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# Junos OS

## Interfaces Fundamentals for Routing Devices

Release  
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## Part 6

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# About This Guide

This preface provides the following guidelines for using the *Junos OS Interfaces Fundamentals for Routing Devices*:

- [Junos Documentation and Release Notes on page xxxi](#)
- [Objectives on page xxxii](#)
- [Audience on page xxxii](#)
- [Supported Routing Platforms on page xxxii](#)
- [Using the Indexes on page xxxiii](#)
- [Using the Examples in This Manual on page xxxiii](#)
- [Documentation Conventions on page xxxiv](#)
- [Documentation Feedback on page xxxvi](#)
- [Requesting Technical Support on page xxxvi](#)

## Junos Documentation and Release Notes

---

For a list of related Junos documentation, see <http://www.juniper.net/techpubs/software/junos/>.

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

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

Juniper Networks supports a technical book program to publish books by Juniper Networks engineers and subject matter experts with book publishers around the world. These books go beyond the technical documentation to explore the nuances of network architecture, deployment, and administration using the Junos operating system (Junos OS) and Juniper Networks devices. In addition, the Juniper Networks Technical Library, published in conjunction with O'Reilly Media, explores improving network security, reliability, and availability using Junos OS configuration techniques. All the books are for sale at technical bookstores and book outlets around the world. The current list can be viewed at <http://www.juniper.net/books>.

## Objectives

---

This guide provides an overview of the network interfaces features of the Junos OS and describes how to configure these properties on the routing platform.



**NOTE:** For additional information about the Junos OS—either corrections to or information that might have been omitted from this guide—see the software release notes at <http://www.juniper.net/>.

---

## Audience

---

This guide is designed for network administrators who are configuring and monitoring a Juniper Networks M Series, MX Series, T Series, EX Series, or J Series router or switch.

To use this guide, you need a broad understanding of networks in general, the Internet in particular, networking principles, and network configuration. You must also be familiar with one or more of the following Internet routing protocols:

- Border Gateway Protocol (BGP)
- Distance Vector Multicast Routing Protocol (DVMRP)
- Intermediate System-to-Intermediate System (IS-IS)
- Internet Control Message Protocol (ICMP) router discovery
- Internet Group Management Protocol (IGMP)
- Multiprotocol Label Switching (MPLS)
- Open Shortest Path First (OSPF)
- Protocol-Independent Multicast (PIM)
- Resource Reservation Protocol (RSVP)
- Routing Information Protocol (RIP)
- Simple Network Management Protocol (SNMP)

Personnel operating the equipment must be trained and competent; must not conduct themselves in a careless, willfully negligent, or hostile manner; and must abide by the instructions provided by the documentation.

## Supported Routing Platforms

---

For the features described in this manual, the Junos OS currently supports the following routing platforms:

- J Series
- M Series

- MX Series
- T Series

## Using the Indexes

---

This reference contains two indexes: a complete index that includes topic entries, and an index of statements and commands only.

In the index of statements and commands, an entry refers to a statement summary section only. In the complete index, the entry for a configuration statement or command contains at least two parts:

- The primary entry refers to the statement summary section.
- The secondary entry, *usage guidelines*, refers to the section in a configuration guidelines chapter that describes how to use the statement or command.

## 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 xxxv 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.                     |

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

Table 2: Text and Syntax Conventions

| Convention                   | Description  | Examples  |
|------------------------------|--|---|
| <b>Bold text like this</b>   | Represents text that you type.   | To enter configuration mode, type the <b>configure</b> command:<br><br><code>user@host&gt; configure</code>   |
| Fixed-width text like this   | Represents output that appears on the terminal screen.   | <code>user@host&gt; show chassis alarms</code><br><code>No alarms currently active</code>   |
| <i>Italic text like this</i> | <ul style="list-style-type: none"> <li>Introduces or emphasizes important new terms.</li> <li>Identifies book names.</li> <li>Identifies RFC and Internet draft titles.</li> </ul> | <ul style="list-style-type: none"> <li>A policy <i>term</i> is a named structure that defines match conditions and actions.</li> <li><i>Junos OS System Basics Configuration Guide</i></li> <li>RFC 1997, <i>BGP Communities Attribute</i></li> </ul> |
| <i>Italic text like this</i> | Represents variables (options for which you substitute a value) in commands or configuration statements.   | Configure the machine's domain name:<br><br>[edit]<br>root@# <b>set system domain-name</b> <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"> <li>To configure a stub area, include the <b>stub</b> statement at the [edit <b>protocols ospf area area-id</b>] hierarchy level.</li> <li>The console port is labeled <b>CONSOLE</b>.</li> </ul>                  |
| < > (angle brackets)         | Enclose optional keywords or variables.  | <code>stub &lt;default-metric metric&gt;;</code>  |

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

| Convention                     | Description  | Examples  |
|--------------------------------|--|---|
| (pipe symbol)                  | Indicates a choice between the mutually exclusive keywords or variables on either side of the symbol. The set of choices is often enclosed in parentheses for clarity. | <b>broadcast   multicast</b><br><br><i>(string1   string2   string3)</i>  |
| # (pound sign)                 | Indicates a comment specified on the same line as the configuration statement to which it applies.   | <b>rsvp { # Required for dynamic MPLS only</b>  |
| [ ] (square brackets)          | Enclose a variable for which you can substitute one or more values.  | <b>community name members [ community-ids ]</b>   |
| Indentation and braces ( { } ) | Identify a level in the configuration hierarchy.   | <b>[edit]</b><br>routing-options {<br>static {<br>route default {<br>nexthop <i>address</i> ;<br>retain;<br>}<br>}<br>}   |
| ;(semicolon)                   | Identifies a leaf statement at a configuration hierarchy level.  |   |
| <b>GUI Conventions</b>         |  |   |
| <b>Bold text like this</b>     | Represents graphical user interface (GUI) items you click or select.   | <ul style="list-style-type: none"> <li>In the Logical Interfaces box, select <b>All Interfaces</b>.</li> <li>To cancel the configuration, click <b>Cancel</b>.</li> </ul> |
| > (bold right angle bracket)   | Separates levels in a hierarchy of menu selections.  | In the configuration editor hierarchy, select <b>Protocols&gt;Ospf</b> .  |

## Documentation Feedback

We encourage you to provide feedback, comments, and suggestions so that we can improve the documentation. You can send your comments to [techpubs-comments@juniper.net](mailto:techpubs-comments@juniper.net), or fill out the documentation feedback form at <https://www.juniper.net/cgi-bin/docbugreport/>. If you are using e-mail, be sure to include the following information with your comments:

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

## Requesting Technical Support

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



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

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

## Self-Help Online Tools and Resources

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

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

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

## Opening a Case with JTAC

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

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

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



## PART 1

# Interfaces Fundamentals Configuration Statements Overview

- [Interfaces Fundamentals Configuration Statements and Hierarchy on page 3](#)



## CHAPTER 1

# Interfaces Fundamentals Configuration Statements and Hierarchy

The following interfaces hierarchy listings show the complete configuration statement hierarchy for the indicated hierarchy levels, listing all possible configuration statements within the indicated hierarchy levels, and showing their level in the configuration hierarchy. When you are configuring the Junos OS, your current hierarchy level is shown in the banner on the line preceding the **user@host#** prompt.

This section contains the following topics:

- [\[edit chassis\] Hierarchy Level on page 3](#)
- [\[edit interfaces\] Hierarchy Level on page 4](#)
- [\[edit logical-systems\] Hierarchy Level on page 21](#)

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

---

```
chassis {
  aggregated-devices {
    ethernet {
      device-count number;
    }
    sonet {
      device-count number;
    }
  }
  maximum-links {
  }
  channel-group number {
    ethernet {
      device-count number;
    }
    fpc slot-number {
      pic pic-number {
        adaptive-services {
          service-package (layer-2 | layer-3);
        }
        aggregate-ports;
        atm-cell-relay-accumulation;
        atm-l2circuit-mode (aal5 | cell | trunk trunk);
      }
    }
  }
}
```

```

ce1 {
  e1 link-number {
    channel-group group-number;
    timeslots time-slot-range;
  }
}
channelization;
ct1 {
  t1 link-number {
    channel-group group-number;
    timeslots time-slot-range;
  }
}
ct3 {
  port port-number {
    t1 link-number {
      channel-group group-number;
      timeslots time-slot-range;
    }
  }
  framing sdh;
}
max-queues-per-interface number;
mlfr-uni-nni-bundles num-intf;
no-concatenate;
shdsl {
  pic-mode (1-port-atm | 2-port-atm);
}
vtmapping (klm | itu-t);
}
}
fpc slot-number {
  pic pic-number {
    account-layer2-overhead
    egress-policer-overhead bytes;
    ingress-policer-overhead bytes;
  }
}
}
}

```

## [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 {
    account-layer2-overhead (Interface Level) {
      value;
      egress bytes;
      ingress bytes;
    }
    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;
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;
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);
                        }
                    }
                }
            }
        }
    }
}

```

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```
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-interopability 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;
optics-options {
    alarm low-light-alarm {
        (link-down | syslog);
    }
    tx-power dbm;
    warning low-light-warning {
        (link-down | syslog);
    }
    wavelength nm;
}
otn-options {
    bytes transmit-payload-type value;
    fec (efec | gfec | gfec-sdfec | none);
    (is-ma | no-is-ma);
    (laser-enable | no-laser-enable);
    (line-loopback | no-line-loopback);
    (local-loopback | no-local-loopback);
    (odu-ttim-action-enable | no-odu-ttim-action-enable);
    (otu-ttim-action-enable | no-otu-ttim-action-enable);
    odu-delay-management {
        (bypass | no-bypass);
        (monitor-end-point | no-monitor-end-point);
        (number-of-frames | no-number-of-frames);
        (start-measurement | no-start-measurement);
    }
    (prbs | no-prbs);
    preemptive-fast-reroute {
        (backward-frr-enable | no-backward-frr-enable);
        (signal-degrade-monitor-enable | no-signal-degrade-monitor-enable);
    }
    rate {
        (fixed-stuff-bytes | no-fixed-stuff-bytes);
        otu4;
        (pass-through | no-pass-through);
    }
    signal-degrade {
        ber-threshold-clear value;
        ber-threshold-signal-degrade value;
        interval value;
    }
    trigger trigger-identifier;
    tti tti-identifier;
}
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-vpi 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;
            }
        }
    }
}
account-layer2-overhead {
    value;
    egress bytes;
    ingress bytes;
}
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;
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);
    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-vs-a-ignore;
mtu bytes;
multicast-only;
negotiate-address;
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-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 | vrrp-inet6-group) group-number {
    (accept-data | no-accept-data);
    advertise-interval seconds;
    authentication-type authentication;
    authentication-key key;
    fast-interval milliseconds;
    (preempt | no-preempt) {
      hold-time seconds;
    }
    priority-number number;
    track {
      priority-cost seconds;
      priority-hold-time interface-name {
        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 {
    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;
(vrrp-group | vrrp-inet6-group) group-number {
  (accept-data | no-accept-data);
  advertise-interval seconds;
  authentication-type authentication;
  authentication-key key;
  fast-interval milliseconds;
  (preempt | no-preempt) {
    hold-time seconds;
  }
  priority-number number;
  track {
    priority-cost seconds;
    priority-hold-time interface-name {
      interface priority;
      bandwidth-threshold bits-per-second {
        priority;
      }
    }
  }
  route ip-address/mask routing-instance instance-name priority-cost cost;
}
}
virtual-address [ addresses ];
}
}
}
}
}
}

```

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



## PART 2

# Router Interfaces Configuration Concepts

- [Understanding Router Interfaces on page 29](#)
- [Configuring Physical Interface Properties on page 79](#)
- [Configuring Logical Interface Properties on page 173](#)
- [Configuring Protocol Family and Interface Address Properties on page 199](#)
- [Configuring Circuit and Translational Cross-Connects on page 253](#)
- [Tracing Interface Operations on page 271](#)



## CHAPTER 2

# Understanding Router Interfaces

- [Router Interfaces Overview on page 30](#)
- [Types of Interfaces Overview on page 30](#)
- [Permanent Interfaces Overview on page 31](#)
- [Understanding Management Ethernet Interfaces on page 31](#)
- [Supported Routing Engines by Chassis on page 33](#)
- [Understanding Internal Ethernet Interfaces on page 43](#)
- [Displaying Internal Ethernet Interfaces for a Routing Matrix with a TX Matrix Plus Router on page 45](#)
- [Understanding Transient Interfaces on page 47](#)
- [Understanding Services Interfaces on page 48](#)
- [Container Interfaces Overview on page 49](#)
- [Interface Encapsulations Overview on page 51](#)
- [Interface Descriptors Overview on page 62](#)
- [Interface Naming Overview on page 63](#)
- [Displaying Interface Configurations Overview on page 77](#)

## Router Interfaces Overview

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Routers typically contain several different types of interfaces suited to various functions. For the interfaces on a router to function, you must configure them, specifying properties such as the interface location (that is, the slot in which the Flexible PIC Concentrator [FPC] or Dense Port Concentrator [DPC] is installed, and the location where the Physical Interface Card [PIC] is installed), the interface type (such as SONET/SDH, Asynchronous Transfer Mode [ATM], or Ethernet), encapsulation, and interface-specific properties. You can configure the interfaces that are currently present in the router, and you can also configure interfaces that are not currently present but that you might add in the future. When a configured interface appears, the Junos OS detects its presence and applies the appropriate configuration to it.

To determine which interfaces are currently installed in the router, issue the **show interfaces terse** operational mode command. If an interface is listed in the output, it is installed in the router. If an interface is not listed in the output, it is not installed in the router.

For information about which PICs are supported on your router, see your router's PIC guide.

You can configure Junos class-of-service (CoS) properties to provide a variety of classes of service for different applications, including multiple forwarding classes for managing packet transmission, congestion management, and CoS-based forwarding. For more information about configuring CoS properties, see the *Junos OS Class of Service Library for Routing Devices*.

**Related Documentation**

- *Router Interfaces*

## Types of Interfaces Overview

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Interfaces can be permanent or transient, and are used for networking or services:

- Permanent interfaces—Interfaces that are always present in the router.
- Transient interfaces—Interfaces that can be inserted into or removed from the router depending on your network configuration needs.
- Networking interfaces—Interfaces, such as Ethernet or SONET/SDH interfaces, that primarily provide traffic connectivity.
- Services interfaces—Interfaces that provide specific capabilities for manipulating traffic before it is delivered to its destination.
- Container interfaces—Interfaces that support automatic protection switching (APS) on physical SONET links using a virtual container infrastructure.

The Junos OS internally generates nonconfigurable interfaces which are described in *Interfaces Command Reference* and *Services Interfaces*.



- Related Documentation**
- [Permanent Interfaces Overview on page 31](#)
  - [Understanding Transient Interfaces on page 47](#)
  - [Understanding Services Interfaces on page 48](#) and *Junos OS Services Interfaces Library for Routing Devices*
  - [Container Interfaces Overview on page 49](#)
  - See also the following sections regarding specific networking interface technologies used in your routers:
    - *ATM Interfaces Overview*
    - *Channelized Interfaces Overview*
    - *Circuit Emulation Interfaces: Mobile Backhaul and Circuit Emulation Overview*
    - *E1 Interfaces Overview* and *E3 Interfaces Overview*
    - *Ethernet Interfaces Overview*
    - *Frame Relay Overview*
    - *ISDN Interfaces Overview*
    - *SONET/SDH Interfaces Overview*
    - *T1 Interfaces Overview* and *T3 Interfaces Overview*

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## Permanent Interfaces Overview

Permanent interfaces in the router consist of management Ethernet interfaces and internal Ethernet interfaces, which are described separately in the following topics:

- [Understanding Management Ethernet Interfaces on page 31](#)
- [Understanding Internal Ethernet Interfaces on page 43](#)

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## Understanding Management Ethernet Interfaces

The management Ethernet interface provides an out-of-band method for connecting to the router using utilities such as ssh and telnet to monitor or configure the router, or the Simple Network Management Protocol (SNMP) to gather statistics from the router. The Junos OS automatically configures the router's management Ethernet interface, as either **em0** or **fxp0**, and the internal Ethernet interface, **em1** or **fxp1**, which connects the Routing Engine with the router's packet-forwarding components.

You can use the **show chassis hardware** command to display hardware information about the router, including its Routing Engine model. The specific Routing Engine model installed in the routers determines which of the two management Ethernet interface types is supported, **em0** or **fxp0**. To determine which management interface type is supported on a router, locate the router and Routing Engine combination in "[Supported Routing Engines by Chassis](#)" on page 33 and note its management Ethernet interface type, either **em0** or **fxp0**.

To use a type **em0** management Ethernet interface as a management port, you must configure its logical port, **em0.0**, with a valid IP address.

To use a type **fxp0** management Ethernet interface as a management port, you must configure its logical port, **fxp0.0**, with a valid IP address.

For the J Series Services Routers, you can use any of the built-in Ethernet ports as a management interface. To use a built-in interface as a management Ethernet interface, configure it with a valid IP address. The factory configuration for the J4350 and J6350 Services Routers automatically enables the J-Web user interface on the **ge-0/0/0**, **ge-0/0/1**, **ge-0/0/2**, and **ge-0/0/3** interfaces. To manually configure J-Web access, include the **interface interface-name** statement at the **[edit system services web-management http]** hierarchy level.



**NOTE: Routing Engine upgrade considerations**—When upgrading to a Routing Engine that supports **em0** from a Routing Engine that supports **fxp0**, you must convert existing management Ethernet interface references in the router configuration files from **fxp0**, **fxp1**, or **fxp2** interfaces to **em0** interfaces. Whether you use an automated script or edit the configuration files manually, you must revise any command lines that reference the **fxp0** management Ethernet interface by replacing “**fxp0**” with “**em0**.”



**NOTE: Reusing scripts for standalone T1600 routers on T1600 routers in a routing matrix**—Automated scripts that you have developed for standalone T1600 routers (T1600 routers that are not in a routing matrix) might contain references to the **fxp0** management Ethernet interface. Before reusing the scripts on T1600 routers in a routing matrix, edit the command lines that reference the **fxp0** management Ethernet interface so that the commands reference the **em0** management Ethernet interface instead.



**NOTE: Restricted load-sharing next hops with fxp0**—On M Series routers and T Series routers running Junos OS later than Release 7.0R2.7 or Release 7.1R2.2, the **fxp0** interface does not support load-sharing next hops. This restriction only affects **fxp0** routes.



**NOTE: CoS not supported on fxp0**—The **fxp0** interface does not support CoS.

For information about configuring the speed of management Ethernet interfaces on M Series and T Series routers, see [“Configuring the Speed of Management Ethernet Interfaces on M Series and T Series Routers” on page 148](#)

For information about establishing basic connectivity and configuring a management port, see the *Getting Started* guide for your router.

#### Related Documentation

- [PTX Series Packet Transport Router Management Ethernet Interfaces](#)
- [Supported Routing Engines by Chassis on page 33](#)
- [Types of Interfaces Overview on page 30](#)
- [Permanent Interfaces Overview on page 31](#)
- [Understanding Internal Ethernet Interfaces on page 43](#)
- [Understanding Transient Interfaces on page 47](#)
- [Understanding Services Interfaces on page 48](#)
- [Container Interfaces Overview on page 49](#)
- [Interface Encapsulations Overview on page 51](#)
- [Interface Descriptors Overview on page 62](#)
- [Interface Naming Overview on page 63](#)
- [Displaying Interface Configurations Overview on page 77](#)

## Supported Routing Engines by Chassis

The following tables list the Routing Engines that each chassis supports, the first supported release for the Routing Engine in the specified chassis, the management Ethernet interface, and the internal Ethernet interfaces for each Routing Engine.

- [M Series Supported Routing Engines on page 33](#)
- [MX Series Supported Routing Engines on page 35](#)
- [PTX Series Supported Routing Engines on page 38](#)
- [T Series Supported Routing Engines on page 39](#)

### M Series Supported Routing Engines

Table 3 on page 33 lists the Routing Engines supported by M Series routers.

**Table 3: Supported Routing Engines by M Series Chassis**

| Chassis                                       | Supported Routing Engines Model Number | Name in CLI Output | First Supported Junos OS Release | Supported Management Ethernet Interface | Supported Internal Ethernet Interface |
|---|--|--------------------|----------------------------------|---|---------------------------------------|
| M7I   | RE-400-768                             | <b>RE-5.0</b>      | 9.0                              | fxp0                                    | fxp1                                  |
| The M7I router supports 32-bit Junos OS only. | RE-850-1536                            | <b>RE-850</b>      | 7.2                              | fxp0                                    | fxp1                                  |
|   | RE-B-1800X1-4G                         | <b>RE-B-1800x1</b> | 11.4R4                           | fxp0                                    | em0                                   |
|   |  |                    | 12.1R2                           |   |                                       |

Table 3: Supported Routing Engines by M Series Chassis (*continued*)

| Chassis  | Supported Routing Engines Model Number                      | Name in CLI Output               | First Supported Junos OS Release  | Supported Management Ethernet Interface | Supported Internal Ethernet Interface |
|--|---|----------------------------------|---|---|---------------------------------------|
| M10i<br><br>The M10i router supports 32-bit Junos OS only. | RE-400-768  | <b>RE-5.0</b>                    | 9.0   | fxp0                                    | fxp1<br><br>fxp2                      |
|  | RE-850-1536   | <b>RE-850</b>                    | 7.2   | fxp0                                    | fxp1<br><br>fxp2                      |
|  | RE-B-1800X1-4G  | <b>RE-B-1800x1</b>               | 11.4R4<br><br>12.1R2  | fxp0                                    | em0                                   |
| M40e   | RE-600-2048 (EOL details: <a href="#">PSN-2008-02-018</a> ) | <b>RE-3.0 or RE-3.0 (RE-600)</b> | 5.3   | fxp0                                    | fxp1<br><br>fxp2                      |
|  | RE-A-1000-2048  | <b>RE-A-1000</b>                 | 8.1   | fxp0                                    | fxp1<br><br>fxp2                      |
| M120   | RE-A-1000-2048  | <b>RE-A-1000</b>                 | 8.0R2   | fxp0                                    | fxp1<br><br>fxp2                      |
|  | RE-A-2000-4096  | <b>RE-A-2000</b>                 | 8.0R2   | fxp0                                    | em0<br><br>bcm0                       |
|  | RE-A-1800x2-8G  | <b>RE-A-1800x2</b>               | 32-bit Junos OS:<br><ul style="list-style-type: none"><li>• 11.4R5</li><li>• 12.1R3</li><li>• 12.2</li></ul> 64-bit Junos OS:<br>10.4 | fxp0                                    | fxp1<br><br>fxp2                      |
|  | RE-A-1800x2-16G   | <b>RE-A-1800x2</b>               | 32-bit Junos OS:<br><ul style="list-style-type: none"><li>• 11.4R5</li><li>• 12.1R3</li><li>• 12.2</li></ul> 64-bit Junos OS:<br>10.4 | fxp0                                    | fxp1<br><br>fxp2                      |

Table 3: Supported Routing Engines by M Series Chassis (*continued*)

| Chassis | Supported Routing Engines Model Number                       | Name in CLI Output | First Supported Junos OS Release  | Supported Management Ethernet Interface | Supported Internal Ethernet Interface |
|---------|--|--------------------|---|---|---------------------------------------|
| M320    | RE-1600-2048 (EOL details: <a href="#">PSN-2008-02-019</a> ) | RE-4.0             | 6.2   | fxp0                                    | fxp1<br>fxp2                          |
|         | RE-A-2000-4096   | RE-A-2000          | 8.1   | fxp0                                    | em0<br>bcm0                           |
|         | RE-A-1800x2-8G   | RE-A-1800x2        | 32-bit Junos OS:<br><ul style="list-style-type: none"> <li>11.4R5</li> <li>12.1R3</li> <li>12.2</li> </ul> 64-bit Junos OS:<br>10.4 | fxp0                                    | em0<br>bcm0                           |
|         | RE-A-1800x2-16G  | RE-A-1800x2        | 32-bit Junos OS:<br><ul style="list-style-type: none"> <li>11.4R5</li> <li>12.1R3</li> <li>12.2</li> </ul> 64-bit Junos OS:<br>10.4 | fxp0                                    | em0<br>bcm0                           |
|         | RE-A-1800x4-8G   | RE-A-1800x4        | 32-bit Junos OS:<br><ul style="list-style-type: none"> <li>11.4R5</li> <li>12.1R3</li> <li>12.2</li> </ul> 64-bit Junos OS:<br>10.4 | fxp0                                    | em0<br>em1                            |
|         | RE-A-1800x4-16G  | RE-A-1800x4        | 32-bit Junos OS:<br><ul style="list-style-type: none"> <li>11.4R5</li> <li>12.1R3</li> <li>12.2</li> </ul> 64-bit Junos OS:<br>10.4 | fxp0                                    | em0<br>em1                            |

## MX Series Supported Routing Engines

Table 4 on page 36 lists the Routing Engines supported by MX Series routers.

Table 4: Supported Routing Engines by MX Series Chassis

| Chassis | Supported Routing Engines Model Number | Name in CLI Output | First Supported Junos OS Release   | Supported Management Ethernet Interface | Supported Internal Ethernet Interface |
|---------|--|--------------------|--|---|---------------------------------------|
| MX240   | RE-S-1300-2048                         | RE-S-1300          | 9.0  | fxp0                                    | fxp1<br>fxp2                          |
|         | RE-S-2000-4096                         | RE-S-2000          | 9.0  | fxp0                                    | fxp1<br>fxp2                          |
|         | RE-S-1800x2-8G                         | RE-S-1800x2        | 32-bit Junos OS:<br>12.1R2<br><br>64-bit Junos OS:<br>10.4                             | fxp0                                    | em0<br>em1                            |
|         | RE-S-1800x2-16G                        | RE-S-1800X2        | 32-bit Junos OS:<br>12.1R2<br><br>64-bit Junos OS:<br>10.4                             | fxp0                                    | em0<br>em1                            |
|         | RE-S-1800x4-8G                         | RE-S-1800X4        | 32-bit Junos OS:<br><br>• 11.4R5<br>• 12.1R3<br>• 12.2<br><br>64-bit Junos OS:<br>10.4 | fxp0                                    | em0<br>em1                            |
|         | RE-S-1800x4-16G                        | RE-S-1800x4        | 32-bit Junos OS:<br><br>• 11.4R5<br>• 12.1R3<br>• 12.2<br><br>64-bit Junos OS:<br>10.4 | fxp0                                    | em0<br>em1                            |
|         | RE-S-1800x4-32G                        | RE-S-1800X4        | 32-bit and 64-bit Junos OS:<br><br>• 12.3R4<br>• 13.2R1                                | fxp0                                    | em0,<br>em1                           |

Table 4: Supported Routing Engines by MX Series Chassis (*continued*)

| Chassis | Supported Routing Engines Model Number | Name in CLI Output | First Supported Junos OS Release   | Supported Management Ethernet Interface | Supported Internal Ethernet Interface |
|---------|--|--------------------|--|---|---------------------------------------|
| MX480   | RE-S-1300-2048                         | RE-S-1300          | 8.4  | fxp0                                    | fxp1<br>fxp2                          |
|         | RE-S-2000-4096                         | RE-S-2000          | 8.4  | fxp0                                    | fxp1<br>fxp2                          |
|         | RE-S-1800x2-8G                         | RE-S-1800x2        | 32-bit Junos OS:<br>12.1R2<br><br>64-bit Junos OS:<br>10.4                             | fxp0                                    | em0<br>em1                            |
|         | RE-S-1800x2-16G                        | RE-S-1800X2        | 32-bit Junos OS:<br>12.1R2<br><br>64-bit Junos OS:<br>10.4                             | fxp0                                    | em0<br>em1                            |
|         | RE-S-1800x4-8G                         | RE-S-1800X4        | 32-bit Junos OS:<br><br>• 11.4R5<br>• 12.1R3<br>• 12.2<br><br>64-bit Junos OS:<br>10.4 | fxp0                                    | em0<br>em1                            |
|         | RE-S-1800x4-16G                        | RE-S-1800x4        | 32-bit Junos OS:<br><br>• 11.4R5<br>• 12.1R3<br>• 12.2<br><br>64-bit Junos OS:<br>10.4 | fxp0                                    | em0<br>em1                            |
|         | RE-S-1800x4-32G                        | RE-S-1800X4        | 32-bit and 64-bit Junos OS:<br><br>• 12.3R4<br>• 13.2R1                                | fxp0                                    | em0,<br>em1                           |
|         |  |                    |  |   |                                       |

Table 4: Supported Routing Engines by MX Series Chassis (*continued*)

| Chassis | Supported Routing Engines Model Number | Name in CLI Output | First Supported Junos OS Release  | Supported Management Ethernet Interface | Supported Internal Ethernet Interface |
|---------|--|--------------------|---|---|---------------------------------------|
| MX960   | RE-S-1300-2048                         | RE-S-1300          | 8.2   | fxp0                                    | fxp1<br>fxp2                          |
|         | RE-S-2000-4096                         | RE-S-2000          | 8.2   | fxp0                                    | fxp1<br>fxp2                          |
|         | RE-S-1800x2-8G                         | RE-S-1800x2        | 32-bit Junos OS: 12.1R2<br>64-bit Junos OS: 10.4  | fxp0                                    | em0<br>em1                            |
|         | RE-S-1800x2-16G                        | RE-S-1800X2        | 32-bit Junos OS: 12.1R2<br>64-bit Junos OS: 10.4  | fxp0                                    | em0<br>em1                            |
|         | RE-S-1800x4-8G                         | RE-S-1800X4        | 32-bit Junos OS: 12.1R2<br>64-bit Junos OS: 10.4  | fxp0                                    | em0<br>em1                            |
|         | RE-S-1800x4-16G                        | RE-S-1800x4        | 32-bit Junos OS: 12.1R2<br>64-bit Junos OS: 10.4  | fxp0                                    | em0<br>em1                            |
|         | RE-S-1800x4-32G                        | RE-S-1800X4        | 32-bit and 64-bit Junos OS:<br><ul style="list-style-type: none"> <li>12.3R4</li> <li>13.2R1</li> </ul> | fxp0                                    | em0,<br>em1                           |
|         |  |                    |   |   |                                       |
| MX2010  | MX2000-RE-1800x4                       | RE-S-1800x4        | 64-bit Junos OS: 12.3R2   | fxp0                                    | em0<br>em1                            |
| MX2020  | MX2000-RE-1800x4                       | RE-S-1800x4        | 64-bit Junos OS: 12.3R2   | fxp0                                    | em0<br>em1                            |

## PTX Series Supported Routing Engines

Table 5 on page 39 lists the Routing Engines supported by PTX Series Packet Transport Routers.



Table 5: Supported Routing Engines by PTX Series Chassis

| Chassis | Supported Routing Engines Model Number | Name in CLI Output | First Supported Junos OS Release | Supported Management Ethernet Interface | Supported Internal Ethernet Interface |
|---------|--|--------------------|----------------------------------|---|---------------------------------------|
| PTX5000 | RE-DUO-C2600-16G                       | <b>RE-DUO-2600</b> | 64-bit Junos OS: 12.1x48         | em0                                     | ixgbe0<br>ixgbe1                      |

**NOTE:** The PTX5000 Packet Transport Router supports 64-bit Junos OS only.

## T Series Supported Routing Engines

Table 6 on page 39 lists the Routing Engines supported by T Series routers.

Table 6: Supported Routing Engines by T Series Chassis

| Chassis | Supported Routing Engines Model Number                       | Name in CLI Output                      | First Supported Junos OS Release | Supported Management Ethernet Interface | Supported Internal Ethernet Interface |
|---------|--|---|----------------------------------|---|---------------------------------------|
| T320    | RE-600-2048 (EOL details: <a href="#">PSN-2008-02-018</a> )  | <b>RE-3.0</b> or <b>RE-3.0 (RE-600)</b> | 5.3                              | fxp0                                    | fxp1<br>fxp2                          |
|         | RE-1600-2048 (EOL details: <a href="#">PSN-2008-02-019</a> ) | <b>RE-4.0</b>                           | 6.2                              | fxp0                                    | fxp1<br>fxp2                          |
|         | RE-A-2000-4096   | <b>RE-A-2000</b>                        | 8.1                              | fxp0                                    | fxp1<br>fxp2                          |

Table 6: Supported Routing Engines by T Series Chassis (*continued*)

| Chassis | Supported Routing Engines Model Number                       | Name in CLI Output        | First Supported Junos OS Release   | Supported Management Ethernet Interface | Supported Internal Ethernet Interface |
|---------|--|---------------------------|--|---|---------------------------------------|
| T640    | RE-600-2048 (EOL details: <a href="#">PSN-2008-02-018</a> )  | RE-3.0 or RE-3.0 (RE-600) | 5.3  | fxp0                                    | fxp1<br>fxp2                          |
|         | RE-1600-2048 (EOL details: <a href="#">PSN-2008-02-019</a> ) | RE-4.0                    | 6.2  | fxp0                                    | fxp1<br>fxp2                          |
|         | RE-A-2000-4096   | RE-A-2000                 | 8.1  | fxp0                                    | em0<br>bcm0                           |
|         | RE-DUO-C1800-8G  | RE-DUO-1800               | 32-bit Junos OS on a standalone T640 router: 11.2<br><br>64-bit Junos OS on a standalone T640 router: 11.3     | em0                                     | bcm0<br>em1                           |
|         | RE-DUO-C1800-16G   | RE-DUO-1800               | 32-bit Junos OS on a standalone T640 router: 11.4R2<br><br>64-bit Junos OS on a standalone T640 router: 11.4R2 | em0                                     | bcm0<br>em1                           |

Table 6: Supported Routing Engines by T Series Chassis (*continued*)

| Chassis   | Supported Routing Engines Model Number                       | Name in CLI Output        | First Supported Junos OS Release  | Supported Management Ethernet Interface | Supported Internal Ethernet Interface |
|---|--|---------------------------|---|---|---------------------------------------|
| T1600<br><br><b>NOTE:</b> (Two RE-DUO-C1800-8G or two RE-DUO-C1800-16G are required to connect to a Routing Matrix) | RE-600-2048 (EOL details: <a href="#">PSN-2008-02-018</a> )  | RE-3.0 or RE-3.0 (RE-600) | 8.5   | fxp0                                    | fxp1<br>fxp2                          |
|   | RE-1600-2048 (EOL details: <a href="#">PSN-2008-02-019</a> ) | RE-4.0 (RE-1600)          | 8.5   | fxp0                                    | fxp1<br>fxp2                          |
|   | RE-A-2000-4096   | RE-A-2000                 | 8.5   | fxp0                                    | em0<br>bcm0                           |
|   | RE-DUO-C1800-8G  | RE-TXP-LCC or RE-DUO-1800 | 32-bit Junos OS on a T1600 router in a routing matrix: 9.6<br><br>32-bit Junos OS on a standalone T1600 router: 11.1<br><br>64-bit Junos OS on a T1600 router in a routing matrix: 9.6<br><br>64-bit Junos OS on a standalone T1600 router: 11.1<br><br><b>NOTE:</b> Junos OS Releases 9.6 through 10.4 support RE-DUO-C1800-8G only during upgrade to a line-card chassis (LCC) in a routing matrix. | em0                                     | bcm0<br>em1                           |
|   | RE-DUO-C1800-16G   | RE-DUO-1800               | 32-bit Junos OS on a standalone T1600 router: 11.4R2<br><br>64-bit Junos OS on a standalone T1600 router: 11.4R2<br><br>32-bit Junos OS on a T1600 router in a routing matrix: 11.4R2<br><br>64-bit Junos OS on a T1600 router in a routing matrix: 11.4R2  | em0                                     | bcm0<br>em1                           |

Table 6: Supported Routing Engines by T Series Chassis (*continued*)

| Chassis   | Supported Routing Engines Model Number                       | Name in CLI Output        | First Supported Junos OS Release                     | Supported Management Ethernet Interface | Supported Internal Ethernet Interface |
|---|--|---------------------------|--|---|---------------------------------------|
| T4000<br><br><i>NOTE:</i> The T4000 router supports 64-bit Junos OS only. | RE-DUO-C1800-8G  | RE-DUO-1800               | 64-bit Junos OS on a standalone T4000 router: 12.1   | em0                                     | bcm0<br>em1                           |
|   | RE-DUO-C1800-16G   | RE-DUO-1800               | 64-bit Junos OS on a standalone T4000 router: 12.1R2 | em0                                     | bcm0<br>em1                           |
| TX Matrix   | RE-600-2048 (EOL details: <a href="#">PSN-2008-02-018</a> )  | RE-3.0 or RE-3.0 (RE-600) | 7.0  | fxp0                                    | fxp1<br>fxp2                          |
|   | RE-1600-2048 (EOL details: <a href="#">PSN-2008-02-019</a> ) | RE-4.0 (RE-1600)          | 7.0  | fxp0                                    | fxp1<br>fxp2                          |
|   | RE-A-2000-4096   | RE-A-2000                 | 8.5  | fxp0                                    | em0<br>bcm0                           |
| TX Matrix Plus  | RE-DUO-C2600-16G   | RE-TXP-SFC or             | 32-bit Junos OS: 9.6                                 | em0                                     | ixgbe0                                |
|   |  | RE-DUO-2600               | 64-bit Junos OS: 11.4                                |   | ixgbe1                                |

**Related Documentation**

- *Routing Engine Specifications*
- [Understanding Internal Ethernet Interfaces on page 43](#)
- [Understanding Management Ethernet Interfaces on page 31](#)

## Understanding Internal Ethernet Interfaces

Within a router or packet transport router, internal Ethernet interfaces provide communication between the Routing Engine and the Packet Forwarding Engines. The Junos OS automatically configures internal Ethernet interfaces when the Junos OS boots. The Junos OS boots the packet-forwarding component hardware. When these components are running, the Control Board uses the internal Ethernet interface to transmit hardware status information to the Routing Engine. Information transmitted includes the internal router temperature, the condition of the fans, whether an FPC has been removed or inserted, and information from the LCD on the craft interface.

To determine the supported internal Ethernet interfaces for your router, see [“Supported Routing Engines by Chassis” on page 33](#).



**NOTE:** Do not modify or remove the configuration for the internal Ethernet interface that the Junos OS automatically configures. If you do, the router or packet transport router will stop functioning.

- J Series, M Series, and MX Series routers and T Series routers—The Junos OS creates the internal Ethernet interface. The internal Ethernet interface connects the Routing Engine **re0** to the Packet Forwarding Engines.

If the router has redundant Routing Engines, another internal Ethernet interface is created on each Routing Engine (**re0** and **re1**) in order to support fault tolerance, two physical links between **re0** and **re1** connect the independent control planes. If one of the links fails, both Routing Engines can use the other link for IP communication.

- TX Matrix Plus routers—On a TX Matrix Plus router, the Routing Engine and Control Board function as a unit, or host subsystem. For each host subsystem in the router, the Junos OS automatically creates two internal Ethernet interfaces, **ixgbe0** and **ixgbe1**.

The **ixgbe0** and **ixgbe1** interfaces connect the TX Matrix Plus Routing Engine to the Routing Engines of every line-card chassis (LCC) configured in the routing matrix.

The TX Matrix Plus Routing Engine connects to a high-speed switch through a 10-Gbps link within the host subsystem. The switch provides a 1-Gbps link to each T1600 Routing Engine. The 1-Gbps links are provided through the UTP Category 5 Ethernet cable connections between the TXP-CBs and the LCC-CBs in the LCCs.

- The TX Matrix Plus Routing Engine connects to a high-speed switch in the local Control Board through a 10-Gbps link within the host subsystem.
- The Gigabit Ethernet switch connects the Control Board to the remote Routing Engines of every LCC configured in the routing matrix.

If a TX Matrix Plus router contains redundant host subsystems, the independent control planes are connected by two physical links between the two 10-Gigabit Ethernet ports on their respective Routing Engines.

- The primary link to the remote Routing Engine is at the **ixgbe0** interface; the 10-Gigabit Ethernet switch on the local Control Board also connects the Routing Engine to the 10-Gigabit Ethernet port accessed by the **ixgbe1** interface on the remote Routing Engine.
- The alternate link to the remote Routing Engine is the 10-Gigabit Ethernet port at the **ixgbe1** interface. This second port connects the Routing Engine to the 10-Gigabit Ethernet switch on the remote Control Board, which connects to the 10-Gigabit Ethernet port at the **ixgbe0** interface on the remote Routing Engine.

If one of the two links between the host subsystems fails, both Routing Engines can use the other link for IP communication.

- LCC in a routing matrix—On an LCC configured in a routing matrix, the Routing Engine and Control Board function as a unit, or host subsystem. For each host subsystem in the LCC, the Junos OS automatically creates two internal Ethernet interfaces, **bcm0** and **em1**, for the two Gigabit Ethernet ports on the Routing Engine.

The **bcm0** interface connects the Routing Engine in each LCC to the Routing Engines of every other LCC configured in the routing matrix.

- The Routing Engine connects to a Gigabit Ethernet switch on the local Control Board through a.
- The switch connects the Control Board to the remote Routing Engines of every other LCC configured in the routing matrix.

If an LCC in a routing matrix contains redundant host subsystems, the independent control planes are connected by two physical links between the Gigabit Ethernet ports on their respective Routing Engines.

- The primary link to the remote Routing Engine is at the **bcm0** interface; the Gigabit Ethernet switch on the local Control Board also connects the Routing Engine to the Gigabit Ethernet port accessed by the **em1** interface on the remote Routing Engine.
- The alternate link to the remote Routing Engine is at the **em1** interface. This second port connects the Routing Engine to the Gigabit Ethernet switch on the remote Control Board, which connects to the Gigabit Ethernet port at the **bcm0** interface on the remote Routing Engine.

If one of the two links between the host subsystems fails, both Routing Engines can use the other link for IP communication.

Each router also has two serial ports, labeled *console* and *auxiliary*, for connecting tty type terminals to the router using standard PC-type tty cables. Although these ports are not network interfaces, they do provide access to the router.

**Related  
Documentation**

- [Permanent Interfaces Overview on page 31](#)
- [Supported Routing Engines by Chassis on page 33](#)

- *TX Matrix Plus and T1600 Router (Routing Matrix) Management Ethernet Interfaces*
- *T1600 Routers (Routing Matrix) Internal Ethernet Interfaces*
- [Displaying Internal Ethernet Interfaces for a Routing Matrix with a TX Matrix Plus Router on page 45](#)
- *show interfaces (M Series and T Series Routers, and PTX Series Packet Transport Routers Management and Internal Ethernet)*

## Displaying Internal Ethernet Interfaces for a Routing Matrix with a TX Matrix Plus Router

The router internal Ethernet interface connects the Routing Engine with the router's packet forwarding components. The Junos OS automatically configures internal Ethernet interfaces. For TX Matrix Plus routers, the internal Ethernet interfaces are **ixgbe0** and **ixgbe1**. For T1600 routers configured in a routing matrix, the internal Ethernet interfaces are **bcm0** and **em1**. For more information about internal Ethernet interfaces, see [“Understanding Internal Ethernet Interfaces” on page 43](#).



**NOTE:** Do not modify or remove the configuration for the internal Ethernet interface that the Junos OS automatically configures. If you do, the router will stop functioning.

The following example is a sequence of **show interfaces** commands issued in a Junos OS command-line interface (CLI) session with a TX Matrix Plus router in a routing matrix. In the example, the TX Matrix Plus router, which is also called the switch-fabric chassis (SFC), is known by the IP host name **host-sfc-0** and contains redundant Routing Engines. The commands display information about the management Ethernet interface and both internal Ethernet interfaces configured on the Routing Engine to which you are currently logged in:

```
user@host-sfc-0> show interfaces em0 terse
Interface      Admin Link Proto  Local          Remote
em0            up    up
em0.0          up    up   inet   192.168.35.95/24
```

```
user@host-sfc-0> show interfaces ixgbe0 terse
Interface      Admin Link Proto  Local          Remote
ixgbe0         up    up
ixgbe0.0       up    up   inet   10.34.0.4/8
                                162.0.0.4/2
                                inet6   fe80::200:ff:fe22:4/64
                                fec0::a:22:0:4/64
                                tnp     0x22000004
```

```
user@host-sfc-0> show interfaces ixgbe1 terse
Interface      Admin Link Proto  Local          Remote
ixgbe1         up    up
ixgbe1.0       up    up   inet   10.34.0.4/8
                                162.0.0.4/2
                                inet6   fe80::200:1ff:fe22:4/64
                                fec0::a:22:0:4/64
```

tnp 0x22000004

The following example is a sequence of **show interfaces** commands issued in a CLI session with a T1600 router in a routing matrix. In the example, the T1600 router, which is also called the line-card chassis (LCC), is known by the IP host name **host-sfc-0-lcc-2** and contains redundant Routing Engines.

This T1600 router is connected to the routing matrix through a connection in the TXP-SIB-F13 in slot 2 of the SCC. The commands display information about the management Ethernet interface and both internal Ethernet interfaces configured on the Routing Engine to which you are currently logged in:



**NOTE:** In a routing matrix, the **show interfaces** command displays information about the current router only. If you are logged in to the TX Matrix Plus router, the **show interfaces** command output does not include information about any of the attached T1600 routers. To display interface information about a specific T1600 router in the routing matrix, you must first log in to that router.

The previous example shows a CLI session with the TX Matrix Plus router. To display interface information about the T1600 router known as **host-sfc-0-lcc-2**, first use the **request routing-engine login** command to log in to that LCC.

```
user@host-sfc-0> request routing-engine login lcc 2
--- JUNOS 9.6I built 2009-06-22 18:13:04 UTC
% cli
warning: This chassis is a Line Card Chassis (LCC) in a multichassis system.
warning: Use of interactive commands should be limited to debugging.
warning: Normal CLI access is provided by the Switch Fabric Chassis (SFC).
warning: Please logout and log into the SFC to use CLI.
```

```
user@host-sfc-0-lcc-2> show interfaces em0 terse
Interface      Admin Link Proto  Local          Remote
em0            up    up
em0.0          up    up   inet    192.168.35.117/24
```

```
user@host-sfc-0-lcc-2> show interfaces bcm0 terse
Interface      Admin Link Proto  Local          Remote
bcm0           up    up
bcm0.0         up    up   inet    10.1.0.5/8
                                   129.0.0.5/2
                                   inet6   fe80::201:ff:fe01:5/64
                                   fec0::a:1:0:5/64
                                   tnp     0x1000005
```

```
user@host-sfc-0-lcc-2> show interfaces em1 terse
Interface      Admin Link Proto  Local          Remote
em1            up    up
em1.0          up    up   inet    10.1.0.5/8
                                   129.0.0.5/2
                                   inet6   fe80::201:1ff:fe01:5/64
                                   fec0::a:1:0:5/64
```



tnp 0x1000005

**Related Documentation** • [Understanding Internal Ethernet Interfaces on page 43](#)

## Understanding Transient Interfaces

The M Series, MX Series, and T Series routers contain slots for installing FPCs. PICs can be installed in FPCs. The number of PICs that can be installed varies by router and type of FPC. The PICs provide the actual physical interfaces to the network. The MX Series routers contain slots for installing either DPC boards that provide the physical interfaces to the network or for installing FPCs in which PICs can be installed. These physical interfaces are transient interfaces of the router. They are referred to as transient because you can hot-swap a DPC or FPC and its PICs at any time.

You can insert any DPC or FPC into any slot that supports them in the appropriate router. Typically, you can place any combination of PICs, compatible with your router, in any location on an FPC. (You are limited by the total FPC bandwidth, and by the fact that some PICs physically require two or four of the PIC locations on the FPC. In some cases, power limitations or microcode limitations may also apply.) To determine DPC and PIC compatibility, see the *Hardware Guide*, *DPC Guide*, and *PIC Guide* for your router.

You must configure each transient interface based on the slot in which the FPC is installed, the location in which the PIC is installed, and for multiple port PICs, the port to which you are connecting.

You can configure the interfaces on PICs that are already installed in the router as well as interfaces on PICs that you plan to install later. The Junos OS detects which interfaces are actually present, so when the software activates its configuration, it activates only the present interfaces and retains the configuration information for the interfaces that are not present. When the Junos OS detects that an FPC containing PICs has been inserted into the router, the software activates the configuration for those interfaces.

**Related Documentation**

- [Types of Interfaces Overview on page 30](#)
- [Permanent Interfaces Overview on page 31](#)
- [Understanding Management Ethernet Interfaces on page 31](#)
- [Understanding Internal Ethernet Interfaces on page 43](#)
- [Supported Routing Engines by Chassis on page 33](#)
- [Understanding Services Interfaces on page 48](#)
- [Container Interfaces Overview on page 49](#)
- [Interface Encapsulations Overview on page 51](#)
- [Interface Descriptors Overview on page 62](#)
- [Interface Naming Overview on page 63](#)
- [Displaying Interface Configurations Overview on page 77](#)

## Understanding Services Interfaces

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Services interfaces enable you to incrementally add services to your network. The Junos OS supports the following services PICs:

- Adaptive Services (AS) PICs—Allow you to provide multiple services on a single PIC by configuring a set of services and applications. The AS PICs offer a special range of services you configure in one or more service sets.
- ES PIC—Provides a security suite for the IP version 4 (IPv4) and IP version 6 (IPv6) network layers. The suite provides functionality such as authentication of origin, data integrity, confidentiality, replay protection, and nonrepudiation of source. It also defines mechanisms for key generation and exchange, management of security associations, and support for digital certificates.
- Monitoring Services PICs—Enable you to monitor traffic flow and export the monitored traffic. Monitoring traffic allows you to gather and export detailed information about IPv4 traffic flows between source and destination nodes in your network; sample all incoming IPv4 traffic on the monitoring interface and present the data in cflowd record format; perform discard accounting on an incoming traffic flow; encrypt or tunnel outgoing cflowd records, intercepted IPv4 traffic, or both; and direct filtered traffic to different packet analyzers and present the data in its original format. On a Monitoring Services II PIC, you can configure either monitoring interfaces or collector interfaces. A collector interface allows you to combine multiple cflowd records into a compressed ASCII data file and export the file to an FTP server.
- Multilink Services, MultiServices, Link Services, and Voice Services PICs—Enable you to split, recombine, and sequence datagrams across multiple logical data links. The goal of multilink operation is to coordinate multiple independent links between a fixed pair of systems, providing a virtual link with greater bandwidth than any of the members.
- Tunnel Services PIC—By encapsulating arbitrary packets inside a transport protocol, tunneling provides a private, secure path through an otherwise public network. Tunnels connect discontinuous subnetworks and enable encryption interfaces, virtual private networks (VPNs), and Multiprotocol Label Switching (MPLS).
- On M Series and T Series routers, logical tunnel interfaces allow you to connect logical systems, virtual routers, or VPN instances. For more information about VPNs, see the *Junos OS VPNs Library for Routing Devices*. For more information about configuring tunnels, see the *Junos OS Services Interfaces Library for Routing Devices*.
- Services (J Series)—On J Series Services Routers, the `lt` interface is an internal interface only and is not associated with a physical medium or PIM. You can configure the logical tunnel interface to provide class-of-service (CoS) support for real-time performance monitoring (RPM) probe packets. For more information, see the *Junos OS Interfaces and Routing Configuration Guide*.



