path database, use the show oam ethernet connectivity-fault-management path-database command.</p> <p>Before using the traceroute command, you can verify the remote MEP's MAC address using the show oam ethernet connectivity-fault-management path-database command.</p>
Options	<p>mac-address—Destination unicast MAC address of the remote maintenance point.</p> <p>mep-id—MEP identifier of the remote maintenance point. The range of values is 1 through 8191.</p> <p>maintenance-association <i>ma-name</i>—Specifies an existing maintenance association from the set of configured maintenance associations.</p> <p>maintenance-domain <i>md-name</i>—Specifies an existing maintenance domain from the set of configured maintenance domains.</p> <p>ttl <i>value</i>—Number of hops to use in the linktrace request. The range is 1 to 255 hops. The default is 4.</p> <p>wait <i>seconds</i>—(Optional) Maximum time to wait for a response to the traceroute request. The range is 1 to 255 seconds. The default is 5.</p>
Required Privilege Level	network
List of Sample Output	traceroute ethernet on page 243
Output Fields	<p>Table 36 on page 242 lists the output fields for the traceroute ethernet command. Output fields are listed in the approximate order in which they appear.</p>

Table 36: traceroute ethernet Output Fields

Field Name	Field Description
Linktrace to	MAC address of the destination maintenance point.
Interface	Local interface used to send the linktrace message (LTM).

Table 36: traceroute ethernet Output Fields (*continued*)

Field Name	Field Description
Maintenance Domain	Maintenance domain specified in the traceroute command.
Level	Maintenance domain level configured.
Maintenance Association	Maintenance association specified in the traceroute command.
Local Mep	The local maintenance end point identifier.
Transaction Identifier	4-byte identifier maintained by the MEP. Each LTM uses a transaction identifier. The transaction identifier is maintained globally across all Maintenance Domains. Use the transaction identifier to match an incoming linktrace response (LTR), with a previously sent LTM.
Hop	Sequential hop count of the linktrace path.
TTL	Number of hops remaining in the linktrace message. The time to live (TTL) is decremented at each hop.
Source MAC address	MAC address of the 802.1ag node responding to the LTM or the source MAC address of the LTR.
Next-hop MAC address	MAC address of the egress interface of the node to which the LTM is forwarded or the next-hop MAC address derived from the next egress identifier in the Egress-ID TLV of the LTR PDU.

Sample Output

traceroute ethernet

```
user@host> traceroute ethernet maintenance-domain md1 maintenance-association ma1
00:01:02:03:04:05
```

```
Linktrace to 00:01:02:03:04:05, Interface : ge-5/0/0.0
```

```
Maintenance Domain: MD1, Level: 7
```

```
Maintenance Association: MA1, Local Mep: 1
```

Hop	TTL	Source MAC address	Next hop MAC address
Transaction Identifier:100001			
1	63	00:00:aa:aa:aa:aa	00:00:ab:ab:ab:ab
2	62	00:00:bb:bb:bb:bb	00:00:bc:bc:bc:bc
3	61	00:00:cc:cc:cc:cc	00:00:cd:cd:cd:cd
4	60	00:01:02:03:04:05	00:00:00:00:00:00

CHAPTER 7

Interface Diagnostics

- [Interface Diagnostics on page 245](#)

Interface Diagnostics

You can use two diagnostic tools to test the physical layer connections of interfaces: loopback testing and bit error rate test (BERT) testing. Loopback testing enables you to verify the connectivity of a circuit. BERT testing enables you to identify poor signal quality on a circuit. This section contains the following topics:

- [Configuring Loopback Testing on page 245](#)
- [Interface Diagnostics on page 247](#)

Configuring Loopback Testing

Loopback testing allows you to verify the connectivity of a circuit. You can configure any of the following interfaces to execute a loopback test: Aggregated Ethernet, Fast Ethernet, Gigabit Ethernet, E1, E3, NxDS0, serial, SONET/SDH, T1, and T3.

The physical path of a network data circuit usually consists of segments interconnected by devices that repeat and regenerate the transmission signal. The transmit path on one device connects to the receive path on the next device. If a circuit fault occurs in the form of a line break or a signal corruption, you can isolate the problem by using a loopback test. Loopback tests allow you to isolate segments of the circuit and test them separately.

To do this, configure a *line loopback* on one of the routers. Instead of transmitting the signal toward the far-end device, the line loopback sends the signal back to the originating router. If the originating router receives back its own data link layer packets, you have verified that the problem is beyond the originating router. Next, configure a line loopback farther away from the local router. If this originating router does not receive its own data link layer packets, you can assume the problem is on one of the segments between the local router and the remote router's interface card. In this case, the next troubleshooting step is to configure a line loopback closer to the local router to find the source of the problem.

There are several types of loopback testing supported by the Junos OS, as follows:

- DCE local—Loops packets back on the local DCE.
- DCE remote—Loops packets back on the remote DCE.

- **Local**—Useful for troubleshooting physical PIC errors. Configuring local loopback on an interface allows transmission of packets to the channel service unit (CSU) and then to the circuit toward the far-end device. The interface receives its own transmission, which includes data and timing information, on the local router's PIC. The data received from the CSU is ignored. To test a local loopback, issue the **show interfaces *interface-name*** command. If PPP keepalives transmitted on the interface are received by the PIC, the **Device Flags** field contains the output **Loop-Detected**.
- **Payload**—Useful for troubleshooting the physical circuit problems between the local router and the remote router. A payload loopback loops data only (without clocking information) on the remote router's PIC. With payload loopback, overhead is recalculated.
- **Remote**—Useful for troubleshooting the physical circuit problems between the local router and the remote router. A remote loopback loops packets, including both data and timing information, back on the remote router's interface card. A router at one end of the circuit initiates a remote loopback toward its remote partner. When you configure a remote loopback, the packets received from the physical circuit and CSU are received by the interface. Those packets are then retransmitted by the PIC back toward the CSU and the circuit. This loopback tests all the intermediate transmission segments.

Table 37 on page 246 shows the loopback modes supported on the various interface types.

Table 37: Loopback Modes by Interface Type

Interface	Loopback Modes	Usage Guidelines
Aggregated Ethernet, Fast Ethernet, Gigabit Ethernet	Local	<i>Configuring Ethernet Loopback Capability</i>
Circuit Emulation E1	Local and remote	<i>Configuring E1 Loopback Capability</i>
Circuit Emulation T1	Local and remote	<i>Configuring T1 Loopback Capability</i>
E1 and E3	Local and remote	<i>Configuring E1 Loopback Capability and Configuring E3 Loopback Capability</i>
NxDSO	Payload	<i>Configuring Channelized E1 IQ and IQE Interfaces, Configuring T1 and NxDSO Interfaces, Configuring Channelized OC12/STM4 IQ and IQE Interfaces (SONET Mode), Configuring Channelized STM1 IQ and IQE Interfaces, and Configuring Channelized T3 IQ Interfaces</i>
Serial (V.35 and X.21)	Local and remote	<i>Configuring Serial Loopback Capability</i>
Serial (EIA-530)	DCE local, DCE remote, local, and remote	<i>Configuring Serial Loopback Capability</i>
SONET/SDH	Local and remote	<i>Configuring SONET/SDH Loopback Capability</i>

Table 37: Loopback Modes by Interface Type (*continued*)

Interface	Loopback Modes	Usage Guidelines
T1 and T3	Local, payload, and remote	<i>Configuring T1 Loopback Capability</i> and <i>Configuring T3 Loopback Capability</i> <i>See also Configuring the T1 Remote Loopback Response</i>

To configure loopback testing, include the **loopback** statement:

loopback mode;

You can include this statement at the following hierarchy levels:

- [edit interfaces *interface-name* aggregated-ether-options]
- [edit interfaces *interface-name* ds0-options]
- [edit interfaces *interface-name* e1-options]
- [edit interfaces *interface-name* e3-options]
- [edit interfaces *interface-name* fastether-options]
- [edit interfaces *interface-name* gigether-options]
- [edit interfaces *interface-name* serial-options]
- [edit interfaces *interface-name* sonet-options]
- [edit interfaces *interface-name* t1-options]
- [edit interfaces *interface-name* t3-options]

Interface Diagnostics

BERT allows you to troubleshoot problems by checking the quality of links. You can configure any of the following interfaces to execute a BERT when the interface receives a request to run this test: E1, E3, T1, T3; the channelized DS3, OC3, OC12, and STM1 interfaces; and the channelized DS3 IQ, E1 IQ, and OC12 IQ interfaces.

A BERT test requires a line loop to be in place on either the transmission devices or the far-end router. The local router generates a known bit pattern and sends it out the transmit path. The received pattern is then verified against the sent pattern. The higher the bit error rate of the received pattern, the worse the noise is on the physical circuit. As you move the position of the line loop increasingly downstream toward the far-end router, you can isolate the troubled portion of the link.