**NOTE:** The `lt` interface on the J Series router does not support logical systems.

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**Related Documentation**

- [Types of Interfaces Overview on page 30](#)

## Container Interfaces Overview

Container interfaces provide the following features:

- Automatic protection switching (APS) on SONET/SDH and ATM links are supported using the container infrastructure.
- Container physical interfaces and logical interfaces remain up on switchover.
- APS parameters are auto-copied from the container interface to the member links.



**NOTE:** Paired groups and true unidirectional APS are not currently supported.

For more information on SONET/SDH configuration, see *Configuring Container Interfaces for APS on SONET Links*.

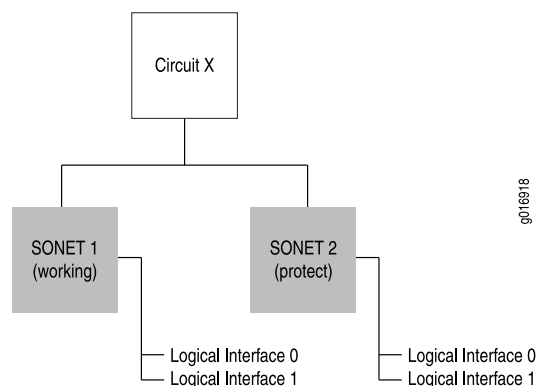
Container interfaces features are described in the following sections:

- [Understanding Traditional APS Concept on page 49](#)
- [Container Interfaces Concept on page 50](#)
- [APS Support for Container-Based Interfaces on page 50](#)
- [Autocopy of APS Parameters on page 50](#)

## Understanding Traditional APS Concept

Traditional APS is configured on two independent physical SONET/SDH interfaces: one configured as the working circuit and the other as the protect circuit (see [Figure 1 on page 49](#)). The circuit, named Circuit X in the figure, is the link between the two SONET interfaces.

**Figure 1: APS Interface**



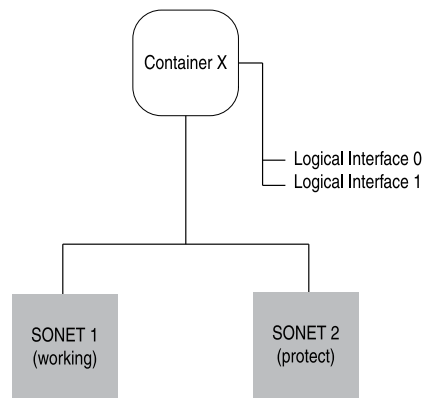
Traditional APS uses routing protocols that run on each individual SONET/SDH interface (since circuit is an abstract construct, instead of being an actual interface). When the

working link goes down, the APS infrastructure brings up the protect link and its underlying logical interfaces, and brings down the working link and its underlying logical interfaces, causing the routing protocols to reconverge. This consumes time and leads to traffic loss even though the APS infrastructure has performed the switch quickly.

## Container Interfaces Concept

To solve this problem, the Junos OS provides a soft interface construct called a container interface (see [Figure 2 on page 50](#)).

**Figure 2: Container Interface**



The container interface allows routing protocols to run on the logical interfaces associated with a virtual *container interface* instead of on the physical SONET/SDH and ATM interfaces. When APS switches the underlying physical link based on a fault condition, the container interface remains up, and the logical interface on the container interface does not flap. The routing protocols remain unaware of the APS switching.

## APS Support for Container-Based Interfaces

With the container interface, APS is configured on the container interface itself. Individual member SONET/SDH and ATM links are either marked as primary (corresponding to the working circuit) or standby (corresponding to the protect circuit) in the configuration. No circuit or group name is specified in the container interface model; physical SONET/SDH and ATM links are put in an APS group by linking them to a single container interface. APS parameters are specified at the container interface level, and are propagated to the individual SONET/SDH and ATM links by the APS daemon.

## Autocopy of APS Parameters

Typical applications require copying APS parameters from the working circuit to the protect circuit, since most of the parameters must be the same for both circuits. This is automatically done in the container interface. APS parameters are specified only once under the container physical interface configuration, and are internally copied over to the individual physical SONET/SDH and ATM links.

- Related Documentation**
- *Configuring Container Interfaces for APS on SONET Links*
  - *Displaying APS Using a Container Interface with ATM Encapsulation*

## Interface Encapsulations Overview

Table 7 on page 51 lists encapsulation support by interface type.

**Table 7: Encapsulation Support by Interface Type**

| Interface Type                            | Physical Interface Encapsulation  | Logical Interface Encapsulation                                       |
|---|---|---|
| <b>ae</b> —Aggregated Ethernet interface  | <b>ethernet-ccc</b> —Ethernet cross-connect   | <b>dix</b> —Ethernet DIXv2 (RFC 894)                                  |
|   | <b>extended-vlan-ccc</b> —Nonstandard TPID tagging for a cross-connect                  | <b>vlan-ccc</b> —802.1Q tagging for a cross-connect                   |
|   | <b>extended-vlan-vpls</b> —Extended VLAN virtual private LAN service                    |   |
|   | <b>flexible-ethernet-services</b> —Allows per-unit Ethernet encapsulation configuration |   |
|   | <b>vlan-ccc</b> —802.1Q tagging for a cross-connect                                     |   |
|   | <b>ethernet-vpls</b> —Ethernet virtual private LAN service                              |   |
|   | <b>vlan-vpls</b> —VLAN virtual private LAN service                                      |   |
| <b>as</b> —Aggregated SONET/SDH interface | <b>cisco-hdlc</b> —Cisco-compatible HDLC framing  | NA  |
|   | <b>ppp</b> —Serial PPP device   |   |
| <b>at</b> —ATM1 interface                 | <b>atm-ccc-cell-relay</b> —ATM cell relay encapsulation for a cross-connect             | <b>atm-ccc-cell-relay</b> —ATM cell relay for CCC                     |
|   | <b>atm-pvc</b> —ATM permanent virtual circuits  | <b>atm-ccc-vc-mux</b> —ATM VC for CCC                                 |
|   | <b>ethernet-over-atm</b> —Ethernet over ATM encapsulation                               | <b>atm-cisco-nlpid</b> —Cisco-compatible ATM NLPID encapsulation      |
|   |   | <b>atm-nlpid</b> —ATM NLPID encapsulation                             |
|   |   | <b>atm-snap</b> —ATM LLC/SNAP encapsulation                           |
|   |   | <b>atm-tcc-snap</b> —ATM LLC/SNAP for a translational cross-connect   |
|   |   | <b>atm-tcc-vc-mux</b> —ATM VC for a translational cross-connect       |
|   |   | <b>atm-vc-mux</b> —ATM VC multiplexing                                |
|   |   | <b>ether-over-atm-llc</b> —Ethernet over ATM (LLC/SNAP) encapsulation |

Table 7: Encapsulation Support by Interface Type (*continued*)

| Interface Type  | Physical Interface Encapsulation   | Logical Interface Encapsulation  |
|---|--|--|
| <b>at</b> —ATM2 intelligent queuing (IQ) interface              | <b>atm-ccc-cell-relay</b> —ATM cell relay encapsulation for a cross-connect<br><br><b>atm-pvc</b> —ATM permanent virtual circuits<br><br><b>ethernet-over-atm</b> —Ethernet over ATM encapsulation | <b>atm-ccc-cell-relay</b> —ATM cell relay for CCC<br><br><b>atm-ccc-vc-mux</b> —ATM VC for CCC<br><br><b>atm-cisco-nlpid</b> —Cisco-compatible ATM NLPID encapsulation<br><br><b>atm-mlppp-llc</b> —ATM MLPPP over AAL5/LLC<br><br><b>atm-nlpid</b> —ATM NLPID encapsulation<br><br><b>atm-ppp-llc</b> —ATM PPP over AAL5/LLC<br><br><b>atm-ppp-vc-mux</b> —ATM PPP over raw AAL5<br><br><b>atm-snap</b> —ATM LLC/SNAP encapsulation<br><br><b>atm-tcc-snap</b> —ATM LLC/SNAP for a translational cross-connect<br><br><b>atm-tcc-vc-mux</b> —ATM VC for a translational cross-connect<br><br><b>atm-vc-mux</b> —ATM VC multiplexing<br><br><b>ether-over-atm-llc</b> —Ethernet over ATM (LLC/SNAP) encapsulation<br><br><b>ether-vpls-over-atm-llc</b> —Ethernet VPLS over ATM (bridging) encapsulation |
| <b>bcm</b> —Gigabit Ethernet internal interfaces                | NA   | NA   |
| <b>br</b> —Integrated Services Digital Network (ISDN) interface | NA   | NA   |
| <b>ci</b> —Container interface                                  | <b>cisco-hdlc</b> —Cisco-compatible HDLC framing<br><br><b>ppp</b> —Serial PPP device  | <b>aps</b> —SONET interface required for APS configuration.  |

Table 7: Encapsulation Support by Interface Type (*continued*)

| Interface Type                | Physical Interface Encapsulation  | Logical Interface Encapsulation  |
|-------------------------------|---|--|
| <b>ds</b> —DS0 interface      | <b>cisco-hdlc</b> —Cisco-compatible HDLC framing<br><br><b>cisco-hdlc-ccc</b> —Cisco-compatible HDLC framing for a cross-connect<br><br><b>cisco-hdlc-tcc</b> —Cisco-compatible HDLC framing for a translational cross-connect<br><br><b>extended-frame-relay-ccc</b> —Any Frame Relay DLCI for a cross-connect<br><br><b>extended-frame-relay-tcc</b> —Any Frame Relay DLCI for a translational cross-connect<br><br><b>flexible-frame-relay</b> —Multiple Frame Relay encapsulations<br><br><b>frame-relay</b> —Frame Relay encapsulation<br><br><b>frame-relay-ccc</b> —Frame Relay for a cross-connect<br><br><b>frame-relay-port-ccc</b> —Frame Relay port encapsulation for a cross-connect<br><br><b>frame-relay-tcc</b> —Frame Relay for a translational cross-connect<br><br><b>multilink-frame-relay-uni-nni</b> —Multilink Frame Relay UNI NNI (FRF.16) encapsulation<br><br><b>ppp</b> —Serial PPP device<br><br><b>ppp-ccc</b> —Serial PPP device for a cross-connect<br><br><b>ppp-tcc</b> —Serial PPP device for a translational cross-connect | <b>frame-relay-ccc</b> —Frame Relay DLCI for CCC<br><br><b>frame-relay-ppp</b> —PPP over Frame Relay<br><br><b>frame-relay-tcc</b> —Frame Relay DLCI for a translational cross-connect |
| <b>dsc</b> —Discard interface | NA  | NA   |

Table 7: Encapsulation Support by Interface Type (*continued*)

| Interface Type  | Physical Interface Encapsulation   | Logical Interface Encapsulation  |
|---|--|--|
| <b>e1</b> —E1 interface (including channelized STM1-to-E1 interfaces) | <b>cisco-hdlc</b> —Cisco-compatible HDLC framing   | <b>frame-relay-ccc</b> —Frame Relay DLCI for CCC                           |
|   | <b>cisco-hdlc-ccc</b> —Cisco-compatible HDLC framing for a cross-connect                   | <b>frame-relay-ppp</b> —PPP over Frame Relay                               |
|   | <b>cisco-hdlc-tcc</b> —Cisco-compatible HDLC framing for a translational cross-connect     | <b>frame-relay-tcc</b> —Frame Relay DLCI for a translational cross-connect |
|   | <b>extended-frame-relay-ccc</b> —Any Frame Relay DLCI for a cross-connect                  |  |
|   | <b>extended-frame-relay-tcc</b> —Any Frame Relay DLCI for a translational cross-connect    |  |
|   | <b>flexible-frame-relay</b> —Multiple Frame Relay encapsulations                           |  |
|   | <b>frame-relay</b> —Frame Relay encapsulation  |  |
|   | <b>frame-relay-ccc</b> —Frame Relay for a cross-connect                                    |  |
|   | <b>frame-relay-port-ccc</b> —Frame Relay port encapsulation for a cross-connect            |  |
|   | <b>frame-relay-tcc</b> —Frame Relay for a translational cross-connect                      |  |
|   | <b>multilink-frame-relay-uni-nni</b> —Multilink Frame Relay UNI NNI (FRF.16) encapsulation |  |
|   | <b>ppp</b> —Serial PPP device  |  |
|   | <b>ppp-ccc</b> —Serial PPP device for a cross-connect                                      |  |
|   | <b>ppp-tcc</b> —Serial PPP device for a translational cross-connect                        |  |



Table 7: Encapsulation Support by Interface Type (*continued*)

| Interface Type   | Physical Interface Encapsulation  | Logical Interface Encapsulation  |
|--|---|--|
| <b>e3</b> —E3 interface (including E3 IQ and IQE interfaces) | <b>cisco-hdlc</b> —Cisco-compatible HDLC framing  | <b>frame-relay-ccc</b> —Frame Relay DLCI for CCC                           |
|  | <b>cisco-hdlc-ccc</b> —Cisco-compatible HDLC framing for a cross-connect                | <b>frame-relay-ppp</b> —PPP over Frame Relay                               |
|  | <b>cisco-hdlc-tcc</b> —Cisco-compatible HDLC framing for a translational cross-connect  | <b>frame-relay-tcc</b> —Frame Relay DLCI for a translational cross-connect |
|  | <b>extended-frame-relay-ccc</b> —Any Frame Relay DLCI for a cross-connect               |  |
|  | <b>extended-frame-relay-tcc</b> —Any Frame Relay DLCI for a translational cross-connect |  |
|  | <b>flexible-frame-relay</b> —Multiple Frame Relay encapsulations                        |  |
|  | <b>frame-relay</b> —Frame Relay encapsulation   |  |
|  | <b>frame-relay-ccc</b> —Frame Relay for a cross-connect                                 |  |
|  | <b>frame-relay-port-ccc</b> —Frame Relay port encapsulation for a cross-connect         |  |
|  | <b>frame-relay-tcc</b> —Frame Relay for a translational cross-connect                   |  |
|  | <b>ppp</b> —Serial PPP device   |  |
|  | <b>ppp-ccc</b> —Serial PPP device for a cross-connect                                   |  |
|  | <b>ppp-tcc</b> —Serial PPP device for a translational cross-connect                     |  |
| <b>em</b> —Management and internal Ethernet interfaces       | NA  | NA   |

Table 7: Encapsulation Support by Interface Type (*continued*)

| Interface Type   | Physical Interface Encapsulation   | Logical Interface Encapsulation  |
|--|--|--|
| <b>fe</b> —Fast Ethernet interface   | <b>ethernet-ccc</b> —Ethernet cross-connect<br><br><b>ethernet-tcc</b> —Ethernet translational cross-connect<br><br><b>ethernet-vpls</b> —Ethernet virtual private LAN service<br><br><b>extended-vlan-ccc</b> —Nonstandard TPID tagging for a cross-connect<br><br><b>extended-vlan-tcc</b> —802.1Q tagging for a translational cross-connect<br><br><b>extended-vlan-vpls</b> —Extended VLAN virtual private LAN service<br><br><b>vlan-ccc</b> —802.1Q tagging for a cross-connect<br><br><b>vlan-vpls</b> —VLAN virtual private LAN service  | <b>dix</b> —Ethernet DIXv2 (RFC 894)<br><br><b>vlan-ccc</b> —802.1Q tagging for a cross-connect<br><br><b>vlan-vpls</b> —VLAN virtual private LAN service  |
| <b>fxp</b> —Management and internal Ethernet interfaces  | NA   | NA   |
| <b>ge</b> —Gigabit Ethernet interface (including Gigabit Ethernet IQ interfaces)                           | <b>ethernet-ccc</b> —Ethernet cross-connect<br><br><b>ethernet-tcc</b> —Ethernet translational cross-connect<br><br><b>ethernet-vpls</b> —Ethernet virtual private LAN service<br><br><b>extended-vlan-ccc</b> —Nonstandard TPID tagging for a cross-connect<br><br><b>extended-vlan-tcc</b> —802.1Q tagging for a translational cross-connect<br><br><b>extended-vlan-vpls</b> —Extended VLAN virtual private LAN service<br><br><b>flexible-ethernet-services</b> —Allows per-unit Ethernet encapsulation configuration<br><br><b>vlan-ccc</b> —802.1Q tagging for a cross-connect<br><br><b>vlan-vpls</b> —VLAN virtual private LAN service | <b>dix</b> —Ethernet DIXv2 (RFC 894)<br><br><b>vlan-ccc</b> —802.1Q tagging for a cross-connect<br><br><b>vlan-tcc</b> —802.1Q tagging for a translational cross-connect<br><br><b>vlan-vpls</b> —VLAN virtual private LAN service |
| <b>ixgbe</b> —10-Gigabit Ethernet internal interfaces  | NA   | NA   |
| <b>lo</b> —Loopback interface; the Junos OS automatically configures one loopback interface ( <b>lo0</b> ) | NA   | NA   |

Table 7: Encapsulation Support by Interface Type (*continued*)

| Interface Type   | Physical Interface Encapsulation   | Logical Interface Encapsulation  |
|--|--|--|
| <b>ls</b> —Link services interface   | <b>multilink-frame-relay-uni-nni</b> —Multilink Frame Relay UNI NNI (FRF.16) encapsulation | <b>multilink-frame-relay-end-to-end</b> —Multilink Frame Relay end-to-end (FRF.15)<br><br><b>multilink-ppp</b> —Multilink PPP  |
| <b>lsq</b> —Link services IQ interface                                     | <b>multilink-frame-relay-uni-nni</b> —Multilink Frame Relay UNI NNI (FRF.16) encapsulation | <b>multilink-frame-relay-end-to-end</b> —Multilink Frame Relay end-to-end (FRF.15)<br><br><b>multilink-ppp</b> —Multilink PPP  |
| <b>lt</b> —Logical tunnel interface  | NA   | <b>ethernet</b> —Ethernet service<br><br><b>ethernet-vpls</b> —Ethernet virtual private LAN service<br><br><b>ethernet-ccc</b> —Ethernet cross-connect<br><br><b>frame-relay</b> —Frame Relay encapsulation<br><br><b>frame-relay-ccc</b> —Frame Relay for a cross-connect<br><br><b>vlan</b> —VLAN service<br><br><b>vlan-ccc</b> —802.1Q tagging for a cross-connect<br><br><b>vlan-vpls</b> —VLAN virtual private LAN service |
| <b>ml</b> —Multilink interface (including Multilink Frame Relay and MLPPP) | NA   | <b>multilink-frame-relay-end-to-end</b> —Multilink Frame Relay end-to-end (FRF.15)<br><br><b>multilink-ppp</b> —Multilink PPP  |

Table 7: Encapsulation Support by Interface Type (*continued*)

| Interface Type   | Physical Interface Encapsulation   | Logical Interface Encapsulation  |
|--|--|--|
| <b>se</b> —Serial interface (including EIA-530, V.35, and X.21 interfaces) | <b>cisco-hdlc</b> —Cisco-compatible HDLC framing                                       | <b>frame-relay-ccc</b> —Frame Relay DLCI for CCC                           |
|  | <b>cisco-hdlc-ccc</b> —Cisco-compatible HDLC framing for a cross-connect               | <b>frame-relay-ppp</b> —PPP over Frame Relay                               |
|  | <b>cisco-hdlc-tcc</b> —Cisco-compatible HDLC framing for a translational cross-connect | <b>frame-relay-tcc</b> —Frame Relay DLCI for a translational cross-connect |
|  | <b>frame-relay</b> —Frame Relay encapsulation  |  |
|  | <b>frame-relay-ccc</b> —Frame Relay for a cross-connect                                |  |
|  | <b>frame-relay-port-ccc</b> —Frame Relay port encapsulation for a cross-connect        |  |
|  | <b>frame-relay-tcc</b> —Frame Relay for a translational cross-connect                  |  |
|  | <b>ppp</b> —Serial PPP device  |  |
|  | <b>ppp-ccc</b> —Serial PPP device for a cross-connect                                  |  |
|  | <b>ppp-tcc</b> —Serial PPP device for a translational cross-connect                    |  |

Table 7: Encapsulation Support by Interface Type (*continued*)

| Interface Type         | Physical Interface Encapsulation  | Logical Interface Encapsulation   |
|------------------------|---|---|
| so—SONET/SDH interface | <b>cisco-hdlc</b> —Cisco-compatible HDLC framing  | <b>frame-relay-ccc</b> —Frame Relay DLCI for CCC  |
|                        | <b>cisco-hdlc-ccc</b> —Cisco-compatible HDLC framing for a cross-connect                | <b>frame-relay-ppp</b> —PPP over Frame Relay  |
|                        | <b>cisco-hdlc-tcc</b> —Cisco-compatible HDLC framing for a translational cross-connect  | <b>frame-relay-tcc</b> —Frame Relay DLCI for a translational cross-connect                                |
|                        | <b>extended-frame-relay-ccc</b> —Any Frame Relay DLCI for a cross-connect               | <b>multilink-frame-relay-end-to-end</b> —IQE SONET PICs support Multilink Frame Relay end-to-end (FRF.15) |
|                        | <b>extended-frame-relay-tcc</b> —Any Frame Relay DLCI for a translational cross-connect | <b>multilink-ppp</b> —IQE SONET PICs support Multilink PPP  |
|                        | <b>flexible-frame-relay</b> —Multiple Frame Relay encapsulations                        |   |
|                        | <b>frame-relay</b> —Frame Relay encapsulation   |   |
|                        | <b>frame-relay-ccc</b> —Frame Relay for a cross-connect                                 |   |
|                        | <b>frame-relay-port-ccc</b> —Frame Relay port encapsulation for a cross-connect         |   |
|                        | <b>frame-relay-tcc</b> —Frame Relay for a translational cross-connect                   |   |
|                        | <b>ppp</b> —Serial PPP device   |   |
|                        | <b>ppp-ccc</b> —Serial PPP device for a cross-connect                                   |   |
|                        | <b>ppp-tcc</b> —Serial PPP device for a translational cross-connect                     |   |

Table 7: Encapsulation Support by Interface Type (*continued*)

| Interface Type  | Physical Interface Encapsulation   | Logical Interface Encapsulation  |
|---|--|--|
| t1—T1 interface (including channelized DS3-to-DS1 interfaces) | <b>cisco-hdlc</b> —Cisco-compatible HDLC framing   | <b>frame-relay-ccc</b> —Frame Relay DLCI for CCC                           |
|   | <b>cisco-hdlc-ccc</b> —Cisco-compatible HDLC framing for a cross-connect                   | <b>frame-relay-ppp</b> —PPP over Frame Relay                               |
|   | <b>cisco-hdlc-tcc</b> —Cisco-compatible HDLC framing for a translational cross-connect     | <b>frame-relay-tcc</b> —Frame Relay DLCI for a translational cross-connect |
|   | <b>extended-frame-relay-ccc</b> —Any Frame Relay DLCI for a cross-connect                  |  |
|   | <b>extended-frame-relay-tcc</b> —Any Frame Relay DLCI for a translational cross-connect    |  |
|   | <b>flexible-frame-relay</b> —Multiple Frame Relay encapsulations                           |  |
|   | <b>frame-relay</b> —Frame Relay encapsulation  |  |
|   | <b>frame-relay-ccc</b> —Frame Relay for a cross-connect                                    |  |
|   | <b>frame-relay-port-ccc</b> —Frame Relay port encapsulation for a cross-connect            |  |
|   | <b>frame-relay-tcc</b> —Frame Relay for a translational cross-connect                      |  |
|   | <b>multilink-frame-relay-uni-nni</b> —Multilink Frame Relay UNI NNI (FRF.16) encapsulation |  |
|   | <b>ppp</b> —Serial PPP device  |  |
|   | <b>ppp-ccc</b> —Serial PPP device for a cross-connect                                      |  |
|   | <b>ppp-tcc</b> —Serial PPP device for a translational cross-connect                        |  |

Table 7: Encapsulation Support by Interface Type (*continued*)

| Interface Type   | Physical Interface Encapsulation  | Logical Interface Encapsulation  |
|--|---|--|
| <b>t3</b> —T3 interface (including channelized OC12-to-DS3 interfaces)   | <b>cisco-hdlc</b> —Cisco-compatible HDLC framing  | <b>frame-relay-ccc</b> —Frame Relay DLCI for CCC                           |
|  | <b>cisco-hdlc-ccc</b> —Cisco-compatible HDLC framing for a cross-connect                | <b>frame-relay-ppp</b> —PPP over Frame Relay                               |
|  | <b>cisco-hdlc-tcc</b> —Cisco-compatible HDLC framing for a translational cross-connect  | <b>frame-relay-tcc</b> —Frame Relay DLCI for a translational cross-connect |
|  | <b>extended-frame-relay-ccc</b> —Any Frame Relay DLCI for a cross-connect               |  |
|  | <b>extended-frame-relay-tcc</b> —Any Frame Relay DLCI for a translational cross-connect |  |
|  | <b>flexible-frame-relay</b> —Multiple Frame Relay encapsulations                        |  |
|  | <b>frame-relay</b> —Frame Relay encapsulation   |  |
|  | <b>frame-relay-ccc</b> —Frame Relay for a cross-connect                                 |  |
|  | <b>frame-relay-port-ccc</b> —Frame Relay port encapsulation for a cross-connect         |  |
|  | <b>frame-relay-tcc</b> —Frame Relay for a translational cross-connect                   |  |
| Controller-level channelized IQ interfaces ( <b>cau4</b> , <b>coc1</b> , <b>coc3</b> , <b>coc12</b> , <b>cstm1</b> , <b>ct1</b> , <b>ct3</b> , <b>ce1</b> )  | <b>ppp</b> —Serial PPP device   |  |
|  | <b>ppp-ccc</b> —Serial PPP device for a cross-connect                                   |  |
|  | <b>ppp-tcc</b> —Serial PPP device for a translational cross-connect                     |  |
| Services interfaces ( <b>cp</b> , <b>gr</b> , <b>ip</b> , <b>mo</b> , <b>vt</b> , <b>es</b> , <b>mo</b> , <b>rsp</b> , <b>sp</b> )   | NA  | NA   |
| Unconfigurable, internally generated interfaces ( <b>gre</b> , <b>ipip</b> , <b>learning-chip</b> ( <b>lc</b> ), <b>lsi</b> , <b>tap</b> , <b>mt</b> , <b>mtun</b> , <b>pd</b> , <b>pe</b> , <b>pimd</b> , <b>pime</b> ) | NA  | NA   |



**NOTE:** You can configure GRE interfaces (**gre-x/y/z**) only for GMPLS control channels. GRE interfaces are not supported or configurable for other applications. For more information about GMPLS, see the *Junos OS MPLS Applications Library for Routing Devices* and the *Junos OS Feature Guides*.

- Related Documentation**
- [Understanding Transient Interfaces on page 47](#)
  - [Router Interfaces Overview on page 30](#)
  - [Types of Interfaces Overview on page 30](#)

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## Interface Descriptors Overview

When you configure an interface, you are effectively specifying the properties for a physical interface descriptor. In most cases, the physical interface descriptor corresponds to a single physical device and consists of the following parts:

- The interface name, which defines the media type
- The slot in which the FPC or DPC is located
- The location on the FPC in which the PIC is installed
- The PIC or DPC port
- The interface's channel and logical unit numbers (optional)

Each physical interface descriptor can contain one or more logical interface descriptors. These allow you to map one or more logical (or virtual) interfaces to a single physical device. Creating multiple logical interfaces is useful for ATM, Frame Relay, and Gigabit Ethernet networks, in which you can associate multiple virtual circuits, data-link connections, or virtual LANs (VLANs) with a single interface device.

Each logical interface descriptor can have one or more family descriptors to define the protocol family that is associated with and allowed to run over the logical interface.

The following protocol families are supported:

- Internet Protocol version 4 (IPv4) suite (inet)
- Internet Protocol version 6 (IPv6) suite (inet6)
- Circuit cross-connect (CCC)
- Translational cross-connect (TCC)
- International Organization for Standardization (ISO)
- Multilink Frame Relay end-to-end (MLFR end-to-end)
- Multilink Frame Relay user-to-network interface network-to-network interface (MLFR UNI NNI)
- Multilink Point-to-Point Protocol (MLPPP)
- Multiprotocol Label Switching (MPLS)
- Trivial Network Protocol (TNP)
- (M Series, T Series, and MX Series routers only) Virtual private LAN service (VPLS)



Finally, each family descriptor can have one or more address entries, which associate a network address with a logical interface and hence with the physical interface.

You configure the various interface descriptors as follows:

- You configure the physical interface descriptor by including the **interfaces** *interface-name* statement.
- You configure the logical interface descriptor by including the **unit** statement within the **interfaces** *interface-name* statement or by including the **.logical** descriptor at the end of the interface name, as in **t3-0/0/0.1**, where the logical unit number is 1, as shown in the following examples:

```
[edit]
user@host# set interfaces t3-0/0/0 unit 1
[edit]
user@host# edit interfaces t3-0/0/0.1
[edit interfaces t3-0/0/0]
user@host# set unit 1
```

- You configure the family descriptor by including the **family** statement within the **unit** statement.
- You configure address entries by including the **address** statement within the **family** statement.
- You configure tunnels by including the **tunnel** statement within the **unit** statement.



**NOTE:** The address of a logical interface cannot be the same as a tunnel interface's source or destination address. If you try to configure a logical interface with a tunnel interface's address or vice versa, a commit failure will occur.

Related  
Documentation

- [Router Interfaces Overview on page 30](#)

## Interface Naming Overview

Each interface has an interface name, which specifies the media type, the slot in which the FPC or DPC is located, the location on the FPC where the PIC is installed, and the PIC or DPC port. The interface name uniquely identifies an individual network connector in the system. You use the interface name when configuring interfaces and when enabling various functions and properties, such as routing protocols, on individual interfaces. The system uses the interface name when displaying information about the interface, for example, in the **show interfaces** command.

The interface name is represented by a physical part, a channel part, and a logical part in the following format:

```
physical<:channel>.logical
```

The channel part of the name is optional for all interfaces except channelized DS3, E1, OC12, and STM1 interfaces.

The following sections provide interface naming configuration guidelines:

- [Physical Part of an Interface Name on page 64](#)
- [Logical Part of an Interface Name on page 69](#)
- [Separators in an Interface Name on page 70](#)
- [Channel Part of an Interface Name on page 70](#)
- [Interface Naming for a Routing Matrix Based on a TX Matrix Router on page 71](#)
- [Interface Naming for a Routing Matrix Based on a TX Matrix Plus Router on page 73](#)
- [Chassis Interface Naming on page 75](#)
- [Examples: Interface Naming on page 75](#)

## Physical Part of an Interface Name

The physical part of an interface name identifies the physical device, which corresponds to a single physical network connector.



### NOTE:

The internal interface is dependent on Routing Engine. To identify if the Routing Engine is using this type of interface, use the following command:

```
user@host> show interfaces terse
```

| Interface       | Admin | Link | Proto  | Local      | Remote |
|-----------------|-------|------|--------|------------|--------|
| pfe-1/0/0       | up    | up   |        |            |        |
| pfe-1/0/0.16383 | up    | up   | inet   |            |        |
|                 |       |      | inet6  |            |        |
| pfh-1/0/0       | up    | up   |        |            |        |
| pfh-1/0/0.16383 | up    | up   | inet   |            |        |
| [.....]         |       |      |        |            |        |
| bcm0            | up    | up   | <----- |            |        |
| bcm0.0          | up    | up   | inet   | 10.0.0.1/8 |        |
| [.....]         |       |      |        |            |        |
| lsi             | up    | up   |        |            |        |
| mtun            | up    | up   |        |            |        |
| pimd            | up    | up   |        |            |        |
| pime            | up    | up   |        |            |        |
| tap             | up    | up   |        |            |        |

For more information on the Routing Engines that each chassis supports, the first supported release for the Routing Engine in the specified chassis, the management Ethernet interface, and the internal Ethernet interfaces for each Routing Engine, please refer the link titled *Supported Routing Engines by Chassis* under Related Documentation section.

This part of the interface name has the following format:

*type-fpc/pic/port*

**type** is the media type, which identifies the network device that can be one of the following:

- **ae**—Aggregated Ethernet interface. This is a virtual aggregated link and has a different naming format from most PICs; for more information, see *Aggregated Ethernet Interfaces Overview*.
- **as**—Aggregated SONET/SDH interface. This is a virtual aggregated link and has a different naming format from most PICs; for more information, see *Configuring Aggregated SONET/SDH Interfaces*.
- **at**—ATM1 or ATM2 intelligent queuing (IQ) interface or a virtual ATM interface on a circuit emulation (CE) interface.
- **bcm**—The bcm0 internal Ethernet process is supported on specific Routing engines for various M series and T series routers. For more information please refer the link titled *Supported Routing Engines by Chassis* under Related Documentation section.
- **br**—Integrated Services Digital Network (ISDN) interface (configured on a 1-port or 4-port ISDN Basic Rate Interface (BRI) card). This interface has a different naming format from most PICs: **br-pim/0/port**. The second number is always 0. For more information, see *Configuring ISDN Physical Interface Properties*.
- **cau4**—Channelized AU-4 IQ interface (configured on the Channelized STM1 IQ or IQE PIC or Channelized OC12 IQ and IQE PICs).
- **ce1**—Channelized E1 IQ interface (configured on the Channelized E1 IQ PIC or Channelized STM1 IQ or IQE PIC).
- **ci**—Container interface.
- **coc1**—Channelized OC1 IQ interface (configured on the Channelized OC12 IQ and IQE or Channelized OC3 IQ and IQE PICs).
- **coc3**—Channelized OC3 IQ interface (configured on the Channelized OC3 IQ and IQE PICs).
- **coc12**—Channelized OC12 IQ interface (configured on the Channelized OC12 IQ and IQE PICs).
- **coc48**—Channelized OC48 interface (configured on the Channelized OC48 and Channelized OC48 IQE PICs).
- **cp**—Collector interface (configured on the Monitoring Services II PIC).
- **cstm1**—Channelized STM1 IQ interface (configured on the Channelized STM1 IQ or IQE PIC).
- **cstm4**—Channelized STM4 IQ interface (configured on the Channelized OC12 IQ and IQE PICs).
- **cstm16**—Channelized STM16 IQ interface (configured on the Channelized OC48/STM16 and Channelized OC48/STM16 IQE PICs).
- **ct1**—Channelized T1 IQ interface (configured on the Channelized DS3 IQ and IQE PICs, Channelized OC3 IQ and IQE PICs, Channelized OC12 IQ and IQE PICs, or Channelized T1 IQ PIC).

- **ct3**—Channelized T3 IQ interface (configured on the Channelized DS3 IQ and IQE PICs, Channelized OC3 IQ and IQE PICs, or Channelized OC12 IQ and IQE PICs).
- **demux**—Interface that supports logical IP interfaces that use the IP source or destination address to demultiplex received packets. Only one demux interface (**demux0**) exists per chassis. All demux logical interfaces must be associated with an underlying logical interface.
- **dfc**—Interface that supports dynamic flow capture processing on T Series or M320 routers containing one or more Monitoring Services III PICs. Dynamic flow capture enables you to capture packet flows on the basis of dynamic filtering criteria. Specifically, you can use this feature to forward passively monitored packet flows that match a particular filter list to one or more destinations using an on-demand control protocol.
- **ds**—DS0 interface (configured on the Multichannel DS3 PIC, Channelized E1 PIC, Channelized OC3 IQ and IQE PICs, Channelized OC12 IQ and IQE PICs, Channelized DS3 IQ and IQE PICs, Channelized E1 IQ PIC, Channelized STM1 IQ or IQE PIC, or Channelized T1 IQ).
- **dsc**—Discard interface.
- **e1**—E1 interface (including channelized STM1-to-E1 interfaces).
- **e3**—E3 interface (including E3 IQ interfaces).
- **em**—Management and internal Ethernet interfaces. For M Series routers, MX Series routers, T Series routers, and TX Series routers, you can use the **show chassis hardware** command to display hardware information about the router, including its Routing Engine model. To determine which management interface is supported on your router and Routing Engine combination, see [“Understanding Management Ethernet Interfaces” on page 31](#) and [“Supported Routing Engines by Chassis” on page 33](#).
- **es**—Encryption interface.
- **et**—100-Gigabit Ethernet interface.
- **fe**—Fast Ethernet interface.
- **fxp**—Management and internal Ethernet interfaces. For M Series routers, MX Series routers, T Series routers, and TX Series routers, you can use the **show chassis hardware** command to display hardware information about the router, including its Routing Engine model. To determine which management interface is supported on your router and Routing Engine combination, see [“Understanding Management Ethernet Interfaces” on page 31](#) and [“Supported Routing Engines by Chassis” on page 33](#).
- **ge**—Gigabit Ethernet interface. Some older 10-Gigabit Ethernet interfaces use the **ge** media type to identify the physical part of the network device, but newer 10-Gigabit Ethernet interfaces use the **xe** media type.



**NOTE:** For configuration, the `ge` interface name should be used instead of the `xe` interface name in XENPAK 10-Gigabit Ethernet interface PICs. Refer the following show commands for more information:

```
user@host> show chassis hardware
..
FPC 4          REV 02   710-015839   CZ1853          M120 FPC Type
3
  PIC 0          REV 09   750-009567   NH1857          1x
10GE(LAN),XENPAK
  Xcvr 0         REV 01   740-012045   535TFZX6        XENPAK-SR

user@host> show configuration interfaces ge-4/0/0
unit 0 {
  family inet {
    address 100.0.0.1/24;
  }
}
```

- **gr**—Generic routing encapsulation (GRE) tunnel interface.
- **gre**—Internally generated interface that is configurable only as the control channel for Generalized MPLS (GMPLS). For more information about GMPLS, see the *Junos OS MPLS Applications Library for Routing Devices* and the *Junos OS Feature Guides*.



**NOTE:** You can configure GRE interfaces (`gre-x/y/z`) only for GMPLS control channels. GRE interfaces are not supported or configurable for other applications..

- **ip**—IP-over-IP encapsulation tunnel interface.
- **ipip**—Internally generated interface that is not configurable.
- **ixgbe**—The internal Ethernet process `ixgbe0` and `ixgbe1` are used by the RE-DUO-C2600-16G Routing Engine, which is supported on TX Matrix Plus and PTX5000.
- **iw**—Logical interfaces associated with the endpoints of Layer 2 circuit and Layer 2 VPN connections (pseudowire stitching Layer 2 VPNs). For more information about VPNs, see the *Junos OS VPNs Library for Routing Devices*.
- **lc**—Internally generated interface that is not configurable.
- **lo**—Loopback interface. The Junos OS automatically configures one loopback interface (`lo0`). The logical interface **lo0.16383** is a nonconfigurable interface for router control traffic.
- **ls**—Link services interface.
- **lsi**—Internally generated interface that is not configurable.
- **ml**—Multilink interface (including Multilink Frame Relay and MLPPP).

- **mo**—Monitoring services interface (including monitoring services and monitoring services II). The logical interface **mo-fpc/pic/port.16383** is an internally generated, nonconfigurable interface for router control traffic.
- **ms**—Multiservices interface.
- **mt**—Multicast tunnel interface (internal router interface for VPNs). If your router has a Tunnel PIC, the Junos OS automatically configures one multicast tunnel interface (**mt**) for each virtual private network (VPN) you configure. Although it is not necessary to configure multicast interfaces, you can use the **multicast-only** statement to configure the unit and family so that the tunnel can transmit and receive multicast traffic only. For more information, see [multicast-only](#).
- **mtun**—Internally generated interface that is not configurable.
- **oc3**—OC3 IQ interface (configured on the Channelized OC12 IQ and IQE PICs or Channelized OC3 IQ and IQE PICs).
- **pd**—Interface on the rendezvous point (RP) that de-encapsulates packets.
- **pe**—Interface on the first-hop RP that encapsulates packets destined for the RP router.
- **pimd**—Internally generated interface that is not configurable.
- **pime**—Internally generated interface that is not configurable.
- **rlsq**—Container interface, numbered from 0 through 127, used to tie the primary and secondary LSQ PICs together in high availability configurations. Any failure of the primary PIC results in a switch to the secondary PIC and vice versa.
- **rms**—Redundant interface for two multiservices interfaces.
- **rsp**—Redundant virtual interface for the adaptive services interface.
- **se**—Serial interface (including EIA-530, V.35, and X.21 interfaces).
- **si**—Services-inline interface, which is hosted on a Trio-based line card.
- **so**—SONET/SDH interface.
- **sp**—Adaptive services interface. The logical interface **sp-fpc/pic/port.16383** is an internally generated, nonconfigurable interface for router control traffic.
- **stm1**—STM1 interface (configured on the OC3/STM1 interfaces).
- **stm4**—STM4 interface (configured on the OC12/STM4 interfaces).
- **stm16**—STM16 interface (configured on the OC48/STM16 interfaces).
- **t1**—T1 interface (including channelized DS3-to-DS1 interfaces).
- **t3**—T3 interface (including channelized OC12-to-DS3 interfaces).
- **tap**—Internally generated interface that is not configurable.
- **umd**—USB modem interface.
- **vsp**—Voice services interface.
- **vc4**—Virtually concatenated interface.
- **vt**—Virtual loopback tunnel interface.

- **xe**—10-Gigabit Ethernet interface. Some older 10-Gigabit Ethernet interfaces use the **ge** media type (rather than **xe**) to identify the physical part of the network device.
- **xt**—Logical interface for Protected System Domains to establish a Layer 2 tunnel connection.

**fpc** identifies the number of the FPC or DPC card on which the physical interface is located. Specifically, it is the number of the slot in which the card is installed.

M40, M40e, M160, M320, M120, T320, T640, and T1600 routers each have eight FPC slots that are numbered 0 through 7, from left to right as you are facing the front of the chassis. For information about compatible FPCs and PICs, see the hardware guide for your router.

The M20 router has four FPC slots that are numbered 0 through 3, from top to bottom as you are facing the front of the chassis. The slot number is printed adjacent to each slot.

MX Series routers support DPCs, FPCs, and Modular Interface Cards (MICs). For information about compatible DPCs, FPCs, PICs, and MICs, see the [MX Series Interface Module Reference](#).

For M5, M7i, M10, and M10i routers, the FPCs are built into the chassis; you install the PICs into the chassis.

The M5 and M7i routers have space for up to four PICs. The M7i router also comes with an integrated Tunnel PIC, or an optional integrated AS PIC, or an optional integrated MS PIC.

The M10 and M10i routers have space for up to eight PICs.

A routing matrix can have up to 32 FPCs (numbered 0 through 31).

For more information about interface naming for a routing matrix, see “[Interface Naming for a Routing Matrix Based on a TX Matrix Router](#)” on page 71.

**pic** identifies the number of the PIC on which the physical interface is located. Specifically, it is the number of the PIC location on the FPC. FPCs with four PIC slots are numbered 0 through 3. FPCs with three PIC slots are numbered 0 through 2. The PIC location is printed on the FPC carrier board. For PICs that occupy more than one PIC slot, the lower PIC slot number identifies the PIC location.

**port** identifies a specific port on a PIC or DPC. The number of ports varies depending on the PIC. The port numbers are printed on the PIC.

## Logical Part of an Interface Name

The logical unit part of the interface name corresponds to the logical unit number, which can be a number from 0 through 16,385 for all interface types except demux and PPPoE. For these two interface types only, the range is 0 through 65,535.

## Separators in an Interface Name

There is a separator between each element of an interface name.

In the physical part of the name, a hyphen (-) separates the media type from the FPC number, and a slash (/) separates the FPC, PIC, and port numbers.

In the virtual part of the name, a period (.) separates the channel and logical unit numbers.

A colon (:) separates the physical and virtual parts of the interface name.

## Channel Part of an Interface Name

The channel identifier part of the interface name is required only on channelized interfaces. For channelized interfaces, channel 0 identifies the first channelized interface. For channelized IQ and channelized IQE interfaces, channel 1 identifies the first channelized interface. A nonconcatenated (that is, channelized) SONET/SDH OC48 interface has four OC12 channels, numbered 0 through 3.

To determine which types of channelized PICs are currently installed in the router, use the **show chassis hardware** command from the top level of the command-line interface (CLI). Channelized IQ and IQE PICs are listed in the output with “intelligent queuing IQ” or “enhanced intelligent queuing IQE” in the description. For more information, see *Channelized Interfaces Overview*.

For ISDN interfaces, you specify the B-channel in the form **bc-pim/0/port:n**. *n* is the B-channel ID and can be 1 or 2. You specify the D-channel in the form **dc-pim/0/port:0**.



.....  
**NOTE:** For ISDN, the B-channel and D-channel interfaces do not have any configurable parameters. However, when interface statistics are displayed, B-channel and D-channel interfaces have statistical values.  
.....



.....  
**NOTE:** In the Junos OS implementation, the term *logical interfaces* generally refers to interfaces you configure by including the unit statement at the [edit interfaces *interface-name*] hierarchy level. Logical interfaces have the *.logical* descriptor at the end of the interface name, as in **ge-0/0/0.1** or **t1-0/0/0:0.1**, where the logical unit number is 1.  
.....

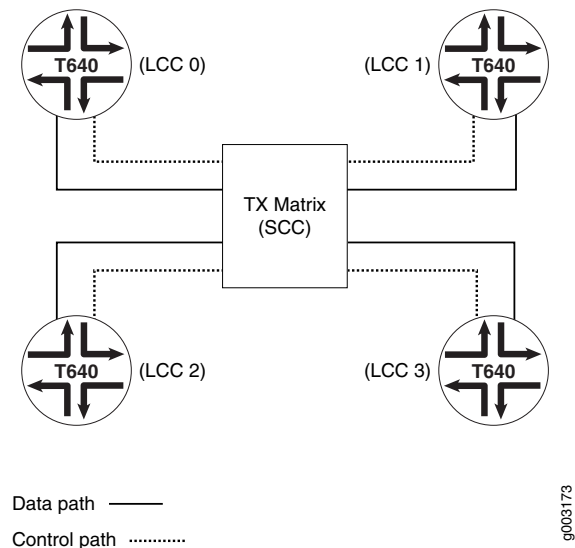
Although channelized interfaces are generally thought of as logical or virtual, the Junos OS sees T3, T1, and NxDS0 interfaces within a channelized IQ or IQE PIC as physical interfaces. For example, both **t3-0/0/0** and **t3-0/0/0:1** are treated as physical interfaces by the Junos OS. In contrast, **t3-0/0/0.2** and **t3-0/0/0:1.2** are considered logical interfaces because they have the **.2** at the end of the interface names.  
.....



## Interface Naming for a Routing Matrix Based on a TX Matrix Router

A routing matrix based on a Juniper Networks TX Matrix router is a multichassis architecture composed of one TX Matrix router and from one to four interconnected T640 routers. From the perspective of the user interface, the routing matrix appears as a single router. The TX Matrix router controls all the T640 routers, as shown in [Figure 3 on page 71](#).

**Figure 3: Routing Matrix**



A TX Matrix router is also referred to as a *switch-card chassis* (SCC). The CLI uses **scc** to refer to the TX Matrix router. A T640 router in a routing matrix is also referred to as a *line-card chassis* (LCC). The CLI uses **lcc** as a prefix to refer to a specific T640 router.

LCCs are assigned numbers 0 through 3, depending on the hardware setup and connectivity to the TX Matrix router. For more information, see the [TX Matrix Router Hardware Guide](#). A routing matrix can have up to four T640 routers, and each T640 router has up to eight FPCs. Therefore, the routing matrix as a whole can have up to 32 FPCs (0 through 31).

In the Junos OS CLI, an interface name has the following format:

*type-fpc/pic/port*

When you specify the **fpc** number for a T640 router in a routing matrix, the Junos OS determines which T640 router contains the specified FPC based on the following assignment:

- On LCC 0, FPC hardware slots 0 through 7 are configured as 0 through 7.
- On LCC 1, FPC hardware slots 0 through 7 are configured as 8 through 15.
- On LCC 2, FPC hardware slots 0 through 7 are configured as 16 through 23.
- On LCC 3, FPC hardware slots 0 through 7 are configured as 24 through 31.

For example, the 1 in **se-1/0/0** refers to FPC hardware slot 1 on the T640 router labeled **lcc0**. The 11 in **t1-11/2/0** refers to FPC hardware slot 3 on the T640 router labeled **lcc1**. The 20 in **so-20/0/1** refers to FPC hardware slot 4 on the T640 router labeled **lcc2**. The 31 in **t3-31/1/0** refers to FPC hardware slot 7 on the T640 router labeled **lcc3**.

[Table 8 on page 72](#) summarizes the FPC numbering for a T640 router in a routing matrix.

**Table 8: FPC Numbering for T640 Routers in a Routing Matrix**

| LCC Numbers Assigned to the T640 Router | Configuration Numbers |
|---|-----------------------|
| 0                                       | 0 through 7           |
| 1                                       | 8 through 15          |
| 2                                       | 16 through 23         |
| 3                                       | 24 through 31         |

[Table 9 on page 72](#) lists each FPC hardware slot and the corresponding configuration numbers for LCCs 0 through 3.

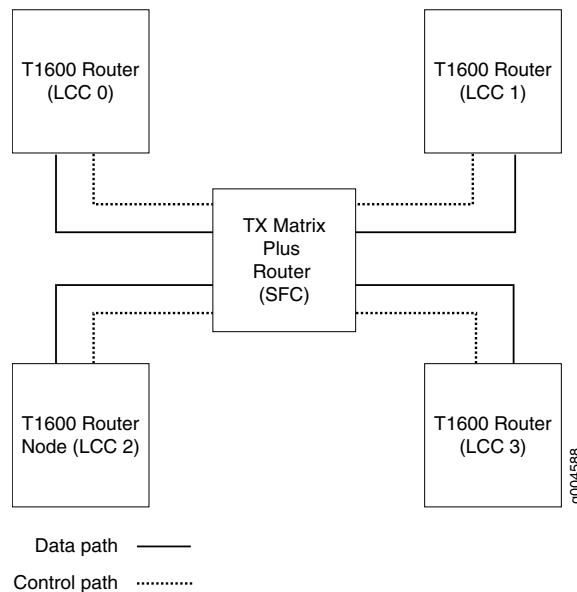
**Table 9: One-to-One FPC Numbering for T640 Routers in a Routing Matrix**

| FPC Numbering         | T640 Routers |    |    |    |    |    |    |    |
|-----------------------|--------------|----|----|----|----|----|----|----|
| LCC 0                 |              |    |    |    |    |    |    |    |
| Hardware Slots        | 0            | 1  | 2  | 3  | 4  | 5  | 6  | 7  |
| Configuration Numbers | 0            | 1  | 2  | 3  | 4  | 5  | 6  | 7  |
| LCC 1                 |              |    |    |    |    |    |    |    |
| Hardware Slots        | 0            | 1  | 2  | 3  | 4  | 5  | 6  | 7  |
| Configuration Numbers | 8            | 9  | 10 | 11 | 12 | 13 | 14 | 15 |
| LCC 2                 |              |    |    |    |    |    |    |    |
| Hardware Slots        | 0            | 1  | 2  | 3  | 4  | 5  | 6  | 7  |
| Configuration Numbers | 16           | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| LCC 3                 |              |    |    |    |    |    |    |    |
| Hardware Slots        | 0            | 1  | 2  | 3  | 4  | 5  | 6  | 7  |
| Configuration Numbers | 24           | 25 | 26 | 27 | 28 | 29 | 30 | 31 |

## Interface Naming for a Routing Matrix Based on a TX Matrix Plus Router

A routing matrix based on a Juniper Networks TX Matrix Plus Router is a multichassis architecture composed of one TX Matrix Plus router and from one to four interconnected T1600 routers. From the perspective of the user interface, the routing matrix appears as a single router. The TX Matrix Plus router controls all the T1600 routers, as shown in [Figure 4 on page 73](#).

**Figure 4: Routing Matrix Based on a TX Matrix Plus Router**



A TX Matrix Plus router is also referred to as a *switch-fabric chassis* (SFC). The CLI uses **sfc** to refer to the TX Matrix Plus router. A T1600 router in a routing matrix is also referred to as a *line-card chassis* (LCC). The CLI uses **lcc** as a prefix to refer to a specific T1600 router.

LCCs are assigned numbers, 0 through 3, depending on the hardware setup and connectivity to the TX Matrix Plus router. For more information, see the *TX Matrix Plus Router Hardware Guide*. A routing matrix based on a TX Matrix Plus router can have up to four T1600 routers, and each T1600 router has up to eight FPCs. Therefore, the routing matrix as a whole can have up to 32 FPCs (0 through 31).

In the Junos OS CLI, an interface name has the following format:

*type-fpc/pic/port*

When you specify the **fpc** number for a T1600 router in a routing matrix, the Junos OS determines which T1600 router contains the specified FPC based on the following assignment:

- On LCC 0, FPC hardware slots 0 through 7 are configured as 0 through 7.
- On LCC 1, FPC hardware slots 0 through 7 are configured as 8 through 15.

- On LCC 2, FPC hardware slots 0 through 7 are configured as 16 through 23.
- On LCC 3, FPC hardware slots 0 through 7 are configured as 24 through 31.

For example, the 1 in **se-1/0/0** refers to FPC hardware slot 1 on the T1600 router labeled **lcc0**. The 11 in **t1-11/2/0** refers to FPC hardware slot 3 on the T1600 router labeled **lcc1**. The 20 in **so-20/0/1** refers to FPC hardware slot 4 on the T1600 router labeled **lcc2**. The 31 in **t3-31/1/0** refers to FPC hardware slot 7 on the T1600 router labeled **lcc3**.

[Table 10 on page 74](#) summarizes the FPC numbering for a routing matrix based on a TX Matrix Plus router.

**Table 10: FPC Numbering for T1600 Routers in a Routing Matrix**

| LCC Numbers Assigned to the T1600 Router | Configuration Numbers |
|--|-----------------------|
| 0  | 0 through 7           |
| 1  | 8 through 15          |
| 2  | 16 through 23         |
| 3  | 24 through 31         |

[Table 11 on page 74](#) lists each FPC hardware slot and the corresponding configuration numbers for LCCs 0 through 3.

**Table 11: One-to-One FPC Numbering for T1600 Routers in a Routing Matrix**

| FPC Numbering         | T1600 Routers |    |    |    |    |    |    |    |
|-----------------------|---------------|----|----|----|----|----|----|----|
| LCC 0                 |               |    |    |    |    |    |    |    |
| Hardware Slots        | 0             | 1  | 2  | 3  | 4  | 5  | 6  | 7  |
| Configuration Numbers | 0             | 1  | 2  | 3  | 4  | 5  | 6  | 7  |
| LCC 1                 |               |    |    |    |    |    |    |    |
| Hardware Slots        | 0             | 1  | 2  | 3  | 4  | 5  | 6  | 7  |
| Configuration Numbers | 8             | 9  | 10 | 11 | 12 | 13 | 14 | 15 |
| LCC 2                 |               |    |    |    |    |    |    |    |
| Hardware Slots        | 0             | 1  | 2  | 3  | 4  | 5  | 6  | 7  |
| Configuration Numbers | 16            | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| LCC 3                 |               |    |    |    |    |    |    |    |

Table 11: One-to-One FPC Numbering for T1600 Routers in a Routing Matrix (*continued*)

| FPC Numbering         | T1600 Routers |    |    |    |    |    |    |    |
|-----------------------|---------------|----|----|----|----|----|----|----|
| Hardware Slots        | 0             | 1  | 2  | 3  | 4  | 5  | 6  | 7  |
| Configuration Numbers | 24            | 25 | 26 | 27 | 28 | 29 | 30 | 31 |

## Chassis Interface Naming

You configure some PIC properties, such as framing, at the **[edit chassis]** hierarchy level. Chassis interface naming varies depending on the routing hardware.

- To configure PIC properties for a standalone router, you must specify the FPC and PIC numbers, as follows:

```
[edit chassis]
fpc slot-number {
  pic pic-number {
    ...
  }
}
```

- To configure PIC properties for a T640 or T1600 router configured in a routing matrix, you must specify the LCC, FPC, and PIC numbers, as follows:

```
[edit chassis]
lcc lcc-number {
  fpc slot-number { # Use the hardware FPC slot number
    pic pic-number {
      ...
    }
  }
}
```

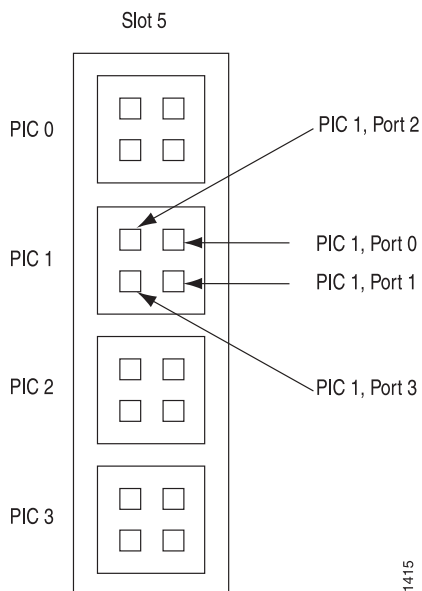
For the FPC slot in a T640 router in a routing matrix, specify the actual hardware slot number, as labeled on the T640 router chassis. Do not use the corresponding software FPC configuration numbers shown in [Table 9 on page 72](#).

For the FPC slot in a T1600 router in a routing matrix, specify the actual hardware slot number, as labeled on the T1600 router chassis. Do not use the corresponding software FPC configuration numbers shown in [Table 10 on page 74](#).

For more information about the **[edit chassis]** hierarchy, see the *Junos OS Administration Library for Routing Devices*.

## Examples: Interface Naming

This section provides examples of naming interfaces. For an illustration of where slots, PICs, and ports are located, see [Figure 5 on page 76](#).

**Figure 5: Interface Slot, PIC, and Port Locations**

For an FPC in slot 1 with two OC3 SONET/SDH PICs in PIC positions 0 and 1, each PIC with two ports uses the following names:

```
so-1/0/0.0
so-1/0/1.0
so-1/1/0.0
so-1/1/1.0
```

An OC48 SONET/SDH PIC in slot 1 and in concatenated mode appears as a single FPC with a single PIC, which has a single port. If this interface has a single logical unit, it has the following name:

```
so-1/0/0.0
```

An OC48 SONET/SDH PIC in slot 1 and in channelized mode has a number for each channel. For example:

```
so-1/0/0:0
so-1/0/0:1
```

For an FPC in slot 1 with a Channelized OC12 PIC in PIC position 2, the DS3 channels have the following names:

```
t3-1/2/0:0
t3-1/2/0:1
t3-1/2/0:2
...
t3-1/2/0:11
```

For an FPC in slot 1 with four OC12 ATM PICs (the FPC is fully populated), the four PICs, each with a single port and a single logical unit, have the following names:

```
at-1/0/0.0
at-1/1/0.0
at-1/2/0.0
```

at-1/3/0.0

In a routing matrix on the T640 router labeled **lcc1**, for an FPC in slot 5 with four SONET OC192 PICs, the four PICs, each with a single port and a single logical unit, have the following names:

so-13/0/0.0

so-13/1/0.0

so-13/2/0.0

so-13/3/0.0

For an FPC in slot 1 with one 4-port ISDN BRI interface card, port 4 has the following name:

br-1/0/4

The first B-channel, the second B-channel, and the control channel have the following names:

bc-1/0/4:1

bc-1/0/4:2

dc-1/0/4:0

- Related Documentation**
- [Router Interfaces Overview on page 30](#)
  - [Supported Routing Engines by Chassis](#)

---

## Displaying Interface Configurations Overview

To display a configuration, use either the **show** command in configuration mode or the **show configuration** top-level command. Interfaces are listed in numerical order, from lowest to highest slot number, then from lowest to highest PIC number, and finally from lowest to highest port number.

- Related Documentation**
- [Router Interfaces Overview on page 30](#)





## CHAPTER 3

# Configuring Physical Interface Properties

- [Physical Interface Configuration Statements Overview on page 80](#)
- [Physical Interfaces Properties Statements List on page 89](#)
- [Interface Ranges on page 106](#)
- [Specifying an Aggregated Interface on page 115](#)
- [Configuring 4-Port OC192 PIC to Operate in OC768-over-OC192 Mode on page 116](#)
- [Configuring Interface Description on page 117](#)
- [Configuring the Link Characteristics on page 118](#)
- [Configuring the Media MTU on page 119](#)
- [Configuring Interface Encapsulation on Physical Interfaces on page 130](#)
- [Configuring the PPP Challenge Handshake Authentication Protocol on page 136](#)
- [Configuring the PPP Password Authentication Protocol on page 139](#)
- [Monitoring a PPP Session on page 143](#)
- [Tracing Operations of the pppd Process on page 143](#)
- [Configuring PPP Address and Control Field Compression on page 145](#)
- [Configuring the PPP Protocol Field Compression on page 147](#)
- [Configuring the Interface Speed on page 148](#)
- [Configuring Keepalives on page 152](#)
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- [Configuring the Clock Source on page 156](#)
- [Configuring the Router as a DCE with Frame Relay Encapsulation on page 157](#)
- [Receive and Transmit Leaky Bucket Properties Overview on page 157](#)
- [Configuring Receive and Transmit Leaky Bucket Properties on page 158](#)
- [Configuring Accounting for the Physical Interface on page 159](#)
- [Interface Diagnostics on page 160](#)
- [Tracing Operations of an Individual Router Interface on page 167](#)
- [Damping Interface Transitions on page 168](#)
- [Configuring Multiservice Physical Interface Properties on page 168](#)
- [Enabling or Disabling SNMP Notifications on Physical Interfaces on page 169](#)

- [Understanding Unidirectional Traffic Flow on Physical Interfaces](#) on page 170
- [Improvements to Interface Transmit Statistics Reporting](#) on page 171
- [Disabling a Physical Interface](#) on page 171

## Physical Interface Configuration Statements Overview

The software driver for each network media type sets reasonable default values for general interface properties, such as the interface's maximum transmission unit (MTU) size, receive and transmit leaky bucket properties, link operational mode, and clock source.

M Series, MX Series, T Series, and J Series routers are factory configured according to the specific router, its features, and its physical interfaces. This section includes a default configuration example showing the statements used to configure the physical interfaces properties. Additional statements are used to set properties for specific interface types and are described in “[Physical Interfaces Properties Statements List](#)” on page 89.

To modify any of the default general interface properties, include the appropriate statements at the `[edit interfaces interface-name]` hierarchy level:



**NOTE:** The following configuration hierarchy and its included statements are shown only as an example of a configuration statement hierarchy and should not be referenced for resolving actual configurations. For information on a specific hierarchy level, see the hierarchy level document for that specific hierarchy, for example “[\[edit interfaces\] Hierarchy Level](#)” on page 4.

```

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 (Interfaces));
        periodic interval;
        system-priority priority;
      }
      link-protection;
      link-speed speed;
      (loopback | no-loopback);
      minimum-links number;
      source-address-filter {
        mac-address
      }
      (source-filtering | no-source-filtering);
    }
  }
}

```

```

}
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);
    }
    vpi vpi-identifier {
        maximum-vcs maximum-vcs;
        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;
        }
    }
}
}
clocking clock-source;
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;
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;
    buildout 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;
        }
    }
    source-address-filter {
        mac-address;
    }
}

```

```
(source-filtering | no-source-filtering);  
ethernet-switch-profile {  
    (mac-learn-enable | no-mac-learn-enable);  
    tag-protocol-id [ tpid ];  
    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-police-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;  
interface-set interface-set-name {  
    interface ethernet-interface-name {  
        (unit unit-number | vlan-tags-outlet vlan-tag );  
    }  
}  
  
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 | nt);  
    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);
  cisco-interoperability send-lip-remove-link-for-link-reject;
  drop-timeout milliseconds;
  fragment-threshold bytes;
  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;
  encapsulation type;
}
modem-options {
  dialin (console | routable);
  init-command-string initialization-command-string;
}
mtu bytes;
multiservice-options {
  (core-dump | no-core-dump);
  (syslog | no-syslog);
  (dump-on-flow-control);
  flow-control-options {
    down-on-flow-control;
    dump-on-flow-control;
    reset-on-flow-control;
  }
}
native-vlan-id number;
no-gratuitous-arp-request;
no-keepalives;
no-partition {
  interface-type type;
}
optics-options {
  wavelength nm;
  alarmalarm-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;
        passive;
    }
}
receive-bucket {
    overflow (discard | tag);
    rate percentage;
    threshold bytes;
}
redundancy-options {
    primary sp-fpc/pic/port;
    secondary sp-fpc/pic/port;
}
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;
loopbackmode;
rts-polarity (negative | positive);
tm-polarity (negative | positive);
transmit-clock invert;
}
services-options {
    inactivity-timeout seconds;
    open-timeout seconds;
    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;
        authentication-key key;
        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 | auto) | speed (auto | 1Gbps | 100Mbps | 10Mbps) | speed
(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);
    }
}
}
multicast-statistics
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 {
    logical-interface-statements;
  }
}

```

Related Documentation • [Router Interfaces Overview on page 30](#)

## Physical Interfaces Properties Statements List

Table 12 on page 89 lists statements that you can use to configure physical interfaces.

Table 12: Statements for Physical Interface Properties

| Statement                        | Interface Types   | Usage Guidelines  |
|----------------------------------|---|---|
| <code>802.3ad aex</code>         | Aggregated Ethernet interfaces                              | <i>Aggregated Ethernet Interfaces Overview</i>                                |
| <code>access-profile name</code> | Interfaces with Point-to-Point Protocol (PPP) encapsulation | "Configuring the PPP Challenge Handshake Authentication Protocol" on page 136 |

Table 12: Statements for Physical Interface Properties (*continued*)

| Statement  | Interface Types  | Usage Guidelines   |
|--|--|--|
| <code>accounting-profile</code> <i>name</i>  | All  | <a href="#">"Configuring Accounting for the Physical Interface" on page 159</a>  |
| <code>acfc</code>  | Interfaces with PPP encapsulation  | <i>Configuring PPPoE</i>   |
| <code>acknowledge-retries</code> <i>number</i>   | Link services and voice services interfaces  | <i>Junos OS Services Interfaces Library for Routing Devices</i>  |
| <code>acknowledge-timer</code> <i>milliseconds</i>   | Link services and voice services interfaces  | <i>Junos OS Services Interfaces Library for Routing Devices</i>  |
| <code>action-red-differential-delay</code><br>( <code>disable-tx</code>   <code>remove-link</code> ) | Link services and voice services interfaces  | <i>Junos OS Services Interfaces Library for Routing Devices</i>  |
| <code>advertise-interval</code> <i>milliseconds</i>  | SONET/SDH interfaces   | <i>Configuring APS Timers</i>  |
| <code>aggregate</code>   | Gigabit Ethernet intelligent queuing (IQ and IQE) interfaces and Gigabit Ethernet interfaces with small form-factor pluggable transceivers (SFPs) (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router) | <i>Configuring Gigabit Ethernet Policers</i>   |
| <code>aggregate</code> <i>asx</i>  | Aggregated SONET/SDH interfaces  | <i>Configuring Aggregated SONET/SDH Interfaces</i>   |
| <code>aggregated-ether-options</code>  | Aggregated Ethernet interfaces   | <i>Aggregated Ethernet Interfaces Overview</i>   |
| <code>aggregate-ports</code>   | SONET/SDH interfaces   | <a href="#">"Configuring 4-Port OC192 PIC to Operate in OC768-over-OC192 Mode" on page 116</a>                                   |
| <code>aggregated-sonet-options</code>  | Aggregated SONET/SDH interfaces  | <i>Configuring Aggregated SONET/SDH Interfaces</i>   |
| <code>alarm</code> <i>alarm-name</i><br>( <code>syslog</code>   <code>link-down</code> )             | 10-Gigabit Ethernet interfaces   | <i>Configuring 10-Gigabit Ethernet Link Down Notification for Optics Options Alarm or Warning</i>                                |
| <code>annex</code> ( <code>annex-a</code>   <code>annex-b</code> )                                   | ATM interfaces on J Series routers<br><br>SONET interfaces using annex-b for MSP switching on M320 and M120 Routers  | <i>Configuring SHDSL Operating Mode on an ATM Physical Interface</i><br><br><i>Configuring Basic Automatic Protect Switching</i> |
| <code>aps</code>   | SONET/SDH interfaces   | <i>SONET/SDH Physical Interface Properties Overview</i>  |
| <code>atm-encapsulation</code> ( <code>direct</code>   <code>plcp</code> )                           | E3 and T3 traffic over Asynchronous Transfer Mode (ATM) interfaces   | <i>Configuring E3 and T3 Parameters on ATM Interfaces</i>  |

Table 12: Statements for Physical Interface Properties (*continued*)

| Statement   | Interface Types  | Usage Guidelines   |
|---|--|--|
| <code>atm-options</code>                                  | ATM1 and ATM2 IQ interfaces  | <a href="#">"Interface Encapsulations Overview" on page 51</a> |
| <code>authentication-key key</code>                       | SONET/SDH interfaces   | <i>SONET/SDH Physical Interface Properties Overview</i>        |
| <code>backup-interface</code>                             | E1, E3, T1, T3 and Fast Ethernet   | <i>Configuring ISDN Logical Interface Properties</i>           |
| <code>bandwidth-limit bps</code>                          | Gigabit Ethernet and Gigabit Ethernet IQ and IQE PICs with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router) | <i>Configuring Gigabit Ethernet Policers</i>                   |
| <code>bchannel-allocation (ascending   descending)</code> | J Series routers equipped with a Dual-Port Channelized T1/E1 PIM; for Integrated Services Digital Network Primary Rate Interfaces (ISDN PRI)                       | <i>Allocating B-Channels for Dialout</i>                       |
| <code>bert-algorithm algorithm</code>                     | E3, T1, T3, multichannel DS3, channelized interfaces (DS3, OC12, and STM1), and channelized IQ and IQE interfaces (E1 and DS3)                                     | <a href="#">"Interface Diagnostics" on page 163</a>            |
| <code>bert-error-rate rate</code>                         | E1, E3, T1, T3, and channelized interfaces (DS3, OC3, OC12, and STM1)  | <a href="#">"Interface Diagnostics" on page 163</a>            |
| <code>bert-period seconds</code>                          | E1, E3, T1, T3, and channelized interfaces (DS3, OC12, and STM1)   | <a href="#">"Interface Diagnostics" on page 163</a>            |
| Configuring the T1 Buildout <code>value</code>            | T1 interfaces  | <i>Configuring the T1 Buildout</i>                             |
| <code>buildout feet</code>                                | E3 and T3 traffic over ATM interfaces  | <i>Configuring E3 and T3 Parameters on ATM Interfaces</i>      |
| <code>burst-size-limit bytes</code>                       | Gigabit Ethernet and Gigabit Ethernet IQ and IQE PICs with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router) | <i>Configuring Gigabit Ethernet Policers</i>                   |
| <code>byte-encoding (nx56   nx64)</code>                  | DS0 and T1 interfaces  | <i>Configuring T1 Byte Encoding</i>                            |
| <code>bytes [ values</code>                               | SONET/SDH interfaces   | <i>Configuring SONET/SDH Header Byte Values</i>                |
| <code>cbit-parity   no-cbit-parity</code>                 | T3 interfaces  | <i>Disabling T3 C-Bit Parity Mode</i>                          |
| <code>cbr rate</code>                                     | ATM interfaces   | <i>Defining the ATM Traffic-Shaping Profile</i>                |

Table 12: Statements for Physical Interface Properties (*continued*)

| Statement  | Interface Types  | Usage Guidelines  |
|--|--|---|
| <code>cell-bundle-size cells</code>  | ATM2 IQ interfaces using ATM Layer 2 circuit cell-relay transport mode | <i>Configuring the Layer 2 Circuit Cell-Relay Cell Maximum</i>  |
| <code>chap</code>  | Interfaces with PPP encapsulation                                      | "Configuring the PPP Challenge Handshake Authentication Protocol" on page 136                         |
| <code>cisco-interoperability</code><br><code>send-lip-remove-link-for-link-reject</code> | link services IQ (lsq) interfaces                                      | <i>Junos OS Services Interfaces Library for Routing Devices</i>                                       |
| <code>classifier</code>  | Gigabit Ethernet IQ interfaces   | <i>Configuring Gigabit Ethernet Policers</i>  |
| <code>clocking clock-source</code>   | ATM, DS0, E1, E3, SONET/SDH, T1, and T3 interfaces                     | "Configuring the Clock Source" on page 156  |
| <code>clocking-mode</code> (dce   internal   loop)                                       | Serial interfaces (EIA-530 and V.35)                                   | "Configuring the Serial Clocking Mode" on page 301  |
| <code>clock-rate rate</code>   | Serial interfaces (EIA-530 and V.35)                                   | "Configuring the DTE Clock Rate" on page 302  |
| <code>compatibility-mode mode</code>   | E3 and T3 interfaces   | <i>Configuring the E3 CSU Compatibility Mode</i> and <i>Configuring the T3 CSU Compatibility Mode</i> |
| <code>compression</code>   | Interfaces with PPP encapsulation                                      | "Configuring the PPP Protocol Field Compression" on page 147  |
| <code>control-polarity</code> (negative   positive)                                      | Serial interfaces (X.21)   | "Configuring Serial Signal Polarities" on page 306  |
| <code>control-signal</code> (assert   de-assert   normal)                                | Serial interfaces (X.21)   | "Configuring the Serial Signal Handling" on page 303  |
| <code>core-dump</code>   <code>no-core-dump</code> )                                     | Adaptive services, monitoring services, and collector interfaces       | "Configuring Multiservice Physical Interface Properties" on page 168                                  |
| <code>cts</code> (ignore   normal   require)   | Serial interfaces (EIA-530 and V.35)                                   | "Configuring the Serial Signal Handling" on page 303  |
| <code>cts-polarity</code> (negative   positive)  | Serial interfaces (EIA-530 and V.35)                                   | "Configuring Serial Signal Polarities" on page 306  |
| <code>current margin</code>  | ATM interfaces on J Series routers                                     | <i>Configuring SHDSL Operating Mode on an ATM Physical Interface</i>                                  |
| <code>dcd</code> (ignore   normal   require)   | Serial interfaces (EIA-530 and V.35)                                   | "Configuring the Serial Signal Handling" on page 303  |

Table 12: Statements for Physical Interface Properties (*continued*)

| Statement                                  | Interface Types  | Usage Guidelines  |
|--|--|---|
| <b>dcd-polarity</b> (negative   positive)  | Serial interfaces (EIA-530 and V.35)   | "Configuring Serial Signal Polarities" on page 306  |
| <b>dce</b>                                 | Interfaces with Frame Relay encapsulation                                    | "Configuring the Router as a DCE with Frame Relay Encapsulation" on page 157  |
| <b>dce-options</b>                         | Serial interfaces (EIA-530, V.35, and X.21) on J Series routers              | "Configuring the Serial Signal Handling" on page 303  |
| <b>default-chap-secret</b> <i>name</i>     | Interfaces with Point-to-Point Protocol (PPP) encapsulation                  | "Configuring a Default CHAP Secret" on page 137   |
| <b>description</b> <i>text</i>             | All  | "Configuring Interface Description" on page 117   |
| <b>dialer-options</b>                      | ISDN interfaces  | <i>Configuring ISDN Physical Interface Properties</i>   |
| <b>disable</b>                             | All  | "Disabling a Physical Interface" on page 171 and "Tracing Operations of an Individual Router Interface" on page 167 |
| <b>dot1x</b>                               | 802.1x Port-Based Network Access Control                                     | <i>IEEE 802.1x Port-Based Network Access Control Overview</i>   |
| <b>down-count</b>                          | ATM interfaces   | <i>Configuring the ATM OAM F5 Loopback Cell Threshold</i>   |
| <b>drop-timeout</b> <i>milliseconds</i>    | Multilink, link services, and voice services interfaces                      | <i>Junos OS Services Interfaces Library for Routing Devices</i>   |
| <b>ds0-options</b>                         | DS0 interfaces   | <i>Channelized Interfaces Overview</i>  |
| <b>dsr</b> (ignore   normal   require)     | Serial interfaces (EIA-530 and V.35)   | "Configuring the Serial Signal Handling" on page 303  |
| <b>dsr-polarity</b> (negative   positive)  | Serial interfaces (EIA-530 and V.35)   | "Configuring Serial Signal Polarities" on page 306  |
| <b>dte-options</b>                         | Serial interfaces (EIA-530, V.35, and X.21) on M Series and T Series routers | "Configuring the Serial Signal Handling" on page 303  |
| <b>dtr</b> <i>signal-handling-option</i>   | Serial interfaces (EIA-530 and V.35)   | "Configuring the Serial Signal Handling" on page 303  |
| <b>dtr-circuit</b> (balanced   unbalanced) | Serial interfaces (EIA-530 and V.35)   | "Configuring the Serial DTR Circuit" on page 306  |
| <b>dtr-polarity</b> (negative   positive)  | Serial interfaces (EIA-530 and V.35)   | "Configuring Serial Signal Polarities" on page 306  |

Table 12: Statements for Physical Interface Properties (*continued*)

| Statement  | Interface Types  | Usage Guidelines  |
|--|--|---|
| <a href="#">e1-options</a>                               | E1 interfaces  | <i>E1 Interfaces Overview</i>   |
| <a href="#">e3-options</a>                               | E3 interfaces  | <i>E3 Interfaces Overview</i>   |
| <a href="#">encapsulation type</a>                       | All interfaces, except loopback and multicast tunnel   | <a href="#">“Configuring Interface Encapsulation on Physical Interfaces” on page 130</a>  |
| <a href="#">encoding (nrz   nrzi)</a>                    | Serial interfaces (EIA-530, V.35, and X.21)  | <a href="#">“Configuring Serial Line Encoding” on page 309</a>  |
| <a href="#">epd-threshold cells</a>                      | ATM2 interfaces  | <i>Configuring ATM2 IQ VC Tunnel CoS Components</i>   |
| <a href="#">es-options</a>                               | ES interfaces  | <i>Junos OS Services Interfaces Library for Routing Devices</i>   |
| <a href="#">ethernet-policer-profile</a>                 | Gigabit Ethernet and Gigabit Ethernet IQ and IQE PICs with SFPs (except the 10-port Gigabit Ethernet PIC, and the built-in Gigabit Ethernet port on the M7i router)  | <i>Configuring Gigabit Ethernet Policers</i>  |
| <a href="#">ethernet-switch-profile</a>                  | Gigabit Ethernet and Gigabit Ethernet IQ and IQE PICs with SFPs (except the 10-port Gigabit Ethernet PIC, Aggregated Ethernet with Gigabit Ethernet IQ interfaces, and the built-in Gigabit Ethernet port on the M7i router) | <i>Configuring Gigabit Ethernet Policers, Configuring MAC Address Filtering, and Configuring the Management Ethernet Interface</i>  |
| <a href="#">facility-override facility-name</a>          | Adaptive services interfaces   | <i>Junos OS Services Interfaces Library for Routing Devices</i>   |
| <a href="#">fastether-options</a>                        | Fast Ethernet interfaces   | <i>Ethernet Interfaces Overview</i>   |
| <a href="#">fcs (16   32)</a>                            | E1/E3, SONET/SDH, and T1/T3 interfaces   | <i>Configuring the E1 Frame Checksum, Configuring the E3 Frame Checksum, Configuring the SONET/SDH Frame Checksum, Configuring the T1 Frame Checksum, and Configuring the T3 Frame Checksum</i> |
| <a href="#">feac-loop-respond   no-feac-loop-respond</a> | T3 interfaces  | <i>Configuring the T3 FEAC Response</i>   |
| <a href="#">flow-control   no-flow-control</a>           | Aggregated Ethernet, Fast Ethernet, and Gigabit Ethernet interfaces  | <i>Configuring Flow Control</i>   |
| <a href="#">force</a>                                    | SONET/SDH interfaces   | <i>Configuring Switching Between the Working and Protect Circuits</i>   |



Table 12: Statements for Physical Interface Properties (*continued*)

| Statement   | Interface Types  | Usage Guidelines  |
|---|--|---|
| <code>forwarding-class class-name</code>                      | ATM2 IQ interfaces   | <i>Configuring ATM2 IQ VC Tunnel CoS Components</i>   |
| <code>forwarding-class class-name</code>                      | Gigabit Ethernet IQ interfaces   | <i>Configuring Gigabit Ethernet Policers</i>  |
| <code>fragment-threshold bytes</code>                         | Multilink, link services, and voice services interfaces  | <i>Junos OS Services Interfaces Library for Routing Devices</i>   |
| <code>framing framing-type</code>                             | E1, E3, and T1 interfaces  | <i>Configuring E3 and T3 Parameters on ATM Interfaces, Configuring E1 Framing, and Configuring T1 Framing</i>   |
| <code>framing framing-type</code>                             | 10-Gigabit Ethernet interfaces   | <i>10-Gigabit Ethernet Framing Overview</i>   |
| <code>framing framing-type</code>                             | SONET interfaces   | <i>Configuring SONET/SDH Framing Mode</i>   |
| <code>gether-options</code>                                   | Gigabit Ethernet and Tri-Rate Ethernet copper interfaces   | <i>Ethernet Interfaces Overview</i>   |
| <code>(gratuitous-arp-reply   no-gratuitous-arp-reply)</code> | Ethernet interfaces  | <i>Configuring Gratuitous ARP</i>   |
| <code>hello-timer milliseconds</code>                         | Link services and voice services interfaces  | <i>Junos OS Services Interfaces Library for Routing Devices</i>   |
| <code>high-plp-max-threshold</code>                           | ATM2 interfaces  | <i>Configuring ATM2 IQ VC Tunnel CoS Components</i>   |
| <code>high-plp-threshold percent</code>                       | ATM2 interfaces  | <i>Configuring ATM2 IQ VC Tunnel CoS Components</i>   |
| <code>hold-time milliseconds</code>                           | SONET/SDH interfaces   | <i>SONET/SDH Physical Interface Properties Overview</i>   |
| <code>hold-time up milliseconds down milliseconds</code>      | All interfaces, except aggregated SONET/SDH, generalized routing encapsulation (GRE) tunnel, and IP tunnel | <i>Configuring SONET/SDH Defect Triggers</i>  |
| <code>host hostname</code>                                    | Adaptive services interfaces   | <i>Junos OS Services Interfaces Library for Routing Devices</i>   |
| <code>ieee802.1p premium [values]</code>                      | Gigabit Ethernet IQ interfaces   | <i>Configuring Gigabit Ethernet Policers</i>  |
| <code>idle-cycle-flag value</code>                            | E1, E3, T1, and T3 interfaces  | <i>Configuring the E1 Idle Cycle Flag, Configuring the E3 Idle Cycle Flag, Configuring the T1 Idle Cycle Flag, and Configuring the T3 Idle Cycle Flag</i> |
| <code>ignore-all</code>                                       | Serial interfaces (EIA-530, V.35, and X.21)  | <i>"Configuring the Serial Signal Handling" on page 303</i>   |

Table 12: Statements for Physical Interface Properties (*continued*)

| Statement  | Interface Types   | Usage Guidelines   |
|--|---|--|
| <code>ilmi</code>  | ATM interfaces  | <i>Configuring Communication with Directly Attached ATM Switches and Routers</i>                       |
| <code>inactivity-timeout seconds</code>  | Adaptive services interfaces  | <i>Junos OS Services Interfaces Library for Routing Devices</i>  |
| <code>indication (ignore   normal   require)</code>  | Serial interfaces (X.21)  | <a href="#">“Configuring the Serial Signal Handling” on page 303</a>                                   |
| <code>indication-polarity (negative   positive)</code>   | Serial interfaces (X.21)  | <a href="#">“Configuring Serial Signal Polarities” on page 306</a>                                     |
| <code>ingress-rate-limit rate</code>   | 8-port, 12-port, and 48-port Fast Ethernet interfaces               | <i>Configuring the Ingress Rate Limit</i>  |
| <code>input-priority-map</code>  | Gigabit Ethernet IQ interfaces                                      | <i>Configuring Gigabit Ethernet Policers</i>   |
| <code>interface-type type</code>   | Channelized IQ and IQE interfaces, ISDN interfaces                  | <i>Channelized Interfaces Overview and Configuring ISDN Physical Interface Properties</i>              |
| <code>invert-data</code>   | DS0, E1, E3, and T1 interfaces                                      | <i>Configuring E1 Data Inversion, Configuring E3 Data Inversion, and Configuring T1 Data Inversion</i> |
| <code>isdn-options</code>  | ISDN interfaces   | <i>Configuring ISDN Logical Interface Properties</i>   |
| <code>keepalives &lt;down-count number &lt;interval seconds&gt; &lt;up-count number&gt;</code> | Aggregated SONET/SDH, DS0, E1, E3, SONET/SDH, T1, and T3 interfaces | <a href="#">“Configuring Keepalives” on page 152</a>   |
| <code>lACP mode</code>   | Aggregated Ethernet interfaces                                      | <i>Configuring Aggregated Ethernet LACP</i>  |
| <code>line-encoding (ami   b8zs)</code>  | T1 interfaces   | <i>Configuring T1 Line Encoding</i>  |
| <code>line-protocol protocol</code>  | Serial interfaces (EIA-530, V.35, and X.21)                         | <a href="#">“Configuring the Serial Line Protocol” on page 297</a>                                     |
| <code>line-rate line-rate</code>   | ATM interfaces on J Series routers                                  | <i>Configuring SHDSL Operating Mode on an ATM Physical Interface</i>                                   |
| <code>linear-red-profile profile-name</code>   | ATM2 interfaces   | <i>Configuring ATM2 IQ VC Tunnel CoS Components</i>  |
| <code>linear-red-profiles profile-name</code>  | ATM2 interfaces   | <i>Configuring ATM2 IQ VC Tunnel CoS Components</i>  |

Table 12: Statements for Physical Interface Properties (*continued*)

| Statement                                       | Interface Types  | Usage Guidelines  |
|---|--|---|
| <code>link-layer-overhead percent</code>        | AS PIC link services IQ interfaces ( <b>lsq</b> )  | <i>Junos OS Services Interfaces Library for Routing Devices</i>   |
| <code>link-mode mode</code>                     | Management Ethernet ( <b>fxp0</b> or <b>em0</b> ) and Fast Ethernet interfaces                     | <a href="#">“Configuring the Link Characteristics” on page 118</a> , <a href="#">“Understanding Management Ethernet Interfaces” on page 31</a>  |
| <code>link-speed speed</code>                   | Aggregated Ethernet interfaces   | <i>Configuring Aggregated Ethernet Link Speed</i>   |
| <code>link-speed speed</code>                   | Aggregated SONET/SDH interfaces  | <i>Configuring Aggregated SONET/SDH Interfaces</i>  |
| <code>lmi lmi-options</code>                    | Interfaces with Frame Relay encapsulation  | <i>Configuring Frame Relay Keepalives and Junos OS Services Interfaces Library for Routing Devices</i>  |
| <code>lmi</code>                                | OAM CFM Ethernet Local Management Interface  | <i>Configuring Ethernet Local Management Interface</i>  |
| <code>lmi-type (ansi   itu   c-lmi)</code>      | Link services interfaces and interfaces with Frame Relay encapsulation                             | <i>Configuring Frame Relay Keepalives</i>   |
| <code>local-name name</code>                    | Interfaces with PPP encapsulation  | <a href="#">“Configuring the PPP Challenge Handshake Authentication Protocol” on page 136</a>   |
| <code>lockout</code>                            | SONET/SDH interfaces   | <i>Configuring Annex B Option</i>   |
| <code>log-prefix prefix-number</code>           | Adaptive services interfaces   | <i>Junos OS Services Interfaces Library for Routing Devices</i>   |
| <code>(long-buildout   no-long-buildout)</code> | T3 interfaces  | <i>Configuring the T3 Line Buildout</i>   |
| <code>(loop-timing   no-loop-timing)</code>     | Channelized IQ interfaces  | <i>Configuring the Channelized T3 Loop Timing</i>   |
| <code>loopback mode</code>                      | DS0, E1, E3, T1, T3, SHDSL on ATM and ATM interfaces on J Series routers, and SONET/SDH interfaces | <i>Configuring E1 Loopback Capability, Configuring E3 Loopback Capability, Configuring T1 Loopback Capability, Configuring T3 Loopback Capability, Configuring SHDSL Operating Mode on an ATM Physical Interface, Configuring SONET/SDH Loopback Capability, and Configuring Ethernet Loopback Capability</i> |
| <code>loopback mode</code>                      | Ethernet and 10-Gigabit Ethernet interfaces in WAN PHY mode  | <i>Configuring Ethernet Loopback Capability</i>   |
| <code>loopback mode</code>                      | Serial interfaces  | <a href="#">“Configuring Serial Loopback Capability” on page 307</a>  |

Table 12: Statements for Physical Interface Properties (*continued*)

| Statement  | Interface Types   | Usage Guidelines   |
|--|---|--|
| ( <a href="#">loopback</a>   <a href="#">no-loopback</a> )   | Aggregated Ethernet, Fast Ethernet, and Gigabit Ethernet interfaces   | <i>Configuring Ethernet Loopback Capability</i>  |
| <a href="#">loss-priority</a> (high   low)   | Gigabit Ethernet IQ interfaces  | <i>Configuring Gigabit Ethernet Policers</i>   |
| <a href="#">lowest-priority-defect</a> (all-defects   err-xcon   mac-rem-err-xcon   no-defect   rem-err-xcon   xcon) | Configuring IEEE 802.1ag OAM connectivity-fault management  | <i>Configuring a Maintenance Endpoint</i>  |
| <a href="#">low-plp-max-threshold</a> <i>percent</i>   | ATM2 interfaces   | <i>Configuring ATM2 IQ VC Tunnel CoS Components</i>  |
| <a href="#">low-plp-threshold</a> <i>percent</i>   | ATM2 interfaces   | <i>Configuring ATM2 IQ VC Tunnel CoS Components</i>  |
| <a href="#">lsq-failure-options</a>  | Link services IQ (lsq) interfaces   | <i>Junos OS Services Interfaces Library for Routing Devices</i>  |
| <a href="#">mac</a> <i>mac-address</i>   | Management Ethernet interface ( <a href="#">fxp0</a> or <a href="#">em0</a> )   | <i>Configuring the MAC Address on the Management Ethernet Interface, "Understanding Management Ethernet Interfaces" on page 31</i> |
| ( <a href="#">mac-learn-enable</a>   <a href="#">no-mac-learn-enable</a> )   | Gigabit Ethernet IQ and IQE, Tri-Rate Ethernet copper, and Gigabit Ethernet PICs with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router) | <i>Configuring Gigabit Ethernet Policers</i>   |
| <a href="#">master-only</a> ;  | Management Ethernet ( <a href="#">fxp0</a> or <a href="#">em0</a> ) and Fast Ethernet interfaces  | <i>Configuring a Consistent Management IP Address, "Understanding Management Ethernet Interfaces" on page 31</i>                   |
| <a href="#">maximum-vc</a> <i>maximum-vc</i>   | ATM interfaces  | <i>Configuring the Maximum Number of ATM1 VCs on a VP</i>  |
| <a href="#">mc-ae</a>  | Aggregated Ethernet interfaces  | <i>Configuring Multichassis Link Aggregation</i>   |
| <a href="#">minimum-links</a> <i>number</i>  | Multilink, link services, and voice services interfaces   | <i>Junos OS Services Interfaces Library for Routing Devices</i>  |
| <a href="#">mip-half-function</a>  | Connectivity Fault Management   | <i>Configuring IEEE 802.3ah OAM Link-Fault Management</i>  |
| <a href="#">mlfr-uni-nni-bundle-options</a> <i>bundle-options</i>  | Link services and voice services interfaces   | <i>Junos OS Services Interfaces Library for Routing Devices</i>  |

Table 12: Statements for Physical Interface Properties (*continued*)

| Statement                                   | Interface Types   | Usage Guidelines  |
|---|---|---|
| <code>mpls</code>                           | 10-Gigabit Ethernet interfaces in WAN PHY mode and ATM and SONET/SDH interfaces in passive monitoring mode                      | <i>Removing MPLS Labels from Incoming Packets, Enabling Passive Monitoring on SONET/SDH Interfaces, and SONET/SDH Physical Interface Properties Overview</i>  |
| <code>mrru bytes</code>                     | Link services and voice services interfaces   | <i>Junos Services Interfaces Configuration Guide</i>  |
| <code>mtu bytes</code>                      | All interfaces, except management Ethernet ( <code>fxp0</code> or <code>em0</code> ), loopback, multilink, and multicast tunnel | <a href="#">“Configuring the Media MTU” on page 119</a> , <a href="#">“Understanding Management Ethernet Interfaces” on page 31</a>   |
| <code>multicast-statistics</code>           | Ethernet, SONET, aggregated Ethernet, and aggregated SONET interfaces.  | <i>Configuring Multicast Statistics Collection on Aggregated Ethernet Interfaces, Configuring Multicast Statistics Collection on SONET Interfaces, Configuring Multicast Statistics Collection on Ethernet Interfaces, and Configuring Multicast Statistics Collection on Aggregated SONET Interfaces</i> |
| <code>multiservice-options</code>           | Adaptive services, monitoring services, and collector interfaces  | <a href="#">“Configuring Multiservice Physical Interface Properties” on page 168</a>  |
| <code>n391 number</code>                    | Link services and voice services interfaces   | <i>Junos OS Services Interfaces Library for Routing Devices</i>   |
| <code>n392 number</code>                    | Link services and voice services interfaces   | <i>Junos OS Services Interfaces Library for Routing Devices</i>   |
| <code>n393 number</code>                    | Link services and voice services interfaces   | <i>Junos OS Services Interfaces Library for Routing Devices</i>   |
| <code>neighbor address</code>               | SONET/SDH interfaces  | <i>SONET/SDH Physical Interface Properties Overview</i>   |
| <code>no-gratuitous-arp-request</code>      | Ethernet interfaces   | <i>Configuring Gratuitous ARP</i>   |
| <code>no-keepalives</code>                  | Interfaces with PPP, Frame Relay, or Cisco High-level Data Link Control (HDLC) encapsulation                                    | <a href="#">“Configuring Keepalives” on page 152</a>  |
| <code>no-partition</code>                   | Channelized IQ interfaces   | <i>Channelized Interfaces Overview</i>  |
| <code>no-termination-request</code>         | Link Services IQ (LSQ) interfaces   | <i>Junos OS Services Interfaces Library for Routing Devices</i>   |
| <code>oam-liveness</code>                   | ATM interfaces  | <i>Configuring the OAM F4 Cell Flows</i>  |
| <code>oam-period (seconds   disable)</code> | ATM interfaces  | <i>Defining the ATM OAM F5 Loopback Cell Period</i>   |

Table 12: Statements for Physical Interface Properties (*continued*)

| Statement  | Interface Types  | Usage Guidelines   |
|--|--|--|
| <code>oc-slice</code> <code>oc-slice-range</code>                      | Channelized OC12 IQ interfaces   | <i>Channelized OC12/STM4 IQ and IQE Interfaces Overview</i>  |
| <code>open-timeout</code> <code>seconds</code>                         | Adaptive services interfaces   | <i>Junos OS Services Interfaces Library for Routing Devices</i>  |
| <code>optics-options</code>  | Gigabit Ethernet dense wavelength-division multiplexing (DWDM) interfaces                                      | <i>Ethernet DWDM Interface Wavelength Overview</i>   |
| <code>output-priority-map</code>                                       | Gigabit Ethernet IQ interfaces   | <i>Configuring Gigabit Ethernet Policers</i>   |
| <code>overflow</code> (discard   tag)<br>(Receive bucket)              | All interfaces, except ATM, channelized E1, E1, Fast Ethernet, Gigabit Ethernet, and channelized IQ interfaces | <a href="#">“Configuring Receive and Transmit Leaky Bucket Properties” on page 158</a>   |
| <code>overflow</code> (discard)<br>(Transmit bucket)                   |  |  |
| <code>paired-group</code> <code>group-name</code>                      | SONET/SDH interfaces   | <i>Configuring APS Load Sharing</i>  |
| <code>partition</code> <code>partition-number</code>                   | Channelized IQ interfaces  | <i>Channelized Interfaces Overview</i>   |
| <code>passive</code>   | Interfaces with PPP encapsulation  | <a href="#">“Configuring the PPP Challenge Handshake Authentication Protocol” on page 136</a>  |
| <code>passive-monitor-mode</code>                                      | SONET/SDH interfaces   | <i>Enabling Passive Monitoring on SONET/SDH Interfaces</i>   |
| <code>path-trace</code> <code>trace-string</code>                      | 10-Gigabit Ethernet interfaces in WAN PHY mode and SONET/SDH interfaces  | <i>Configuring the SONET/SDH Path Trace Identifier</i>   |
| ( <code>payload-scrambler</code>   <code>no-payload-scrambler</code> ) | E3, SONET/SDH, and T3 interfaces   | <i>Configuring E3 and T3 Parameters on ATM Interfaces, Configuring E3 HDLC Payload Scrambling, Configuring SONET/SDH HDLC Payload Scrambling, and Configuring T3 HDLC Payload Scrambling</i> |
| <code>periodic</code> <code>interval</code>                            | Aggregated Ethernet interfaces   | <i>Configuring Aggregated Ethernet LACP</i>  |
| <code>per-unit-scheduler</code>  | IQ interfaces  | <i>Junos OS Services Interfaces Library for Routing Devices</i>  |
| <code>pfc</code>   | Interfaces with PPP encapsulation  | <a href="#">“Configuring the PPP Protocol Field Compression” on page 147</a>   |
| <code>pic-type</code> (atm1   atm2)                                    | ATM2 IQ interfaces   | <i>Configuring the ATM PIC Type</i>  |

Table 12: Statements for Physical Interface Properties (*continued*)

| Statement                               | Interface Types  | Usage Guidelines   |
|---|--|--|
| <code>plp1 cells</code>                 | ATM2 interfaces  | <i>Configuring ATM2 IQ VC Tunnel CoS Components</i>  |
| <code>plp-to-clp</code>                 | ATM2 IQ interfaces   | <i>Configuring ATM2 IQ VC Tunnel CoS Components</i>  |
| <code>policer cos-policer-name</code>   | Gigabit Ethernet and Gigabit Ethernet IQ and IQE PICs with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router) | <i>Configuring Gigabit Ethernet Policers</i>   |
| <code>pop-all-labels</code>             | ATM and SONET/SDH interfaces in passive monitoring mode  | <i>Removing MPLS Labels from Incoming Packets and Enabling Passive Monitoring on SONET/SDH Interfaces</i>        |
| <code>ppp-options</code>                | Interfaces with PPP encapsulation  | <a href="#">“Configuring the PPP Challenge Handshake Authentication Protocol” on page 136</a>                    |
| <code>premium</code>                    | Enhanced Intelligent Queuing (IQE) interfaces (hierarchical policer)   | <a href="#">“Applying Policers” on page 222</a> and <i>Junos OS Class of Service Library for Routing Devices</i> |
| <code>premium</code>                    | Gigabit Ethernet IQ interfaces (policer)   | <i>Configuring Gigabit Ethernet Policers</i>   |
| <code>premium</code>                    | Gigabit Ethernet IQ interfaces (output priority map)   | <i>Configuring Gigabit Ethernet Policers</i>   |
| <code>primary sp-fpc/pic/port</code>    | Redundant interfaces for adaptive services interfaces ( <code>rsp-</code> )  | <i>Junos OS Services Interfaces Library for Routing Devices</i>  |
| <code>priority (high   low)</code>      | ATM2 IQ interfaces   | <i>Configuring ATM2 IQ VC Tunnel CoS Components</i>  |
| <code>priority number</code>            | Ethernet protocols (OAM CFM)   | <i>Configuring a Maintenance Endpoint</i>  |
| <code>promiscuous-mode</code>           | ATM2 IQ interfaces   | <i>Configuring ATM Cell-Relay Promiscuous Mode</i>   |
| <code>protect-circuit group-name</code> | SONET/SDH interfaces   | <i>Configuring Switching Between the Working and Protect Circuits</i>  |
| <code>queue-depth cells</code>          | ATM2 interfaces  | <i>Configuring ATM2 IQ VC Tunnel CoS Components</i>  |
| <code>queue-length number</code>        | ATM1 interfaces  | <i>Configuring the ATM1 Queue Length</i>   |