To configure BERT, you must configure the duration of the test, the bit pattern to send on the transmit path, and the error rate to monitor when the inbound pattern is received.

To configure the duration of the test, the pattern to send in the bit stream, and the error rate to include in the bit stream, include the **bert-period**, **bert-algorithm**, and **bert-error-rate** statements, respectively, at the [edit interfaces *interface-name* *interface-type*-options] hierarchy level:

```
[edit interfaces interface-name interface-type-options]
bert-algorithm algorithm;
bert-error-rate rate;
bert-period seconds;
```

By default, the BERT period is 10 seconds. You can configure the BERT period to last from 1 through 239 seconds on some PICs and from 1 through 240 seconds on other PICs.

rate is the bit error rate. This can be an integer from 0 through 7, which corresponds to a bit error rate from 10^{-0} (1 error per bit) to 10^{-7} (1 error per 10 million bits).

algorithm is the pattern to send in the bit stream. For a list of supported algorithms, enter a ? after the **bert-algorithm** statement; for example:

```
[edit interfaces t1-0/0/0 t1-options]
user@host# set bert-algorithm ?
Possible completions:
pseudo-2e11-o152      Pattern is 2^11 - 1 (per 0.152 standard)
pseudo-2e15-o151      Pattern is 2^15 - 1 (per 0.152 standard)
pseudo-2e20-o151      Pattern is 2^20 - 1 (per 0.151 standard)
pseudo-2e20-o153      Pattern is 2^20 - 1 (per 0.153 standard)
...
```

For specific hierarchy information, see the individual interface types.



NOTE: The 4-port E1 PIC supports only the following algorithms:

pseudo-2e11-o152	Pattern is 2^11 - 1 (per 0.152 standard)
pseudo-2e15-o151	Pattern is 2^15 - 1 (per 0.151 standard)
pseudo-2e20-o151	Pattern is 2^20 - 1 (per 0.151 standard)
pseudo-2e23-o151	Pattern is 2^23 (per 0.151 standard)

When you issue the help command from the CLI, all BERT algorithm options are displayed, regardless of the PIC type, and no commit check is available. Unsupported patterns for a PIC type can be viewed in system log messages.



NOTE: The 12-port T1/E1 Circuit Emulation (CE) PIC supports only the following algorithms:

```
all-ones-repeating    Repeating one bits
all-zeros-repeating   Repeating zero bits
alternating-double-ones-zeros Alternating pairs of ones and zeros
alternating-ones-zeros Alternating ones and zeros
pseudo-2e11-o152     Pattern is 2^11 - 1 (per 0.152 standard)
pseudo-2e15-o151     Pattern is 2^15 - 1 (per 0.151 standard)
pseudo-2e20-o151     Pattern is 2^20 - 1 (per 0.151 standard)
pseudo-2e7           Pattern is 2^7 - 1
pseudo-2e9-o153      Pattern is 2^9 - 1 (per 0.153 standard)
repeating-1-in-4      1 bit in 4 is set
repeating-1-in-8      1 bit in 8 is set
repeating-3-in-24     3 bits in 24 are set
```

When you issue the help command from the CLI, all BERT algorithm options are displayed, regardless of the PIC type, and no commit check is available. Unsupported patterns for a PIC type can be viewed in system log messages.



NOTE: The IQE PICs support only the following algorithms:

```
all-ones-repeating    Repeating one bits
all-zeros-repeating   Repeating zero bits
alternating-double-ones-zeros Alternating pairs of ones and zeros
alternating-ones-zeros Alternating ones and zeros
pseudo-2e9-o153       Pattern is 2^9 - 1 (per 0.153 (511 type) standard)
pseudo-2e11-o152      Pattern is 2^11 - 1 (per 0.152 and 0.153 (2047 type)
standards)
pseudo-2e15-o151      Pattern is 2^15 - 1 (per 0.151 standard)
pseudo-2e20-o151      Pattern is 2^20 - 1 (per 0.151 standard)
pseudo-2e20-o153      Pattern is 2^20 - 1 (per 0.153 standard)
pseudo-2e23-o151      Pattern is 2^23 - 1 (per 0.151 standard)
repeating-1-in-4       1 bit in 4 is set
repeating-1-in-8       1 bit in 8 is set
repeating-3-in-24      3 bits in 24 are set
```

When you issue the help command from the CLI, all BERT algorithm options are displayed, regardless of the PIC type, and no commit check is available. Unsupported patterns for a PIC type can be viewed in system log messages.



NOTE: BERT is supported on the PDH interfaces of the Channelized SONET/SDH OC3/STM1 (Multi-Rate) MIC with SFP and the DS3/E3 MIC. The following BERT algorithms are supported:

all-ones-repeating	Repeating one bits
all-zeros-repeating	Repeating zero bits
alternating-double-ones-zeros	Alternating pairs of ones and zeros
alternating-ones-zeros	Alternating ones and zeros
repeating-1-in-4	1 bit in 4 is set
repeating-1-in-8	1 bit in 8 is set
repeating-3-in-24	3 bits in 24 are set
pseudo-2e9-o153	Pattern is $2^9 - 1$ (per 0.153 standard)
pseudo-2e11-o152	Pattern is $2^{11} - 1$ (per 0.152 standard)
pseudo-2e15-o151	Pattern is $2^{15} - 1$ (per 0.151 standard)
pseudo-2e20-o151	Pattern is $2^{20} - 1$ (per 0.151 standard)
pseudo-2e20-o153	Pattern is $2^{20} - 1$ (per 0.153 standard)
pseudo-2e23-o151	Pattern is $2^{23} - 1$ (per 0.151 standard)

Table 38 on page 250 shows the BERT capabilities for various interface types.

Table 38: BERT Capabilities by Interface Type

Interface	T1 BERT	T3 BERT	Comments
12-port T1/E1 Circuit Emulation	Yes (ports 0–11)		<ul style="list-style-type: none"> Limited algorithms
4-port Channelized OC3/STM1 Circuit Emulation	Yes (port 0–3)		<ul style="list-style-type: none"> Limited algorithms
E1 or T1	Yes (port 0–3)	Yes (port 0–3)	<ul style="list-style-type: none"> Single port at a time Limited algorithms
E3 or T3	Yes (port 0–3)	Yes (port 0–3)	<ul style="list-style-type: none"> Single port at a time
Channelized OC12	N/A	Yes (channel 0–11)	<ul style="list-style-type: none"> Single channel at a time Limited algorithms No bit count
Channelized STM1	Yes (channel 0–62)	N/A	<ul style="list-style-type: none"> Multiple channels Only one algorithm No error insert No bit count
Channelized T3 and Multichannel T3	Yes (channel 0–27)	Yes (port 0–3 on channel 0)	<ul style="list-style-type: none"> Multiple ports and channels Limited algorithms for T1 No error insert for T1 No bit count for T1

These limitations do not apply to channelized IQ interfaces. For information about BERT capabilities on channelized IQ interfaces, see *Channelized IQ and IQE Interfaces Properties*.

Starting and Stopping a BERT Test

Before you can start the BERT test, you must disable the interface. To do this, include the **disable** statement at the **[edit interfaces *interface-name*]** hierarchy level:

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

After you configure the BERT properties and commit the configuration, begin the test by issuing the **test interface *interface-name interface-type-bert-start*** operational mode command:

```
user@host> test interface interface-name interface-type-bert-start
```

The test runs for the duration you specify with the **bert-period** statement. If you wish to terminate the test sooner, issue the **test interface *interface-name interface-type-bert-stop*** command:

```
user@host> test interface interface-name interface-type-bert-stop
```

For example:

```
user@host> test interface t3-1/2/0 t3-bert-start
user@host> test interface t3-1/2/0 t3-bert-stop
```

To view the results of the BERT test, issue the **show interfaces extensive | find BERT** command:

```
user@host> show interfaces interface-name extensive | find BERT
```

For more information about running and evaluating the results of the BERT procedure, see the [CLI Explorer](#).



NOTE: To exchange BERT patterns between a local router and a remote router, include the **loopback remote** statement in the interface configuration at the remote end of the link. From the local router, issue the **test interface** command.

Example: Configuring Bit Error Rate Testing

Configure a BERT test on a T3 interface. In this example, the run duration lasts for 120 seconds. The configured error rate is 0, which corresponds to a bit error rate of 10^{-0} (1 error per bit). The configured bit pattern of **all-ones-repeating** means that every bit the interface sends is a set to a value of 1.

```
[edit interfaces]
t3-1/2/0 {
  t3-options {
    bert algorithm all-ones-repeating;
    bert-error-rate 0;
    bert-period 120;
```

```
}  
}
```

PART 5

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