Table 12: Statements for Physical Interface Properties (*continued*)

| Statement   | Interface Types   | Usage Guidelines  |
|---|---|---|
| <b>rate</b> <i>percentage</i>                             | All interfaces, except ATM, channelized E1, E1, Fast Ethernet, Gigabit Ethernet, and channelized IQ | <a href="#">“Configuring Receive and Transmit Leaky Bucket Properties” on page 158</a>                    |
| <b>receive-bucket</b>                                     | All interfaces, except ATM, Fast Ethernet, and Gigabit Ethernet                                     | <a href="#">“Configuring Receive and Transmit Leaky Bucket Properties” on page 158</a>                    |
| <b>red-differential-delay</b> <i>milliseconds</i>         | Link services and voice services interfaces   | <i>Junos OS Services Interfaces Library for Routing Devices</i>   |
| <b>redundancy-options</b>                                 | Redundant interfaces for adaptive services interfaces ( <b>rsp-</b> )                               | <i>Junos OS Services Interfaces Library for Routing Devices</i>   |
| <b>remote-loopback-respond</b>                            | T1 interfaces   | <i>Configuring the T1 Remote Loopback Response</i>  |
| <b>request</b>  | SONET/SDH interfaces  | <i>Configuring Switching Between the Working and Protect Circuits</i>                                     |
| <b>required-depth</b> <i>number</i>                       | ATM and SONET/SDH interfaces in passive monitoring mode   | <i>Removing MPLS Labels from Incoming Packets and Enabling Passive Monitoring on SONET/SDH Interfaces</i> |
| <b>revert-time</b> <i>seconds</i>                         | SONET/SDH interfaces  | <i>Configuring Revertive Mode</i>   |
| <b>rfc-2615</b>   | SONET/SDH interfaces  | <i>Configuring SONET/SDH RFC 2615 Support</i>   |
| <b>rts</b> (assert   de-assert   normal)                  | Serial interfaces (EIA-530 and V.35)  | <a href="#">“Configuring the Serial Signal Handling” on page 303</a>                                      |
| <b>rts-polarity</b> (negative   positive)                 | Serial interfaces (EIA-530 and V.35)  | <a href="#">“Configuring Serial Signal Polarities” on page 306</a>  |
| <b>rtvbr</b> <i>peak rate sustained rate burst length</i> | ATM interfaces  | <i>Defining the ATM Traffic-Shaping Profile</i>   |
| <b>scheduler-maps</b> <i>map-name</i>                     | ATM2 interfaces   | <i>Configuring ATM2 IQ VC Tunnel CoS Components</i>   |
| <b>schedulers</b> <i>number</i>                           | Ethernet IQ2 and IQ2-E PICs port interfaces   | <i>Junos OS Services Interfaces Library for Routing Devices</i>   |
| <b>secondary</b> <i>sp-fpc/pic/port</i>                   | Redundant interfaces for adaptive services interfaces ( <b>rsp-</b> )                               | <i>Junos OS Services Interfaces Library for Routing Devices</i>   |
| <b>services-options</b>                                   | Services interfaces   | <i>Junos OS Services Interfaces Library for Routing Devices</i>   |
| <b>serial-options</b>                                     | Serial interfaces (EIA-530, V.35, and X.21)   | <a href="#">“Serial Interfaces Overview” on page 295</a>  |



Table 12: Statements for Physical Interface Properties (*continued*)

| Statement   | Interface Types   | Usage Guidelines   |
|---|---|--|
| <code>services priority-level</code>                  | Adaptive services interfaces  | <i>Junos OS Services Interfaces Library for Routing Devices</i>  |
| <code>shdsl-options</code>                            | ATM interfaces on J Series routers  | <i>Configuring SHDSL Operating Mode on an ATM Physical Interface</i>   |
| <code>size</code>                                     | All   | <a href="#">“Tracing Operations of the Interface Process” on page 272</a>  |
| <code>shaping</code>                                  | ATM interfaces  | <i>Defining the ATM Traffic-Shaping Profile</i>  |
| <code>shaping</code>                                  | Circuit Emulation PICs  | <i>Configuring ATM QoS or Shaping</i>  |
| <code>snext margin</code>                             | ATM interfaces on J Series routers  | <i>Configuring SHDSL Operating Mode on an ATM Physical Interface</i>   |
| <code>snr-margin</code>                               | ATM interfaces on J Series routers  | <i>Configuring SHDSL Operating Mode on an ATM Physical Interface</i>   |
| <code>sonet-options</code>                            | SONET/SDH interfaces  | <i>SONET/SDH Physical Interface Properties Overview</i>  |
| <code>source-address-filter mac-address</code>        | Aggregated Ethernet, Fast Ethernet, Tri-Rate Ethernet copper, and Gigabit Ethernet interfaces   | <i>Enabling Ethernet MAC Address Filtering</i>   |
| <code>(source-filtering   no-source-filtering)</code> | Aggregated Ethernet, Fast Ethernet, Tri-Rate Ethernet copper, Gigabit Ethernet, Gigabit Ethernet IQ and IQE, and Gigabit Ethernet interfaces with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router) | <i>Enabling Ethernet MAC Address Filtering</i>   |
| <code>speed (10m   100m   1g   auto)</code>           | Management Ethernet interface ( <code>fxp0</code> or <code>em0</code> ), Tri-Rate Ethernet copper interfaces, and 12-port and 48-port Fast Ethernet interfaces  | <i>Configuring the Interface Speed on Ethernet Interfaces, “Understanding Management Ethernet Interfaces” on page 31</i> |
| <code>speed (oc3   oc12   oc48)</code>                | SONET/SDH PICs with SFP   | <i>Configuring SONET/SDH Interface Speed</i>   |
| <code>spid1spid2</code>                               | ISDN interfaces   | <i>Configuring ISDN Physical Interface Properties and Configuring ISDN Logical Interface Properties</i>                  |
| <code>stacked-vlan-tagging</code>                     | Gigabit Ethernet IQ interfaces  | <i>Stacking and Rewriting Gigabit Ethernet VLAN Tags Overview</i>  |

Table 12: Statements for Physical Interface Properties (*continued*)

| Statement   | Interface Types   | Usage Guidelines  |
|---|---|---|
| <a href="#">start-end-flag</a> (filler   shared)                | DSO, E1, E3, T1, and T3 interfaces  | <i>Configuring E1 Start and End Flags, Configuring the E3 Start and End Flags, Configuring T1 Start and End Flags, and Configuring T3 Start and End Flags</i> |
| <a href="#">switching-mode</a> (bidirectional   unidirectional) | Unchannelized OC3, OC12, and OC48 SONET/SDH interfaces on T Series routers                          | <i>Configuring Switching Mode</i>   |
| <a href="#">syslog</a>  | Adaptive services interfaces  | <i>Junos OS Services Interfaces Library for Routing Devices</i>   |
| ( <a href="#">syslog</a>   <a href="#">no-syslog</a> )          | Adaptive services, monitoring services, and collector interfaces                                    | <a href="#">"Configuring Multiservice Physical Interface Properties"</a> on page 168  |
| <a href="#">t1-options</a>                                      | T1 interfaces   | <i>T1 Interfaces Overview</i>   |
| <a href="#">t3-options</a>                                      | T3 interfaces   | <i>T3 Interfaces Overview</i>   |
| <a href="#">t310</a>  | ISDN interfaces   | <i>Configuring ISDN Physical Interface Properties</i>   |
| <a href="#">t391 seconds</a>                                    | Link services and voice services interfaces   | <i>Junos OS Services Interfaces Library for Routing Devices</i>   |
| <a href="#">t392 number</a>                                     | Link services and voice services interfaces   | <i>Junos OS Services Interfaces Library for Routing Devices</i>   |
| <a href="#">tei-option</a> (first-call   power-up)              | ISDN interfaces   | <i>Configuring ISDN Physical Interface Properties</i>   |
| <a href="#">threshold bytes</a>                                 | All interfaces, except ATM, channelized E1, E1, Fast Ethernet, Gigabit Ethernet, and channelized IQ | <a href="#">"Configuring Receive and Transmit Leaky Bucket Properties"</a> on page 158  |
| <a href="#">timeslots</a> <a href="#">time-slot-range</a>       | Channelized T1 IQ and channelized E1 IQ interfaces  | <i>Channelized Interfaces Overview</i>  |
| <a href="#">tm</a> (ignore   normal   require)                  | Serial interfaces (EIA-530)   | <a href="#">"Configuring the Serial Signal Handling"</a> on page 303  |
| <a href="#">tm-polarity</a> (negative   positive)               | Serial interfaces (EIA-530)   | <a href="#">"Configuring Serial Signal Polarities"</a> on page 306  |
| <a href="#">traceoptions</a>                                    | All   | <a href="#">"Tracing Operations of an Individual Router Interface"</a> on page 167  |
| <a href="#">traceoptions</a>                                    | All   | <a href="#">"Tracing Operations of the Interface Process"</a> on page 272   |

Table 12: Statements for Physical Interface Properties (*continued*)

| Statement  | Interface Types  | Usage Guidelines  |
|--|--|---|
| <code>transmit-bucket</code>   | All interfaces, except ATM, Fast Ethernet, Tri-Rate Ethernet copper, and Gigabit Ethernet  | <a href="#">“Configuring Receive and Transmit Leaky Bucket Properties” on page 158</a>                    |
| <code>transmit-clock invert</code>   | Serial interfaces (EIA-530, V.35, and X.21)  | <a href="#">“Configuring the Serial Clocking Mode” on page 301</a>  |
| <code>transmit-weight</code> (cells <i>number</i>   percent <i>number</i> )  | ATM2 IQ interfaces   | <i>Configuring ATM2 IQ VC Tunnel CoS Components</i>   |
| ( <code>traps</code>   <code>no-traps</code> )   | All  | <a href="#">“Enabling or Disabling SNMP Notifications on Physical Interfaces” on page 169</a>             |
| <code>trigger defect ignore</code>   <code>defect hold-time</code> up <i>milliseconds</i> down <i>milliseconds</i> ; | 10-Gigabit Ethernet interfaces in WAN PHY mode and ATM over SONET/SDH and SONET/SDH interfaces   | <i>Configuring SONET/SDH Defect Triggers</i>  |
| ( <code>unframed</code>   <code>no-unframed</code> )   | E3 IQ interfaces   | <i>Configuring E3 IQ and IQE Unframed Mode</i>  |
| <code>unidirectional</code>  | 10-Gigabit Ethernet interfaces on: <ul style="list-style-type: none"> <li>• MX960 4-Port 10-Gigabit Ethernet DPC</li> <li>• T Series 10-Gigabit Ethernet IQ2 PIC</li> <li>• T Series 10-Gigabit Ethernet IQ2E PIC</li> </ul> | <i>Enabling Unidirectional Traffic Flow on Physical Interfaces</i>  |
| <code>vbr peak rate</code> <code>sustained rate</code> <code>burst length</code>                                     | ATM interfaces   | <i>Defining the ATM Traffic-Shaping Profile</i>   |
| <code>vc-cos-mode</code> (alternate   strict)  | ATM2 interfaces  | <i>Configuring ATM2 IQ VC Tunnel CoS Components</i>   |
| <code>vlan-tagging</code>  | Fast Ethernet, Tri-Rate Ethernet copper, and Gigabit Ethernet interfaces   | <i>802.1Q VLANs Overview</i>  |
| <code>vlan-vci-tagging</code>  | Fast Ethernet, Tri-Rate Ethernet copper, Gigabit Ethernet, 10-Gigabit Ethernet, and aggregated Ethernet interfaces   | <a href="#">“Configuring ATM-to-Ethernet Interworking” on page 260</a>                                    |
| <code>vpi vpi-identifier</code>  | ATM interfaces   | <i>Configuring ATM Cell-Relay Promiscuous Mode and Configuring the Maximum Number of ATM1 VCs on a VP</i> |
| <code>vtmapping</code>   | Channelized STM1 interfaces  | <i>Configuring Channelized STM1 Interfaces</i>  |
| <code>warningwarning-name</code> (syslog   link-down)  | 10-Gigabit Ethernet interfaces   | <i>Configuring 10-Gigabit Ethernet Link Down Notification for Optics Options Alarm or Warning</i>         |

Table 12: Statements for Physical Interface Properties (*continued*)

| Statement   | Interface Types   | Usage Guidelines  |
|---|---|---|
| <code>wavelength nm</code>                          | Gigabit Ethernet dense wavelength-division multiplexing (DWDM) interfaces | <i>Ethernet DWDM Interface Wavelength Overview</i>                    |
| <code>working-circuit group-name</code>             | SONET/SDH interfaces  | <i>Configuring Switching Between the Working and Protect Circuits</i> |
| <code>yellow-differential-delay milliseconds</code> | Link services and voice services interfaces                               | <i>Junos OS Services Interfaces Library for Routing Devices</i>       |
| <code>(z0-increment   no-z0-increment)</code>       | SONET/SDH interfaces  | <i>Configuring an Incrementing STM ID</i>                             |

## Interface Ranges



**NOTE:** This task uses Junos OS for EX Series switches that does not support the Enhanced Layer 2 Software (ELS) configuration style. If your switch runs software that supports ELS, see *Interface Ranges*. For ELS details, see *Getting Started with Enhanced Layer 2 Software*.

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

- [Configuring Interface Ranges on page 106](#)
- [Expanding Interface Range Member and Member Range Statements on page 110](#)
- [Configuration Inheritance for Member Interfaces on page 111](#)
- [Member Interfaces Inheriting Configuration from Configuration Groups on page 112](#)
- [Interfaces Inheriting Common Configuration on page 113](#)
- [Configuring Inheritance Range Priorities on page 114](#)
- [Configuration Expansion Where Interface Range Is Used on page 114](#)

## Configuring Interface Ranges

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

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

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

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

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

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

To specify interfaces in lexical order, use the **member-range start-range to end-range** statement.

A range for a member statement should contain the following:

- **\***—All, specifies sequential interfaces from 0 through 47.



**CAUTION:** The wildcard **\*** in a member statement does not take into account the interface numbers supported by a specific interface type. Irrespective of the interface type, **\*** includes interface numbers ranging from 0 through 47 to the interface group. Therefore, use **\*** in a member statement with caution.

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

**Example: Specifying an  
Interface Range  
Member Range**

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

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

To specify the list of interface range members individually or for multiple interfaces using regex, use the **member list of interface names** statement.

**Example: Specifying an Interface Range Member**

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

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

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

**Example: Interface Range Common Configuration**

Configuration common to an interface range can be added as a part of the **interface-range** definition, as follows:

```
[edit]  
interfaces {  
  + interface-range foo {  
    + member-range ge-1/0/0 to ge-4/0/40;  
    + member ge-0/1/1;  
    + member ge-5/[1-10]/*;  
    /*Common configuration is added as part of interface-range definition*/  
    mtu 256;  
    hold-time up 10;  
    ether-options {  
      flow-control;  
      speed {  
        100m;  
      }  
      802.3ad primary;  
    }  
  }  
}
```

An **interface-range** definition having just **member** or **member-range** statements and no common configurations statements is valid.

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

**Example: Interface-Range foo Used Under the Protocols Hierarchy**

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

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



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

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

- protocols dot1x authentication interface
- protocols dvmrp interface
- protocols oam ethernet lmi interface
- protocols esis interface
- protocols igmp interface
- protocols igmp-host client *num* interface
- protocols mld-host client *num* interface
- protocols router-advertisement interface
- protocols isis interface
- protocols ldp interface
- protocols oam ethernet link-fault-management interface
- protocols lldp interface
- protocols link-management peer lmp-control-channel interface
- protocols link-management peer control-channel
- protocols link-management te-link *name* interface
- protocols mld interface
- protocols ospf area *id* interface
- protocols pim interface
- protocols router-discovery interface
- protocols rip group *name* neighbour
- protocols ripng group *name* neighbour
- protocols rsvp interface
- protocols snmp interface
- protocols layer2-control bpdu-block interface
- protocols layer2-control mac-rewrite interface

- protocols mpls interface
- protocols stp interface
- protocols rstp interface
- protocols mstp interface
- protocols vstp interface
- protocols mstp msti *id* interface
- protocols mstp msti vlan *id* interface
- protocols vstp vlan *name* interface
- protocols gvrp interface
- protocols igmp-snooping vlan *name* interface
- protocols lldp interface
- protocols lldp-med interface
- protocols sflow interfaces
- ethernet-switching-options analyzer *name* input [egress | ingress ] interface
- ethernet-switching-options analyzer *name* output interface
- ethernet-switching-options secure-access-port interface
- ethernet-switching-options interfaces ethernet-switching-options voip interface
- ethernet-switching-options redundant-trunk-group group *g1* interface
- ethernet-switching-options redundant-trunk-group group *g1* interface
- ethernet-switching-options bpdu-block interface
- poe interface vlans pro-bng-mc1-bsd1 interface

## Expanding Interface Range Member and Member Range Statements

All **member** and **member-range** statements in an interface range definition are expanded to generate the final list of interface names for the specified interface range.

### Example: Expanding Interface Range Member and Member Range Statements

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



```

    802.3ad primary;
  }
}

```

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

```
member-range ge-0/0/0 to ge-4/0/20
```

expands to:

```

[ge-0/0/0, ge-0/0/1 ... ge-0/0/max_ports
 ge-0/1/0 ge-0/1/1 ... ge-0/1/max_ports
 ge-0/2/0 ge-0/2/1 ... ge-0/2/max_ports
 .
 .
 ge-0/MAX_PICS/0 ... ge-0/max_pics/max_ports
 ge-1/0/0 ge-1/0/1 ... ge-1/0/max_ports
 .
 ge-1/MAX_PICS/0 ... ge-1/max_pics/max_ports
 .
 .
 ge-4/0/0 ge-4/0/1 ... ge-4/0/max_ports]

```

The following **member** statement:

```
ge-5/[0-5]/*
```

expands to:

```

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

```

The following **member** statement:

```
ge-5/1/[2,3,6,10]
```

expands to:

```

ge-5/1/2
ge-5/1/3
ge-5/1/6
ge-5/1/10

```

## Configuration Inheritance for Member Interfaces

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

**Example:** Foreground interface configuration takes priority over configuration inherited by the interface through the **interface-range**.

```
interfaces {
```

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

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

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

```
user@host: # show interfaces | display inheritance
## 'ge-1/0/0' was expanded from interface-range 'range-1'
##
ge-1/0/0 {
  ##
  ## '256' was expanded from interface-range 'range-1'
  ##
  mtu 256;
}
ge-1/0/1 {
  mtu 1024;
}
##
## 'ge-1/0/2' was expanded from interface-range 'range-1'
##
ge-1/0/2 {
  ##
  ## '256' was expanded from interface-range 'range-1'
  ##
  mtu 256;
}
.....
.....
##
## 'ge-10/0/47' was expanded from interface-range 'range-1'
##
ge-10/0/47 {
  ##
  ## '256' was expanded from interface-range 'range-1'
  ##
  mtu 256;
}
```

## Member Interfaces Inheriting Configuration from Configuration Groups

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

```
groups {
  global {
    interfaces {
      <*> {
        hold-time up 10;
      }
    }
  }
}
```

```

    }
  }
}
apply-groups [global];
interfaces {
  interface-range range-1 {
    member-range ge-1/0/0 to ge-10/0/47;
    mtu 256;
  }
}
}

```

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

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

```

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

```

## Interfaces Inheriting Common Configuration

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

```

[edit]
interfaces {
  interface-range range-1 {

```

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

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

## Configuring Inheritance Range Priorities

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

```
[edit]
interfaces {
    interface-range int-grp-one {
        member-range ge-0/0/0 to ge-4/0/40;
        member ge-1/1/1;
        /*Common config is added part of the interface-range definition*/
        mtu 256;
        hold-time up 10;
    }
}
interfaces {
    interface-range int-grp-two {
        member-range ge-5/0/0 to ge-10/0/40;
        member ge-1/1/1;
        mtu 1024;
    }
}
```

Interface ge-1/1/1 exists in both *interface-range int-grp-one* and *interface-range int-grp-two*. This interface inherits **mtu 256** from *interface-range int-grp-one* because it was defined first.

## Configuration Expansion Where Interface Range Is Used

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

```
[edit]
interfaces {
    interface-range range-1 {
        member ge-10/1/1;
        member ge-5/5/1;
        mtu 256;
        hold-time up 10;
        ether-options {
            flow-control;
            speed {
                100m;
            }
        }
    }
}
```

```

        802.3ad primary;
    }
}
protocols {
    dot1x {
        authenticator {
            interface range-1 {
                retries 1;
            }
        }
    }
}
}

```

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

```

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

```

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

This configuration can be verified using the **show protocols dot1x | display inheritance** command.

**Related Documentation**

- *Physical Interfaces*

## Specifying an Aggregated Interface

The M Series, MX Series, and T Series routers support aggregated interfaces. To specify an aggregated interface assign a number with the aggregated interface name. For example, configure **aex** at the **[edit interfaces]** hierarchy level, where *x* is an integer ranging 0 through 127 for M Series and T Series routers and 0 through 479 on MX Series routers.

For aggregated SONET/SDH interfaces, configure **asx** at the **[edit interfaces]** hierarchy level.



**NOTE:** SONET/SDH aggregation is proprietary to the Junos OS and might not work with other software.

If you are configuring VLANs for aggregated Ethernet interfaces, you must include the **vlan-tagging** statement at the **[edit interfaces aex]** hierarchy level to complete the association.

- Related Documentation**
- *Aggregated Ethernet Interfaces Overview*
  - *Configuring Aggregated SONET/SDH Interfaces*

---

## Configuring 4-Port OC192 PIC to Operate in OC768-over-OC192 Mode

---

In the 4-port OC192 PIC with OC768-over-OC192 mode, four OC192 links are aggregated into one OC768 link with one logical interface. This single interface achieves data rates of approximately 40 Gbps. OC768 optics are expensive, and most long-distance networks currently use fiber optics and regenerators that cannot carry OC768 SONET. When you create an OC768 pipe as a large data pipe running over existing infrastructures, you transfer network traffic without link bonding or load sharing over parallel links. Load sharing is automatically accomplished in the Junos OS using a proprietary method, and does not need to be manually configured.

The following limitations apply to OC768-over-OC192 mode:

- The maximum difference in delay between all links in the bundle is 8  $\mu$  (microseconds), equivalent to approximately 1.5 km maximum difference in length between the longest and shortest fiber pairs.
- If a single link in the bundle fails, the whole bundle fails. If link redundancy is required, implement an aggregated SONET/SDH bundle instead.
- Only routers that contain 4-port OC192 PICs can operate in OC768-over-OC192 mode.

To configure the 4-port OC192 PIC to operate in OC768-over-OC192 mode:

1. In the configuration mode go to the **[edit chassis]** hierarchy level.

```
[edit]
user@host# edit chassis
```

2. Configure the aggregate-ports.

- On standalone T640, T1600, and T4000 routers, include the **aggregate-ports** statement at the **[edit chassis fpc slot-number pic pic-number]** hierarchy level.

```
[edit chassis]
user@host# edit fpc slot-number pic pic-number
user@host# set aggregate-ports
```

- On TX Matrix and TX Matrix Plus router, configure the **aggregate-ports** statement at the **[edit chassis lcc lcc-number fpc slot-number pic pic-number]** hierarchy level.

```
[edit chassis]
user@host# edit lcc lcc-number fpc slot-number pic pic-number
user@host# set aggregate-ports
```

3. To verify the configuration, execute the **show interfaces so-fpc/pic/port extensive** operational command. When this command is used for the 4-port OC192 PIC

configured for OC768-over-OC192 mode, only port 0 (**so-fpc/pic/0**) is displayed. This port is displayed as **OC768**.



**NOTE:** When you configure the 4-port OC192 PIC for OC768-over-OC192 mode, only port 0 (the first port) needs be configured as the OC768 port.

Related Documentation • [aggregate-ports on page 336](#)

## Configuring Interface Description

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

Before you add a text description of a physical interface in the configuration file, you must first configure the interface at the **[edit interfaces]** hierarchy level. To add a text description, include the **description** statement at the **[edit interfaces interface-name]** hierarchy level:

```
[edit]
user@host# edit interfaces interface-name
description text
```

For example:

```
[edit interfaces fe-0/0/1]
description "Backbone connection to PHL01"
```

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



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

For information about describing logical units, see [“Adding a Logical Unit Description to the Configuration” on page 186](#).

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

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

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

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

Related  
Documentation

## Configuring the Link Characteristics

By default, the router's management Ethernet interface, **fxp0** or **em0**, autonegotiates whether to operate in full-duplex or half-duplex mode. Fast Ethernet and J Series router Gigabit Ethernet interfaces can operate in either full-duplex or half-duplex mode, and all other interfaces can operate only in full-duplex mode. For Gigabit Ethernet, the link partner must also be set to full duplex.



**NOTE:** When you configure the Tri-Rate Ethernet copper interface to operate at 1 Gbps, autonegotiation must be enabled.



**NOTE:** When you manually configure Fast Ethernet interfaces on the M Series and T Series routers, link mode and speed must both be configured. If both these values are not configured, the router uses autonegotiation for the link and ignores the user-configured settings.





**NOTE:** When the Fast Ethernet interface on Juniper Networks routers with autonegotiation enabled interoperates with a device configured to operate in half-duplex mode (autonegotiation disabled), the interface defaults to half-duplex mode after the PIC is taken offline and brought back online. This results in packet loss and cyclic redundancy check (CRC) errors.

To explicitly configure an Ethernet interface to operate in either full-duplex or half-duplex mode, include the **link-mode** statement at the **[edit interfaces *interface-name*]** hierarchy level:

```
[edit interfaces interface-name]  
link-mode (full-duplex | half-duplex);
```

## Configuring the Media MTU

The media maximum transmission unit (MTU) is the largest data unit that can be forwarded without fragmentation.

This topic contains the following sections:

- [Media MTU Overview on page 119](#)
- [How to Configure the Media MTU on page 120](#)
- [Encapsulation Overhead by Encapsulation Type on page 121](#)
- [Media MTU Sizes by Interface Type for M5 and M7i Routers with CFEB, M10 and M10i Routers with CFEB, and M20 and M40 Routers on page 122](#)
- [Media MTU Sizes by Interface Type for M40e Routers on page 123](#)
- [Media MTU Sizes by Interface Type for M160 Routers on page 124](#)
- [Media MTU Sizes by Interface Type for M7i Routers with CFEB-E, M10i Routers with CFEB-E, and M320 and M120 Routers on page 124](#)
- [Media MTU Sizes by Interface Type for MX Series Routers on page 125](#)
- [Media MTU Sizes by Interface Type for T320 Routers on page 126](#)
- [Media MTU Sizes by Interface Type for T640 Platforms on page 126](#)
- [Media MTU Sizes by Interface Type for J2300 Platforms on page 127](#)
- [Media MTU Sizes by Interface Type for J4300 and J6300 Platforms on page 127](#)
- [Media MTU Sizes by Interface Type for J4350 and J6350 Platforms on page 128](#)
- [Media MTU Sizes by Interface Type for EX Series Switches and ACX Series Routers on page 130](#)
- [Media MTU Sizes by Interface Type for PTX Series Packet Transport Routers on page 130](#)

## Media MTU Overview

The default media MTU size used on a physical interface depends on the encapsulation used on that interface. In some cases, the default IP Protocol MTU depends on whether the protocol used is IP version 4 (IPv4) or International Organization for Standardization (ISO).

The default media MTU is calculated as follows:

Default media MTU = Default IP MTU + encapsulation overhead

When you are configuring point-to-point connections, the MTU sizes on both sides of the connections must be the same. Also, when you are configuring point-to-multipoint connections, all interfaces in the subnet must use the same MTU size. For details about encapsulation overhead, see [“Encapsulation Overhead by Encapsulation Type” on page 121](#).



**NOTE:** The actual frames transmitted also contain cyclic redundancy check (CRC) bits, which are not part of the media MTU. For example, the media MTU for a Gigabit Ethernet Version 2 interface is specified as 1514 bytes, but the largest possible frame size is actually 1518 bytes; you need to consider the extra bits in calculations of MTUs for interoperability.

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

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

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

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

MPLS MTU = physical interface MTU – encapsulation overhead – 12

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

---

## How to Configure the Media MTU

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

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

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



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

---

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

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

Because tunnel services interfaces are considered logical interfaces, you cannot configure the MTU setting for the physical interface. This means you cannot include the **mtu** statement at the [edit interfaces *interface-name*] hierarchy level for the following interface types: generic routing encapsulation (**gr-**), IP-IP (**ip-**), loopback (**lo-**), link services (**ls-**), multilink services (**ml-**), and multicast (**pe-**, **pd-**). You can, however, configure the protocol MTU on tunnel interfaces, as described in [“Setting the Protocol MTU” on page 218](#).

## Encapsulation Overhead by Encapsulation Type

Table 13: Encapsulation Overhead by Encapsulation Type

| Interface Encapsulation   | Encapsulation Overhead (Bytes) |
|---|--------------------------------|
| 802.1Q/Ethernet 802.3   | 21                             |
| 802.1Q/Ethernet Subnetwork Access Protocol (SNAP)                           | 26                             |
| 802.1Q/Ethernet version 2   | 18                             |
| ATM Cell Relay  | 4                              |
| ATM permanent virtual connection (PVC)                                      | 12                             |
| Cisco HDLC  | 4                              |
| Ethernet 802.3  | 17                             |
| Ethernet circuit cross-connect (CCC) and virtual private LAN service (VPLS) | 4                              |
| Ethernet over ATM   | 32                             |
| Ethernet SNAP   | 22                             |
| Ethernet translational cross-connect (TCC)                                  | 18                             |
| Ethernet version 2  | 14                             |
| Extended virtual local area network (VLAN) CCC and VPLS                     | 4                              |
| Extended VLAN TCC   | 22                             |
| Frame Relay   | 4                              |

Table 13: Encapsulation Overhead by Encapsulation Type (*continued*)

| Interface Encapsulation | Encapsulation Overhead (Bytes) |
|-------------------------|--------------------------------|
| PPP                     | 4                              |
| VLAN CCC                | 4                              |
| VLAN VPLS               | 4                              |
| VLAN TCC                | 22                             |

### Media MTU Sizes by Interface Type for M5 and M7i Routers with CFEB, M10 and M10i Routers with CFEB, and M20 and M40 Routers

Table 14: Media MTU Sizes by Interface Type for M5 and M7i Routers with CFEB, M10 and M10i Routers with CFEB, and M20 and M40 Routers

| Interface Type                                | Default Media MTU (Bytes) | Maximum MTU (Bytes)   | Default IP Protocol MTU (Bytes) |
|---|---------------------------|---|---------------------------------|
| Adaptive Services (MTU size not configurable) | 9192                      | N/A   | N/A                             |
| ATM   | 4482                      | 9192  | 4470                            |
| E1/T1   | 1504                      | 9192  | 1500                            |
| E3/T3   | 4474                      | 9192  | 4470                            |
| Fast Ethernet                                 | 1514                      | 1533 (4-port)<br>1532 (8-port)<br>1532 (12-port)<br><br><i>NOTE:</i> The maximum MTU for two 100Base-TX Fast Ethernet port FIC is 9192 bytes. | 1500 (IPv4),<br>1497 (ISO)      |
| Gigabit Ethernet                              | 1514                      | 9192<br><br><i>NOTE:</i> The maximum MTU for one Gigabit Ethernet port FIC is 9192 bytes.   | 1500 (IPv4),<br>1497 (ISO)      |
| Serial  | 1504                      | 9192  | 1500 (IPv4),<br>1497 (ISO)      |
| SONET/SDH                                     | 4474                      | 9192  | 4470                            |

## Media MTU Sizes by Interface Type for M40e Routers

Table 15: Media MTU Sizes by Interface Type for M40e Routers

| Interface Type                                   | Default Media MTU (Bytes) | Maximum MTU (Bytes)   | Default IP Protocol MTU (Bytes) |
|--|---------------------------|---|---------------------------------|
| Adaptive Services<br>(MTU size not configurable) | 9192                      | N/A   | N/A                             |
| ATM  | 4482                      | 9192  | 4470                            |
| E1/T1  | 1504                      | 4500  | 1500                            |
| E3/T3  | 4474                      | 4500<br>9192 (4-port)   | 4470                            |
| E3/DS3 IQ  | 4474                      | 9192  | 4470                            |
| Fast Ethernet                                    | 1514                      | 1533  | 1500 (IPv4),<br>1497 (ISO)      |
| Gigabit Ethernet                                 | 1514                      | 9192 (1- or 2-port)<br>9192 (4-port)  | 1500 (IPv4),<br>1497 (ISO)      |
| Serial   | 1504                      | 9192  | 1500 (IPv4),<br>1497 (ISO)      |
| SONET/SDH  | 4474                      | 4500 (1-port nonconcatenated)<br>9192 (4-port OC3)<br>9192 (4-port OC3c)<br>4500 (1-port OC12)<br>4500 (4-port OC12)<br>4500 (4-port OC12c)<br>4500 (1-port OC48)<br>9192 (2-port OC3)<br>9192 (2-port OC3c)<br>9192 (1-port OC12c)<br>9192 (1-port OC48c)<br>4500 (1-port OC192)<br>9192 (1-port OC192c) | 4470                            |

## Media MTU Sizes by Interface Type for M160 Routers

Table 16: Media MTU Sizes by Interface Type for M160 Routers

| Interface Type                                   | Default Media MTU (Bytes) | Maximum MTU (Bytes)   | Default IP Protocol MTU (Bytes) |
|--|---------------------------|---|---------------------------------|
| Adaptive Services<br>(MTU size not configurable) | 9192                      | N/A   | N/A                             |
| ATM  | 4482                      | 9192  | 4470                            |
| E1/T1  | 1504                      | 4500  | 1500                            |
| E3/T3  | 4474                      | 4500  | 4470                            |
| E3/DS3 IQ  | 4474                      | 9192  | 4470                            |
| Fast Ethernet                                    | 1514                      | 1533  | 1500 (IPv4),<br>1497 (ISO)      |
| Gigabit Ethernet                                 | 1514                      | 9192 (1- or 2-port)<br>4500 (4-port)                                  | 1500 (IPv4),<br>1497 (ISO)      |
| Serial   | 1504                      | 9192  | 1500 (IPv4),<br>1497 (ISO)      |
| SONET/SDH  | 4474                      | 4500 (1-port nonconcatenated)<br>9192 (1- or 2-port)<br>4500 (4-port) | 4470                            |

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

Table 17: Media MTU Sizes by Interface Type for M7i Routers with CFEB-E, M10i Routers with CFEB-E, and M320 and M120 Routers

| Interface Type      | Default Media MTU (Bytes) | Maximum MTU (Bytes) | Default IP Protocol MTU (Bytes) |
|---------------------|---------------------------|---------------------|---------------------------------|
| ATM2 IQ             | 4482                      | 9192                | 4470                            |
| Channelized DS3 IQ  | 4471                      | 4500                | 4470                            |
| Channelized E1 IQ   | 1504                      | 4500                | 1500                            |
| Channelized OC12 IQ | 4474                      | 9192                | 4470                            |

**Table 17: Media MTU Sizes by Interface Type for M7i Routers with CFEB-E, M10i Routers with CFEB-E, and M320 and M120 Routers (*continued*)**

| Interface Type             | Default Media MTU (Bytes) | Maximum MTU (Bytes)                         | Default IP Protocol MTU (Bytes) |
|----------------------------|---------------------------|---|---------------------------------|
| Channelized STM1 IQ        | 4474                      | 9192  | 4470                            |
| DS3                        | 4471                      | 4500  | 4470                            |
| E1                         | 1504                      | 4500  | 1500                            |
| E3 IQ                      | 4471                      | 4500  | 4470                            |
| Fast Ethernet              | 1514                      | 1533 (4-port)<br>1532 (8-, 12- and 48-port) | 1500 (IPv4),<br>1497 (ISO)      |
| Gigabit Ethernet           | 1514                      | 9192  | 1500 (IPv4),<br>1497 (ISO)      |
| SONET/SDH                  | 4474                      | 9192  | 4470                            |
| T1                         | 1504                      | 4500  | 1500                            |
| CT3 IQ<br>(excluding M120) | 4474                      | 9192  | 4470                            |

**Media MTU Sizes by Interface Type for MX Series Routers****Table 18: Media MTU Sizes by Interface Type for MX Series Routers**

| Interface Type      | Default Media MTU (Bytes) | Maximum MTU (Bytes) | Default IP Protocol MTU (Bytes)            |
|---------------------|---------------------------|---------------------|--|
| Gigabit Ethernet    | 1514                      | 9192                | 1500 (IPv4),<br>1488 (MPLS),<br>1497 (ISO) |
| 10-Gigabit Ethernet | 1514                      | 9192                | 1500 (IPv4),<br>1488 (MPLS),<br>1497 (ISO) |
| Multi-Rate Ethernet | 1514                      | 9192                | 1500 (IPv4),<br>1488 (MPLS),<br>1497 (ISO) |
| Tri-Rate Ethernet   | 1514                      | 9192                | 1500 (IPv4),<br>1488 (MPLS),<br>1497 (ISO) |

**Table 18: Media MTU Sizes by Interface Type for MX Series Routers (*continued*)**

|   |      |      |  |
|---|------|------|--|
| Channelized SONET/SDH OC3/STM1 (Multi-Rate) | 1514 | 9192 | 1500 (IPv4),<br>1488 (MPLS),<br>1497 (ISO) |
| DS3/E3 (Multi-Rate)                         | 1514 | 9192 | 1500 (IPv4),<br>1488 (MPLS),<br>1497 (ISO) |

**Media MTU Sizes by Interface Type for T320 Routers****Table 19: Media MTU Sizes by Interface Type for T320 Routers**

| Interface Type      | Default Media MTU (Bytes) | Maximum MTU (Bytes)                     | Default IP Protocol MTU (Bytes) |
|---------------------|---------------------------|---|---------------------------------|
| ATM                 | 4482                      | 9192                                    | 4470                            |
| ATM2 IQ             | 4482                      | 9192                                    | 4470                            |
| Channelized OC12 IQ | 4474                      | 9192                                    | 4470                            |
| Channelized STM1 IQ | 4474                      | 9192                                    | 4470                            |
| DS3                 | 4471                      | 4500                                    | 4470                            |
| Fast Ethernet       | 1514                      | 1533 (4-port)<br>1532 (12- and 48-port) | 1500 (IPv4),<br>1497 (ISO)      |
| Gigabit Ethernet    | 1514                      | 9192                                    | 1500 (IPv4),<br>1497 (ISO)      |
| SONET/SDH           | 4474                      | 9192                                    | 4470                            |
| CT3 IQ              | 4474                      | 9192                                    | 4470                            |

**Media MTU Sizes by Interface Type for T640 Platforms****Table 20: Media MTU Sizes by Interface Type for T640 Platforms**

| Interface Type        | Default Media MTU (Bytes) | Maximum MTU (Bytes) | Default IP Protocol MTU (Bytes) |
|-----------------------|---------------------------|---------------------|---------------------------------|
| ATM2 IQ               | 4482                      | 9192                | 4470                            |
| 48-port Fast Ethernet | 1514                      | 1532                | 1500 (IPv4),<br>1497 (ISO)      |



**Table 20: Media MTU Sizes by Interface Type for T640 Platforms (continued)**

| Interface Type   | Default Media MTU (Bytes) | Maximum MTU (Bytes) | Default IP Protocol MTU (Bytes) |
|------------------|---------------------------|---------------------|---------------------------------|
| Gigabit Ethernet | 1514                      | 9192                | 1500 (IPv4),<br>1497 (ISO)      |
| SONET/SDH        | 4474                      | 9192                | 4470                            |
| CT3 IQ           | 4474                      | 9192                | 4470                            |

**Media MTU Sizes by Interface Type for J2300 Platforms****Table 21: Media MTU Sizes by Interface Type for J2300 Platforms**

| Interface Type         | Default Media MTU (Bytes) | Maximum MTU (Bytes) | Default IP Protocol MTU (Bytes) |
|------------------------|---------------------------|---------------------|---------------------------------|
| Fast Ethernet (10/100) | 1514                      | 9192                | 1500                            |
| G.SHDSL                | 4482                      | 9150                | 4470                            |
| ISDN BRI               | 1504                      | 4092                | 1500                            |
| Serial                 | 1504                      | 9150                | 1500                            |
| T1 or E1               | 1504                      | 9150                | 1500                            |

**Media MTU Sizes by Interface Type for J4300 and J6300 Platforms****Table 22: Media MTU Sizes by Interface Type for J4300 and J6300 Platforms**

| Interface Type  | Default Media MTU (Bytes) | Maximum MTU (Bytes) | Default IP Protocol MTU (Bytes) |
|---|---------------------------|---------------------|---------------------------------|
| ADSL2+ PIM  | 4482                      | 9150                | 4470                            |
| Dual-port Fast Ethernet (10/100) PIM                  | 1514                      | 9192                | 1500                            |
| Dual-port Serial PIM                                  | 1504                      | 9150                | 1500                            |
| Dual-port T1 or E1 PIM                                | 1504                      | 9150                | 1500                            |
| Dual-port Channelized T1/E1 PIM (channelized to DS0s) | 1504                      | 4500                | 1500                            |

**Table 22: Media MTU Sizes by Interface Type for J4300 and J6300 Platforms (*continued*)**

| Interface Type   | Default Media MTU (Bytes) | Maximum MTU (Bytes) | Default IP Protocol MTU (Bytes) |
|--|---------------------------|---------------------|---------------------------------|
| Dual-port Channelized T1/E1 PIM (clear channel T1 or E1) | 1504                      | 9150                | 1500                            |
| Fast Ethernet (10/100) built-in interface                | 1514                      | 9192                | 1500                            |
| G.SHDSL PIM  | 4482                      | 9150                | 4470                            |
| 4-port ISDN BRI PIM                                      | 1504                      | 4092                | 1500                            |
| T3 (DS3) or E3 PIM                                       | 4474                      | 9192                | 4470                            |

**Media MTU Sizes by Interface Type for J4350 and J6350 Platforms****Table 23: Media MTU Sizes by Interface Type for J4350 and J6350 Platforms**

| Interface Type   | Default Media MTU (Bytes) | Maximum MTU (Bytes) | Default IP Protocol MTU (Bytes) |
|--|---------------------------|---------------------|---------------------------------|
| 4-port ISDN BRI PIM                                      | 1504                      | 4092                | 1500                            |
| ADSL2+ PIM   | 4482                      | 9150                | 4470                            |
| Dual-port Fast Ethernet (10/100) PIM                     | 1514                      | 9192                | 1500                            |
| Dual-port Serial PIM                                     | 1504                      | 9150                | 1500                            |
| Dual-port T1 or E1 PIM                                   | 1504                      | 9150                | 1500                            |
| Dual-port Channelized T1/E1 PIM (channelized to DS0s)    | 1504                      | 4500                | 1500                            |
| Dual-port Channelized T1/E1 PIM (clear channel T1 or E1) | 1504                      | 9150                | 1500                            |
| 4-port Fast Ethernet (10/100) ePIM                       | 1518                      | 1518                | 1500                            |

**Table 23: Media MTU Sizes by Interface Type for J4350 and J6350 Platforms** (*continued*)

| Interface Type   | Default Media MTU (Bytes) | Maximum MTU (Bytes) | Default IP Protocol MTU (Bytes) |
|--|---------------------------|---------------------|---------------------------------|
| Gigabit Ethernet (10/100/1000) built-in interface                        | 1514                      | 9018                | 1500                            |
| Gigabit Ethernet (10/100/1000) Enhanced Physical Interface Module (ePIM) | 1514                      | 9018                | 1500                            |
| Gigabit Ethernet (10/100/1000) SFP ePIM                                  | 1514                      | 9018                | 1500                            |
| G.SHDSL PIM  | 4482                      | 9150                | 4470                            |
| T3 (DS3) or E3 PIM   | 4474                      | 9192                | 4470                            |



**NOTE:** On Gigabit Ethernet ePIMs in J4350 and J6350 Services Routers, you can configure a maximum transmission unit (MTU) size of only 9018 bytes even though the CLI indicates that you can configure an MTU of up to 9192 bytes. If you configure an MTU greater than 9018 bytes, the router does not accept the configuration and generates a system log error message similar to the following:

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

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

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

## Media MTU Sizes by Interface Type for EX Series Switches and ACX Series Routers

**Table 24: Media MTU Sizes by Interface Type for EX Series Switches and ACX Series Routers**

| Interface Type      | Default Media MTU (Bytes) | Maximum MTU (Bytes) | Default IP Protocol MTU (Bytes) |
|---------------------|---------------------------|---------------------|---------------------------------|
| Gigabit Ethernet    | 1514                      | 9192                | 1500 (IPv4),<br>1497 (ISO)      |
| 10-Gigabit Ethernet | 1514                      | 9192                | 1500 (IPv4),<br>1497 (ISO)      |

## Media MTU Sizes by Interface Type for PTX Series Packet Transport Routers

**Table 25: Media MTU Sizes by Interface Type for PTX Series Packet Transport Routers**

| Interface Type       | Default Media MTU (Bytes) | Maximum MTU (Bytes) | Default IP Protocol MTU (Bytes)            |
|----------------------|---------------------------|---------------------|--|
| 10-Gigabit Ethernet  | 1514                      | 9500                | 1500 (IPv4),<br>1488 (MPLS),<br>1497 (ISO) |
| 40-Gigabit Ethernet  | 1514                      | 9500                | 1500 (IPv4),<br>1488 (MPLS),<br>1497 (ISO) |
| 100-Gigabit Ethernet | 1514                      | 9500                | 1500 (IPv4),<br>1488 (MPLS),<br>1497 (ISO) |

### Related Documentation

- [Configuring Interface Encapsulation on Physical Interfaces on page 130](#)
- [Setting the Protocol MTU on page 218](#)

## Configuring Interface Encapsulation on Physical Interfaces

Point-to-Point Protocol (PPP) encapsulation is the default encapsulation type for physical interfaces. You need not configure encapsulation for any physical interfaces that support PPP encapsulation. If you do not configure encapsulation, PPP is used by default. For physical interfaces that do not support PPP encapsulation, you must configure an encapsulation to use for packets transmitted on the interface.

You can optionally configure an encapsulation on a logical interface, which is the encapsulation used within certain packet types. For more information about logical interface encapsulation, see [“Configuring the Encapsulation on a Logical Interface” on page 190](#).

For information about encapsulation overhead, see [Table 13 on page 121](#).

This section contains the following topics:

- [Configuring the Encapsulation on a Physical Interface on page 131](#)
- [Encapsulation Capabilities on page 134](#)

## Configuring the Encapsulation on a Physical Interface

By default, PPP is the encapsulation type for physical interfaces. To configure the encapsulation on a physical interface, include the **encapsulation** statement at the **[edit interfaces *interface-name*]** hierarchy level:

```
[edit interfaces interface-name]
encapsulation (atm-ccc-cell-relay | atm-pvc | cisco-hdlc | cisco-hdlc-ccc | cisco-hdlc-tcc
| ethernet-ccc | ethernet-over-atm | ethernet-tcc | ethernet-vpls |
extended-frame-relay-ccc | extended-frame-relay-ether-type-tcc |
extended-frame-relay-tcc | extended-vlan-ccc | extended-vlan-tcc | extended-vlan-vpls
| flexible-ethernet-services | flexible-frame-relay | frame-relay | frame-relay-ccc |
frame-relay-ether-type | frame-relay-ether-type-tcc | frame-relay-port-ccc |
frame-relay-tcc | multilink-frame-relay-uni-nni | ppp | ppp-ccc | ppp-tcc | vlan-ccc |
vlan-vpls);
```

The physical interface encapsulation can be one of the following:

- ATM CCC cell relay—Connects two remote virtual circuits or ATM physical interfaces with a label-switched path (LSP). Traffic on the circuit is ATM cells.

You can configure an ATM1 Physical Interface Card (PIC) to use cell-relay accumulation mode (CAM). In this mode, the incoming cells (1 to 8 cells) are packaged into a single packet and forwarded to the LSP. Cell-relay accumulation mode is not supported on ATM2 PICs. You configure CAM as shown in the following example:

```
[edit chassis]
fpc 1 {
  pic 0 {
    atm-cell-relay-accumulation;
  }
}
```

For more information, see the *Junos OS Administration Library for Routing Devices*.

- ATM PVC—Defined in RFC 2684, *Multiprotocol Encapsulation over ATM Adaptation Layer 5*. When you configure physical ATM interfaces with ATM PVC encapsulation, an RFC 2684-compliant ATM Adaptation Layer 5 (AAL5) tunnel is set up to route the ATM cells over a Multiprotocol Label Switching (MPLS) path that is typically established between two MPLS-capable routers using the Label Distribution Protocol (LDP).
- Cisco HDLC—E1, E3, SONET/SDH, T1, and T3 interfaces can use Cisco HDLC encapsulation. Two related versions are supported:
  - CCC version (**cisco-hdlc-ccc**)—The logical interface does not require an encapsulation statement. When you use this encapsulation type, you can configure the **ccc** family only.

- TCC version (**cisco-hdlc-tcc**)—Similar to CCC and has the same configuration restrictions, but used for circuits with different media on either side of the connection.
- Ethernet over ATM—As defined in RFC 1483, *Multiprotocol Encapsulation over ATM Adaptation Layer 5*, this encapsulation type allows ATM interfaces to connect to devices that support only bridged-mode protocol data units (BPDUs). The Junos OS does not completely support bridging, but accepts BPDU packets as a default gateway. If you use the router as an edge device, then the router acts as a default gateway. It accepts Ethernet logical link control (LLC)/SNAP frames with IP or Address Resolution Protocol (ARP) in the payload, and drops the rest. For packets destined to the Ethernet local area network (LAN), a route lookup is done using the destination IP address. If the route lookup yields a full address match, the packet is encapsulated with an LLC/SNAP and media access control (MAC) header, and the packet is forwarded to the ATM interface.
- Ethernet cross-connect—Ethernet interfaces without VLAN tagging can use Ethernet CCC encapsulation. Two related versions are supported:
  - CCC version (**ethernet-ccc**)—Ethernet interfaces with standard Tag Protocol ID (TPID) tagging can use Ethernet CCC encapsulation. When you use this encapsulation type, you can configure the **ccc** family only.
  - TCC version (**ethernet-tcc**)—Similar to CCC, but used for circuits with different media on either side of the connection.

For 8-port, 12-port, and 48-port Fast Ethernet PICs, TCC is not supported.

- VLAN CCC (**vlan-ccc**)—Ethernet interfaces with VLAN tagging enabled can use VLAN CCC encapsulation. VLAN CCC encapsulation supports TPID 0x8100 only. When you use this encapsulation type, you can configure the **ccc** family only.
- Extended VLAN cross-connect—Gigabit Ethernet interfaces with VLAN 802.1Q tagging enabled can use extended VLAN cross-connect encapsulation. (Ethernet interfaces with standard TPID tagging can use VLAN CCC encapsulation.) Two related versions of extended VLAN cross-connect are supported:
  - CCC version (**extended-vlan-ccc**)—Extended VLAN CCC encapsulation supports TPIDs 0x8100, 0x9100, and 0x9901. When you use this encapsulation type, you can configure the **ccc** family only.
  - TCC version (**extended-vlan-tcc**)—Similar to CCC, but used for circuits with different media on either side of the connection.

For 8-port, 12-port, and 48-port Fast Ethernet PICs, extended VLAN CCC is not supported. For 4-port Gigabit Ethernet PICs, extended VLAN CCC and extended VLAN TCC are not supported.

- Ethernet VPLS (**ethernet-vpls**)—Ethernet interfaces with VPLS enabled can use Ethernet VPLS encapsulation. For more information about VPLS, see the *Junos OS VPNs Library for Routing Devices* and the *Junos OS Feature Guides*.
- Ethernet VLAN VPLS (**vlan-vpls**)—Ethernet interfaces with VLAN tagging and VPLS enabled can use Ethernet VLAN VPLS encapsulation. For more information about

VPLS, see the *Junos OS VPNs Library for Routing Devices* and the *Junos OS Feature Guides*.

- Extended VLAN VPLS (**extended-vlan-vpls**)—Ethernet interfaces with VLAN 802.1Q tagging and VPLS enabled can use Ethernet Extended VLAN VPLS encapsulation. (Ethernet interfaces with standard TPID tagging can use Ethernet VLAN VPLS encapsulation.) Extended Ethernet VLAN VPLS encapsulation supports TPIDs 0x8100, 0x9100, and 0x9901. For more information about VPLS, see the *Junos OS VPNs Library for Routing Devices* and the *Junos OS Feature Guides*.
- Flexible Ethernet services (**flexible-ethernet-services**)—Gigabit Ethernet and Gigabit Ethernet IQ and IQE PICs with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router) can use flexible Ethernet services encapsulation. Aggregated Ethernet bundles can use this encapsulation type. You use this encapsulation type when you want to configure multiple per-unit Ethernet encapsulations. This encapsulation type allows you to configure any combination of route, TCC, CCC, Layer 2 virtual private networks (VPNs), and VPLS encapsulations on a single physical port. If you configure flexible Ethernet services encapsulation on the physical interface, VLAN IDs from 1 through 511 are no longer reserved for normal VLANs.
- Flexible Frame Relay (**flexible-frame-relay**)—IQ and IQE interfaces can use flexible Frame Relay encapsulation. You use flexible Frame Relay encapsulation when you want to configure multiple per-unit Frame Relay encapsulations. This encapsulation type allows you to configure any combination of TCC, CCC, and standard Frame Relay encapsulations on a single physical port. Also, each logical interface can have any data-link connection identifier (DLCI) value from 1 through 1022.
- Frame Relay (**frame-relay**)—Defined in RFC 1490, *Multiprotocol Interconnect over Frame Relay*. E1, E3, link services, SONET/SDH, T1, T3, and voice services interfaces can use Frame Relay encapsulation. Five related versions are supported:
  - CCC version (**frame-relay-ccc**)—The same as standard Frame Relay for DLCIs 0 through 511. DLCIs 512 through 1022 are dedicated to CCC. The logical interface must also have **frame-relay-ccc** encapsulation. When you use this encapsulation type, you can configure the **ccc** family only.
  - TCC version (**frame-relay-tcc**)—Similar to Frame Relay CCC and has the same configuration restrictions, but used for circuits with different media on either side of the connection.
  - Extended CCC version (**extended-frame-relay-ccc**)—This encapsulation type allows you to dedicate DLCIs 1 through 1022 to CCC. The logical interface must have **frame-relay-ccc** encapsulation. When you use this encapsulation type, you can configure the **ccc** family only.
  - Extended TCC version (**extended-frame-relay-tcc**)—Similar to extended Frame Relay CCC, this encapsulation type allows you to dedicate DLCIs 1 through 1022 to TCC, which is used for circuits with different media on either side of the connection.
  - Port CCC version (**frame-relay-port-ccc**)—Defined in the IETF document *Frame Relay Encapsulation over Pseudo-Wires* (expired December 2002). This encapsulation type allows you to transparently carry all the DLCIs between two customer edge (CE)

routers without explicitly configuring each DLCI on the two provider edge (PE) routers with Frame Relay transport. The connection between the two CE routers can be either user-to-network interface (UNI) or network-to-network interface (NNI); this is completely transparent to the PE routers. The logical interface does not require an encapsulation statement. When you use this encapsulation type, you can configure the **ccc** family only.

- Frame Relay Ether Type (**frame-relay-ether-type**)—Physical interfaces can use Frame Relay ether type encapsulation for compatibility with Cisco Frame Relay. IETF frame relay encapsulation identifies the payload format using NLPID and SNAP formats. Cisco-compatible Frame Relay encapsulation uses the Ethernet type to identify the type of payload. Two related versions are supported:
  - TCC version (**frame-relay-ether-type-tcc**)—Cisco-compatible Frame Relay for DLCIs 0 through 511. DLCIs 512 through 1022 are dedicated to TCC. This encapsulation is used for circuits with different media on either side of the connection.
  - Extended TCC version (**extended-frame-relay-ether-type-tcc**)—This encapsulation allows you to dedicate Cisco-compatible Frame Relay TCC for DLCIs 1 through 1022. This encapsulation is used for circuits with different media on either side of the connection.
- Multilink Frame Relay (MLFR) UNI and NNI (**multilink-frame-relay-uni-nni**)—Link services and voice services interfaces functioning as FRF.16 bundles can use multilink Frame Relay UNI NNI encapsulation. This encapsulation is also used on link services and voice services interfaces' constituent T1, E1, or NxDS0 interfaces.
- PPP—Defined in RFC 1661, *The Point-to-Point Protocol (PPP) for the Transmission of Multiprotocol Datagrams over Point-to-Point Links*. PPP is the default encapsulation type for physical interfaces. E1, E3, SONET/SDH, T1, and T3 interfaces can use PPP encapsulation. Two related versions are supported:
  - Circuit cross-connect (CCC) version (**ppp-ccc**)—The logical interface does not require an encapsulation statement. When you use this encapsulation type, you can configure the **ccc** family only.
  - Translational cross-connect (TCC) version (**ppp-tcc**)—Similar to CCC and has the same configuration restrictions, but used for circuits with different media on either side of the connection.



**NOTE:** When the encapsulation type is set to Cisco-compatible Frame Relay encapsulation, ensure that the LMI type is set to ANSI or Q933-A.

---

## Encapsulation Capabilities

When you configure a point-to-point encapsulation (such as PPP or Cisco HDLC) on a physical interface, the physical interface can have only one logical interface (that is, only one **unit** statement) associated with it. When you configure a multipoint encapsulation (such as Frame Relay), the physical interface can have multiple logical units, and the units can be either point-to-point or multipoint.



Ethernet CCC encapsulation for Ethernet interfaces with standard TPID tagging requires that the physical interface have only a single logical interface. Ethernet interfaces in VLAN mode can have multiple logical interfaces.

For Ethernet interfaces in VLAN mode, VLAN IDs are applicable as follows:

- VLAN ID 0 is reserved for tagging the priority of frames.
- For encapsulation type **vlan-ccc**, VLAN IDs 1 through 511 are reserved for normal VLANs. VLAN IDs 512 and above are reserved for VLAN CCCs.
- For encapsulation type **vlan-vpls**, VLAN IDs 1 through 511 are reserved for normal VLANs, and VLAN IDs 512 through 4094 are reserved for VPLS VLANs. For 4-port Fast Ethernet interfaces, you can use VLAN IDs 512 through 1024 for VPLS VLANs.
- For Gigabit Ethernet interfaces and Gigabit Ethernet IQ and IQE PICs with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router), you can configure flexible Ethernet services encapsulation on the physical interface. For interfaces with **flexible-ethernet-services** encapsulation, all VLAN IDs are valid. VLAN IDs from 1 through 511 are not reserved.
- For encapsulation types **extended-vlan-ccc** and **extended-vlan-vpls**, all VLAN IDs are valid.

The upper limits for configurable VLAN IDs vary by interface type.

When you configure a TCC encapsulation, some modifications are needed to handle VPN connections over unlike Layer 2 and Layer 2.5 links and terminate the Layer 2 and Layer 2.5 protocol locally.

The router performs the following media-specific changes:

- PPP TCC—Both Link Control Protocol (LCP) and Network Control Protocol (NCP) are terminated on the router. Internet Protocol Control Protocol (IPCP) IP address negotiation is not supported. The Junos OS strips all PPP encapsulation data from incoming frames before forwarding them. For output, the next hop is changed to PPP encapsulation.
- Cisco HDLC TCC—Keepalive processing is terminated on the router. The Junos OS strips all Cisco HDLC encapsulation data from incoming frames before forwarding them. For output, the next hop is changed to Cisco HDLC encapsulation.
- Frame Relay TCC—All Local Management Interface (LMI) processing is terminated on the router. The Junos OS strips all Frame Relay encapsulation data from incoming frames before forwarding them. For output, the next hop is changed to Frame Relay encapsulation.
- ATM—Operation, Administration, and Maintenance (OAM) and Interim Local Management Interface (ILMI) processing is terminated at the router. Cell relay is not supported. The Junos OS strips all ATM encapsulation data from incoming frames before forwarding them. For output, the next hop is changed to ATM encapsulation.

### Example: Configuring the Encapsulation on a Physical Interface

---

Configure PPP encapsulation on a SONET/SDH interface. The second and third **family** statements allow Intermediate System-to-Intermediate System (IS-IS) and MPLS to run on the interface.

```
[edit interfaces]
so-7/0/0 {
  encapsulation ppp;
  unit 0 {
    point-to-point;
    family inet {
      address 192.168.1.113/32 {
        destination 192.168.1.114;
      }
    }
    family iso;
    family mpls;
  }
}
```

**Related  
Documentation**

- [Configuring the Encapsulation on a Logical Interface on page 190](#)
- [Configuring the Media MTU on page 119](#)

### Configuring the PPP Challenge Handshake Authentication Protocol

---

For interfaces with PPP encapsulation, you can configure interfaces to support the PPP Challenge Handshake Authentication Protocol (CHAP), as defined in RFC 1994, *PPP Challenge Handshake Authentication Protocol (CHAP)*. When you enable CHAP on an interface, the interface can authenticate its peer and can be authenticated by its peer.

By default, PPP CHAP is disabled. If CHAP is not explicitly enabled, the interface makes no CHAP challenges and denies all incoming CHAP challenges. To enable CHAP, you must create an access profile, and you must configure the interfaces to use CHAP.

To configure a CHAP access profile, include the **profile** statement and specify a profile name at the **[edit access]** hierarchy level:

```
[edit access]
profile profile-name {
  client name chap-secret data;
}
```

For more information about configuring access profiles, see the *Junos OS Administration Library for Routing Devices*.

When you configure an interface to use CHAP, you must assign an access profile to the interface. When an interface receives CHAP challenges and responses, the access profile in the packet is used to look up the shared secret, as defined in RFC 1994.

If no matching access profile is found for the CHAP challenge that was received by the interface, the optionally configured default CHAP secret is used. The default CHAP secret

is useful if the CHAP name of the peer is unknown, or if the CHAP name changes during PPP link negotiation.

To configure PPP CHAP on an interface with PPP encapsulation, include the **chap** statement at the **[edit interfaces *interface-name* ppp-options]** hierarchy level:

```
[edit interfaces interface-name ppp-options]
chap {
  access-profile name;
  default-chap-secret name;
  local-name name;
  passive;
}
```

On each interface with PPP encapsulation, you can configure the following PPP CHAP properties:

- [Assigning an Access Profile to an Interface on page 137](#)
- [Configuring a Default CHAP Secret on page 137](#)
- [Configuring the Local Name on page 138](#)
- [Configuring Passive Mode on page 138](#)
- [Example: Configuring the PPP Challenge Handshake Authentication Protocol on page 138](#)

When you configure PPP over ATM or Multilink PPP over ATM encapsulation, you can enable CHAP on the logical interface. For more information, see *Configuring PPP over ATM2 Encapsulation*.

## Assigning an Access Profile to an Interface

To assign an access profile to an interface, include the **access-profile** statement at the **[edit interfaces *interface-name* ppp-options chap]** hierarchy level:

```
[edit interfaces interface-name ppp-options chap]
access-profile name;
```

You must include the **access-profile** statement when you configure the CHAP authentication method. If an interface receives a CHAP challenge or response from a peer that is not in the applied access profile, the link is immediately dropped unless a default CHAP secret has been configured. For information about configuring the default CHAP secret, see [“Configuring a Default CHAP Secret” on page 137](#).

## Configuring a Default CHAP Secret

To configure a default CHAP secret for an interface, include the **default-chap-secret** statement at the **[edit interfaces *interface-name* ppp-options chap]** hierarchy level:

```
[edit interfaces interface-name ppp-options chap]
default-chap-secret name;
```

The default CHAP secret is used when no matching CHAP access profile exists, or if the CHAP name changes during PPP link negotiation.

## Configuring the Local Name

By default, when CHAP is enabled on an interface, the interface uses the router's system hostname as the name sent in CHAP challenge and response packets.

To configure the name the interface uses in CHAP challenge and response packets, include the **local-name** statement at the **[edit interfaces *interface-name* ppp-options chap]** hierarchy level:

```
[edit interfaces interface-name ppp-options chap]
local-name name;
```

The local name is any string from 1 to 250 characters in length, starting with an alphanumeric or underscore character, and including only the following characters:

a-z A-Z 0-9 % @ # / \ . \_ -

## Configuring Passive Mode

By default, when CHAP is enabled on an interface, the interface always challenges its peer and responds to challenges from its peer.

You can configure the interface not to challenge its peer, and only respond when challenged. To configure the interface not to challenge its peer, include the **passive** statement at the **[edit interfaces *interface-name* ppp-options chap]** hierarchy level:

```
[edit interfaces interface-name ppp-options chap]
passive;
```

## Example: Configuring the PPP Challenge Handshake Authentication Protocol

Configure CHAP:

```
[edit access]
profile pe-A-ppp-clients;
client cpe-1 chap-secret "$1$dQYsZ$B5ojUeUjDsUo.yKwcCZ0";
    # SECRET-DATA
client cpe-2 chap-secret "$1$kdAsfaDAfkdjDsASxfafdkdFKJ";
    # SECRET-DATA
[edit interfaces so-1/2/0]
encapsulation ppp;
ppp-options {
    chap {
        access-profile pe-A-ppp-clients;
        default-chap-secret "$9$mPafafhdsaiufhyrv1Rxd";
        local-name "pe-A-so-1/1/1";
    }
}
[edit interfaces so-1/1/2]
encapsulation ppp;
ppp-options {
    chap {
        access-profile pe-A-ppp-clients;
        default-chap-secret "$9$mPafafhdsaiufhyrv1Rxd";
        local-name "pe-A-so-1/1/2";
    }
}
```

```
}
}
```

## Configuring the PPP Password Authentication Protocol

For interfaces with PPP encapsulation, you can configure interfaces to support the Password Authentication Protocol (PAP), as defined in RFC 1334, *PAP Authentication Protocols*. If authentication is configured, the PPP link negotiates using CHAP or PAP protocol for authentication during the Link Control Protocol (LCP) negotiation phase. PAP is only performed after the link establishment phase (LCP up) portion of the authentication phase.

During authentication, the PPP link sends a PAP authentication-request packet to the peer with an ID and password. The authentication-request packet is sent every 2 seconds, similar to the CHAP challenge, until a response is received (acknowledgment packet, nonacknowledgment packet). If an acknowledgment packet is received, the PPP link transitions to the next state, the network phase. If a nonacknowledgment packet is received, an LCP terminate request is sent, and the PPP link goes back to the link establishment phase. If no response is received, and an optional retry counter is set to **true**, a new request acknowledgment packet is resent. If the retry counter expires, the PPP link transitions to the LCP negotiate phase.

You can configure the PPP link with PAP in passive mode. By default, when PAP is enabled on an interface, the interface expects authenticate-request packets from the peer. However, the interface can be configured to send authentication request packets to the peer by configuring PAP to operate in passive mode. In PAP passive mode, the interface sends the authenticate-request packets to the peer only if the interface receives the PAP option from the peer during LCP negotiation—in passive mode, the interface does not authenticate the peer.

When both CHAP and PAP authentication are configured on a PPP interface, only CHAP protocol is used for authentication. If CHAP authentication fails, LCP is restarted and the PPP link uses the CHAP protocol again for authentication. Therefore, each time CHAP authentication fails, LCP is restarted.

To enable PAP, you must create an access profile, and you must configure the interfaces to use PAP.

To configure a PAP access profile, include the **profile** statement and specify a profile name at the **[edit access]** hierarchy level:

```
[edit access]
profile profile-name {
  client name;
  pap-password password;
}
```

For more information about configuring access profiles, see the *Junos OS Administration Library for Routing Devices*.

When you configure an interface to use PAP, you must assign an access profile to the interface. When an interface receives PAP authentication requests, the access profile in the packet is used to look up the password.

If no matching access profile is found for the PAP authentication request that was received by the interface, the optionally configured default PAP password is used. For information about configuring the default PAP password, see [“Configuring PPP PAP Authentication” on page 194](#).

To configure PPP PAP on a physical interface with PPP encapsulation, include the **pap** statement at the **[edit interfaces *interface-name* ppp-options]** hierarchy level:

```
[edit interfaces interface-name ppp-options]
pap {
  access-profile name;
  local-name name;
  local-password password;
  passive;
}
```

To configure PPP PAP on a logical interface with PPP encapsulation, include the **pap** statement with options:

```
pap {
  default-pap-password password;
  local-name name;
  local-password password;
  passive;
}
```

You can include these statements at the following hierarchy levels:

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

For more information about configuring PAP for logical interfaces, see [“Configuring PPP PAP Authentication” on page 194](#). For information about configuring tracing operations for PPP, see [“Tracing Operations of the pppd Process” on page 143](#).

On each physical interface with PPP encapsulation, you can perform one of the following tasks:

- [Configuring the Local Name on page 140](#)
- [Configuring the Local Password on page 141](#)
- [Configuring Passive Mode on page 141](#)
- [Example: Configuring PAP Authentication Protocol on page 141](#)

## Configuring the Local Name

By default, when PAP is enabled on an interface, the interface uses the router’s system hostname as the name sent in PAP request and response packets.

To configure the name the interface uses in PAP request and response packets, include the **local-name** statement at the **[edit interfaces *interface-name* ppp-options pap]** hierarchy level:

```
[edit interfaces interface-name ppp-options pap]
local-name name;
```

### Configuring the Local Password

You need to configure the password to be used for authentication. To configure the host password for sending PAP requests, include the **local-password** statement at the **[edit interfaces *interface-name* ppp-options pap]** hierarchy level:

```
[edit interfaces interface-name ppp-options pap]
local-password password;
```

### Configuring Passive Mode

By default, when PAP is enabled on an interface, the interface expects authenticate-request packets from the peer. However, the interface can be configured to send authentication request packets to the peer by configuring PAP to operate in passive mode. In PAP passive mode, the interface sends the authenticate-request packets to the peer only if the interface receives the PAP option from the peer during LCP negotiation—in passive mode, the interface does not authenticate the peer.

To configure the interface to authenticate with PAP in passive mode, include the **passive** statement at the **[edit interfaces *interface-name* ppp-options pap]** hierarchy level:

```
[edit interfaces interface-name ppp-options pap]
passive;
```

### Example: Configuring PAP Authentication Protocol

Configure a PAP access profile, the physical and logical interfaces, and tracing operations for PPP.

For PAP authentication, a username and password for the peer is configured in the access profile, along with a PAP password. Each user can have either a PAP password or a CHAP secret.

```
[edit access]
profile userlist1;
client {
  papuser {
    pap-password "#%@^***"; # SECRET-DATA;
  }
  chapuser {
    chap-secret "#%@^***"; # SECRET-DATA;
  }
}
```

To configure the same name for the PAP password and the CHAP secret, configure the client with two different access profiles:

```
[edit access]
```

```
profile chap-profile;
client {
  sjcrouter {
    chap-secret "%@^***"; # SECRET-DATA;
  }
  boston {
    chap-secret "%@^***"; # SECRET-DATA;
  }
}
profile pap-profile;
client {
  sjcrouter {
    pap-password "%@^***"; # SECRET-DATA;
  }
  boston {
    pap-password "%@^***"; # SECRET-DATA;
  }
}
```

Configure the physical interface, including the access profile name to be used for PPP authentication:

```
[edit interfaces so-0/0/0]
ppp-options {
  pap {
    access-profile "pap-profile";
    local-name "rtrnum1";
    local-password "XXXXXXX"; #SECRET-DATA
    passive;
  }
}
```

Configure the logical interface, including the default PAP password to be used, should the access profile not be located during authentication:

```
[edit interfaces so-0/0/0]
encapsulation frame-relay;
unit 0 {
  dlci 100;
  encapsulation frame-relay-ppp;
  ppp-options {
    pap {
      local-name "rtrnum1";
      local-password "XXXXXXX"; #SECRET-DATA
      default-pap-password "XXXXX"; #SECRET-DATA
      passive;
    }
  }
}
```

Include the **pap** statement to trace PPP protocol operations:

```
[edit protocols]
ppp {
  traceoptions {
    flag {
      pap;
    }
  }
}
```



```
    }
  }
}
```

## Monitoring a PPP Session

You can monitor PPP packet exchanges. When monitoring is enabled, packets exchanged during a session are logged by default to `/var/log/pppd`, or to the file specified in the **traceoptions** statement.

To monitor a PPP session:

1. In configuration mode, go to the **[edit protocols ppp]** hierarchy level.

```
[edit ]
user@host# edit protocols ppp
```

2. Include the **monitor-session** statement.

```
[edit protocols ppp]
user@host# monitor-session (interface-name | all);
```

When monitoring is configured, the operational mode commands **show ppp summary** and **show ppp interface** display a **Monitored** flag in the **Session flags** column or line.

Related Documentation [monitor-session on page 613](#)

## Tracing Operations of the pppd Process

You can trace the operations of the router's pppd process.

To trace the router's pppd process:

1. In configuration mode, go to the **[edit protocols ppp]** hierarchy level.

```
[edit ]
user@host# edit protocols ppp
```

2. Include the **traceoptions** statement.

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

- To specify more than one tracing operation, include multiple **flag** statements.

You can specify the following flags in the **traceoptions** statement:

- **access**—Trace access code
- **address-pool**—Trace address pool code

- **all**—Trace all areas of code
- **auth**—Trace authentication code
- **chap**—Trace challenge handshake authentication protocol code
- **ci**—Trace CI code
- **config**—Trace configuration code
- **ifdb**—Trace interface database code
- **lcp**—Trace LCP state machine code
- **memory**—Trace memory management code
- **message**—Trace message processing code
- **mlppp**—Trace multilink point-to-point protocol code
- **ncp**—Trace NCP state machine code
- **pap**—Trace password authentication protocol code
- **ppp**—Trace PPP protocol processing code
- **radius**—Trace RADIUS processing code
- **redundancy**—Trace redundancy code
- **rtsock**—Trace routing socket code
- **session**—Trace session management code
- **signal**—Trace signal handling code
- **timer**—Trace timer code
- **ui**—Trace user interface code

**Related Documentation**   [traceoptions on page 813](#)

## Configuring PPP Address and Control Field Compression

For interfaces with PPP, PPP CCC, or PPP TCC encapsulation, you can configure compression of the Data Link Layer address and control fields, as defined in RFC 1661, *The Point-to-Point Protocol (PPP)*. By default, the address and control fields are not compressed. This means PPP-encapsulated packets are transmitted with two 1-byte fields (0xff and 0x03). If you configure address and control field compression (ACFC) and ACFC is successfully negotiated with the local router's peer, the local router transmits packets without these 2 bytes. ACFC allows you to conserve bandwidth by transmitting less data.

On M320, M120, and T Series routers, ACFC is not supported for any ISO family protocols. Do not include the **acfc** statement at the **[edit interfaces *interface-name* ppp-options compression]** hierarchy level when you include the **family iso** statement at the **[edit interfaces *interface-name* unit *logical-unit-number*]** hierarchy level.



**NOTE:** The address and control fields cannot be compressed in Link Control Protocol (LCP) packets.

The PPP session restarts when you configure or modify compression options.

To configure ACFC:

1. In configuration mode, go to the **[edit interfaces *interface-name* ppp-options]** hierarchy level.

```
[edit ]
user@host# edit interfaces interface-name ppp-options
```

2. Include the **compression** statement at the **[edit interfaces *interface-name* ppp-options]** hierarchy level, and specify **acfc**.

```
[edit interfaces interface-name ppp-options]
compression acfc;
```

To monitor the configuration, issue the **show interfaces *interface-name*** command. Configured options are displayed in the **link flags** field for the physical interface. Successfully negotiated options are displayed in the **flags** field for the logical interface. In this example, both ACFC and PFC are configured, but neither compression feature has been successfully negotiated.

```
user@router# run show interfaces so-0/1/1
Physical interface: so-0/1/1, Enabled, Physical link is Up
Interface index: 133, SNMP ifIndex: 27
Link-level type: PPP, MTU: 4474, Clocking: Internal, SONET mode, Speed: 0C3,
Loopback: None, FCS: 16
Payload scrambler: Enabled
Device flags   : Present Running
Interface flags: Point-To-Point SNMP-Traps 16384
Link flags    : No-Keepalives ACFC PFC
LCP state: Opened
```

```
NCP state: inet: Opened, inet6: Not-configured, iso: Not-configured, mpls:
Not-configured
CHAP state: Not-configured
CoS queues      : 4 supported
Last flapped    : 2004-12-29 10:49:32 PST (00:18:35 ago)
Input rate      : 0 bps (0 pps)
Output rate     : 0 bps (0 pps)
SONET alarms    : None
SONET defects   : None
Logical interface so-0/1/1.0 (Index 68) (SNMP ifIndex 169)
  Flags: Point-To-Point SNMP-Traps ACFC Encapsulation: PPP
  Protocol inet, MTU: 4470
    Flags: None
    Addresses, Flags: Is-Preferred Is-Primary
      Destination: 3.3.3/24, Local: 3.3.3.2, Broadcast: 3.3.3.255
```

This configuration causes the local router to try to negotiate ACFC with its peer. If ACFC is successfully negotiated, the local router sends packets with compressed address and control fields. When you include the **compression acfc** statement in the configuration, the PPP session restarts, and the local router sends the ACFC option in the LCP Configure-Request packet. The ACFC option informs the local router's peer that the local router can receive packets with compression. If the peer indicates that it, too, can receive packets with compression, then ACFC is negotiated. If ACFC is successfully negotiated, the local router can receive packets with or without the address and control bytes included.

**Related Documentation**

- [ppp-options on page 692](#)
- [compression on page 389](#)
- [acfc on page 320](#)

## Configuring the PPP Protocol Field Compression

For interfaces with PPP, PPP CCC, or PPP TCC encapsulation, you can configure protocol field compression. By default, the protocol field is not compressed. This means PPP-encapsulated packets are transmitted with a two-byte protocol field. For example, IPv4 packets are transmitted with the protocol field set to 0x0021, and MPLS packets are transmitted with the protocol field set to 0x0281.

For all protocols with identifiers in the range 0x0000 through 0x00ff, you can configure the router to compress the protocol field to one byte, as defined in RFC 1661, *The Point-to-Point Protocol (PPP)*. Protocol field compression (PFC) allows you to conserve bandwidth by transmitting less data.



**NOTE:** The protocol field cannot be compressed in Link Control Protocol (LCP) packets.

The PPP session restarts when you configure or modify compression options.

To configure PFC:

1. In configuration mode, go to the `[edit interfaces interface-name ppp-options]` hierarchy level.

`[edit ]`

`user@host# edit interfaces interface-name ppp-options`

2. Include the **compression** statement at the `[edit interfaces interface-name ppp-options]` hierarchy level, and specify **pfc**.

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

**compression pfc;**

To monitor the configuration, issue the **show interfaces *interface-name*** command.

Configured options are displayed in the **link flags** field for the physical interface.

Successfully negotiated options are displayed in the **flags** field for the logical interface.

In this example, both ACFC and PFC are configured, but neither compression feature has been successfully negotiated.

`user@router# run show interfaces so-0/1/1`

Physical interface: so-0/1/1, Enabled, Physical link is Up

Interface index: 133, SNMP ifIndex: 27

Link-level type: PPP, MTU: 4474, Clocking: Internal, SONET mode, Speed: OC3, Loopback: None, FCS: 16,

Payload scrambler: Enabled

Device flags : Present Running

Interface flags: Point-To-Point SNMP-Traps 16384

Link flags : No-Keepalives **ACFC PFC**

LCP state: Opened

NCP state: inet: Opened, inet6: Not-configured, iso: Not-configured, mpls: Not-configured

CHAP state: Not-configured

CoS queues : 4 supported

Last flapped : 2004-12-29 10:49:32 PST (00:18:35 ago)

```
Input rate      : 0 bps (0 pps)
Output rate     : 0 bps (0 pps)
SONET alarms    : None
SONET defects   : None
Logical interface so-0/1/1.0 (Index 68) (SNMP ifIndex 169)
  Flags: Point-To-Point SNMP-Traps ACFC Encapsulation: PPP
  Protocol inet, MTU: 4470
  Flags: None
  Addresses, Flags: Is-Preferred Is-Primary
    Destination: 3.3.3/24, Local: 3.3.3.2, Broadcast: 3.3.3.255
```

This configuration causes the local router to try to negotiate PFC with its peer. If PFC is successfully negotiated, the local router sends packets with compressed protocol fields. When you include the **compression pfc** statement in the configuration, the PPP session restarts, and the local router sends the PFC option in the LCP Configure-Request packet. The PFC option informs the local router's peer that the local router can receive packets with compression. If the peer indicates that it, too, can receive packets with compression, then PFC is negotiated. If PFC is successfully negotiated, the local router can receive packets with either 2-byte (uncompressed) or 1-byte (compressed) protocol fields.

**Related  
Documentation**

[ppp-options on page 692](#)

[compression on page 389](#)

[pfc on page 675](#)

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## Configuring the Interface Speed

You can configure the interface speed on the following interfaces:

- [Configuring the Speed of Management Ethernet Interfaces on M Series and T Series Routers on page 148](#)
- [Configuring the Speed of Gigabit Ethernet Interfaces on J Series Routers on page 149](#)
- [Configuring the Speed of Fast Ethernet Interfaces on page 149](#)
- [Configuring the Speed of Tri-Rate Ethernet Copper Interfaces on page 150](#)
- [Configuring the Speed of SONET/SDH Interfaces on page 150](#)

### Configuring the Speed of Management Ethernet Interfaces on M Series and T Series Routers

M Series routers, MX Series routers, T Series routers, and TX Series routers use one of two management Ethernet interface types, either **em** or **fxp**, dependent on the installed Routing Engine model. For information about management Ethernet interfaces and to determine the management Ethernet interface type for your router, see [“Understanding Management Ethernet Interfaces” on page 31](#) and [“Supported Routing Engines by Chassis” on page 33](#).

By default, the M Series and T Series routers management Ethernet interface autonegotiates whether to operate at 10 megabits per second (Mbps) or 100 Mbps. All other interfaces automatically choose the correct speed based on the PIC type and whether the PIC is configured to operate in multiplexed mode (using the **no-concatenate**

statement in the **[edit chassis]** configuration hierarchy, as described in the *Junos OS Administration Library for Routing Devices*).

To configure the management Ethernet interface to operate at 10 Mbps or 100 Mbps, include the **speed** statement at the **[edit interfaces fxp0]** or **[edit interfaces em0]** hierarchy level:

```
[edit interfaces (fxp0 | em0)]
  speed (10m | 100m);
```

For information about configuring the link mode, see *Configuring the Link Characteristics on Ethernet Interfaces*.

## Configuring the Speed of Gigabit Ethernet Interfaces on J Series Routers

By default, Gigabit Ethernet interfaces (both built-in and PIMs) for J Series routers autonegotiate whether to operate at 10 megabits per second (Mbps), 100 Mbps, or 1000 Mbps.

To configure a J Series Gigabit Ethernet interface to operate at 10 Mbps, 100 Mbps, or 1000 Mbps, include the **speed** statement at the **[edit interfaces ge-pim/0/port]** hierarchy level:

```
[edit interfaces ge-pim/0/port]
  speed (10m | 100m | 1g);
```

For information about configuring the link mode, see *Configuring the Link Characteristics on Ethernet Interfaces*.

## Configuring the Speed of Fast Ethernet Interfaces

By default, both of the built-in Fast Ethernet ports on the M7i router FIC autonegotiate whether to operate at 10 Mbps or 100 Mbps. All other interfaces automatically choose the correct speed based on the PIC type and whether the PIC is configured to operate in multiplexed mode (using the **no-concatenate** statement at the **[edit chassis]** hierarchy level, as described in the *Junos OS Administration Library for Routing Devices*).

If the link partner does not support autonegotiation, configure either Fast Ethernet port manually to match its link partner's speed and link mode. When the link mode is configured, autonegotiation is disabled.



**NOTE:** When you manually configure Fast Ethernet interfaces on the M Series and T Series routers, link mode and speed must both be configured. If both these values are not configured, the router uses autonegotiation for the link and ignores the user-configured settings.

To configure a Fast Ethernet port on the FIC to operate at 10 Mbps or 100 Mbps, include the **speed** statement at the **[edit interfaces fe-fpc/pic/port]** hierarchy level:

```
[edit interfaces fe-fpc/pic/port]
  speed (10m | 100m);
```

For information about configuring the link mode, see *Configuring the Link Characteristics on Ethernet Interfaces*.

## Configuring the Speed of Tri-Rate Ethernet Copper Interfaces

By default, the Tri-Rate Ethernet copper interfaces on MX Series routers operate at 1 Gbps. Tri-Rate Ethernet copper interfaces can also be configured to operate at 10 Mbps, 100 Mbps, or 1 Gbps.



**NOTE:** When you configure the Tri-Rate Ethernet copper interface to operate at 1 Gbps, autonegotiation must be enabled.



**NOTE:** Half-duplex mode is not supported on Tri-Rate Ethernet copper interfaces. When you include the `speed` statement, you must include the `link-mode full-duplex` statement at the same hierarchy level.

To configure a Tri-Rate Ethernet copper interface to operate at 10 Mbps, 100 Mbps, or 1 Gbps, include the `speed` statement at the `[edit interfaces ge-fpc/pic/port]` hierarchy level:

```
[edit interfaces ge-fpc/pic/port]
  speed (10m | 100m | 1g);
```

For information about configuring the link mode, see *Configuring the Link Characteristics on Ethernet Interfaces*.

## Configuring the Speed of SONET/SDH Interfaces

You can configure the speed of SONET/SDH interfaces on next-generation SONET/SDH Type 1 and Type 2 PICs with SFP. The speed you select is dependent upon whether the PIC is in concatenated or nonconcatenated mode. In concatenated mode, the bandwidth of the interface is in a single channel. In nonconcatenated mode, the PIC operates in channelized (multiplexed) mode.

Table 26 on page 150 shows the mode combinations for the next-generation SONET/SDH Type 1 PICs with SFP.

**Table 26: Type 1 PIC Mode Combinations**

| PIC        | Mode                   | Speed Configuration                 | Default Mode    |
|------------|------------------------|-------------------------------------|-----------------|
| 2-port OC3 | 2xOC3 concatenated     | <code>fpc/pic/0 speed oc3</code>    | concatenated    |
| 4-port OC3 | 1xOC12 concatenated    | <code>fpc/pic/0 speed oc12</code>   | —               |
|            | 1xOC12 nonconcatenated | <code>fpc/pic/0:0 speed oc3</code>  | nonconcatenated |
|            | 4xOC3 concatenated     | <code>fpc/pic/port speed oc3</code> | concatenated    |



Table 26: Type 1 PIC Mode Combinations (*continued*)

| PIC         | Mode                   | Speed Configuration          | Default Mode    |
|-------------|------------------------|------------------------------|-----------------|
| 1-port OC12 | 1xOC12 concatenated    | <i>fpc/pic/0 speed oc12</i>  | concatenated    |
|             | 1xOC12 nonconcatenated | <i>fpc/pic/0:0 speed oc3</i> | nonconcatenated |
|             | 1xOC3 concatenated     | <i>fpc/pic/0 speed oc3</i>   | —               |

Table 27 on page 151 shows the mode combinations for the next-generation SONET/SDH Type 2 PICs with SFP.

Table 27: Type 2 PIC Mode Combinations

| PIC                     | Mode                   | Speed Configuration                | Default Mode    |
|-------------------------|------------------------|------------------------------------|-----------------|
| 1-port OC48, IQ and IQE | 1xOC48 concatenated    | <i>fpc/pic/0 speed oc48</i>        | concatenated    |
|                         | 1xOC48 nonconcatenated | <i>fpc/pic/0:0 speed oc12</i>      | nonconcatenated |
|                         | 1xOC12 concatenated    | <i>fpc/pic/0 speed oc12</i>        | —               |
|                         | 1xOC12 nonconcatenated | <i>fpc/pic/0 0 speed oc3</i>       | —               |
|                         | 1xOC3 concatenated     | <i>fpc/pic/0 speed oc3</i>         | —               |
| 4-port OC12, IQ and IQE | 1xOC48 concatenated    | <i>fpc/pic/0 speed oc48</i>        | —               |
|                         | 1xOC48 nonconcatenated | <i>fpc/pic/0:0 speed oc12</i>      | nonconcatenated |
|                         | 1xOC12 nonconcatenated | <i>fpc/pic/0 speed oc3</i>         | —               |
|                         | 4xOC12 concatenated    | <i>fpc/pic/port speed oc3 oc12</i> | concatenated    |
| 4-port OC3, IQ and IQE  | 1xOC12 concatenated    | <i>fpc/pic/0 speed oc12</i>        | —               |
|                         | 1xOC12 nonconcatenated | <i>fpc/pic/0:0 speed oc3</i>       | nonconcatenated |
|                         | 4xOC3 concatenated     | <i>fpc/pic/port speed oc3</i>      | concatenated    |

By default, SONET/SDH PICs operate in concatenated mode. To specify interface speed in concatenated mode, include the **speed** statement with options at the **[edit interfaces so-fpc/pic/port]** hierarchy level:

```
[edit interfaces so-fpc/pic/port]
speed (oc3 | oc12 | oc48);
```

For example, each port of the 4-port OC12 PIC can be configured to be in OC3 or OC12 speed independently when this PIC is in 4xOC12 concatenated mode.

To specify interface speed in nonconcatenated mode, include the **speed** statement at the **[edit interfaces so-fpc/pic/port.channel]** hierarchy level:

```
[edit interfaces so-fpc/pic/port.channel]
speed (oc3 | oc12);
```

To configure the PIC to operate in channelized (multiplexed) mode, include the **no-concatenate** statement at the **[edit chassis fpc slot-number pic pic-number]** hierarchy level.

For more information about using the **no-concatenate** statement, see the *Junos OS Administration Library for Routing Devices*.

---

## Configuring Keepalives

By default, physical interfaces configured with Cisco HDLC or PPP encapsulation send keepalive packets at 10-second intervals. The Frame Relay term for keepalives is LMI packets; the Junos OS supports both ANSI T1.617 Annex D LMIs and ITU Q933 Annex A LMIs. On ATM networks, OAM cells perform the same function. You configure OAM cells at the logical interface level; for more information, see *Defining the ATM OAM F5 Loopback Cell Period*.

To disable the sending of keepalives:

1. In configuration mode, go to the **[edit interfaces interface-name]** hierarchy level.

```
[edit ]
user@host# edit interfaces interface-name
```

2. Include the **no-keepalives** statement at the **[edit interfaces interface-name]** hierarchy level.

```
[edit interfaces interface-name]
no-keepalives;
```

To disable the sending of keepalives on a physical interface configured with Cisco HDLC encapsulation for a translational cross-connection:

1. In configuration mode, go to the **[edit interfaces interface-name]** hierarchy level.

```
[edit ]
user@host# edit interfaces interface-name
```

2. Include the **no-keepalives** statement with the **encapsulation cisco-hdlc-tcc** statement at the **[edit interfaces interface-name]** hierarchy level.

```
[edit interfaces interface-name]
encapsulation cisco-hdlc-tcc;
no-keepalives;
```

To disable the sending of keepalives on a physical interface configured with PPP encapsulation for a translational cross-connection:

1. In configuration mode, go to the **[edit interfaces interface-name]** hierarchy level.

```
[edit ]
user@host# edit interfaces interface-name
```

2. Include the **no-keepalives** statement with the **encapsulation ppp-tcc** statement at the **[edit interfaces *interface-name*]** hierarchy level.

```
[edit interfaces interface-name]
encapsulation ppp-tcc;
no-keepalives;
```

For more information about translation cross-connections, see Circuit and Translational Cross-Connects Overview.

When you configure PPP over ATM or Multilink PPP over ATM encapsulation, you can enable or disable keepalives on the logical interface. For more information, see Configuring PPP over ATM2 Encapsulation.

To explicitly enable the sending of keepalives:

1. In configuration mode, go to the **[edit interfaces *interface-name*]** hierarchy level.

```
[edit ]
user@host# edit interfaces interface-name
```

2. Include the **keepalives** statement at the **[edit interfaces *interface-name*]** hierarchy level.

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

To change one or more of the default keepalive values:

1. In configuration mode, go to the **[edit interfaces *interface-name*]** hierarchy level.

```
[edit ]
user@host# edit interfaces interface-name
```

2. Include the **keepalives** statement with the appropriate option as **interval *seconds***, **down-count *number***, and the **up-count *number***.

```
[edit interfaces interface-name]
keepalives;
keepalives <interval seconds> <down-count number> <up-count number>;
```

On interfaces configured with Cisco HDLC or PPP encapsulation, you can include the following three keepalive statements; note that Frame Relay encapsulation is not affected by these statements:

- **interval *seconds***—The time in seconds between successive keepalive requests. The range is from 1 second through 32767 seconds, with a default of 10 seconds.
- **down-count *number***—The number of keepalive packets a destination must fail to receive before the network takes a link down. The range is from 1 through 255, with a default of 3.
- **up-count *number***—The number of keepalive packets a destination must receive to change a link's status from down to up. The range is from 1 through 255, with a default of 1.



**CAUTION:** If interface keepalives are configured on an interface that does not support the keepalives configuration statement (for example, 10-Gigabit Ethernet), the link layer may go down when the PIC is restarted. Avoid configuring the keepalives on interfaces that do not support the keepalives configuration statement.

For information about Frame Relay keepalive settings, see *Configuring Frame Relay Keepalives*.

On MX Series routers with Modular Port Concentrators/Modular Interface Cards (MPCs/MICs), the Packet Forwarding Engine on an MPC/MIC processes and responds to Link Control Protocol (LCP) Echo-Request keepalive packets that the PPP subscriber (client) initiates and sends to the router. The mechanism by which LCP Echo-Request packets are processed by the Packet Forwarding Engine instead of by the Routing Engine is referred to as *PPP fast keepalive*. For more information about how PPP fast keepalive works on an MX Series router with MPCs/MICs, see the *Junos OS Subscriber Access Configuration Guide*.

**Related  
Documentation**

- *Defining the ATM OAM F5 Loopback Cell Period*
- *Disabling the Sending of PPPoE Keepalive Messages*
- *Understanding How the Router Processes Subscriber-Initiated PPP Fast Keepalive Requests*
- [keepalives on page 550](#)
- [no-keepalives on page 636](#)
- *Configuring Frame Relay Keepalives*
- [Circuit and Translational Cross-Connects Overview on page 253](#)
- *Configuring PPP over ATM2 Encapsulation*

## Clock Source Overview

For both the router and interfaces, the clock source can be an external clock that is received on the interface or the router's internal Stratum 3 clock.

For example, interface A can transmit on interface A's received clock (external, loop timing) or the Stratum 3 clock (internal, line timing, or normal timing). Interface A cannot use a clock from any other source. For interfaces such as SONET/SDH that can use different clock sources, you can configure the source of the transmit clock on each interface.

The clock source resides on the System Control Board (SCB) for M40 routers, the System and Switch Board (SSB) for M20 routers, the Control Board (CB) for M120 routers, and the Miscellaneous Control Subsystem (MCS) for M40e and M160 routers. M7i and M10i routers have a clock source on the Compact Forwarding Engine Board (CFEB) and Enhanced Compact Forwarding Engine Board (CFEB-E).

For T Series and MX Series, the clock source internal Stratum 3 clock resides on the SONET Clock Generator and Switch Control Board (SCB) respectively. By default, the 19.44-MHz Stratum 3 reference clock generates the clock signal for all serial PICs (SONET/SDH) and Plesiochronous Digital Hierarchy (PDH) PICs. PDH PICs include DS3, E3, T1, and E1 PICs.



**NOTE:** M7i and M10i routers do not support external clocking of SONET interfaces.

For information about clocking on channelized interfaces, see *Channelized IQ and IQE Interfaces Properties*. Also see *Configuring the Clock Source on SONET/SDH Interfaces* and *Configuring the Channelized T3 Loop Timing*.

For information about configuring an external synchronization interface that can be used to synchronize the internal Stratum 3 clock to an external source on the M40e, M120, M320, routers and T Series routers, see *Junos OS Administration Library for Routing Devices*, *Configuring the Junos OS to Support an External Clock Synchronization Interface for M Series and T Series Routers*.

For information about configuring Synchronous Ethernet on MX 80, MX240, MX480, and MX960 3D Universal Edge Routers, see *Junos OS Administration Library for Routing Devices*, *Synchronous Ethernet Overview* and *Configuring Clock Synchronization Interface for MX Series Routers*.

### Related Documentation

- [Configuring an External Synchronization Interface](#)
- [Configuring the Clock Source on page 156](#)
- [Configuring the Junos OS to Support an External Clock Synchronization Interface for M Series and T Series Routers](#)
- [Synchronous Ethernet Overview](#)

- *Configuring Clock Synchronization Interface for MX Series Routers*

## Configuring the Clock Source

---

For both the router and interfaces, the clock source can be an external clock that is received on the interface or the router's internal Stratum 3 clock.

To set the clock source as external or internal:

1. In configuration mode, go to the **[edit interfaces *interface-name*]** hierarchy level:

```
[edit]
user@host# edit interfaces interface-name
```

2. Configure the **clocking** option as external or internal.

```
[edit interfaces interface-name]
user@host# set clocking (external | internal)
```



**NOTE:** M7i and M10i routers do not support external clocking of SONET interfaces.

For information about clocking on channelized interfaces, see *Channelized IQ and IQE Interfaces Properties*. Also see *Configuring the Clock Source on SONET/SDH Interfaces* and *Configuring the Channelized T3 Loop Timing*.

For information about configuring an external synchronization interface that can be used to synchronize the internal Stratum 3 clock to an external source on the M40e, M120, and M320 routers and on the T Series routers, see *Junos OS Administration Library for Routing Devices, Configuring the Junos OS to Support an External Clock Synchronization Interface for M Series and T Series Routers*.

For information about configuring Synchronous Ethernet on MX80, MX240, MX480, and MX960 3D Universal Edge Routers, see *Junos OS Administration Library for Routing Devices, Synchronous Ethernet Overview* and *Configuring Clock Synchronization Interface for MX Series Routers*.

### Related Documentation

- *Configuring an External Synchronization Interface*
- [clocking on page 386](#)
- [Clock Source Overview on page 155](#)
- *Configuring the Junos OS to Support an External Clock Synchronization Interface for M Series and T Series Routers*
- *Synchronous Ethernet Overview*
- *Configuring Clock Synchronization Interface for MX Series Routers*

## Configuring the Router as a DCE with Frame Relay Encapsulation

By default, when you configure an interface with Frame Relay encapsulation, the routing platform is assumed to be data terminal equipment (DTE). That is, the routing platform is assumed to be at a terminal point on the network.

When you configure the router to be a data circuit-terminating equipment (DCE), keepalives are disabled by default.

To configure the router to be DCE:

1. In configuration mode, go to the **[edit interfaces *interface-name*]** hierarchy level:

```
[edit]
user@host# edit interfaces interface-name
```

2. Configure the **dce** option to respond to Frame Relay status enquiry messages.

```
[edit interfaces interface-name]
user@host# set dce
```

Perform one of the following tasks for back-to-back Frame Relay connections:

- Disable sending of keepalives on both sides of the connection.
- Configure one side of the connection as a DTE (the default Junos configuration) by removing the **dce** statement from the configuration and the other as a DCE.

Related Documentation

- [dce on page 408](#)

## Receive and Transmit Leaky Bucket Properties Overview

Congestion control is particularly difficult in high-speed networks with high volumes of traffic. When congestion occurs in such a network, it is usually too late to react. You can avoid congestion by regulating the flow of packets into your network. Smoother flows prevent bursts of packets from arriving at (or being transmitted from) the same interface and causing congestion.

For all interface types except ATM, Fast Ethernet, Gigabit Ethernet, and channelized IQ and IQE, you can configure leaky bucket properties, which allow you to limit the amount of traffic received on and transmitted by a particular interface. You effectively specify what percentage of the interface's total capacity can be used to receive or transmit packets. You might want to set leaky bucket properties to limit the traffic flow from a link that is known to transmit high volumes of traffic.



**NOTE:** Instead of configuring leaky bucket properties, you can limit traffic flow by configuring policers. Policers work on all interfaces. For more information, see the *Routing Policy Feature Guide for Routing Devices*.

The leaky bucket is used at the host-network interface to allow packets into the network at a constant rate. Packets might be generated in a bursty manner, but after they pass through the leaky bucket, they enter the network evenly spaced. In some cases, you might want to allow short bursts of packets to enter the network without smoothing them out. By controlling the number of packets that can accumulate in the bucket, the **threshold** property controls burstiness. The maximum number of packets entering the network in time units is **threshold + rate \* t**.

By default, leaky buckets are disabled and the interface can receive and transmit packets at the maximum line rate.

For each DS3 channel on a channelized OC12 interface, you can configure unique receive and transmit buckets.



**NOTE:** HDLC payload scrambling conflicts with traffic shaping configured using leaky bucket properties. If you configure leaky bucket properties, you must disable payload scrambling, because the Junos OS rejects configurations that have both features enabled. For more information, see *Configuring SONET/SDH HDLC Payload Scrambling*.

**Related  
Documentation**

- [Configuring Receive and Transmit Leaky Bucket Properties on page 158](#)
- [SONET/SDH Physical Interface Properties Overview](#)
- [receive-bucket on page 719](#)
- [transmit-bucket on page 820](#)

---

## Configuring Receive and Transmit Leaky Bucket Properties

---

You can configure leaky bucket properties which allow you to limit the amount of traffic received on and transmitted by a particular interface. You can specify what percentage of the interface's total capacity can be used to receive or transmit packets. You might want to set leaky bucket properties to limit the traffic flow from a link that is known to transmit high volumes of traffic.

To configure leaky bucket properties:

1. In configuration mode, go to the **[edit interfaces *interface-name*]** hierarchy level.  

```
[edit]  
user@host# edit interfaces interface-name
```
2. Configure the **receive-bucket** statement.  

```
[edit interfaces interface-name]  
user@host# set receive-bucket
```
3. Configure the **overflow** option, the **threshold** option, and the **rate** option for the receive leaky bucket, which specifies what percentage of the interface's total capacity can be used to receive packets.



```
[edit interfaces interface-name receive-bucket]
user@host# set overflow (discard | tag)
user@host# set threshold bytes
user@host# set rate percentage
```

4. Configure the **transmit-bucket** statement.

```
[edit interfaces interface-name]
user@host# set transmit-bucket
```

5. Configure the **overflow** option, the **threshold** option, and the **rate** option for the transmit leaky bucket, which specifies what percentage of the interface's total capacity can be used to transmit packets.

```
[edit interfaces interface-name transmit-bucket]
user@host# set overflow (discard | tag)
user@host# set threshold bytes
user@host# set rate percentage
```

#### Related Documentation

- [Receive and Transmit Leaky Bucket Properties Overview on page 157](#)
- [SONET/SDH Physical Interface Properties Overview](#)
- [receive-bucket on page 719](#)
- [transmit-bucket on page 820](#)

## Configuring Accounting for the Physical Interface

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

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

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

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

## Applying an Accounting Profile to the Physical Interface

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

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

You can also reference profiles by logical unit; for more information, see [“Configuring Accounting for the Logical Interface” on page 187](#).

---

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

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

```
[edit]  
accounting-options {  
  file if_stats {  
    size 4m files 10 transfer-interval 15;  
    archive-sites {  
      "ftp://login:password@host/path";  
    }  
  }  
  interface-profile if_profile {  
    interval 15;  
    file if_stats {  
      fields {  
        input-bytes;  
        output-bytes;  
        input-packets;  
        output-packets;  
        input-errors;  
        output-errors;  
      }  
    }  
  }  
}  
[edit interfaces ge-1/0/1]  
  accounting-profile if_profile;
```

---

## 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 161](#)
- [Interface Diagnostics on page 163](#)

## 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, NxDSO, 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 28 on page 162 shows the loopback modes supported on the various interface types.

Table 28: 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                         | <a href="#">"Configuring Serial Loopback Capability" on page 307</a>   |
| Serial (EIA-530)                                     | DCE local, DCE remote, local, and remote | <a href="#">"Configuring Serial Loopback Capability" on page 307</a>   |
| SONET/SDH  | Local and remote                         | <i>Configuring SONET/SDH Loopback Capability</i>   |
| T1 and T3  | Local, payload, and remote               | <i>Configuring T1 Loopback Capability and Configuring T3 Loopback Capability</i><br><br><i>See also <a href="#">Configuring the T1 Remote Loopback Response</a></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 29 on page 165 shows the BERT capabilities for various interface types.

**Table 29: BERT Capabilities by Interface Type**

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

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 *Junos OS Operational Mode Commands*.



**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;
```



```
}
}
```

## Tracing Operations of an Individual Router Interface

To trace the operations of individual router interfaces, perform the following steps:

1. In configuration mode, go to the **[edit interfaces *interface-name*]** hierarchy level:

```
[edit]
user@host# edit interfaces interface-name
```

2. Configure the **traceoptions** option.

```
[edit interfaces interface-name]
user@host# edit traceoptions
```

3. Configure the tracing flag.

```
[edit interfaces interface-name traceoptions]
user@host# set flag flag-option
```

You can specify the following interface tracing flags:

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

The interfaces **traceoptions** statement does not support a trace file. The logging is done by the kernel, so the tracing information is placed in the system **syslog** files.

For more information about trace operations, see [“Tracing Operations of the Interface Process” on page 272](#).

**Related Documentation**

- [traceoptions on page 807](#)

## Damping Interface Transitions

---

By default, when an interface changes from being up to being down, or from down to up, this transition is advertised immediately to the hardware and Junos OS. In some situations—for example, when an interface is connected to an add-drop multiplexer (ADM) or wavelength-division multiplexer (WDM), or to protect against SONET/SDH framer holes—you might want to damp interface transitions. This means not advertising the interface's transition until a certain period of time has passed, called the *hold-time*. When you have damped interface transitions and the interface goes from up to down, the interface is not advertised to the rest of the system as being down until it has remained down for the hold-time period. Similarly when an interface goes from down to up, it is not advertised as being up until it has remained up for the hold-time period.

To damp interface transitions:

1. In the configuration mode, go to the **[edit interfaces *interface-name*]** hierarchy level, where the interface name is *so-fpc/pic/port*.

```
[edit]
user@host# edit interfaces interface-name
```

2. Configure the hold-time for link up and link down.

```
[edit interfaces interface-name]
user@host# set hold-time up milliseconds down milliseconds
```

The hold time can be a value from 0 through 4,294,967,295 milliseconds. The default value is 0, which means that interface transitions are not damped. Junos OS advertises the transition within 100 milliseconds of the time value you specify.

For most Ethernet interfaces, hold timers are implemented using a 1-second polling algorithm. For 1-port, 2-port, and 4-port Gigabit Ethernet interfaces with small form-factor pluggable transceivers (SFPs), hold timers are interrupt-driven.



**NOTE:** The **hold-time** option is not available for controller interfaces.

---

### Related Documentation

- [SONET/SDH Defect Hold Times Overview](#)
- [Configuring SONET/SDH Defect Triggers](#)
- [hold-time on page 506](#)

## Configuring Multiservice Physical Interface Properties

---

The adaptive services (AS), collector, monitoring services, and monitoring services II interfaces are multiservice interfaces specifically designed to enable IP services. To configure multiservice physical interface properties on the collector, monitoring services, and AS interfaces, include the **multiservice-options** statement:

```
multiservice-options {
```

```

(core-dump | no-core-dump);
(syslog | no-syslog);
flow-control-options {
    down-on-flow-control;
    dump-on-flow-control;
    reset-on-flow-control;
}
}

```

You can include these statements at the following hierarchy levels:

- [edit interfaces *cp-fpc/pic/port*]
- [edit interfaces *mo-fpc/pic/port*]
- [edit interfaces *sp-fpc/pic/port*]

For more information about the services interfaces, see the *Junos OS Services Interfaces Library for Routing Devices*.

## Enabling or Disabling SNMP Notifications on Physical Interfaces

By default, Simple Network Management Protocol (SNMP) notifications are sent when the state of an interface or a connection changes. You can enable or disable these notification based on you requirements.

To explicitly enable sending SNMP notifications on the physical interface, perform the following steps:

1. In configuration mode, go to the [edit interfaces *interface-name*] hierarchy level:

```

[edit]
user@host# edit interfaces interface-name

```

2. Configure the **traps** option to enable sending of Simple Network Management Protocol (SNMP) notifications when the state of the connection changes.

```

[edit interfaces interface-name]
user@host# set traps

```

To disable sending SNMP notifications on the physical interface, perform the following steps:

1. In configuration mode, go to the [edit interfaces *interface-name*] hierarchy level:

```

[edit]
user@host# edit interfaces interface-name

```

2. Configure the **no-traps** option to disable sending of Simple Network Management Protocol (SNMP) notifications when the state of the connection changes.

```

[edit interfaces interface-name]
user@host# set no-traps

```



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

Related Documentation • [traps on page 823](#)

---

## Understanding Unidirectional Traffic Flow on Physical Interfaces

---

By default, physical interfaces are bidirectional; that is, they both transmit and receive traffic. You can configure unidirectional link mode on a 10-Gigabit Ethernet interface that creates two new physical interfaces that are unidirectional. The new transmit-only and receive-only interfaces operate independently, but both are subordinate to the original parent interface.

The unidirectional interfaces enable the configuration of a unidirectional link topology. Unidirectional links are useful for applications such as broadband video services where almost all traffic flow is in one direction, from the provider to the user. Unidirectional link mode conserves bandwidth by enabling it to be differentially dedicated to transmit and receive interfaces. In addition, unidirectional link mode conserves ports for such applications because the transmit-only and receive-only interfaces act independently. Each can be connected to different routers, for example, reducing the total number of ports required.



**NOTE:** Unidirectional link mode is currently supported on only the following hardware:

- 4-port 10-Gigabit Ethernet DPC on the MX960 router
  - 10-Gigabit Ethernet IQ2 PIC and 10-Gigabit Ethernet IQ2E PIC on the T Series router
- 

The transmit-only interface is always operationally up. The operational status of the receive-only interface depends only on local faults; it is independent of remote faults and of the status of the transmit-only interface.

On the parent interface, you can configure attributes common to both interfaces, such as clocking, framing, `gether-options`, and `sonet-options`. On each of the unidirectional interfaces, you can configure encapsulation, MAC address, MTU size, and logical interfaces.

Unidirectional interfaces support IP and IPv6. Packet forwarding takes place by means of static routes and static ARP entries, which you can configure independently on both unidirectional interfaces.

Only transmit statistics are reported on the transmit-only interface (and shown as zero on the receive-only interface). Only receive statistics are reported on the receive-only interface (and shown as zero on the transmit-only interface). Both transmit and receive statistics are reported on the parent interface.

Related Documentation • [unidirectional on page 829](#)  
• *Enabling Unidirectional Traffic Flow on Physical Interfaces*

## Improvements to Interface Transmit Statistics Reporting

The offered load on an interface can be defined as the amount of data the interface is capable of transmitting during a given time period. The actual traffic that goes out of the interface is the transmitted load. However, when outgoing interfaces are oversubscribed, there could be traffic drops in the schedulers attached to the outgoing interfaces. Hence, the offered load is not always the same as the actual transmitted load because the offered load calculation does not take into account possible packet drop or traffic loss.

On MX Series routers, the logical interface-level statistics show the offered load, which is often different from the actual transmitted load. To address this limitation, Junos OS introduces a new configuration option in Release 11.4 R3 and later. The new configuration option, **interface-transmit-statistics**, at the **[edit interface *interface-name*]** hierarchy level, enables you to configure Junos OS to accurately capture and report the transmitted load on interfaces.

When the **interface-transmit-statistics** statement is included at the **[edit interface *interface-name*]** hierarchy level, the following operational mode commands report the actual transmitted load:

- **show interface *interface-name* <detail | extensive>**
- **monitor interface *interface-name***
- **show snmp mib get *objectID.ifIndex***



**NOTE:** This configuration is supported only on Enhanced Queuing Dense Port Concentrators (DPCs) and Enhanced IQ (IQE) PICs of MX Series routers.

The **show interface *interface-name*** command also shows whether the **interface-transmit-statistics** configuration is enabled or disabled on the interface.

### Related Documentation

- [interface-transmit-statistics on page 533](#)
- [show interfaces \(Gigabit Ethernet\)](#)

## Disabling a Physical Interface

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

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



**CAUTION:** Dynamic subscribers and logical interfaces use physical interfaces for connection to the network. The Junos OS allows you to set the interface to disable and commit the change while dynamic subscribers and logical

interfaces are still active. This action results in the loss of all subscriber connections on the interface. Use care when disabling interfaces.



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



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

### Example: Disabling a Physical Interface

Sample interface configuration:

```
[edit interfaces]
user@host# show
ge-0/3/2 {
  unit 0 {
    description CE2-to-PE1;
    family inet {
      address 20.1.1.6/24;
    }
  }
}
```

Disabling the interface:

```
[edit interfaces]
user@host# set ge-0/3/2 disable
```

Verifying the interface configuration:

```
[edit interfaces]
user@host# show
ge-0/3/2 {
  disable; # Interface is marked as disabled.
  unit 0 {
    description CE2-to-PE1;
    family inet {
      address 20.1.1.6/24;
    }
  }
}
```

## CHAPTER 4

# Configuring Logical Interface Properties

- [Logical Interfaces Configuration Properties Overview on page 173](#)
- [Logical Interfaces Configuration Statements on page 174](#)
- [Logical Interfaces Statements List on page 177](#)
- [Specifying the Logical Interface Number on page 184](#)
- [Configuring Logical System Interface Properties on page 185](#)
- [Adding a Logical Unit Description to the Configuration on page 186](#)
- [Configuring a Point-to-Point Connection on page 187](#)
- [Configuring a Multipoint Connection on page 187](#)
- [Configuring Accounting for the Logical Interface on page 187](#)
- [Configuring the Interface Bandwidth on page 189](#)
- [Enabling or Disabling SNMP Notifications on Logical Interfaces on page 189](#)
- [Configuring Interface Encapsulation on Logical Interfaces on page 190](#)
- [Configuring the LCP Configure-Request Maximum Sent on page 191](#)
- [Configuring the NCP Configure-Request Maximum Sent on page 192](#)
- [Configuring the PPP Restart Timers on page 192](#)
- [Configuring the PPP Clear Loop Detected Timer on page 193](#)
- [Configuring Dynamic Profiles for PPP on page 193](#)
- [Configuring PPP CHAP Authentication on page 194](#)
- [Configuring PPP PAP Authentication on page 194](#)
- [Configuring Dynamic Call Admission Control on page 196](#)
- [Disabling a Logical Interface on page 197](#)

## Logical Interfaces Configuration Properties Overview

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For a physical interface device to function, you must configure at least one logical interface on that device. For each logical interface, you must specify the protocol family that the interface supports. You can also configure other logical interface properties. These vary by Physical Interface Card (PIC) and encapsulation type, but include the IP address of the interface, and whether the interface supports multicast traffic, data-link connection

identifiers (DLCIs), virtual channel identifiers (VCIs) and virtual path identifiers (VPIs), and traffic shaping.

**Related Documentation**

- *Logical Part of an Interface Name*

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## Logical Interfaces Configuration Statements

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To configure logical interface properties, include the following statements:

```
unit logical-unit-number {
  accept-source-mac {
    mac-address mac-address {
      policer {
        input cos-policer-name;
        output cos-policer-name;
      }
    }
  }
  accounting-profile name;
  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;
      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 number;
    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 plp1 cells;
filter filter-name;
fragment-threshold bytes;
inner-vlan-id-range start start-id end end-id;
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;
link-layer-overhead percent;
layer2-policer {
    input-policer policer-name;
    input-three-color policer-name;
    output-policer policer-name;
    output-three-color policer-name;
}
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-push | 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;
    lcp-restart-timer milliseconds;
    loopback-clear-timer seconds;
    ncp-restart-timer milliseconds;
    pap {
        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;
}
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-range number-number;
  vlan-tags inner tpid.vlan-id outer tpid.vlan-id;
  family family {
    [ family-statements ];
  }
}

```

You can include these statements at the following hierarchy levels:

- [edit interfaces *interface-name*]
- [edit logical-systems *logical-system-name* interfaces *interface-name*]

For information about interface-specific logical properties, see [Table 30 on page 177](#).

## Logical Interfaces Statements List

[Table 30 on page 177](#) lists statements that you can use to configure logical interfaces.

**Table 30: Statements for Logical Interface Properties**

| Statement  | Interface Types   | Usage Guidelines   |
|--|---|--|
| <code>access-profile</code> <i>name</i>                      | ATM2 IQ interfaces  | "Configuring PPP PAP Authentication" on page 194               |
| <code>accept-source-mac</code>                               | Gigabit Ethernet intelligent queuing (IQ) interfaces  | <i>Configuring Gigabit Ethernet Policers</i>                   |
| <code>accounting-profile</code> <i>name</i>                  | All   | "Configuring Accounting for the Logical Interface" on page 187 |
| <code>activation-delay</code> <i>seconds</i>                 | ISDN interfaces   | <i>ISDN Interfaces Overview</i>                                |
| <code>activation-priority</code> <i>priority</i>             | Fast Ethernet and Gigabit Ethernet interfaces, ISDN BRI interfaces, and serial interfaces with PPP or Frame Relay encapsulation on J4350 and J6350 Services Routers supporting voice over IP with the TGM550 media gateway module | "Configuring Dynamic Call Admission Control" on page 196       |
| <code>adaptive-shapers</code><br><i>adaptive-shaper-name</i> | Frame Relay interfaces on J Series routers  | <i>Junos OS Class of Service Library for Routing Devices</i>   |
| <code>allow-any-vci</code>                                   | Asynchronous Transfer Mode (ATM) interfaces   | <i>Configuring ATM Interface Encapsulation</i>                 |

Table 30: Statements for Logical Interface Properties (*continued*)

| Statement   | Interface Types   | Usage Guidelines   |
|---|---|--|
| <code>atm-scheduler-map</code> ( <i>map-name</i>   <i>default</i> ) | ATM2 IQ interfaces  | <i>Configuring ATM2 IQ VC Tunnel CoS Components</i>                  |
| <code>backup-destination</code> <i>address</i>                      | Encryption interfaces   | <i>Junos OS Class of Service Library for Routing Devices</i>         |
| <code>backup-options</code>   | J Series routers ISDN interfaces  | <i>Configuring ISDN Logical Interface Properties</i>                 |
| <code>bandwidth</code> <i>rate</i>                                  | All interfaces, except multilink and aggregated   | "Configuring the Interface Bandwidth" on page 189                    |
| <code>bearer-bandwidth-limit</code> <i>kilobits-per-second</i>      | Fast Ethernet and Gigabit Ethernet interfaces, ISDN BRI interfaces, and serial interfaces with PPP or Frame Relay encapsulation on J4350 and J6350 Services Routers supporting voice over IP with the TGM550 media gateway module | "Configuring Dynamic Call Admission Control" on page 196             |
| <code>cbr</code> <i>rate</i>  | ATM interfaces  | <i>Defining the ATM Traffic-Shaping Profile</i>                      |
| <code>cell-bundle-size</code> <i>cells</i>                          | ATM2 IQ interfaces  | <i>Configuring the Layer 2 Circuit Cell-Relay Cell Maximum</i>       |
| <code>clear-dont-fragment-bit</code>                                | Adaptive services interfaces  | <i>Junos OS Services Interfaces Library for Routing Devices</i>      |
| <code>compression</code>  | AS PIC or MultiServices PIC link services IQ interfaces ( <i>lsq</i> ) and voice services interfaces  | <i>Junos OS Services Interfaces Library for Routing Devices</i>      |
| <code>compression-device</code> <i>interface-name</i>               | J Series routers E1 and T1 interfaces.  | <i>Junos OS Services Interfaces Library for Routing Devices</i>      |
| <code>copy-tos-to-outer-ip-header</code>                            | GRE tunnel interfaces   | <i>Junos OS Class of Service Library for Routing Devices</i>         |
| <code>deactivation-delay</code> <i>seconds</i>                      | ISDN interfaces   | <i>ISDN Interfaces Overview</i>                                      |
| <code>demux-destination</code> <i>family</i>                        | IP demux interfaces   | "Configuring an IP Demux Underlying Interface" on page 281           |
| <code>demux-options</code> <i>family</i>                            | IP demux interfaces   | "Specifying the Demux Underlying Interface" on page 283              |
| <code>demux-source</code> <i>family</i>                             | IP demux interfaces   | "Configuring an IP Demux Underlying Interface" on page 281           |
| <code>description</code> <i>text</i>                                | All   | "Adding a Logical Unit Description to the Configuration" on page 186 |

Table 30: Statements for Logical Interface Properties (*continued*)

| Statement  | Interface Types   | Usage Guidelines  |
|--|---|---|
| <code>destination (address   routing-instance-name)</code> | Encryption generic routing encapsulation (GRE) tunnel, and IP tunnel interfaces   | <i>Junos OS Services Interfaces Library for Routing Devices</i>   |
| <code>dialer-options</code>                                | J Series routers ISDN interfaces  | <i>Configuring ISDN Physical Interface Properties</i>   |
| <code>disable</code>                                       | All   | "Disabling a Logical Interface" on page 197   |
| <code>disable-mlppp-inner-ppp-pfc</code>                   | MLPPP interfaces  | <i>Junos OS Services Interfaces Library for Routing Devices</i>   |
| <code>dlci dlci-identifier</code>                          | Point-to-point interfaces with Frame Relay encapsulation  | <i>Configuring Frame Relay DLCIs</i>  |
| <code>drop-timeout milliseconds</code>                     | Multilink interfaces  | <i>Junos OS Services Interfaces Library for Routing Devices</i>   |
| <code>dynamic-call-admission-control</code>                | Fast Ethernet and Gigabit Ethernet interfaces, ISDN BRI interfaces, and serial interfaces with PPP or Frame Relay encapsulation on J4350 and J6350 Services Routers supporting voice over IP with the TGM550 media gateway module | "Configuring Dynamic Call Admission Control" on page 196  |
| <code>dynamic-profile profile-name</code>                  | 1-Gigabit Ethernet and 10-Gigabit Ethernet interfaces configured with PPP over Ethernet on M120 and M320 routers  | <i>Junos Subscriber Access Configuration Guide</i>  |
| <code>encapsulation type</code>                            | All interfaces, except aggregated SONET/SDH and loopback  | "Configuring the Encapsulation on a Logical Interface" on page 190  |
| <code>epd-threshold cells</code>                           | ATM2 IQ interfaces  | <i>Configuring the ATM2 IQ EPD Threshold</i>  |
| <code>f-max-period number</code>                           | AS PIC or MultiServices link services IQ interfaces ( <b>lsq-</b> ) and voice services interfaces   | <i>Junos OS Services Interfaces Library for Routing Devices</i>   |
| <code>family</code>  | All   | "Configuring the Protocol Family" on page 202   |
| <code>fragment-threshold bytes</code>                      | Multilink interfaces  | <i>Junos OS Services Interfaces Library for Routing Devices</i>   |
| <code>frame-relay map-name   default)</code>               | Frame Relay Interfaces on J Series routers  | <i>Junos OS Services Interfaces Library for Routing Devices and Junos OS Class of Service Library for Routing Devices</i> |
| <code>idle-timeout</code>                                  | ISDN interfaces   | <i>Configuring ISDN Logical Interface Properties</i>  |

Table 30: Statements for Logical Interface Properties (*continued*)

| Statement                                   | Interface Types  | Usage Guidelines   |
|---|--|--|
| <code>initial-route-check seconds</code>    | ISDN interfaces  | <i>Configuring ISDN Logical Interface Properties</i>   |
| <code>inner-tag-protocol-id</code>          | Gigabit Ethernet IQ interfaces   | <i>802.1Q VLANs Overview</i>   |
| <code>inner-vlan-id</code>                  | Gigabit Ethernet IQ interfaces   | <i>802.1Q VLANs Overview</i>   |
| <code>inner-vlan-id-range</code>            | Gigabit Ethernet, 10-Gigabit Ethernet, and aggregated Ethernet IQ interfaces                             | <a href="#">“Configuring ATM-to-Ethernet Interworking” on page 260</a>   |
| <code>input</code>                          | AS PIC or MultiServices link services  | <i>Junos OS Services Interfaces Library for Routing Devices</i>  |
| <code>input-policer policer-name</code>     | For 1-Gigabit Ethernet and 10-Gigabit Ethernet IQ2 and IQ2-E interfaces on M Series and T Series routers | <i>Junos OS Services Interfaces Library for Routing Devices and Configuring Gigabit Ethernet Two-Color and Tricolor Policers</i> |
| <code>input-three-color policer-name</code> | For 1-Gigabit Ethernet and 10-Gigabit Ethernet IQ2 and IQ2-E interfaces on M Series and T Series routers | <i>Junos OS Class of Service Library for Routing Devices and Configuring Gigabit Ethernet Two-Color and Tricolor Policers</i>    |
| <code>input-vlan-map</code>                 | Gigabit Ethernet IQ interfaces   | <i>Stacking and Rewriting Gigabit Ethernet VLAN Tags Overview</i>  |
| <code>interleave-fragments</code>           | Link services interfaces   | <i>Junos OS Services Interfaces Library for Routing Devices</i>  |
| <code>inverse-arp</code>                    | Interfaces with ATM and Frame Relay encapsulation  | <i>Configuring Inverse ATM1 or ATM2 ARP and Configuring Inverse Frame Relay ARP</i>  |
| <code>key number</code>                     | GRE tunnel interfaces on Adaptive Services PICs  | <i>Junos OS Services Interfaces Library for Routing Devices</i>  |
| <code>layer2-policer</code>                 | 1-Gigabit Ethernet and 10-Gigabit Ethernet IQ2 and IQ2-E interfaces                                      | <i>Configuring Gigabit Ethernet Two-Color and Tricolor Policers</i>  |
| <code>lcp-restart-timer</code>              | Interfaces with PPP encapsulation  | <a href="#">“Configuring the PPP Restart Timers” on page 192</a>   |
| <code>l2tp-interface-id name</code>         | Adaptive services interfaces   | <i>Junos OS Services Interfaces Library for Routing Devices</i>  |
| <code>link-layer-overhead percent</code>    | AS PIC or MultiServices link services IQ interfaces (lsq)  | <i>Junos OS Services Interfaces Library for Routing Devices</i>  |
| <code>load-threshold number</code>          | ISDN interfaces  | <i>Configuring ISDN Logical Interface Properties</i>   |

Table 30: Statements for Logical Interface Properties (*continued*)

| Statement  | Interface Types  | Usage Guidelines   |
|--|--|--|
| <code>local-name name</code>                             | ATM2 IQ interfaces   | <a href="#">“Configuring PPP CHAP Authentication” on page 194</a> and <a href="#">“Configuring PPP PAP Authentication” on page 194</a> |
| <code>loss-priority-maps</code>                          | Frame Relay interfaces on J Series routers   | <i>Junos OS Services Interfaces Library for Routing Devices</i> and <i>Junos OS Class of Service Library for Routing Devices</i>       |
| <code>mac-address mac-address</code>                     | Gigabit Ethernet interfaces and Gigabit Ethernet IQ and IQE interfaces with small form-factor pluggable transceivers (SFPs) (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router) | <i>Configuring Gigabit Ethernet Policers</i>   |
| <code>minimum-links number</code>                        | Multilink interfaces   | <i>Junos OS Services Interfaces Library for Routing Devices</i>  |
| <code>mrru bytes</code>                                  | Multilink interfaces   | <i>Junos OS Services Interfaces Library for Routing Devices</i>  |
| <code>multicast-dlci dlci-identifier</code>              | Point-to-multipoint Frame Relay interfaces   | <i>Configuring Frame Relay DLCIs</i>   |
| <code>multicast-vci vpi-identifier vci-identifier</code> | Point-to-multipoint ATM1 and ATM2 IQ interfaces  | <i>Configuring the ATM OAM F5 Loopback Cell Threshold</i>  |
| <code>multilink-max-classes number</code>                | AS PIC or MultiServices link services IQ interfaces ( <b>lsq-</b> )  | <i>Junos OS Services Interfaces Library for Routing Devices</i>  |
| <code>multipoint</code>                                  | All  | <a href="#">“Configuring a Multipoint Connection” on page 187</a>  |
| <code>ncp-restart-timer</code>                           | Interfaces with PPP encapsulation  | <a href="#">“Configuring the PPP Restart Timers” on page 192</a>   |
| <code>oam-liveness</code>                                | ATM1 and ATM2 IQ interfaces  | <i>Configuring the ATM OAM F5 Loopback Cell Threshold</i>  |
| <code>oam-period (disable   seconds)</code>              | ATM1 and ATM2 IQ interfaces  | <i>Defining the ATM OAM F5 Loopback Cell Period</i>  |
| <code>output</code>                                      | All  | <i>Junos OS Services Interfaces Library for Routing Devices</i>  |
| <code>output-policer policer-name</code>                 | For 1-Gigabit Ethernet and 10-Gigabit Ethernet IQ2 and IQ2-E interfaces on M Series and T Series routers   | <i>Junos OS Class of Service Library for Routing Devices</i> and <i>Configuring Gigabit Ethernet Two-Color and Tricolor Policers</i>   |

Table 30: Statements for Logical Interface Properties (*continued*)

| Statement   | Interface Types  | Usage Guidelines   |
|---|--|--|
| <code>output-three-color</code> <i>policer-name</i> | For 1-Gigabit Ethernet and 10-Gigabit Ethernet IQ2 and IQ2-E interfaces on M Series and T Series routers   | <i>Junos OS Class of Service Library for Routing Devices and Configuring Gigabit Ethernet Two-Color and Tricolor Policers</i>          |
| <code>output-vlan-map</code>                        | Gigabit Ethernet IQ interfaces   | <i>Stacking and Rewriting Gigabit Ethernet VLAN Tags Overview</i>  |
| <code>passive</code> (CHAP)                         | ATM2 IQ interfaces   | <a href="#">“Configuring PPP CHAP Authentication” on page 194</a>  |
| <code>passive</code> (PAP)                          | ATM2 IQ interfaces   | <a href="#">“Configuring PPP PAP Authentication” on page 194</a>   |
| <code>passive-monitor-mode</code>                   | SONET/SDH interfaces   | <i>Enabling Passive Monitoring on SONET/SDH Interfaces</i>   |
| <code>peer-unit</code> <i>unit-number</i>           | Logical tunnel interfaces  | <i>Junos OS Services Interfaces Library for Routing Devices</i>  |
| <code>pfc</code>                                    | Interfaces with PPP, PPP CCC, or PPP TCC encapsulation   | <a href="#">“Configuring the PPP Protocol Field Compression” on page 147</a>   |
| <code>plp1 cells</code>                             | ATM2 IQ interfaces   | <i>Configuring the ATM2 IQ EPD Threshold</i>   |
| <code>plp-to-clp</code>                             | ATM2 IQ interfaces   | <i>Configuring ATM2 IQ VC Tunnel CoS Components</i>  |
| <code>point-to-point</code>                         | All  | <a href="#">“Configuring a Point-to-Point Connection” on page 187</a>  |
| <code>policer</code>                                | Gigabit Ethernet and Gigabit Ethernet IQ and IQE PICs with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router) | <i>Configuring Gigabit Ethernet Policers</i>   |
| <code>pop</code>                                    | Gigabit Ethernet IQ interfaces   | <i>Removing a VLAN Tag</i>   |
| <code>pop-pop</code>                                | Gigabit Ethernet IQ interfaces   | <i>Removing the Outer and Inner VLAN Tags</i>  |
| <code>pop-swap</code>                               | Gigabit Ethernet IQ interfaces   | <i>Removing the Outer VLAN Tag and Rewriting the Inner VLAN Tag</i>  |
| <code>port</code>                                   | AS PIC or MultiServices or MultiServices link services IQ interfaces ( <b>lsq</b> ) and voice services interfaces  | <i>Junos OS Services Interfaces Library for Routing Devices</i>  |
| <code>ppp-options</code>                            | Interfaces with PPP, PPP CCC, or PPP TCC encapsulation   | <a href="#">“Configuring PPP CHAP Authentication” on page 194</a> and <a href="#">“Configuring PPP PAP Authentication” on page 194</a> |



Table 30: Statements for Logical Interface Properties (*continued*)

| Statement  | Interface Types  | Usage Guidelines   |
|--|--|--|
| <code>proxy-arp</code>                                   | Ethernet interfaces  | <i>Configuring Restricted and Unrestricted Proxy ARP</i>                         |
| <code>push</code>  | Gigabit Ethernet IQ interfaces   | <i>Stacking a VLAN Tag</i>   |
| <code>push-push</code>                                   | Gigabit Ethernet IQ interfaces   | <i>Stacking Two VLAN Tags</i>  |
| <code>queue-length number</code>                         | ATM1 interfaces  | <i>Configuring the ATM1 Queue Length</i>   |
| <code>queues [ queue-numbers ]</code>                    | AS PIC or MultiServices link services IQ interfaces ( <b>lsq</b> ) and voice services interfaces   | <i>Junos OS Services Interfaces Library for Routing Devices</i>                  |
| <code>routing-instance</code>                            | GRE tunnel and IP tunnel interfaces  | <i>Junos OS Services Interfaces Library for Routing Devices</i>                  |
| <code>rtp</code>   | AS PIC or MultiServices link services IQ interfaces ( <b>lsq</b> ) and voice services interfaces   | <i>Junos OS Services Interfaces Library for Routing Devices</i>                  |
| <code>rtvbr peak rate sustained rate burst length</code> | ATM2 interfaces  | <i>Defining the ATM Traffic-Shaping Profile</i>                                  |
| <code>service-domain (inside   outside)</code>           | Adaptive services interfaces   | <i>Junos OS Services Interfaces Library for Routing Devices</i>                  |
| <code>shaping</code>                                     | ATM1 and ATM2 IQ interfaces  | <i>Defining the ATM Traffic-Shaping Profile</i>                                  |
| <code>short-sequence</code>                              | Multilink interfaces   | <i>Junos OS Services Interfaces Library for Routing Devices</i>                  |
| <code>source source-address</code>                       | Encryption, GRE tunnel, and IP tunnel interfaces   | <i>Junos OS Services Interfaces Library for Routing Devices</i>                  |
| <code>swap</code>  | Gigabit Ethernet IQ interfaces   | <i>Configuring Frames with Particular TPIDs to Be Processed as Tagged Frames</i> |
| <code>swap-push</code>                                   | Gigabit Ethernet IQ interfaces   | <i>Rewriting a VLAN Tag and Adding a New Tag</i>                                 |
| <code>swap-swap</code>                                   | Gigabit Ethernet IQ interfaces   | <i>Rewriting the Inner and Outer VLAN Tags</i>                                   |
| <code>tag-protocol-id tpid</code>                        | Gigabit Ethernet and Gigabit Ethernet IQ and IQE PICs with SFPs (except the 10-port Gigabit Ethernet PIC, Aggregated Ethernet with Gigabit Ethernet IQ interfaces, and the built-in Gigabit Ethernet port on the M7i router) | <i>Rewriting the VLAN Tag on Tagged Frames</i>                                   |

Table 30: Statements for Logical Interface Properties (*continued*)

| Statement  | Interface Types  | Usage Guidelines   |
|--|--|--|
| <code>transmit-weight number</code>                        | ATM2 IQ interfaces   | <i>Configuring the ATM2 IQ Transmission Weight</i>   |
| <code>(traps   no-traps)</code>                            | All  | <a href="#">“Enabling or Disabling SNMP Notifications on Logical Interfaces” on page 189</a> |
| <code>trunk-bandwidth rate</code>                          | ATM2 IQ interfaces   | <i>Configuring Layer 2 Circuit Trunk Mode Scheduling</i>                                     |
| <code>trunk-id number</code>                               | ATM2 IQ interfaces   | <i>Configuring Layer 2 Circuit Transport Mode</i>  |
| <code>ttl number</code>                                    | GRE tunnel and IP tunnel interfaces  | <i>Junos OS Services Interfaces Library for Routing Devices</i>                              |
| <code>tunnel</code>  | Encryption, GRE tunnel, and IP tunnel interfaces   | <i>Junos OS Services Interfaces Library for Routing Devices</i>                              |
| <code>underlying-interface</code>                          | IP demux interfaces  | <a href="#">“Specifying the Demux Underlying Interface” on page 283</a>                      |
| <code>vbr peak rate sustained rate burst length</code>     | ATM interfaces   | <i>Defining the ATM Traffic-Shaping Profile</i>  |
| <code>vci vpi-identifier vci-identifier</code>             | ATM1 and ATM2 IQ point-to-point interfaces   | <i>Configuring a Point-to-Point ATM1 or ATM2 IQ Connection</i>                               |
| <code>vci-range</code>                                     | ATM2 IQ interfaces   | <a href="#">“Configuring ATM-to-Ethernet Interworking” on page 260</a>                       |
| <code>vpi vpi-identifier</code>                            | ATM1 and ATM2 IQ point-to-point interfaces   | <i>Configuring a Point-to-Point ATM1 or ATM2 IQ Connection</i>                               |
| <code>vlan-id number</code>                                | Fast Ethernet, Gigabit Ethernet, and Gigabit Ethernet IQ interfaces and aggregated Ethernet using Gigabit Ethernet IQ interfaces | <i>Binding VLAN IDs to Logical Interfaces and Rewriting the VLAN Tag on Tagged Frames</i>    |
| <code>vlan-tags inner tpidvlan-id outer tpidvlan-id</code> | Gigabit Ethernet IQ interfaces   | <i>Configuring Dual VLAN Tags</i>  |
| <code>watch-list</code>                                    | ISDN interfaces  | <i>Configuring ISDN Logical Interface Properties</i>   |

## Specifying the Logical Interface Number

Each logical interface must have a logical unit number. The logical unit number corresponds to the logical unit part of the interface name. For more information, see [“Interface Naming Overview” on page 63](#).

Point-to-Point Protocol (PPP), Cisco High-level Data Link Control (HDLC), and Ethernet circuit cross-connect (CCC) encapsulations support only a single logical interface, whose logical unit number must be 0. Frame Relay and ATM encapsulations support multiple logical interfaces, so you can configure one or more logical unit numbers.

You specify the logical unit number by including the **unit** statement:

```
unit logical-unit-number {
  ...
}
```

You can include this statement at the following hierarchy levels:

- [edit interfaces *interface-name*]
- [edit logical-systems *logical-system-name* interfaces *interface-name*]

The logical unit number can be in the range 0 through 65,535 for demux and PPPoE static interfaces only. The logical unit number can be in the range 0 through 16,385 for all other static interface types.

## Configuring Logical System Interface Properties

With Junos OS, you can partition a single physical router into multiple logical devices that perform independent routing tasks. Because logical systems perform a subset of the tasks once handled by the physical router, logical systems offer an effective way to maximize the use of a single router.

You can include the following logical system statements:

```
[edit logical-systems logical-system-name]
interfaces interface-name {
  unit logical-unit-number {
    logical-interface-statements;
  }
}
policy-options {
  policy-options-statements;
}
protocols {
  protocols-statements;
}
routing-instances {
  routing-instances-statements;
}
routing-options {
  routing-options-statements;
}
```

For an overview of logical systems, see the *Junos OS Feature Guides*. For detailed information about logical system configuration, see the *Junos OS Routing Protocols Library for Routing Devices*. For information about configuring peer relationships between logical systems, see *Junos OS Services Interfaces Library for Routing Devices*.

To configure interface properties of a logical system, you must include the following statements at the `[edit logical-systems logical-system-name]` hierarchy level:

```
[edit logical-systems logical-system-name]  
interfaces interface-name {  
  unit logical-unit-number {  
    logical-interface-statements;  
  }  
}
```

## Example: Configuring Logical System Interface Properties

Configure a logical system's interface properties:

```
[edit interfaces t3-0/0/1]  
description "Physical interface to be partitioned into multiple logical systems";  
[edit logical-systems 1-on-t3-0/0/1]  
interfaces t3-0/0/1 {  
  unit 1 {  
    family inet {  
      address 10.0.0.1/32 {  
        destination 10.0.0.2;  
      }  
    }  
  }  
}
```

**Related Documentation**

- [\[edit logical-systems\] Hierarchy Level](#)

---

## Adding a Logical Unit Description to the Configuration

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

**description** *text*;

You can include this statement at the following hierarchy levels:

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

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



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

For information about describing physical interfaces, see “[Configuring Interface Description](#)” on page 117.

## Configuring a Point-to-Point Connection

By default, all interfaces are assumed to be point-to-point connections. You must ensure that the maximum transmission unit (MTU) sizes on both sides of the connection are the same.

For all interfaces except aggregated Ethernet, Fast Ethernet, and Gigabit Ethernet, you can explicitly configure an interface to be a point-to-point connection by including the **point-to-point** statement:

**point-to-point;**

You can include this statement at the following hierarchy levels:

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

## Configuring a Multipoint Connection

By default, all interfaces are assumed to be point-to-point connections. To configure an interface to be a multipoint connection, include the **multipoint** statement:

**multipoint;**

You can include this statement at the following hierarchy levels:

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

## Configuring Accounting for the Logical Interface

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

- The fields used in the accounting records
- The number of files that the router or switch retains before discarding, and the number of bytes per file

- The period that the system uses to record the data

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

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

## Applying an Accounting Profile to the Logical Interface

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

```
accounting-profile name;
```

You can include this statement at the following hierarchy level:

- **[edit interfaces *interface-name* unit *logical-unit-number*]**

You can also reference profiles for the physical interface; for more information, see [“Configuring Accounting for the Physical Interface” on page 159](#).

---

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

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

```
[edit]
accounting-options {
  file if_stats {
    size 4m files 10 transfer-interval 15;
    archive-sites {
      "ftp://login:password@host/path";
    }
  }
  interface-profile if_profile {
    interval 15;
    file if_stats {
      fields {
        input-bytes;
        output-bytes;
        input-packets;
        output-packets;
        input-errors;
        output-errors;
      }
    }
  }
}
[edit interfaces ge-1/0/1 unit 1]
accounting-profile if_profile;
```

To reference profiles by physical interface, see [“Applying an Accounting Profile to the Physical Interface” on page 160](#). For information about configuring a firewall filter accounting profile, see the *Routing Policy Feature Guide for Routing Devices*.

## Configuring the Interface Bandwidth

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



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

$$\text{cost} = \text{reference-bandwidth} / \text{bandwidth},$$

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

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

**bandwidth** *rate*;

You can include this statement at the following hierarchy levels:

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

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

## Enabling or Disabling SNMP Notifications on Logical Interfaces

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

([traps](#) | [no-traps](#));

You can include these statements at the following hierarchy levels:

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



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

---

## Configuring Interface Encapsulation on Logical Interfaces

---

PPP encapsulation is the default encapsulation type for physical interfaces. You need not configure encapsulation for any physical interfaces that support PPP encapsulation. If you do not configure encapsulation, PPP is used by default. For physical interfaces that do not support PPP encapsulation, you must configure an encapsulation to use for packets transmitted on the interface. For more information about physical interface encapsulation, see “[Configuring the Encapsulation on a Physical Interface](#)” on page 131.

You can optionally configure an encapsulation on a logical interface, which is the encapsulation used within certain packet types.

### Configuring the Encapsulation on a Logical Interface

Generally, you configure an interface's encapsulation at the [edit interfaces *interface-name*] hierarchy level. However, for some encapsulation types, such as Frame Relay, ATM, and Ethernet virtual local area network (VLAN) encapsulations, you can also configure the encapsulation type that is used inside the Frame Relay, ATM, or VLAN circuit itself. To do this, include the **encapsulation** statement:

```
encapsulation (atm-ccc-cell-relay | atm-ccc-vc-mux | atm-tcc-vc-mux | atm-cisco-nlpid  
| atm-mlppp-llc | atm-nlpid | atm-ppp-llc | atm-ppp-vc-mux | atm-snap | atm-tcc-snap  
| atm-vc-mux | ether-over-atm-llc | ether-vpls-over-atm-llc | ethernet |  
frame-relay-ether-type | frame-relay-ether-type-tcc | frame-relay-ccc | frame-relay-tcc  
| multilink-frame-relay-end-to-end | multilink-ppp | vlan-ccc | vlan-tcc | vlan-vpls);
```

You can include this statement at the following hierarchy levels:

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

Some of the ATM encapsulations are defined in RFC 2684, *Multiprotocol Encapsulation over ATM Adaptation Layer 5*.

The following restrictions apply to logical interface encapsulation:



- With the atm-nlpid, atm-cisco-nlpid, and atm-vc-mux encapsulations, you can configure the inet family only.
- With the CCC circuit encapsulations, you cannot configure a family on the logical interface.
- A logical interface cannot have frame-relay-ccc encapsulation unless the physical device also has frame-relay-ccc encapsulation.
- A logical interface cannot have frame-relay-tcc encapsulation unless the physical device also has frame-relay-tcc encapsulation. In addition, you must assign this logical interface a DLCI from 512 through 1022 and configure it as point-to-point.
- A logical interface cannot have frame-relay-ether-type or frame-relay-ether-type-tcc encapsulation unless the physical interface has flexible-frame-relay encapsulation and is on an IQ or IQE PIC.
- For frame-relay-ether-type-tcc encapsulation, you must assign this logical interface a DLCI from 512 through 1022.
- For interfaces that carry IP version 6 (IPv6) traffic, you cannot configure ether-over-atm-llc encapsulation.
- When you use ether-over-atm-llc encapsulation, you cannot configure multipoint interfaces.
- A logical interface cannot have vlan-ccc or vlan-vpls encapsulation unless the physical device also has vlan-ccc or vlan-vpls encapsulation, respectively. In addition, you must assign this logical interface a VLAN ID from 512 through 1023; if the VLAN ID is 511 or lower, it is subject to the normal destination filter lookups in addition to source address filtering. For more information, see *Configuring VLAN Encapsulation*.
- You can create an ATM cell-relay circuit by configuring an entire ATM physical device or an individual virtual circuit (VC). When you configure an entire device, only cell-relay encapsulation is allowed on the logical interfaces. For more information, see *Configuring an ATM Cell-Relay Circuit*.

For more information about ATM encapsulations, see *Configuring ATM Interface Encapsulation*.

For more information about Frame Relay encapsulations, see *Configuring Frame Relay Interface Encapsulation*.

For more information about multilink encapsulations, see the *Junos OS Services Interfaces Library for Routing Devices*.

---

## Configuring the LCP Configure-Request Maximum Sent

Link Control Protocol (LCP) Configure-Request is used to establish a link. You can configure the maximum number of LCP Configure-Requests to send. The router stops sending LCP Configure-Requests after the specified maximum number is sent. To configure the LCP Configure-Request maximum, use the **lcp-max-conf-req** statement at the **[edit interfaces interface-name unit number ppp-options]** hierarchy level. The **number**

range is from 0 to 65,535; where 0 specifies no limit and the LCP Configure-Request is sent indefinitely. The default is 254.

**Related Documentation** • [lcp-max-conf-req on page 556](#)

---

## Configuring the NCP Configure-Request Maximum Sent

Network Control Protocol (NCP) Configure-Request is used to establish a link. You can configure the maximum number of NCP Configure-Requests to send. The router stops sending NCP Configure-Requests after the specified maximum number is sent. To configure the NCP Configure-Request maximum, use the **ncp-max-conf-req** statement at the **[edit interfaces *interface-name* unit *number* ppp-options]** hierarchy level. The *number* range is from 0 to 65,535; where 0 specifies no limit and NCP Configure-Request is sent indefinitely. The default is 254.

**Related Documentation** • [ppp-options on page 692](#)

---

## Configuring the PPP Restart Timers

You can configure a restart timer for the Link Control Protocol (LCP) and Network Control Protocol (NCP) components of a PPP session. You can configure the LCP restart timer on interfaces with PPP, PPP TCC, PPP over Ethernet, PPP over ATM, and PPP over Frame Relay encapsulations. You can configure the NCP restart timer on interfaces with PPP and PPP TCC encapsulations and on multilink PPP bundle interfaces.

To configure the restart timer for the NCP component of a PPP session, include the **ncp-restart-timer** statement, and specify the number of milliseconds.

To configure the restart timer for the LCP component of a PPP session, include the **lcp-restart-timer** statement, and specify the number of milliseconds:

```
lcp-restart-timer milliseconds;  
ncp-restart-timer milliseconds;
```

You can include these statements at the following hierarchy levels:

- **[edit interfaces *interface-name* unit *logical-unit-number* ppp-options]**
- **[edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number* ppp-options]**

To monitor the configuration, issue the **show interfaces *interface-name*** command. Configured options are displayed in the **PPP parameters** field for the physical interface.

```
user@host> run show interfaces tl-0/0/0:1:1.0 detail  
Logical interface tl-0/0/0:1:1.0 (Index 67) (SNMP ifIndex 40)  
(Generation 156)  
Flags: Hardware-Down Device-Down Point-To-Point SNMP-Traps 0x4000  
Encapsulation: PPP  
PPP parameters:  
  LCP restart timer: 2000 msec  
  NCP restart timer: 2000 msec
```

```

Protocol inet, MTU: 1500, Generation: 163, Route table: 0
Flags: Protocol-Down
Addresses, Flags: Dest-route-down Is-Preferred Is-Primary
Destination: 1.1.1/24, Local: 1.1.1.2, Broadcast: 1.1.1.255,

```

## Configuring the PPP Clear Loop Detected Timer

When a Point-to-Point Protocol (PPP) session detects a loop, the loop detected flag is set. If the flag is not cleared by the protocol after the loopback is cleared, the clear loop detected timer clears the flag after the specified time has elapsed.

To configure the clear loop detected timer for the LCP component of a PPP session, include the **loopback-clear-timer** statement, and specify the number of seconds.

```
loopback-clear-timer seconds;
```

You can include this statement at the following hierarchy levels:

- [edit interfaces *interface-name* unit *logical-unit-number* ppp-options]
- [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number* ppp-options]

To monitor the configuration, issue the **show interfaces *interface-name* extensive** command.

## Configuring Dynamic Profiles for PPP

A dynamic profile acts as a template that enables you to create, update, or remove a configuration that includes attributes for client access (for example, interface or protocol) or service (for example, IGMP). Using these profiles you can consolidate all of the common attributes of a client (and eventually a group of clients) and apply the attributes simultaneously.

After they are created, the profiles reside in a profile library on the router. You can then use the **dynamic-profile** statement to attach profiles to interfaces. To assign a dynamic profile to a PPP interface, you can include the **dynamic-profile** statement at the [edit interfaces *interface-name* unit *logical-unit-number* ppp-options] hierarchy level:

```
[edit interfaces interface-name unit logical-unit-number ppp-options]
dynamic-profile profile-name;
```

To monitor the configuration, issue the **show interfaces *interface-name*** command.

For information about dynamic profiles, see *Dynamic Profiles Overview* in the *Junos Subscriber Access Configuration Guide*.

For information about creating dynamic profiles, see *Configuring a Basic Dynamic Profile* in the *Junos Subscriber Access Configuration Guide*.

For information about assigning a dynamic profile to a PPP interface, see *Attaching Dynamic Profiles to Static PPP Subscriber Interfaces* in the *Junos Subscriber Access Configuration Guide*.



**NOTE:** Dynamic profiles for PPP subscribers are supported only on PPPoE interfaces for this release.

**Related  
Documentation**

- [Configuring Dynamic Authentication for PPP Subscribers](#)

---

## Configuring PPP CHAP Authentication

For interfaces with PPP encapsulation, you can configure interfaces to support the PPP Challenge Handshake Authentication Protocol (CHAP), as defined in RFC 1994, *PPP Challenge Handshake Authentication Protocol (CHAP)*. When you enable CHAP on an interface, the interface can authenticate its peer and can be authenticated by its peer.

For information about configuring CHAP, see [“Configuring the PPP Challenge Handshake Authentication Protocol” on page 136](#).

---

## Configuring PPP PAP Authentication

The Password Authentication Protocol (PAP) provides a simple method for the peer to establish its identity using a two-way handshake. This is done only upon initial link establishment.

After the link is established, an ID and password pair is repeatedly sent by the peer to the authenticator until authentication is acknowledged or the connection is terminated.

To configure PAP, you must create an access profile, configure tracing operations, and configure the logical and physical interfaces.

To configure PAP on a logical interface with PPP encapsulation, include the **pap** statement with options:

```
pap {  
  default-pap-password password;  
  local-name name;  
  local-password password;  
  passive;  
}
```

You can include these statements at the following hierarchy levels:

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

For more information about configuring PAP for physical interfaces, see [“Configuring the PPP Password Authentication Protocol” on page 139](#). For information about configuring tracing operations for the PPP protocol, see [“Tracing Operations of the pppd Process” on page 143](#).

On each logical interface with PPP encapsulation, you can perform the following tasks:

- [Configuring a Default PAP Password on page 195](#)
- [Configuring the Local Name on page 195](#)
- [Configuring the Local Password on page 195](#)
- [Configuring Passive Mode on page 196](#)

## Configuring a Default PAP Password

The default PAP password is used when no matching PAP access profile exists, or if the PAP access profile name changes during PPP link negotiation.

To configure a default PAP password for an interface, include the **default-pap-password** statement:

```
default-pap-password password;
```

You can include the statement at the following hierarchy levels:

- [edit interfaces *interface-name* unit *logical-unit-number* ppp-options pap]
- [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number* ppp-options pap]

## Configuring the Local Name

By default, when PAP is enabled on an interface, the interface uses the router's system hostname as the name sent in PAP request and response packets.

To configure the name the interface uses in PAP request and response packets, include the **local-name** statement:

```
local-name name;
```

You can include the statement at the following hierarchy levels:

- [edit interfaces *interface-name* unit *logical-unit-number* ppp-options pap]
- [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number* ppp-options pap]

## Configuring the Local Password

You need to configure the password to be used for authentication.

To configure the host password for sending PAP requests, include the **local-password** statement:

```
local-password password;
```

You can include the statement at the following hierarchy levels:

- [edit interfaces *interface-name* unit *logical-unit-number* ppp-options pap]

- [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number* **ppp-options** **pap**]

## Configuring Passive Mode

By default, when PAP is enabled on an interface, the interface expects authenticate-request packets from the peer. However, the interface can be configured to send authentication request packets to the peer by configuring PAP to operate in passive mode. In PAP passive mode, the interface sends the authenticate-request packets to the peer only if the interface receives the PAP option from the peer during LCP negotiation—in passive mode, the interface does not authenticate the peer.

To configure the interface to authenticate with PAP in passive mode, include the **passive** statement:

```
passive;
```

You can include the statement at the following hierarchy levels:

- [edit interfaces *interface-name* unit *logical-unit-number* **ppp-options** **pap**]
- [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number* **ppp-options** **pap**]

---

## Configuring Dynamic Call Admission Control

Dynamic call admission control (CAC) provides enhanced control over WAN bandwidth. You can configure dynamic CAC on J4350 and J6350 Services Routers supporting voice over IP through the TGM550 media gateway module. It can be used with the following interfaces:

- Fast Ethernet and Gigabit Ethernet interfaces
- ISDN BRI interfaces
- Serial interfaces with PPP or Frame Relay encapsulation

When dynamic CAC is configured on an interface responsible for providing call bandwidth, the TGM550 informs the Media Gateway Controller (MGC) of the bandwidth limit available for voice packets on the interface and requests the MGC to block new calls when the bandwidth is exhausted.

Dynamic CAC is useful when a primary link becomes unavailable and a backup link with less bandwidth takes its place. Without dynamic CAC, the MGC cannot detect the switchover to the backup link or the resulting changes in network topology and available bandwidth. The MGC would continue to admit calls at the bandwidth of the primary link, causing network congestion and possible jitter, delay, and loss of calls.

To configure dynamic CAC for a logical interface, include the **dynamic-call-admission-control** statement, with options:

```
dynamic-call-admission-control {  
  activation-priority priority;
```

```
bearer-bandwidth-limit kilobits-per-second;
}
```

You can include this statement at the following hierarchy levels:

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

**bearer-bandwidth-limit *kilobits-per-second*** is the dynamic CAC bearer bandwidth limit (BBL)—the maximum bandwidth available for voice traffic on the interface. The TGM550 reports the BBL to the MGC. When the call bandwidth exceeds the BBL, the MGC blocks new calls and alerts the user with a busy tone. The BBL range is from 0 through 9999. The default BBL is -1, which indicates that dynamic CAC is not configured on an interface.

**activation-priority *priority*** specifies the order in which interfaces are used for providing call bandwidth. The interface with the highest activation priority value is used as the primary link for providing call bandwidth. If the primary link becomes unavailable, the TGM550 switches to the next active interface with the highest activation priority value, and so on. The activation priority value range is from 0 through 255. The default is 50.



**NOTE:** Dynamic CAC works in conjunction with the Avaya Communication Manager (CM) Call Admission Control: Bandwidth Limitation (CAC-BL) feature. If you configure dynamic CAC on WAN interfaces, you must also configure CAC-BL on Avaya CM. For more information about configuring CAC-BL, see the *Administrator Guide for Avaya Communication Manager*.

## Example: Configuring Dynamic CAC

Configure dynamic CAC on a logical interface:

```
[edit]
interfaces {
  t1-4/0/0 {
    unit 0 {
      dynamic-call-admission-control {
        bearer-bandwidth-limit 900 kbps;
        activation-priority 75;
      }
    }
  }
}
```

## Disabling a Logical Interface

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

```
disable;
```

You can include this statement at the following hierarchy levels:

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

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



## CHAPTER 5

# Configuring Protocol Family and Interface Address Properties

- [Protocol Family Configuration and Interface Address Statements on page 199](#)
- [Configuring the Protocol Family on page 202](#)
- [Configuring the Interface Address on page 204](#)
- [Configuring ICCP for MC-LAG on page 209](#)
- [Configuring IPCP Options on page 210](#)
- [Configuring an Unnumbered Interface on page 213](#)
- [Setting the Protocol MTU on page 218](#)
- [Disabling the Removal of Address and Control Bytes on page 219](#)
- [Disabling the Transmission of Redirect Messages on an Interface on page 219](#)
- [Configuring Default, Primary, and Preferred Addresses and Interfaces on page 220](#)
- [Applying Policers on page 222](#)
- [Applying a Filter to an Interface on page 230](#)
- [Configuring Unicast RPF on page 235](#)
- [Enabling Source Class and Destination Class Usage on page 241](#)
- [Enabling Targeted Broadcast on page 249](#)

## Protocol Family Configuration and Interface Address Statements

---

For each logical interface, you must configure one or more protocol families. You can also configure interface address properties. To do this, include the following statements:

```
family family {  
    accounting {  
        destination-class-usage;  
        source-class-usage {  
            direction;  
        }  
    }  
    address address {  
        destination address;  
    }  
    bundle interface-name;
```

```

filter {
    dialer filter-name;
    input filter-name;
    output filter-name;
    group filter-group-number;
}
interface-mode (access | trunk);
ipsec-sa sa-name;
keep-address-and-control;
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>;
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>;
    }
}
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;
vlan-id number;
vlan-id-list [number number-number];
unnumbered-address interface-name destination address destination-profile
    profile-name;
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;
    multipoint-destination address {

```

```

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

```

You can include these statements at the following hierarchy levels:

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

For information about interface-specific protocol and address properties, see *Configuring T1 and NxDSO Interfaces*.

## Configuring the Protocol Family

---

For each logical interface, you can configure one or more of the following protocols that run on the interface:

- **any**—Protocol-independent family used for Layer 2 packet filtering. This option is not supported on J Series routers and 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. You can optionally configure this protocol family for the logical interface on which you configure VPLS.
- **ccc**—Circuit cross-connect (CCC). You can configure this protocol family for the logical interface of CCC physical interfaces. When you use this encapsulation type, you can configure the **ccc** family only.
- **inet**—IP. You must configure this protocol family for the logical interface to support IP protocol traffic, including Open Shortest Path First (OSPF), Border Gateway Protocol (BGP), Internet Control Message Protocol (ICMP), and Internet Protocol Control Protocol (IPCP).
- **inet6**—IP version 6 (IPv6). You must configure this protocol family for the logical interface to support IPv6 protocol traffic, including Routing Information Protocol for IPv6 (RIPng), Intermediate System-to-Intermediate System (IS-IS), BGP, and Virtual Router Redundancy Protocol for IPv6 (VRRP). For more information about IPv6, see [“IPv6 Overview” on page 203](#).
- **iso**—International Organization for Standardization (ISO). You must configure this protocol family for the logical interface to support IS-IS traffic.
- **mlfr-uni-nni**—Multilink Frame Relay (MLFR) FRF.16 user-to-network network-to-network (UNI NNI). You must configure this protocol or **mlfr-end-to-end** for the logical interface to support link services and voice services bundling.
- **mlfr-end-to-end**—Multilink Frame Relay end-to-end. You must configure this protocol or multilink Point-to-Point Protocol (MLPPP) for the logical interface to support multilink bundling.
- **mlppp**—MLPPP. You must configure this protocol (or **mlfr-end-to-end**) for the logical interface to support multilink bundling.
- **mpls**—Multiprotocol Label Switching (MPLS). You must configure this protocol family for the logical interface to participate in an MPLS path.
- **tcc**—Translational cross-connect (TCC). You can configure this protocol family for the logical interface of TCC physical interfaces.
- **tnp**—Trivial Network Protocol. This protocol is used to communicate between the Routing Engine and the router’s packet forwarding components. The Junos OS

automatically configures this protocol family on the router's internal interfaces only, as discussed in [“Understanding Internal Ethernet Interfaces” on page 43](#).

- **vpls**—M Series and T Series routers support Virtual Private LAN service (VPLS). You can optionally configure this protocol family for the logical interface on which you configure VPLS. VPLS provides an Ethernet-based point-to-multipoint Layer 2 VPN to connect customer edge (CE) routers across an MPLS backbone. When you configure a VPLS encapsulation type, the **family vpls** statement is assumed by default.

MX Series routers support dynamic profiles for VPLS pseudowires, VLAN identifier translation, and automatic bridge domain configuration.

For more information about VPLS, see the *Junos OS VPNs Library for Routing Devices* and the *Junos OS Feature Guides*.

To configure the logical interface's protocol family, include the **family** statement, specifying the selected family. To configure more than one protocol **family** on a logical interface, include multiple **family** statements. Following is the minimum configuration:

```
family family {
  mtu size;
  multicast-only;
  no-redirects;
  primary;
  address address {
    destination address;
    broadcast address;
    preferred;
    primary;
  }
}
```

You can include these statements at the following hierarchy levels:

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

## IPv6 Overview

IP version 4 (IPv4) has been widely deployed and used to network the Internet today. With the rapid growth of the Internet, enhancements to IPv4 are needed to support the influx of new subscribers, Internet-enabled devices, and applications. IPv6 is designed to enable the global expansion of the Internet.

IPv6 builds upon the functionality of IPv4, providing improvements to addressing, configuration and maintenance, and security.

IPv6 is defined in the following documents:

- RFC 2373, *IP Version 6 Addressing Architecture*
- RFC 2460, *Internet Protocol, Version 6 (IPv6)*

### IPv4-to-IPv6 Transition

---

Implementing IPv6 requires a transition mechanism to allow interoperability between IPv6 nodes (both routers and hosts) and IPv4 nodes. The transition mechanism is the key factor in the successful deployment of IPv6. Because millions of IPv4 nodes already exist, upgrading every node to IPv6 at the same time is not feasible.

As a result, transition from IPv4 to IPv6 happens gradually, allowing nodes to be upgraded independently and without disruption to other nodes. While a gradual upgrade occurs, compatibility between IPv6 and IPv4 nodes becomes a requirement. Otherwise, an IPv6 node would not be able to communicate with an IPv4 node.

Transition mechanisms allow IPv6 and IPv4 nodes to coexist together in the same network, and make gradual upgrading possible. The transition mechanism supported by the Junos OS is tunneling. Tunnels allow IPv6 packets to be encapsulated into IPv4 headers and sent across an IPv4 infrastructure. For more information about configuring tunnels to support IPv4-to-IPv6 transition, see the *Junos OS Services Interfaces Library for Routing Devices*.

### VRRP Properties

---

The Virtual Router Redundancy Protocol (VRRP) provides a much faster switchover to a backup router when the default router fails. Using VRRP, a backup router can take over a failed default router within a few seconds. This is done with minimum amount of VRRP traffic and without any interactions with the hosts.

For more information on VRRP properties, see the *Junos OS High Availability Library for Routing Devices*.

#### Related Documentation

- [Understanding Internal Ethernet Interfaces on page 43](#)

## Configuring the Interface Address

---

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



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

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

```
address address {  
  broadcast address;  
  destination address;  
  destination-profile name;
```

```
eui-64;
preferred;
primary;
}
```

You can include these statements at the following hierarchy levels:

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

In the **address** statement, specify the network address of the interface.

For each address, you can optionally configure one or more of the following:

- Broadcast address for the interface subnet—Specify this in the **broadcast** statement; this applies only to Ethernet interfaces, such as the management interface **fxp0**, **em0**, or **me0** the Fast Ethernet interface, and the Gigabit Ethernet interface.
- Address of the remote side of the connection (for point-to-point interfaces only)—Specify this in the **destination** statement.
- PPP properties to the remote end—Specify this in the **destination-profile** statement. You define the profile at the [edit access group-profile *name* **ppp**] hierarchy level (for point-to-point interfaces only).
- Whether the router or switch automatically generates the host number portion of interface addresses—The **eui-64** statement applies only to interfaces that carry IPv6 traffic, in which the prefix length of the address is 64 bits or less, and the low-order 64 bits of the address are zero. This option does not apply to the loopback interface (**lo0**) because IPv6 addresses configured on the loopback interface must have a 128-bit prefix length.
- Whether this address is the preferred address—Each subnet on an interface has a preferred local address. If you configure more than one address on the same subnet, the preferred local address is chosen by default as the source address when you originate packets to destinations on the subnet.

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

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

By default, the primary address on an interface is the lowest-numbered non-127 (in other words, non-loopback) preferred address on the interface. To override the default and

explicitly configure the preferred address, include the **primary** statement when configuring the address.

- [Configuring Interface IPv4 Addresses on page 206](#)
- [Configuring Interface IPv6 Addresses on page 208](#)

## Configuring Interface IPv4 Addresses

You can configure router or switch interfaces with a 32-bit IP version 4 (IPv4) address and optionally with a destination prefix, sometimes called a *subnet mask*. An IPv4 address utilizes a 4-octet dotted decimal address syntax (for example, **192.16.1.1**). An IPv4 address with destination prefix utilizes a 4-octet dotted decimal address syntax with a destination prefix appended (for example, **192.16.1.1/30**).

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



**NOTE:** Juniper Networks routers and switches support /31 destination prefixes when used in point-to-point Ethernet configurations; however, they are not supported by many other devices, such as hosts, hubs, routers, or switches. You must determine if the peer system also supports /31 destination prefixes before configuration.

---

## Operational Behavior of Interfaces when the Same IPv4 Address is Assigned to Them

You can configure the same IPv4 address on multiple physical interfaces. When you assign the same IPv4 address to multiple physical interfaces, the operational behavior of those interfaces differs, depending on whether they are implicitly or explicitly point-to-point.



**NOTE:** By default, all interfaces are assumed to be point-to-point (PPP) interfaces. For all interfaces except aggregated Ethernet, Fast Ethernet, and Gigabit Ethernet, you can explicitly configure an interface to be a point-to-point connection.

The following examples show the sample configuration of assigning the same IPv4 address to implicitly and explicitly point-to-point interfaces, and their corresponding **show interfaces terse** command outputs to see their operational status.

### Configuring same IPv4 address on implicitly PPP interfaces:

```
[edit]
user@host# show
ge-0/1/0 {
  unit 0 {
    family inet {
      address 200.1.1.1/24;
```



```

    }
  }
}
ge-3/0/1 {
  unit 0 {
    family inet {
      address 200.1.1.1/24;
    }
  }
}
}

```

The sample output shown below for the above configuration reveals that only **ge-0/1/0.0** was assigned the same IPv4 address **200.1.1.1/24** and its **link** state was **up**, while **ge-3/0/1.0** was not assigned the IPv4 address, though its **link** state was **up**, which means that it will be operational only when it gets a unique IPv4 address other than **200.1.1.1/24**.

```

user@host> show interfaces terse ge*
Interface           Admin Link Proto  Local          Remote
      ge-0/1/0             up   up    inet
      ge-0/1/0.0           up   up    inet    200.1.1.1/24
                        multiservice
      ge-0/1/1             up   down
      ge-3/0/0             up   down
      ge-3/0/1             up   up
      ge-3/0/1.0           up   up    inet
                        multiservice

```

#### Configuring same IPv4 address on explicitly PPP interfaces:

```

[edit]
user@host# show
so-0/0/0 {
  unit 0 {
    family inet {
      address 200.1.1.1/24;
    }
  }
}
so-0/0/3 {
  unit 0 {
    family inet {
      address 200.1.1.1/24;
    }
  }
}
}

```

The sample output shown below for the above configuration reveals that both **so-0/0/0.0** and **so-0/0/3.0** were assigned the same IPv4 address **200.1.1.1/24** and that their **link** states were **down**, which means that to make them operational at least one of them will have to be configured with a unique IPv4 address other than **200.1.1.1/24**.

```

user@host> show interfaces terse so*
Interface           Admin Link Proto  Local          Remote
so-0/0/0             up   up
so-0/0/0.0           up   down inet    200.1.1.1/24
so-0/0/1             up   up
so-0/0/2             up   down

```

|            |    |      |                   |
|------------|----|------|-------------------|
| so-0/0/3   | up | up   |                   |
| so-0/0/3.0 | up | down | inet 200.1.1.1/24 |
| so-1/1/0   | up | down |                   |
| so-1/1/1   | up | down |                   |
| so-1/1/2   | up | up   |                   |
| so-1/1/3   | up | up   |                   |
| so-2/0/0   | up | up   |                   |
| so-2/0/1   | up | up   |                   |
| so-2/0/2   | up | up   |                   |
| so-2/0/3   | up | down |                   |

## Configuring Interface IPv6 Addresses



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

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

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

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



**NOTE:** You cannot configure a subnet zero IPv6 address because RFC 2461 reserves the subnet-zero address for anycast addresses, and Junos OS complies with the RFC.

You can include this statement at the following hierarchy levels:

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

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

```
interfaces fe-0/0/1 {
  unit 0 {
    family inet6 {
      address fec0:1:1::2/64;
    }
  }
}
```



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

### Related Documentation

- [Configuring IPCP Options on page 210](#)
- [Configuring Default, Primary, and Preferred Addresses and Interfaces on page 220](#)

## Configuring ICCP for MC-LAG

For multichassis link aggregation (MC-LAG), you must configure Inter-Control Center Communications Protocol (ICCP) to exchange information between two MC-LAG peers.

To enable ICCP, include the **iccp** statement at the **[edit protocols]** hierarchy level:

```
[edit protocols]
iccp {
  authentication-key string;
  local-ip-addr ipv4-address;
  peer ip-address {
    authentication-key string;
    liveness-detection {
      detection-time {
        threshold milliseconds;
      }
    }
    minimum-interval milliseconds;
    minimum-receive-interval milliseconds;
    multiplier number;
    no-adaptation;
    transmit-interval {
      minimum-interval milliseconds;
      threshold milliseconds;
    }
    version (1 | automatic);
  }
  local-ip-addr ipv4-address;
  redundancy-group-id-list [ redundancy-groups ];
  session-establishment-hold-time value;
}
session-establishment-hold-time value;
traceoptions;
```

The **local-ip-address** statement sets the source address. This could be a specified address or interface address. The **session-establishment-hold-time** statement determines whether a chassis takes over as the master at the ICCP session.

The **authentication-key** statement is provided by TCP Message Digest 5 (md5) option for an ICCP TCP session. The **redundancy-group-id-list** statement specifies the redundancy groups between ICCP peers and the **liveness-detection** hierarchy configures Bidirectional Forwarding Detection (BFD) protocol options.



**NOTE:** ICCP is based on TCP and it uses IP routes to reach the MC-LAG peer. To ensure that the ICCP session is as resilient as possible, we recommend that you configure alternative routes between the ICCP end-point IP addresses. Alternatively, configure a LAG interface that has two or more interfaces between the MC-LAG pairs to prevent session failure when there are no alternative routes.

For Inter-Control Center Communications Protocol (ICCP) in a multichassis link aggregation group (MC-LAG) configured in an active-active bridge domain, you must ensure that you configure the same peer IP address hosting the MC-LAG by including the **peer ip-address** statement at the **[edit protocols iccp]** hierarchy level and the **multi-chassis-protection peer ip-address** statement at the **[edit interfaces interface-name]** hierarchy level. Multichassis protection reduces the configuration at the logical interface level for MX Series routers with multichassis aggregated Ethernet (MC-AE) interfaces. If the ICCP is UP and the interchassis data link (ICL) comes UP, the router configured as standby will bring up the MC-AE interfaces shared with the peer active-active node specified by the **peer** statement.

For example, the following statements illustrate how the same peer IP address can be configured for both the ICCP peer and multichassis protection link:

```
set interfaces ae1 unit 0 multi-chassis-protection 10.255.34.112 interface ae0.0
set protocols iccp peer 10.255.34.112 redundancy-group-id-list 1
```

Although you can commit an MC-LAG configuration with various parameters defined for it, you can configure multichassis protection between two peers without configuring the ICCP peer address. You can also configure multiple ICCP peers and commit such a configuration.

**Related Documentation**

- [\[edit protocols\] Hierarchy Level](#)

---

## Configuring IPCP Options

---

For interfaces with PPP encapsulation, you can configure IPCP to negotiate IP address assignments and to pass network-related information such as Windows Name Service (WINS) and Domain Name System (DNS) servers, as defined in RFC 1877, *PPP Internet Protocol Control Protocol Extensions for Name Server Addresses*.



**NOTE:** The Junos OS does not request name servers from the remote end; the software does, however, send name servers to the remote end if requested.

On the logical interface, the following PPP encapsulation types are supported:

- **atm-mlppp-llc**
- **atm-ppp-llc**
- **atm-ppp-vc-mux**
- **multilink-ppp**

When you enable a PPP interface, you can configure an IP address, enable the interface to negotiate an IP address assignment from the remote end, or allow the interface to be unnumbered. You can also assign a destination profile to the remote end. The destination

profile includes PPP properties, such as primary and secondary DNS and NetBIOS Name Servers (NBNSs). These options are described in the following sections:

- [Configuring an IP Address for an Interface on page 211](#)
- [Negotiating an IP Address Assignment from the Remote End on page 211](#)
- [Configuring an Interface to Be Unnumbered on page 211](#)
- [Assigning a Destination Profile to the Remote End on page 212](#)

## Configuring an IP Address for an Interface

You can configure an IP address for the interface by including the **address** statement in the configuration. For more information, see [“Configuring the Interface Address” on page 204](#).

If you include the **address** statement in the configuration, you cannot include the **negotiate-address** or **unnumbered-address** statement in the configuration.

When you include the **address** statement in the interface configuration, you can assign PPP properties to the remote end, as shown in [“Assigning a Destination Profile to the Remote End” on page 212](#).



**NOTE:** The option to negotiate an IP address is not allowed in MLFR and MFR encapsulations.

## Negotiating an IP Address Assignment from the Remote End

To enable the interface to obtain an IP address from the remote end, include the **negotiate-address** statement:

```
negotiate-address;
```

You can include this statement at the following hierarchy levels:

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

If you include the **negotiate-address** statement in the configuration, you cannot include the **address** or **unnumbered-address** statement in the configuration.

## Configuring an Interface to Be Unnumbered

To configure an interface to be unnumbered, include the **unnumbered-address** and **destination** statements in the configuration:

```
unnumbered-address interface-name destination address;
```

The **unnumbered-address** statement enables the local address to be derived from the specified interface. The interface name must include a logical unit number and must

have a configured address (see [“Configuring the Interface Address” on page 204](#)). Specify the IP address of the remote interface with the **destination** statement.

You can include these statements at the following hierarchy levels:

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

If you include the **unnumbered-address** statement in the configuration, you cannot include the **address** or **negotiate-address** statement in the interface configuration.

When you include the **unnumbered-address** statement in the interface configuration, you can assign PPP properties to the remote end, as shown in [“Assigning a Destination Profile to the Remote End” on page 212](#).

## Assigning a Destination Profile to the Remote End

When you include the **address** or **unnumbered-address** statement in the interface configuration, you can assign PPP properties to the remote end. To do this, include the **destination-profile** statement:

```
destination-profile name;
```

You can include this statement at the following hierarchy levels:

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

The profile name is a PPP group profile. You define the profile by including the following statements at the [edit **access group-profile** *name* **ppp**] hierarchy level:

```
[edit access group-profile name ppp]  
framed-pool pool-id;  
interface-id interface-id;  
primary-dns primary-dns;  
primary-wins primary-win-server;  
secondary-dns secondary-dns;  
secondary-wins secondary-wins;
```

For more information about PPP group profiles, see the *Junos OS Administration Library for Routing Devices*.

## Configuring an Unnumbered Interface

When you need to conserve IP addresses, you can configure unnumbered interfaces. Setting up an unnumbered interface enables IP processing on the interface without assigning an explicit IP address to the interface. For IPv6, in which conserving addresses is not a major concern, you can configure unnumbered interfaces to share the same subnet across multiple interfaces. IPv6 unnumbered interfaces are only supported on Ethernet interfaces. The statements you use to configure an unnumbered interface depend on the type of interface you are configuring: a point-to-point interface or an Ethernet interface:

- [Configuring an Unnumbered Point-to-Point Interface on page 213](#)
- [Configuring an Unnumbered Ethernet or Demux Interface on page 214](#)

## Configuring an Unnumbered Point-to-Point Interface

To configure an unnumbered point-to-point interface, configure the protocol family, but do not include the **address** statement:

**family** *family*;

You can include this statement at the following hierarchy levels:

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



**NOTE:** For interfaces with PPP encapsulation, you can configure an unnumbered interface by including the **unnumbered-interface** statement in the configuration. For more information, see [“Configuring IPCP Options” on page 210](#).

When configuring unnumbered interfaces, you must ensure that a source address is configured on some interface in the router. This address is the default address. We recommend that you do this by assigning an address to the loopback interface (**lo0**), as described in [“Configuring the Loopback Interface” on page 289](#). If you configure an address (other than a martian) on the **lo0** interface, that address is always the default address, which is preferable because the loopback interface is independent of any physical interfaces and therefore is always accessible.

### Example: Configuring an Unnumbered Point-to-Point Interface

Configure an unnumbered point-to-point interface:

```
[edit]
interfaces {
  so-6/1/0 {
    unit 0 {
      family inet;
```

```
        family iso;
    }
}
```

## Configuring an Unnumbered Ethernet or Demux Interface

To configure an unnumbered Ethernet or demultiplexing interface, include the **unnumbered-address** statement in the configuration:

```
unnumbered-address interface-name;
```

You can include this statement at the following hierarchy levels:

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

For dynamic profiles, include the **unnumbered-address** statement at the following hierarchy levels:

- [edit **dynamic-profiles** *profile-name* **interfaces** *interface-name* **unit** *logical-unit-number* **family** *family*]
- [edit **dynamic-profiles** *profile-name* **interfaces** *demux0* **unit** *logical-unit-number* **family** *family*]

The **unnumbered-address** statement currently supports configuration of unnumbered demux interfaces only for the IPv4 address family. You can configure unnumbered Ethernet interfaces for both IPv4 and IPv6 address families.

The interface that you configure to be unnumbered *borrow*s an assigned IP address from another interface, and is referred to as the *borrower interface*. The interface from which the IP address is borrowed is referred to as the *donor interface*. In the **unnumbered-address** statement, *interface-name* specifies the donor interface. For an unnumbered Ethernet interface, the donor interface can be an Ethernet, ATM, SONET, or loopback interface that has a logical unit number and configured IP address and is not itself an unnumbered interface. For an unnumbered IP demultiplexing interface, the donor interface can be an Ethernet or loopback interface that has a logical unit number and configured IP address and is not itself an unnumbered interface. In addition, for either Ethernet or demux, the donor interface and the borrower interface must be members of the same routing instance and the same logical system.

When you configure an unnumbered Ethernet or demux interface, the IP address of the donor interface becomes the source address in packets generated by the unnumbered interface.

You can configure a host route that points to an unnumbered Ethernet or demux interface. For information about host routes, see the *Junos OS MPLS Applications Library for Routing Devices*.



For more information, see the following sections:

- [Configuring a Preferred Source Address for Unnumbered Ethernet or Demux Interfaces on page 215](#)
- [Configuring Static Routes on Unnumbered Ethernet Interfaces on page 216](#)
- [Restrictions for Configuring Unnumbered Ethernet Interfaces on page 216](#)
- [Example: Configuring an Unnumbered Ethernet Interface on page 217](#)
- [Example: Configuring the Preferred Source Address for an Unnumbered Ethernet Interface on page 217](#)
- [Example: Configuring an Unnumbered Ethernet Interface as the Next Hop for a Static Route on page 217](#)

For additional information about dynamic-profiles, see *Dynamic Profiles Overview*.

### Configuring a Preferred Source Address for Unnumbered Ethernet or Demux Interfaces

When a loopback interface with multiple secondary IP addresses is configured as the donor interface for an unnumbered Ethernet or demux interface, you can optionally specify any one of the loopback interface's secondary addresses as the preferred source address for the unnumbered Ethernet or demux interface. This feature enables you to use an IP address other than the primary IP address on some of the unnumbered Ethernet or demux interfaces in your network.

To configure a secondary address on a loopback donor interface as the preferred source address for an unnumbered Ethernet or demux interface, include the **preferred-source-address** option in the **unnumbered-address** statement:

```
unnumbered-address interface-name <preferred-source-address address>;
```

You can include this statement at the following hierarchy levels:

- [edit **interfaces** interface-name **unit** logical-unit-number **family** family]
- [edit **logical-systems** logical-system-name **interfaces** interface-name **unit** logical-unit-number **family** family]
- [edit **dynamic-profiles** profile-name **interfaces** interface-name **unit** logical-unit-number **family** family]
- [edit **dynamic-profiles** profile-name **interfaces** demux0 **unit** logical-unit-number **family** family]

The following considerations apply when you configure a preferred source address on an unnumbered Ethernet or demux interface:

- The **unnumbered-address** statement currently supports the configuration of a preferred source address only for the IPv4 address family for demux interfaces, and for IPv4 and IPv6 address families for Ethernet interfaces.
- If you do not specify the preferred source address, the router uses the default primary IP address of the donor interface.

- You cannot delete an address on a donor loopback interface while it is being used as the preferred source address for an unnumbered Ethernet or demux interface.
- The router uses the preferred source address, if configured for an unnumbered Ethernet or demux interface, in ARP requests and replies. ARP requests must match the preferred source address.

For a configuration example that illustrates this feature, see [“Example: Configuring the Preferred Source Address for an Unnumbered Ethernet Interface”](#) on page 217.

To display the preferred source address for an unnumbered Ethernet or demux interface, use the **show interfaces** operational mode command. For information about using this command, see the *Junos OS Operational Mode Commands*.

---

### Configuring Static Routes on Unnumbered Ethernet Interfaces

You can configure static routes on an unnumbered Ethernet interface. To do so, you use the **qualified-next-hop** statement to specify the unnumbered Ethernet interface as the next-hop interface for a configured static route. This feature enables you to specify independent preferences and metrics for static routes on a next-hop basis.

For a configuration example that illustrates this feature, see [“Example: Configuring an Unnumbered Ethernet Interface as the Next Hop for a Static Route”](#) on page 217.

For information about how to specify an independent preference for a static route, see the *Junos OS Routing Protocols Library for Routing Devices*.

---

### Restrictions for Configuring Unnumbered Ethernet Interfaces

The following restrictions apply when you configure unnumbered Ethernet interfaces:

- The **unnumbered-address** statement currently supports the configuration of unnumbered Ethernet interfaces for IPv4 and IPv6 address families.
- You cannot assign an IP address to an Ethernet interface that is already configured as an unnumbered interface.
- The donor interface for an unnumbered Ethernet interface must have one or more configured IP addresses.
- The donor interface for an unnumbered Ethernet interfaced cannot be configured as unnumbered.
- An unnumbered Ethernet interface does not support configuration of the following **address** statement options: **arp**, **broadcast**, **primary**, **preferred**, and **vrrp-group**. For information about these options, see [“Configuring the Interface Address”](#) on page 204.
- Running IGMP and PIM are supported only on unnumbered Ethernet interfaces that directly face the host and have no downstream PIM neighbors. IGMP and PIM are not supported on unnumbered Ethernet interfaces that act as upstream interfaces in a PIM topology.
- Running OSPF and IS-IS on unnumbered Ethernet interfaces is not supported. However, you can run OSPF over unnumbered Ethernet interfaces configured as a Point-to-Point connection.

### Example: Configuring an Unnumbered Ethernet Interface

In this example, **ge-1/0/0** is the unnumbered interface and **ge-0/0/0** is the donor interface from which **ge-1/0/0** “borrows” an IP address.

```

interfaces {
  ge-0/0/0 {
    unit 0 {
      family inet {
        address 4.4.4.1/24;
      }
    }
  }
  ge-1/0/0 {
    unit 0 {
      family inet {
        unnumbered-address ge-0/0/0.0;
      }
    }
  }
}

```

### Example: Configuring the Preferred Source Address for an Unnumbered Ethernet Interface

In this example, loopback interface **lo0** is the donor interface from which unnumbered Ethernet interface **ge-4/0/0** “borrows” an IP address. The example also configures one of the loopback interface’s secondary addresses, 3.3.3.1, as the preferred source address for the unnumbered Ethernet interface.

```

interfaces {
  lo0 {
    unit 0 {
      family inet {
        address 2.2.2.1/32;
        address 3.3.3.1/32;
      }
    }
  }
}
interfaces {
  ge-4/0/0 {
    unit 0 {
      family inet {
        unnumbered-address lo0.0 preferred-source-address 3.3.3.1;
      }
    }
  }
}

```

### Example: Configuring an Unnumbered Ethernet Interface as the Next Hop for a Static Route

In this example, **ge-0/0/0** is the unnumbered interface and a loopback interface, **lo0**, is the donor interface from which **ge-0/0/0** “borrows” an IP address. The example also

configures a static route to 7.7.1/32 with a next hop through unnumbered interface ge-0/0/0.0.

```
interfaces {
  lo0 {
    unit 0 {
      family inet {
        address 5.5.5.1/32;
        address 6.6.6.1/32;
      }
    }
  }
}
interfaces
  ge-0/0/0 {
    unit 0 {
      family inet {
        unnumbered-address lo0.0;
      }
    }
  }
}
routing-options {
  static {
    route 7.7.1/32 {
      qualified next-hop ge-0/0/0.0;
    }
  }
}
```

---

## Setting the Protocol MTU

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

For a list of default protocol MTU values, see [“Configuring the Media MTU” on page 119](#).

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

**mtu** *bytes*;

You can include this statement at the following hierarchy levels:

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

If you increase the size of the protocol MTU, you must ensure that the size of the media MTU is equal to or greater than the sum of the protocol MTU and the encapsulation overhead. For a list of encapsulation overhead values, see [Table 13 on page 121](#). If you reduce the media MTU size, but there are already one or more address families configured and active on the interface, you must also reduce the protocol MTU size. (You configure

the media MTU by including the **mtu** statement at the **[edit interfaces *interface-name*]** hierarchy level, as discussed in “Configuring the Media MTU” on page 119.)



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

The maximum number of data-link connection identifiers (DLCIs) is determined by the MTU on the interface. If you have keepalives enabled, the maximum number of DLCIs is 1000, with the MTU set to 5012.

The actual frames transmitted also contain cyclic redundancy check (CRC) bits, which are not part of the MTU. For example, the default protocol MTU for a Gigabit Ethernet interface is 1500 bytes, but the largest possible frame size is actually 1504 bytes; you need to consider the extra bits in calculations of MTUs for interoperability.

## Disabling the Removal of Address and Control Bytes

For Point-to-Point Protocol (PPP) CCC-encapsulated interfaces, the address and control bytes are removed by default before the packet is encapsulated into a tunnel.

You can disable the removal of address and control bytes. To do this, include the **keep-address-and-control** statement:

```
keep-address-and-control;
```

You can include this statement at the following hierarchy levels:

- **[edit interfaces *interface-name* unit *logical-unit-number* family *ccc*]**
- **[edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number* family *ccc*]**

## Disabling the Transmission of Redirect Messages on an Interface

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

```
no-redirects;
```

You can include this statement at the following hierarchy levels:

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

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

## Configuring Default, Primary, and Preferred Addresses and Interfaces

---

The router has a default address and a primary interface, and interfaces have primary and preferred addresses.

The *default address* of the router is used as the source address on unnumbered interfaces. The routing protocol process tries to pick the default address as the router ID, which is used by protocols, including OSPF and internal BGP (IBGP).

The *primary interface* for the router is the interface that packets go out when no interface name is specified and when the destination address does not imply a particular outgoing interface.

An interface's *primary address* is used by default as the local address for broadcast and multicast packets sourced locally and sent out the interface. An interface's *preferred address* is the default local address used for packets sourced by the local router to destinations on the subnet.

The default address of the router is chosen using the following sequence:

1. The primary address on the loopback interface **lo0** that is not **127.0.0.1** is used.
2. The primary address on the primary interface is used.

To configure these addresses and interfaces, you can do the following:

- [Configuring the Primary Interface for the Router on page 220](#)
- [Configuring the Primary Address for an Interface on page 221](#)
- [Configuring the Preferred Address for an Interface on page 221](#)

### Configuring the Primary Interface for the Router

The *primary interface* for the router has the following characteristics:

- It is the interface that packets go out when you type a command such as ping 255.255.255.255—that is, a command that does not include an interface name (there is no interface *type-0/0/0.0* qualifier) and where the destination address does not imply any particular outgoing interface.
- It is the interface on which multicast applications running locally on the router, such as Session Announcement Protocol (SAP), do group joins by default.
- It is the interface from which the default local address is derived for packets sourced out an unnumbered interface if there are no non-127 addresses configured on the loopback interface, lo0.

By default, the multicast-capable interface with the lowest-index address is chosen as the primary interface. If there is no such interface, the point-to-point interface with the lowest index address is chosen. Otherwise, any interface with an address could be picked. In practice, this means that, on the router, the **fxp0** or **em0** interface is picked by default.

To configure a different interface to be the primary interface, include the **primary** statement:

**primary;**

You can include this statement at the following hierarchy levels:

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

## Configuring the Primary Address for an Interface

The *primary address* on an interface is the address that is used by default as the local address for broadcast and multicast packets sourced locally and sent out the interface. For example, the local address in the packets sent by a **ping interface so-0/0/0.0 255.255.255.255** command is the primary address on interface **so-0/0/0.0**. The primary address flag also can be useful for selecting the local address used for packets sent out unnumbered interfaces when multiple non-127 addresses are configured on the loopback interface, **lo0**. By default, the primary address on an interface is selected as the numerically lowest local address configured on the interface.

To set a different primary address, include the **primary** statement:

**primary;**

You can include this statement at the following hierarchy levels:

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

## Configuring the Preferred Address for an Interface

The *preferred address* on an interface is the default local address used for packets sourced by the local router to destinations on the subnet. By default, the numerically lowest local address is chosen. For example, if the addresses **172.16.1.1/12**, **172.16.1.2/12**, and **172.16.1.3/12** are configured on the same interface, the preferred address on the subnet (by default, **172.16.1.1**) would be used as a local address when you issue a **ping 172.16.1.5** command.

To set a different preferred address for the subnet, include the **preferred** statement:

**preferred;**

You can include this statement at the following hierarchy levels:

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

## Applying Policers

---

Policers allow you to perform simple traffic policing on specific interfaces or Layer 2 virtual private networks (VPNs) without configuring a firewall filter. To apply policers, include the **policer** statement:

```
policer {  
    arp policer-template-name;  
    input policer-template-name;  
    output policer-template-name;  
}
```

You can include these statements at the following hierarchy levels:

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

In the **family** statement, the protocol family can be **ccc**, **inet**, **inet6**, **mpls**, **tcc**, or **vpls**.

In the **arp** statement, list the name of one policer template to be evaluated when Address Resolution Protocol (ARP) packets are received on the interface. By default, an ARP policer is installed that is shared among all the Ethernet interfaces on which you have configured the **family inet** statement. If you want more stringent or lenient policing of ARP packets, you can configure an interface-specific policer and apply it to the interface. You configure an ARP policer just as you would configure any other policer, at the [edit firewall policer] hierarchy level. If you apply this policer to an interface, the default ARP packet policer is overridden. If you delete this policer, the default policer takes effect again.

In the **input** statement, list the name of one policer template to be evaluated when packets are received on the interface.

In the **output** statement, list the name of one policer template to be evaluated when packets are transmitted on the interface.



**NOTE:** To use policing on a CCC or TCC interface, you must configure the CCC or TCC protocol family.

---

You can configure a different policer on each protocol family on an interface, with one input policer and one output policer for each family. When you apply policers, you can configure the family **ccc**, **inet**, **inet6**, **mpls**, **tcc**, or **vpls** only, and one ARP policer for the family **inet** protocol only. Each time a policer is referenced, a separate copy of the policer is installed on the packet forwarding components for that interface.

If you apply both policers and firewall filters to an interface, input policers are evaluated before input firewall filters, and output policers are evaluated after output firewall filters.



If you apply the policer to the interface **lo0**, it is applied to packets received or transmitted by the Routing Engine.

On T Series, M120, and M320 platforms, if the interfaces are on the same FPC, the filters or policers do not act on the sum of traffic entering and exiting the interfaces.

For more information about policers, see the *Routing Policy Feature Guide for Routing Devices*.

This section includes the following topics:

- [Applying Aggregate Policers on page 223](#)
- [Applying Hierarchical Policers on Enhanced Intelligent Queuing PICs on page 225](#)

## Applying Aggregate Policers

By default, if you apply a policer to multiple protocol families on the same logical interface, the policer restricts traffic for each protocol family individually. For example, a policer with a 50 Mbps bandwidth limit applied to both IPv4 and IPv6 traffic would allow the interface to accept 50 Mbps of IPv4 traffic and 50 Mbps of IPv6 traffic. If you apply an aggregate policer, the policer would allow the interface to receive only 50 Mbps of IPv4 and IPv6 traffic combined.

To configure an aggregate policer, include the **logical-interface-policer** statement at the **[edit firewall policer *policer-template-name*]** hierarchy level:

```
[edit firewall policer policer-template-name]
logical-interface-policer;
```

For the policer to be treated as an aggregate, you must apply it to multiple protocol families on a single logical interface by including the **policer** statement:

```
policer {
  arp policer-template-name;
  input policer-template-name;
  output policer-template-name;
}
```

You can include these statements at the following hierarchy levels:

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

In the **family** statement, the protocol family can be **ccc**, **inet**, **inet6**, **mpls**, **tcc**, or **vpls**.

The protocol families on which you do not apply the policer are not affected by the policer. For example, if you configure a single logical interface to accept MPLS, IPv4, and IPv6 traffic and you apply the logical interface policer **policer1** to only the IPv4 and IPv6 protocol families, MPLS traffic is not subject to the constraints of **policer1**.

If you apply **policer1** to a different logical interface, there are two instances of the policer. This means the Junos OS polices traffic on separate logical interfaces separately, not as

an aggregate, even if the same logical-interface policer is applied to multiple logical interfaces on the same physical interface port.

### Example: Applying Aggregate Policers

---

Configure two logical interface policers: **aggregate\_police1** and **aggregate\_police2**. Apply **aggregate\_police1** to IPv4 and IPv6 traffic received on logical interface **fe-0/0/0.0**. Apply **aggregate\_police2** to CCC and MPLS traffic received on logical interface **fe-0/0/0.0**. This configuration causes the software to create only one instance of **aggregate\_police1** and one instance of **aggregate\_police2**.

Apply **aggregate\_police1** to IPv4 and IPv6 traffic received on another logical interface **fe-0/0/0.1**. This configuration causes the software to create a new instance of **aggregate\_police1**, one that applies to unit 0 and another that applies to unit 1.

```
[edit firewall]
policer aggregate_police1 {
  logical-interface-policer;
  if-exceeding {
    bandwidth-limit 100m;
    burst-size-limit 500k;
  }
  then {
    discard;
  }
}
policer aggregate_police2 {
  logical-interface-policer;
  if-exceeding {
    bandwidth-limit 10m;
    burst-size-limit 200k;
  }
  then {
    discard;
  }
}
[edit interfaces fe-0/0/0]
unit 0 {
  family inet {
    policer {
      input aggregate_police1;
    }
  }
  family inet6 {
    policer {
      input aggregate_police1;
    }
  }
  family ccc {
    policer {
      input aggregate_police2;
    }
  }
  family mpls {
    policer {
```

```

        input aggregate_police2;
    }
}
unit 1 {
    family inet {
        policer {
            input aggregate_police1;
        }
    }
    family inet6 {
        policer {
            input aggregate_police1;
        }
    }
}
}

```

## Applying Hierarchical Policers on Enhanced Intelligent Queuing PICs

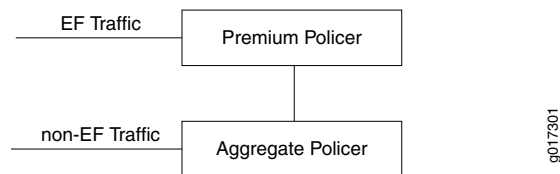
M40e, M120, and M320 edge routers and T Series core routers with Enhanced Intelligent Queuing (IQE) PICs support hierarchical policers in the ingress direction and allow you to apply a hierarchical policer for the premium and aggregate (premium plus normal) traffic levels to an interface. Hierarchical policers provide cross-functionality between the configured physical interface and the Packet Forwarding Engine.

Before you begin, there are some general restrictions that apply to hierarchical policers:

- Only one type of policer can be configured for a logical or physical interface. For example, a hierarchical policer and a regular policer in the same direction for the same logical interface is not allowed.
- The chaining of the policers—that is, applying policers to both a port and the logical interfaces of that port—is not allowed.
- There is a limit of 64 policers per interface in case there is no BA classification, providing a single policer per DLCI.
- Only one kind of policer can be applied on a physical or logical interface.
- The policer should be independent of BA classification. Without BA classification, all traffic on an interface will be treated either as EF or non-EF, based on the configuration. With BA classification, an interface can support up to 64 policers. Again, the interface here may be a physical interface or logical interface (for example, DLCI).
- With BA classification, the miscellaneous traffic (the traffic *not* matching with any of the BA classification DSCP/EXP bits) will be policed as non-EF traffic. No separate policers will be installed for this traffic.

### Hierarchical Policer Overview

Hierarchical policing uses two token buckets, one for aggregate (non-EF) traffic and one for premium (EF) traffic. Which traffic is EF and which is non-EF is determined by the class-of-service configuration. Logically, hierarchical policing is achieved by chaining two policers.

**Figure 6: Hierarchical Policer**

In the example in [Figure 6 on page 226](#), EF traffic is policed by Premium Policer and non EF traffic is policed by Aggregate Policer. What that means is, for EF traffic the out-of-spec action will be the one that is configured for Premium Policer, but the in-spec EF traffic will still consume the tokens from the Aggregate Policer.

But EF traffic will never be submitted to the out-of-spec action of the Aggregate Policer. Also, if the out-of-spec action of the Premium Policer is not set to Discard, those out-of-spec packets will not consume the tokens from the Aggregate Policer. Aggregate Policer only polices the non-EF traffic. As you can see, the Aggregate Policer token bucket can go negative, if all the tokens are consumed by the non-EF traffic and then you get bursts of EF traffic. But that will be for a very short time, and over a period of time it will average out. For example:

- *Premium Policer*: Bandwidth 2 Mbps, OOS Action: Discard
- *Aggregate Policer*: Bandwidth 10 Mbps, OOS Action: Discard

In the above case, EF traffic is guaranteed 2 Mbps and the non-EF traffic will get from 8 Mbps to 10 Mbps, depending on the input rate of the EF traffic.

### Hierarchical Policing Characteristics

Hierarchical token bucket features include:

- Ingress traffic is first classified into EF and non-EF traffic prior to applying a policer:
  - Classification is performed by Q-tree lookup
- Channel number selects a shared token bucket policer:
  - Dual token bucket policer is divided into two single bucket policers:
    - Policer1—EF traffic
    - Policer2—non-EF traffic
- Shared token bucket is used to police the traffic as follows:
  - Policer1 is set to EF rate (for example, 2 Mbps)
  - Policer2 is set to aggregate interface policed rate (for example, 10 Mbps).
  - EF traffic gets applied to Policer1.
    - If traffic is in-spec it is allowed to pass and decrement from both Policer1 and Policer2.

- If traffic is out-of-spec it can be discarded or marked with a new FC or loss priority. Policer2 will not do anything with out-of-spec EF traffic.
- Non-EF traffic gets applied only to Policer2.
  - If traffic is in-spec it is allowed to pass through and decremented Policer2.
  - If traffic is out-of-spec it is discarded or marked with a new FC or set with a new drop priority.
- Rate-limit the port speed to a desired rate at Layer 2
- Rate-limit the EF traffic
- Rate-limit the non-EF traffic
- Policing drops counted per color

### Configuring Hierarchical Policers

To configure a hierarchical policer, apply the **policing-priority** statement to the proper forwarding class and configure a hierarchical policer for the aggregate and premium level. For more information about class of service, see the *Junos OS Class of Service Library for Routing Devices*.



**NOTE:** Hierarchical policers can only be configured on SONET physical interfaces hosted on an IQE PIC. Only aggregate and premium levels are supported.

#### CoS Configuration of Forwarding Classes for Hierarchical Policers

```
[edit class-of-service forwarding-classes]
class fc1 queue-num 0 priority high policing-priority premium;
class fc2 queue-num 1 priority low policing-priority normal;
class fc3 queue-num 2 priority low policing-priority normal;
class fc4 queue-num 3 priority low policing-priority normal;
```

For detailed information on class-of-service configuration and statements, see the *Junos OS Class of Service Library for Routing Devices*.

#### Firewall Configuration for Hierarchical Policers

```
[edit firewall hierarchical-policer foo]
aggregate {
  if-exceeding {
    bandwidth-limit 70m;
    burst-size-limit 1500;
  }
  then {
    discard;
  }
}
premium {
  if-exceeding {
    bandwidth-limit 50m;
    burst-size-limit 1500;
  }
  then {
    discard;
  }
}
```

```
}  
}
```

You can apply the hierarchical policer as follows:

```
[edit interfaces so-0/1/0 unit 0 layer-2-policer]  
input-hierarchical-policer foo;
```

You also have the option to apply the policer at the physical port level as follows:

```
[edit interfaces so-0/1/0 layer-2-policer]  
input-hierarchical-policer foo;
```

---

### Configuring a Single-Rate Two-Color Policer

You can configure a single-rate two-color policer as follows:

```
[edit firewall policer foo]  
if-exceeding {  
    bandwidth-limit 50m;  
    burst-size-limit 1500;  
}  
then {  
    discard;  
}  
}
```

You can apply the policer as follows:

```
[edit interfaces so-0/1/0 unit 0 layer-2-policer]  
input-policer foo;
```

You also have the option to apply the policer at the physical port level as follows:

```
[edit interfaces so-0/1/0 layer-2-policer]  
input-policer foo;
```

---

### Configuring a Single-Rate Tricolor Policer

This section describes single-rate color blind and color aware policers.

#### *Configuring a Single-Rate Color-Blind Policer*

You can configure a single-rate color blind policer as follows:

```
[edit firewall three-color-policer foo]  
single-rate {  
    color-blind;  
    committed-information-rate 50m;  
    committed-burst-size 1500;  
    excess-burst-size 1500;  
}  
}
```

You can apply the single-rate color blind policer as follows:

```
[edit interfaces so-0/1/0 unit 0 layer-2-policer]  
input-three-color foo;
```

You also have the option to apply the policer at the physical port level as follows:

```
[edit interfaces so-0/1/0 layer-2-policer]
```

```
input-three-color foo;
```

### ***Configuring a Single-Rate Color-Aware Policer***

You can configure a single-rate color-aware policer as follows:

```
[edit firewall three-color-policer bar]
single-rate {
  color-aware;
  committed-information-rate 50m;
  committed-burst-size 1500;
  excess-burst-size 1500;
}
```

You can apply the single-rate color-aware policer as follows:

```
[edit interfaces so-0/1/0 unit 0 layer-2-policer]
input-three-color foo;
```

You also have the option to apply the policer at the physical port level as follows:

```
[edit interfaces so-0/1/0 layer-2-policer]
input-three-color bar;
```

---

### ***Configuring a Two-Rate Tricolor Marker Policer***

Ingress policing is implemented using a two-rate tricolor marker (trTCM). This is done with a dual token bucket (DTB) that maintains two rates, committed, and a peak. Egress static policing also uses a token bucket.

The token buckets perform the following ingress policing functions:

- (1K) trTCM - Dual token bucket (red, yellow, and green marking)
- Policing is based on Layer 2 packet size:
  - After +/- byte adjust offset
- Marking is color aware and color blind:
  - Color aware needs to have the color set by q-tree lookup based on:
    - ToS
    - EXP
- Programmable marking actions:
  - Color (red, yellow, green)
  - Drop based on color and congestion profile
- Policer is selected based on the arriving channel number:
  - Channel number LUT produces policer index and queue index
  - Multiple channels can share the same policer (LUT produces same policer index)
- Support ingress policing and trTCM at the following levels:

- Queue
  - Logical interface (ifl/DLCI)
  - Physical interface (ifd)
  - Physical port (controller ifd)
  - Any combinations of logical interface, physical interface, and port
- Support percentage of interface speed and bits per second

Rate limits may be applied to selected queues on ingress and on predefined queues at egress. The token bucket operates in color aware and color blind modes (specified by RFC 2698).

|  |   |
|--|---|
| <b>Configuring a<br/>Color-Blind trTCM</b> | <pre>[edit firewall three-color-policer foo] two-rate {   color-blind;   committed-information-rate 50m;   committed-burst-size 1500;   peak-information-rate 100m;   peak-burst-size 3k; }</pre> |
|--|---|

You can apply the three-color two-rate color-blind policer as follows:

```
[edit interfaces so-0/1/0 unit 0 layer-2-policer]
input-three-color foo;
```

You also have the option to apply the policer at the physical port level as follows:

```
[edit interfaces so-0/1/0 layer-2-policer]
input-three-color foo;
```

|  |   |
|--|---|
| <b>Configuring a<br/>Color-Aware trTCM</b> | <pre>[edit firewall three-color-policer bar] two-rate {   color-aware;   committed-information-rate 50m;   committed-burst-size 1500;   peak-information-rate 100m;   peak-burst-size 3k; }</pre> |
|--|---|

You can apply the three-color two-rate color-aware policer as follows:

```
[edit interfaces so-0/1/0 unit 0 layer-2-policer]
input-three-color bar;
```

You also have the option to apply the policer at the physical port level as follows:

```
[edit interfaces so-0/1/0 layer-2-policer]
input-three-color bar;
```

---

## Applying a Filter to an Interface

To apply firewall filters to an interface, include the **filter** statement:



```

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

```

To apply a single filter, include the **input** statement:

```

filter {
  input filter-name;
}

```

To apply a list of filters to evaluate packets received on an interface, include the **input-list** statement.

```

filter {
  input-list [ filter-names ];
}

```

Up to 16 filter names can be included in an input list.

To apply a list of filters to evaluate packets transmitted on an interface, include the **output-list** statement.

```

filter {
  output-list [ filter-names ];
}

```

When you apply filters using the **input-list** statement or the **output-list** statement, a new filter is created with the name *<interface-name>.<unit-direction>*. This filter is exclusively interface-specific.

You can include these statements at the following hierarchy levels:

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

In the **family** statement, the protocol family can be **ccc**, **inet**, **inet6**, **mpls**, or **vpls**.

In the **group** statement, specify the interface group number to associate with the filter.

In the **input** statement, list the name of one firewall filter to be evaluated when packets are received on the interface.

In the **input-list** statement, list the names of filters to evaluate when packets are received on the interface. You can include up to 16 filter names.

In the **output** statement, list the name of one firewall filter to be evaluated when packets are transmitted on the interface.



**NOTE:** Output filters do not work for broadcast and multicast traffic, including VPLS traffic (except in MX Series routers with MPC/MIC interfaces), as shown in “[Example: Applying a Filter to an Interface](#)” on page 233.



**NOTE:** On an MX Series router, you cannot apply as an output filter, a firewall filter configured at the `[edit firewall filter family ccc]` hierarchy level. Firewall filters configured for the `family ccc` statement can be applied only as input filters.

In the **output-list** statement, list the names of filters to evaluate when packets are transmitted on the interface. You can include up to 16 filter names.

You can use the same filter one or more times. On M Series routers (except the M320 and M120 routers), if you apply a firewall filter or policer to multiple interfaces, the filter or policer acts on the sum of traffic entering or exiting those interfaces.

On T Series, M120, and M320 routers, interfaces are distributed among multiple packet forwarding components. Therefore, on these routers, if you apply a firewall filter or policer to multiple interfaces, the filter or policer acts on the traffic stream entering or exiting each interface, regardless of the sum of traffic on the multiple interfaces.

For more information on Understanding Ethernet Frame Statistics, see the *MX Series Layer 2 Configuration Guide*.

If you apply the filter to the interface **lo0**, it is applied to packets received or transmitted by the Routing Engine. You cannot apply MPLS filters to the management interface (**fxp0** or **em0**) or the loopback interface (**lo0**).

Filters applied at the `[set interfaces lo0 unit 0 family any filter input]` hierarchy level are not installed on T4000 Type 5 FPCs.

For more information about firewall filters, see the *Routing Policy Feature Guide for Routing Devices*. For more information about MPLS filters, see the *Junos OS MPLS Applications Library for Routing Devices*.

See also the following sections:

- [Defining Interface Groups in Firewall Filters](#) on page 232
- [Filter-Based Forwarding on the Output Interface](#) on page 233
- [Example: Applying a Filter to an Interface](#) on page 233

## Defining Interface Groups in Firewall Filters

When applying a firewall filter, you can define an interface to be part of an *interface group*. Packets received on that interface are tagged as being part of the group. You can then match these packets using the **interface-group** match statement, as described in the *Routing Policy Feature Guide for Routing Devices*.

To define the interface to be part of an interface group, include the **group** statement:

```
group filter-group-number;
```

You can include this statement at the following hierarchy levels:

- [edit interfaces *interface-name* unit *logical-unit-number* family *family* filter]
- [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number* family *family* filter]



**NOTE:** The number 0 is not a valid interface group number.

## Filter-Based Forwarding on the Output Interface

If port-mirrored packets are to be distributed to multiple monitoring or collection interfaces, based on patterns in packet headers, it is helpful to configure a filter-based forwarding (FBF) filter on the port-mirroring egress interface.

When an FBF filter is installed as an output filter, a packet that is forwarded to the filter has already undergone at least one route lookup. After the packet is classified at the egress interface by the FBF filter, it is redirected to another routing table for additional route lookup. To avoid packet looping inside the Packet Forwarding Engine, the route lookup in the latter routing table (designated by an FBF routing instance) must result in a different next hop from any next hop specified in a table that has already been applied to the packet.

If an input interface is configured for FBF, the source lookup is disabled for those packets headings to a different routing instance, since the routing table is not set up to handle the source lookup.

For more information about FBF configuration, see the *Junos OS Routing Protocols Library for Routing Devices*. For more information about port mirroring, see the *Junos OS Services Interfaces Library for Routing Devices*.

## Example: Applying a Filter to an Interface

### Input Filter for VPLS Traffic

For M Series and T Series routers only, apply an input filter to VPLS traffic. Output filters do not work for broadcast and multicast traffic, including VPLS traffic. Note that on MX Series routers with MPC/MIC interfaces, the VPLS filters on the egress is applicable to broadcast, multicast, and unknown unicast traffic.



**NOTE:**

```
[edit interfaces]
fe-2/2/3 {
  vlan-tagging;
  encapsulation vlan-vpls;
  unit 601 {
    encapsulation vlan-vpls;
    vlan-id 601;
```

```

family vpls {
  filter {
    input filter1; # Works for multicast destination MAC address
    output filter1; # Does not work for multicast destination MAC address
  }
}
}
[edit firewall]
family vpls {
  filter filter1 {
    term 1 {
      from {
        destination-mac-address {
          01:00:0c:cc:cc:cd/48;
        }
      }
      then {
        discard;
      }
    }
    term 2 {
      then {
        accept;
      }
    }
  }
}
}

```

### Filter-Based Forwarding at the Output Interface

The following example illustrates the configuration of filter-based forwarding at the output interface. In this example, the packet flow follows this path:

1. A packet arrives at interface **fe-1/2/0.0** with source and destination addresses **10.50.200.1** and **10.50.100.1** respectively.
2. The route lookup in routing table **inet.0** points to the egress interface **so-0/0/3.0**.
3. The output filter installed at **so-0/0/3.0** redirects the packet to routing table **fbf.inet.0**.
4. The packet matches the entry **10.50.100.0/25** in the **fbf.inet.0** table, and finally leaves the router from interface **so-2/0/0.0**.

```

[edit interfaces]
so-0/0/3 {
  unit 0 {
    family inet {
      filter {
        output fbf;
      }
      address 10.50.10.2/25;
    }
  }
}
fe-1/2/0 {
  unit 0 {
    family inet {

```

```

        address 10.50.50.2/25;
    }
}
so-2/0/0 {
    unit 0 {
        family inet {
            address 10.50.20.2/25;
        }
    }
}
[edit firewall]
filter fbf {
    term 0 {
        from {
            source-address {
                10.50.200.0/25;
            }
        }
        then routing-instance fbf;
    }
    term d {
        then count d;
    }
}
[edit routing-instances]
fbf {
    instance-type forwarding;
    routing-options {
        static {
            route 10.50.100.0/25 next-hop so-2/0/0.0;
        }
    }
}
[edit routing-options]
interface-routes {
    rib-group inet fbf-group;
}
static {
    route 10.50.100.0/25 next-hop 10.50.10.1;
}
rib-groups {
    fbf-group {
        import-rib [inet.0 fbf.inet.0];
    }
}
}

```

## Configuring Unicast RPF

For interfaces that carry IPv4 or IPv6 traffic, you can reduce the impact of denial of service (DoS) attacks by configuring unicast reverse path forwarding (RPF). Unicast RPF helps determine the source of attacks and rejects packets from unexpected source addresses on interfaces where unicast RPF is enabled.



**NOTE:** If you want to configure unicast RPF, your router must be equipped with the Internet Processor II application-specific integrated circuit (ASIC).

If you enable unicast RPF on live traffic, some packets are dropped while the packet forwarding components are updating.

For transit packets exiting the router through the tunnel, forwarding path features, such as RPF, forwarding table filtering, source class usage, and destination class usage are not supported on the interfaces you configure as the output interface for tunnel traffic. For firewall filtering, you must allow the output tunnel packets through the firewall filter applied to input traffic on the interface that is the next-hop interface towards the tunnel destination.

The following sections describe unicast RPF in detail:

- [Configuring Unicast RPF Strict Mode on page 236](#)
- [Configuring Unicast RPF Loose Mode on page 237](#)
- [Unicast RPF and Default Routes on page 238](#)
- [Unicast RPF with Routing Asymmetry on page 239](#)
- [Configuring Unicast RPF on a VPN on page 240](#)
- [Example: Configuring Unicast RPF on page 240](#)

## Configuring Unicast RPF Strict Mode

In strict mode, unicast RPF checks whether the incoming packet has a source address that matches a prefix in the routing table, and whether the interface expects to receive a packet with this source address prefix.

If the incoming packet fails the unicast RPF check, the packet is not accepted on the interface. When a packet is not accepted on an interface, unicast RPF counts the packet and sends it to an optional fail filter. If the fail filter is not configured, the default action is to silently discard the packet.

The optional fail filter allows you to apply a filter to packets that fail the unicast RPF check. You can define the fail filter to perform any filter operation, including accepting, rejecting, logging, sampling, or policing.

When unicast RPF is enabled on an interface, Bootstrap Protocol (BOOTP) packets and Dynamic Host Configuration Protocol (DHCP) packets are not accepted on the interface. To allow the interface to accept BOOTP packets and DHCP packets, you must apply a fail filter that accepts all packets with a source address of **0.0.0.0** and a destination address of **255.255.255.255**. For a configuration example, see [“Example: Configuring Unicast RPF” on page 240](#).

For more information about unicast RPF, see the *Junos OS Routing Protocols Library for Routing Devices*. For more information about defining fail filters, see the *Routing Policy Feature Guide for Routing Devices*.

To configure unicast RPF, include the **rpf-check** statement:

```
rpf-check <fail-filter filter-name>;
```

You can include this statement at the following hierarchy levels:

- [edit interfaces *interface-name* unit *logical-unit-number* family (inet | inet6)]
- [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number* family (inet | inet6)]

Using unicast RPF can have several consequences when implemented with traffic filters:

- RPF fail filters are evaluated after input filters and before output filters.
- If you configure a filter counter for packets dropped by an input filter, and you want to know the total number of packets dropped, you must also configure a filter counter for packets dropped by the RPF check.
- To count packets that fail the RPF check and are accepted by the RPF fail filter, you must configure a filter counter.
- If an input filter forwards packets anywhere other than the inet.0 or inet6.0 routing tables, the unicast RPF check is not performed.
- If an input filter forwards packets anywhere other than the routing instance the input interface is configured for, the unicast RPF check is not performed.

## Configuring Unicast RPF Loose Mode

By default, unicast RPF uses strict mode. Unicast RPF loose mode is similar to unicast RPF strict mode and has the same configuration restrictions. The only check in loose mode is whether the packet has a source address with a corresponding prefix in the routing table; loose mode does not check whether the interface expects to receive a packet with a specific source address prefix. If a corresponding prefix is not found, unicast RPF loose mode does not accept the packet. As in strict mode, loose mode counts the failed packet and optionally forwards it to a fail filter, which either accepts, rejects, logs, samples, or polices the packet.

To configure unicast RPF loose mode, include the **mode**:

```
mode loose;
```

You can include this statement at the following hierarchy levels:

- [edit interfaces *interface-name* unit *logical-unit-number* family (inet | inet6) rpf-check <fail-filter filter-name>]
- [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number* family (inet | inet6) rpf-check <fail-filter filter-name>]

## Configuring Unicast RPF Loose Mode with Ability to Discard Packets

Starting with Junos OS Release 12.1, unicast RPF loose mode has the ability to discard packets with the source address pointing to the discard interface. This feature is supported

on MX Series routers and on T Series routers with Type 1 FPCs, Type 2 FPCs, and Type 3 FPCs. Using unicast RPF loose mode, along with Remote Triggered Black Hole (RTBH) filtering, provides an efficient way to discard packets coming from known attack sources. BGP policies in edge routers ensure that packets with untrusted source addresses have their next hop set to a discard route. When a packet arrives at the router with an untrusted source address, unicast RPF performs a route lookup of the source address. Because the source address route points to a discard next hop, the packet is dropped and a counter is incremented. This feature is supported on both IPv4 (inet) and IPv6 (inet6) address families.

To configure unicast RPF loose mode with the ability to discard packets, include the **rpf-loose-mode-discard family inet** statement at the **[edit forwarding-options]** hierarchy level:

```
rpf-loose-mode-discard {  
  family {  
    inet;  
  }  
}
```

## Unicast RPF and Default Routes

When the active route cannot be chosen from the routes in a routing table, the router chooses a default route. A default route is equivalent to an IP address of 0.0.0.0/0. If you configure a default route, and you configure unicast RPF on an interface that the default route uses, unicast RPF behaves differently than it does otherwise. For information about configuring default routes, see the *Junos OS Routing Protocols Library for Routing Devices*.

To determine whether the default route uses an interface, enter the **show route** command:

```
user@host> show route address
```

**address** is the next-hop address of the configured default route. The default route uses the interfaces shown in the output of the **show route** command.

The following sections describe how unicast RPF behaves when a default route uses an interface and when a default route does not use an interface:

- [Unicast RPF Behavior with a Default Route on page 238](#)
- [Unicast RPF Behavior Without a Default Route on page 239](#)

---

### Unicast RPF Behavior with a Default Route

If you configure a default route that uses an interface configured with unicast RPF, unicast RPF behaves as follows:

- Loose mode—All packets are automatically accepted. For this reason, we recommend that you not configure unicast RPF loose mode on interfaces that the default route uses.
- Strict mode—The packet is accepted when either of the following is true:



- The source address of the packet matches any of the routes (either default or learned) that can be originated from the interface. Note that routes can have multiple destinations associated with them; therefore, if one of the destinations matches the incoming interface of the packet, the packet is accepted.
- The source address of the packet does not match any of the routes.

The packet is not accepted when either of the following is true:

- The source address of the packet does not match a prefix in the routing table.
- The interface does not expect to receive a packet with this source address prefix.

### Unicast RPF Behavior Without a Default Route

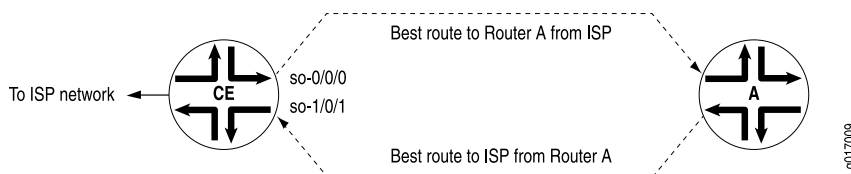
If you do not configure a default route, or if the default route does not use an interface configured with unicast RPF, unicast RPF behaves as described in [“Configuring Unicast RPF Strict Mode” on page 236](#) and [“Configuring Unicast RPF Loose Mode” on page 237](#). To summarize, unicast RPF without a default route behaves as follows:

- Strict mode—The packet is not accepted when either of the following is true:
  - The packet has a source address that does not match a prefix in the routing table.
  - The interface does not expect to receive a packet with this source address prefix.
- Loose mode—The packet is not accepted when the packet has a source address that does not match a prefix in the routing table.

## Unicast RPF with Routing Asymmetry

In general, we recommend that you not enable unicast RPF on interfaces that are internal to the network because internal interfaces are likely to have *routing asymmetry*. Routing asymmetry means that a packet’s outgoing and return paths are different. Routers in the core of the network are more likely to have asymmetric reverse paths than routers at the customer or provider edge. [Figure 7 on page 239](#) shows unicast RPF in an environment with routing asymmetry.

**Figure 7: Unicast RPF with Routing Asymmetry**



In [Figure 7 on page 239](#), if you enable unicast RPF on interface `so-0/0/0`, traffic destined for Router A is not rejected. If you enable unicast RPF on interface `so-1/0/1`, traffic from Router A is rejected.

If you need to enable unicast RPF in an asymmetric routing environment, you can use fail filters to allow the router to accept incoming packets that are known to be arriving by specific paths. For an example of a fail filter that accepts packets with a specific source and destination address, see [“Example: Configuring Unicast RPF” on page 240](#).

## Configuring Unicast RPF on a VPN

You can configure unicast RPF on a VPN interface by enabling unicast RPF on the interface and including the **interface** statement at the **[edit routing-instances routing-instance-name]** hierarchy level.

You can configure unicast RPF only on the interfaces you specify in the routing instance. This means the following:

- For Layer 3 VPNs, unicast RPF is supported on the CE router interface.
- Unicast RPF is not supported on core-facing interfaces.
- For virtual-router routing instances, unicast RPF is supported on all interfaces you specify in the routing instance.
- If an input filter forwards packets anywhere other than the routing instance the input interface is configured for, the unicast RPF check is not performed.

For more information about VPNs and virtual-router routing instances, see the *Junos OS VPNs Library for Routing Devices*. For more information about FBF, see the *Junos OS Routing Protocols Library for Routing Devices*.

---

### Example: Configuring Unicast RPF on a VPN

Configure unicast RPF on a Layer 3 VPN interface:

```
[edit interfaces]
so-0/0/0 {
  unit 0 {
    family inet {
      rpf-check;
    }
  }
}
[edit routing-instance]
VPN-A {
  interface so-0/0/0.0;
}
```

### Example: Configuring Unicast RPF

Configure unicast RPF strict mode, and apply a fail filter that allows the interface to accept BOOTP packets and DHCP packets. The filter accepts all packets with a source address of 0.0.0.0 and a destination address of 255.255.255.255.

```
[edit firewall]
filter rpf-special-case-dhcp-bootp {
  term allow-dhcp-bootp {
    from {
      source-address {
        0.0.0.0/32;
      }
    }
    address {
      255.255.255.255/32;
    }
  }
}
```

```

    }
  }
  then {
    count rpf-dhcp-bootp-traffic;
    accept;
  }
}
term default {
  then {
    log;
    reject;
  }
}
}
[edit]
interfaces {
  so-0/0/0 {
    unit 0 {
      family inet {
        rpf-check fail-filter rpf-special-case-dhcp-bootp;
      }
    }
  }
}

```

- Related Documentation**
- [unicast-reverse-path](#)
  - [Example: Configuring Unicast Reverse-Path-Forwarding Check](#)

## Enabling Source Class and Destination Class Usage

For interfaces that carry IPv4, IPv6, MPLS, or peer AS billing traffic, you can maintain packet counts based on the entry and exit points for traffic passing through your network. Entry and exit points are identified by source and destination prefixes grouped into disjoint sets defined as *source classes* and *destination classes*. You can define classes based on a variety of parameters, such as routing neighbors, autonomous systems, and route filters.

Source class usage (SCU) counts packets sent to customers by performing lookup on the IP source address. SCU makes it possible to track traffic originating from specific prefixes on the provider core and destined for specific prefixes on the customer edge. You must enable SCU accounting on both the inbound and outbound physical interfaces, and the route for the source of the packet must be in located in the forwarding table.



**NOTE:** SCU and DCU accounting do not work with directly connected interface routes. Source class usage does not count packets coming from sources with direct routes in the forwarding table because of software architecture limitations.

Destination class usage (DCU) counts packets from customers by performing lookup of the IP destination address. DCU makes it possible to track traffic originating from the customer edge and destined for specific prefixes on the provider core router.



**NOTE:** SCU and DCU accounting are supported on the J Series router only for IPv4 and IPv6 traffic.

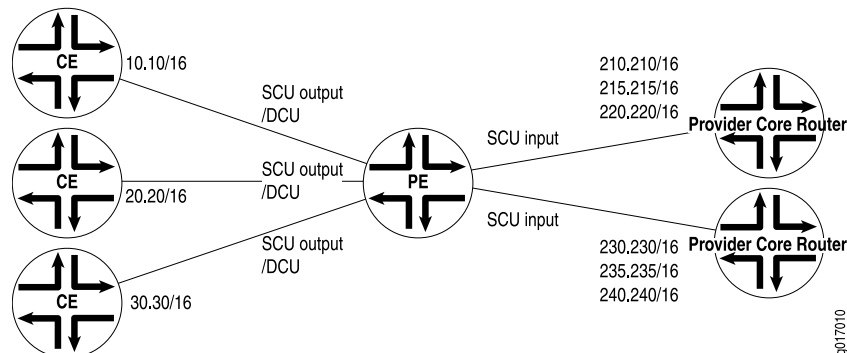


**NOTE:** We recommend that you stop the network traffic on an interface before you modify the DCU or SCU configuration for that interface. Modifying the DCU or SCU configuration without stopping the traffic might corrupt the DCU or SCU statistics. Before you restart the traffic after modifying the configuration, enter the `clear interfaces statistics` command.

Figure 8 on page 242 illustrates an Internet service provider (ISP) network. In this topology, you can use DCU to count packets customers send to specific prefixes. For example, you can have three counters, one per customer, that count the packets destined for prefix **210.210/16** and **220.220/16**.

You can use SCU to count packets the provider sends from specific prefixes. For example, you can count the packets sent from prefix **210.210/16** and **215.215/16** and transmitted on a specific output interface.

**Figure 8: Prefix Accounting with Source and Destination Classes**



You can configure up to 126 source classes and 126 destination classes. For each interface on which you enable destination class usage and source class usage, the Junos OS maintains an interface-specific counter for each corresponding class up to the 126 class limit.



**NOTE:** For transit packets exiting the router through the tunnel, forwarding path features, such as RPF, forwarding table filtering, source class usage, and destination class usage are not supported on the interfaces you configure as the output interface for tunnel traffic. For firewall filtering, you must allow the output tunnel packets through the firewall filter applied to input traffic on the interface that is the next-hop interface towards the tunnel destination.

**NOTE:**

Performing DCU accounting when an output service is enabled produces inconsistent behavior in the following configuration:

- Both SCU input and DCU are configured on the packet input interface.
- SCU output is configured on the packet output interface.
- Interface services is enabled on the output interface.

For an incoming packet with source and destination prefixes matching the SCU and DCU classes respectively configured in the router, both SCU and DCU counters will be incremented. This behavior is not harmful or negative. However, it is inconsistent with non-serviced packets, in that only the SCU count will be incremented (because the SCU class ID will override the DCU class ID in this case).

To enable packet counting on an interface, include the **accounting** statement:

```
accounting {
  destination-class-usage;
  source-class-usage {
    direction;
  }
}
```

*direction* can be one of the following:

- **input**—Configure at least one expected ingress point.
- **output**—Configure at least one expected egress point.
- **input output**—On a single interface, configure at least one expected ingress point and one expected egress point.

You can include these statements at the following hierarchy levels:

- [edit interfaces *interface-name* unit *logical-unit-number* family (inet | inet6 | mpls)]
- [edit logical-systems *logical-system-name* interfaces *interface-name* unit *logical-unit-number* family (inet | inet6 | mpls)]

For SCU to work, you must configure at least one input interface and at least one output interface.

The ability to count a single packet for both SCU and DCU accounting depends on the underlying physical interface.

- For traffic over interfaces on Junos Trio chipset-based Packet Forwarding Engine, a single incoming packet is counted for both SCU and DCU accounting if both SCU and DCU are configured. To ensure the outgoing packet is counted, include the **source-class-usage output** statements in the configuration of the outgoing interface.

- For traffic over other interfaces, an incoming packet is counted only once, and SCU takes priority over DCU. This means that when a packet arrives on an interface on which you include the **source-class-usage input** and **destination-class-usage** statements in the configuration, and when the source and destination both match accounting prefixes, the Junos OS associates the packet with the source class only.

For traffic over interfaces on Junos Trio chipset-based Packet Forwarding Engine, SCU and DCU accounting is performed after output filters are evaluated. If a packet matches a firewall filter match condition, the packet is included in SCU or DCU accounting except in the case where the action of the matched term is **discard**.

On T Series, M120, and M320 routers, the source class and destination classes are not carried across the router fabric. The implications of this are as follows:

- On T Series, M120, and M320 routers, SCU and DCU accounting is performed before the packet enters the fabric.
- On M7i, M10i, M120, and M320 routers, on MX Series routers with non-Trio chipset-based Packet Forwarding Engine, and on T Series routers, SCU and DCU accounting is performed before output filters are evaluated. Consequently, if a packet matches a firewall filter match condition, the packet is included in SCU or DCU accounting; the packet is counted for any term action (including the **discard** action).
- On M120, M320, and T Series routers, the **destination-class** and **source-class** statements are supported at the **[edit firewall family *family-name* filter *filter-name* term *term-name* from]** hierarchy level only for the filter applied to the forwarding table. On M7i, M10i, and MX Series routers, these statements are supported.

Once you enable accounting on an interface, the Junos OS maintains packet counters for that interface, with separate counters for **inet**, **inet6**, and **mpls** protocol families. You must then configure the source class and destination class attributes in policy action statements, which must be included in forwarding-table export policies.



**NOTE:** When configuring policy action statements, you can configure only one source class for each matching route. In other words, more than one source class cannot be applied to the same route.

---

In Junos OS Release 9.3 and later, you can configure SCU accounting for Layer 3 VPNs configured with the **vrf-table-label** statement. Include the **source-class-usage** statement at the **[edit routing-instances *routing-instance-name* vrf-table-label]** hierarchy level. The **source-class-usage** statement at this hierarchy level is supported only for the virtual routing and forwarding (VRF) instance type.



**NOTE:** DCU counters cannot be enabled on the label-switched interface (LSI) that is created dynamically when the **vrf-table-label** statement is configured within a VRF. For more information, see the *Junos OS VPNs Library for Routing Devices*.

---

For a complete discussion about source and destination class accounting profiles, see the *Network Management Administration Guide for Routing Devices*. For more information about MPLS, see the *Junos OS MPLS Applications Library for Routing Devices*.

## Examples: Enabling Source Class and Destination Class Usage

Configure DCU and SCU output on one interface:

```
[edit]
interfaces {
  so-6/1/0 {
    unit 0 {
      family inet {
        accounting {
          destination-class-usage;
          source-class-usage {
            output;
          }
        }
      }
    }
  }
}
```

### Complete SCU Configuration

Source routers A and B use loopback addresses as the prefixes to be monitored. Most of the configuration tasks and actual monitoring occur on transit Router SCU.

The loopback address on Router A contains the origin of the prefix that is to be assigned to source class A on Router SCU. However, no SCU processing happens on this router. Therefore, configure Router A for basic OSPF routing and include your loopback interface and interface **so-0/0/2** in the OSPF process.

### Router A

```
[edit]
interfaces {
  so-0/0/2 {
    unit 0 {
      family inet {
        address 10.255.50.2/24;
      }
    }
  }
  lo0 {
    unit 0 {
      family inet {
        address 10.255.192.10/32;
      }
    }
  }
}
protocols {
  ospf {
    area 0.0.0.0 {
      interface so-0/0/2.0;
      interface lo0.0;
    }
  }
}
```

```
}
```

**Router SCU** Last, apply the policy to the forwarding table.

Router SCU handles the bulk of the activity in this example. On Router SCU, enable source class usage on the inbound and outbound interfaces at the **[edit interfaces interface-name unit unit-number family inet accounting]** hierarchy level. Make sure you specify the expected traffic: input, output, or, in this case, both.

Next, configure a route filter policy statement that matches the prefixes of the loopback addresses from routers A and B. Include statements in the policy that classify packets from Router A in one group named **scu-class-a** and packets from Router B in a second class named **scu-class-b**. Notice the efficient use of a single policy containing multiple terms.

```
[edit]
interfaces {
  so-0/0/1 {
    unit 0 {
      family inet {
        accounting {
          source-class-usage {
            input;
            output;
          }
        }
        address 10.255.50.1/24;
      }
    }
  }
  so-0/0/3 {
    unit 0 {
      family inet {
        accounting {
          source-class-usage {
            input;
            output;
          }
        }
        address 10.255.10.3/24;
      }
    }
  }
  lo0 {
    unit 0 {
      family inet {
        address 10.255.6.111/32;
      }
    }
  }
}
protocols {
  ospf {
    area 0.0.0.0 {
      interface so-0/0/1.0;
      interface so-0/0/3.0;
```



```

    }
  }
}
routing-options {
  forwarding-table {
    export scu-policy;
  }
}
policy-options {
  policy-statement scu-policy {
    term 0 {
      from {
        route-filter 10.255.192.0/24 orlonger;
      }
      then source-class scu-class-a;
    }
    term 1 {
      from {
        route-filter 10.255.165.0/24 orlonger;
      }
      then source-class scu-class-b;
    }
  }
}
}

```

**Router B** Just as Router A provides a source prefix, Router B's loopback address matches the prefix assigned to **scu-class-b** on Router SCU. Again, no SCU processing happens on this router, so configure Router B for basic OSPF routing and include your loopback interface and interface **so-0/0/4** in the OSPF process.

```

interfaces {
  so-0/0/4 {
    unit 0 {
      family inet {
        address 10.255.10.4/24;
      }
    }
  }
  lo0 {
    unit 0 {
      family inet {
        address 10.255.165.226/32;
      }
    }
  }
}
protocols {
  ospf {
    area 0.0.0.0 {
      interface so-0/0/4.0;
      interface lo0.0;
    }
  }
}
}

```

### Enabling Packet Counting for Layer 3 VPNs

You can use SCU and DCU to count packets on Layer 3 VPNs. To enable packet counting for Layer 3 VPN implementations at the egress point of the MPLS tunnel, you must configure a virtual loopback tunnel interface (**vt**) on the PE router, map the virtual routing and forwarding (VRF) instance type to the virtual loopback tunnel interface, and send the traffic received from the VPN out the source class output interface, as shown in the following example:

Configure a virtual loopback tunnel interface on a provider edge router equipped with a tunnel PIC:

```
[edit interfaces]
vt-0/3/0 {
  unit 0 {
    family inet {
      accounting {
        source-class-usage {
          input;
        }
      }
    }
  }
}
```

Map the VRF instance type to the virtual loopback tunnel interface.

In Junos OS Release 9.3 and later, you can configure SCU accounting for Layer 3 VPNs configured with the **vrf-table-label** statement. Include the **source-class-usage** statement at the **[edit routing-instances routing-instance-name vrf-table-label]** hierarchy level. The **source-class-usage** statement at this hierarchy level is supported only for the virtual routing and forwarding (VRF) instance type. DCU is not supported when the **vrf-table-label** statement is configured. For more information, see the *Junos OS VPNs Library for Routing Devices*.

```
[edit routing-instances]
VPN-A {
  instance-type vrf;
  interface at-2/1/1.0;
  interface vt-0/3/0.0;
  route-distinguisher 10.255.14.225:100;
  vrf-import import-policy-A;
  vrf-export export-policy-A;
  protocols {
    bgp {
      group to-r4 {
        local-address 10.27.253.1;
        peer-as 400;
        neighbor 10.27.253.2;
      }
    }
  }
}
```

Send traffic received from the VPN out the source class output interface:

```
[edit interfaces]
at-2/1/0 {
  unit 0 {
```

```

family inet {
  accounting {
    source-class-usage {
      output;
    }
  }
}

```

For more information about VPNs, see the *Junos OS VPNs Library for Routing Devices*. For more information about virtual loopback tunnel interfaces, see the *Junos OS Services Interfaces Library for Routing Devices*.

#### Related Documentation

- [accounting on page 319](#)
- *destination-classes*
- [family on page 473](#)
- [forward-and-send-to-re on page 484](#)
- *source-classes*
- [targeted-broadcast on page 799](#)
- [unit on page 830](#)

## Enabling Targeted Broadcast

- [Understanding Targeted Broadcast on page 249](#)
- [Configuring Targeted Broadcast on page 250](#)

### Understanding Targeted Broadcast

Targeted broadcast is a process of flooding a target subnet with Layer 3 broadcast IP packets originating from a different subnet. The intent of targeted broadcast is to flood the target subnet with the broadcast packets on a LAN interface without broadcasting to the entire network. Targeted broadcast is configured with various options on the egress interface of the router or switch and the IP packets are broadcast only on the LAN (egress) interface. Targeted broadcast helps you implement remote administration tasks such as backups and wake-on LAN (WOL) on a LAN interface, and supports virtual routing and forwarding (VRF) instances.

Regular Layer 3 broadcast IP packets originating from a subnet are broadcast within the same subnet. When these IP packets reach a different subnet, they are forwarded to the Routing Engine (to be forwarded to other applications). Because of this, remote administration tasks such as backups cannot be performed on a particular subnet through another subnet. As a workaround you can enable targeted broadcast, to forward broadcast packets that originate from a different subnet.

Layer 3 broadcast IP packets have a destination IP address that is a valid broadcast address for the target subnet. These IP packets traverse the network in the same way as unicast IP packets until they reach the destination subnet. In the destination subnet,

if the receiving router has targeted broadcast enabled on the egress interface, the IP packets are forwarded to an egress interface and the Routing Engine or to an egress interface only. The IP packets are then translated into broadcast IP packets which flood the target subnet only through the LAN interface (if there is no LAN interface, the packets are discarded), and all hosts on the target subnet receive the IP packets. If targeted broadcast is not enabled on the receiving router, the IP packets are treated as regular Layer 3 broadcast IP packets and are forwarded to the Routing Engine. If targeted broadcast is enabled without any options, the IP packets are discarded.

Targeted broadcast can be configured to forward the IP packets only to an egress interface, which is helpful when the router is flooded with packets to process, or to both an egress interface and the Routing Engine.



**NOTE:** Targeted broadcast does not work when the targeted broadcast option `forward-and-send-to-re` and the traffic sampling option `sampling` are configured on the same egress interface of an M320 router, a T640 router, or an MX960 router. To overcome this scenario, you must either disable one of these options or enable the `sampling` option with the targeted broadcast option `forward-only` on the egress interface. For information about traffic sampling, see *Configuring Traffic Sampling*.



**NOTE:** Any firewall filter that is configured on the Routing Engine loopback interface (lo0) cannot be applied to IP packets that are forwarded to the Routing Engine as a result of a targeted broadcast. This is because broadcast packets are forwarded as flood next hop and not as local next hop traffic, and you can only apply a firewall filter to local next hop routes for traffic directed towards the Routing Engine.

---

## Configuring Targeted Broadcast

The following sections explain how to configure targeted broadcast on an egress interface and its options:

- [Configuring Targeted Broadcast and Its Options on page 250](#)
- [Display Targeted Broadcast Configuration Options on page 251](#)

---

### Configuring Targeted Broadcast and Its Options

You can configure targeted broadcast on an egress interface with different options. You can either allow the IP packets destined for a Layer 3 broadcast address to be forwarded on the egress interface and to send a copy of the IP packets to the Routing Engine or you can allow the IP packets to be forwarded on the egress interface only. Note that the packets are broadcast only if the egress interface is a LAN interface.

To configure targeted broadcast and its options:

1. Configure the physical interface.

```
[edit]
user@host# set interfaces interface-name
```

2. Configure the logical unit number at the `[edit interfaces interface-name]` hierarchy level.

```
[edit interfaces interface-name]
user@host# set unit logical-unit-number
```

3. Configure the protocol family as `inet` at the `[edit interfaces interface-name unit interface-unit-number]` hierarchy level.

```
[edit interfaces interface-name unit interface--unit-number]
user@host# set family inet
```

4. Configure targeted broadcast at the `[edit interfaces interface-name unit interface-unit-number family inet]` hierarchy level

```
[edit interfaces interface-name unit interface--unit-number family inet]
user@host# set targeted-broadcast
```

5. Specify one of the following options as per requirement:

- To allow IP packets destined for a Layer 3 broadcast address to be forwarded on the egress interface and to send a copy of the IP packets to the Routing Engine.

```
[edit interfaces interface-name unit interface-unit-number family inet
targeted-broadcast]
user@host# set forward-and-send-to-re
```

- To allow IP packets to be forwarded on the egress interface only.

```
[edit interfaces interface-name unit interface-unit-number family inet
targeted-broadcast]
user@host# set forward-only
```



**NOTE:** Targeted broadcast does not work when the targeted broadcast option `forward-and-send-to-re` and the traffic sampling option `sampling` are configured on the same egress interface of an M320 router, a T640 router, or an MX960 router. To overcome this scenario, you must either disable one of these options or enable the `sampling` option with the targeted broadcast option `forward-only` on the egress interface. For information about traffic sampling, see *Configuring Traffic Sampling*.

## Display Targeted Broadcast Configuration Options

The following topics display targeted broadcast configuration with its various options:

- [Forward IP Packets On the Egress Interface and To the Routing Engine on page 251](#)
- [Forward IP Packets On the Egress Interface Only on page 252](#)

### Forward IP Packets On the Egress Interface and To the Routing Engine

**Purpose** Display the configuration when targeted broadcast is configured on the egress interface to forward the IP packets on the egress interface and to send a copy of the IP packets to the Routing Engine.

**Action** To display the configuration run the **show** command at the **[edit interfaces *interface-name* unit *interface-unit-number* family inet]** where the interface name is ge-2/0/0, the unit value is set to 0, the protocol family is set to inet.

```
[edit interfaces interface-name unit interface-unit-number family inet]
user@host#show
targeted-broadcast {
  forward-and-send-to-re;
}
```

#### ***Forward IP Packets On the Egress Interface Only***

**Purpose** Display the configuration when targeted broadcast is configured on the egress interface to forward the IP packets on the egress interface only.

**Action** To display the configuration run the **show** command at the **[edit interfaces *interface-name* unit *interface-unit-number* family inet]** where the interface name is ge-2/0/0, the unit value is set to 0, the protocol family is set to inet.

```
[edit interfaces interface-name unit interface-unit-number family inet]
user@host#show
targeted-broadcast {
  forward-only;
}
```

## CHAPTER 6

# Configuring Circuit and Translational Cross-Connects

- [Circuit and Translational Cross-Connects Overview on page 253](#)
- [Defining the Encapsulation for Switching Cross-Connects on page 255](#)
- [Defining the Connection for Switching Cross-Connects on page 258](#)
- [Configuring MPLS for Switching Cross-Connects on page 259](#)
- [Configuring IS-IS or MPLS Traffic for TCC Interfaces on page 259](#)
- [Configuring ATM-to-Ethernet Interworking on page 260](#)
- [Examples: Configuring Switching Cross-Connects on page 264](#)

### Circuit and Translational Cross-Connects Overview

---

Circuit cross-connect (CCC) and translational cross-connect (TCC) allow you to configure transparent connections between two circuits, where a circuit can be a Frame Relay data-link connection identifier (DLCI), an Asynchronous Transfer Mode (ATM) virtual circuit (VC), a Point-to-Point Protocol (PPP) interface, a Cisco High-level Data Link Control (HDLC) interface, or a Multiprotocol Label Switching (MPLS) label-switched path (LSP).

Using CCC or TCC, packets from the source circuit are delivered to the destination circuit with, at most, the Layer 2 address being changed. No other processing, such as header checksums, time-to-live (TTL) decrementing, or protocol processing, is done.

To connect interfaces of the same type, use CCC. To connect unlike interfaces, use TCC.

CCC and TCC circuits fall into three categories: logical interfaces, which include ATM VCs and Frame Relay DLCIs; physical interfaces, which include PPP and Cisco HDLC; and paths, which include LSPs. The three circuit categories provide three types of cross-connect:

- **Layer 2 switching (interface-to-interface)**—Cross-connects between logical interfaces provide what is essentially Layer 2 switching.
- **MPLS tunneling (interface-to-LSP)**—Cross-connects between interfaces and LSPs allow you to connect two distant interface circuits by creating MPLS tunnels that use LSPs as the conduit.

- LSP stitching (LSP-to-LSP)—Cross-connects between LSPs provide a way to “stitch” together two label-switched paths, including paths that fall in two different traffic engineering database (TED) areas.

The cross-connect is bidirectional, so packets received on the first interface are transmitted out the second interface, and those received on the second interface are transmitted out the first interface.

For most CCC connections that connect interfaces, the interfaces must be of the same type; that is, ATM to ATM, Frame Relay to Frame Relay, PPP to PPP, or Cisco HDLC to Cisco HDLC.

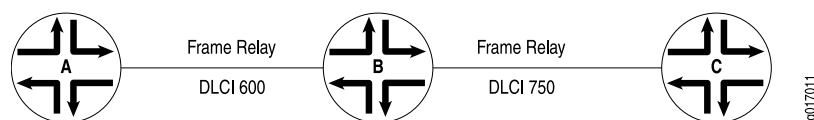
ATM-to-Ethernet interworking cross-connect circuits connect logical interfaces configured on an ATM2 and Gigabit Ethernet IQ2 and IQ2-E or 10-Gigabit Ethernet IQ2 and IQ2-E physical interfaces.

For all TCC connections that connect interfaces, the interfaces can be of unlike types. Mainly, TCC is used for Layer 2.5 virtual private networks (VPNs), but it can also be used as a simple “unlike circuit” switch.

Switching cross-connects join logical interfaces to form what is essentially Layer 2 switching.

Figure 9 on page 254 illustrates a Layer 2 switching circuit cross-connect. In this topology, Router A and Router C have Frame Relay connections to Router B, which is a Juniper Networks router. CCC allows you to configure Router B to act as a Frame Relay (Layer 2) switch. To do this, configure a circuit from Router A to Router C that passes through Router B, effectively configuring Router B as a Frame Relay switch with respect to these routers. This configuration allows Router B to transparently switch packets (frames) between Router A and Router C without regard to the packets' contents or the Layer 3 protocols. The only processing that Router B performs is to translate DLCI 600 to 750.

**Figure 9: Layer 2 Switching Circuit Cross-Connect**



If the Router A-to-Router B and Router B-to-Router C circuits are PPP, for example, the Link Control Protocol and Network Control Protocol exchanges occur between Router A and Router C. These messages are handled transparently by Router B, allowing Router A and Router C to use various PPP options (such as header or address compression and authentication) that Router B might not support. Similarly, Router A and Router C exchange keepalives, providing circuit-to-circuit connectivity status.

You can configure Layer 2 switching cross-connects on PPP, Cisco HDLC, Frame Relay, Ethernet CCC, Ethernet VLAN, and ATM circuits. With CCC, only like interfaces can be connected in a single cross-connect. With TCC, unlike interfaces can be connected in a single cross-connect. In Layer 2 switching cross-connects, the exchanges take place between point-to-point links.



This chapter discusses the Layer 2 switching cross-connect configuration tasks. For information about MPLS tunneling and LSP stitching, see the *Junos OS MPLS Applications Library for Routing Devices*.

For information about Layer 2 and Layer 2.5 VPNs, see the *Junos OS VPNs Library for Routing Devices*.

#### Related Documentation

- [Defining the Encapsulation for Switching Cross-Connects on page 255](#)
- [Defining the Connection for Switching Cross-Connects on page 258](#)
- [Configuring MPLS for Switching Cross-Connects on page 259](#)
- [Configuring IS-IS or MPLS Traffic for TCC Interfaces on page 259](#)
- [Configuring ATM-to-Ethernet Interworking on page 260](#)
- [Example: Configuring a CCC over Frame Relay Encapsulated Interface on page 264](#)
- [Example: Configuring a TCC on page 265](#)
- [Example: Configuring CCC over Aggregated Ethernet on page 266](#)
- [Example: Configuring a Remote LSP CCC over Aggregated Ethernet on page 268](#)
- [Example: Configuring ATM-to-Ethernet Interworking on page 270](#)

## Defining the Encapsulation for Switching Cross-Connects

To configure Layer 2 or Layer 2.5 switching cross-connects, configure the CCC or TCC encapsulation on the router that is acting as the switch (Router B in [Figure 9 on page 254](#)).



**NOTE:** When you use CCC encapsulation, you can configure the `ccc` family only. Likewise, when you use TCC encapsulation, you can configure the `tcc` family only.

This section contains the following topics:

- [Configuring PPP or Cisco HDLC Circuits on page 255](#)
- [Configuring ATM Circuits on page 256](#)
- [Configuring Frame Relay Circuits on page 256](#)
- [Configuring Ethernet CCC Circuits on page 257](#)
- [Configuring Ethernet VLAN Circuits on page 258](#)

### Configuring PPP or Cisco HDLC Circuits

For PPP or Cisco HDLC circuits, specify the encapsulation by including the **encapsulation** statement at the `[edit interfaces interface-name]` hierarchy level. This statement configures the entire physical device. For these circuits to work, you must configure a logical interface unit 0.

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

```
encapsulation (ppp-ccc | cisco-hdlc-ccc | ppp-tcc | cisco-hdlc-tcc);
unit 0;
```

## Configuring ATM Circuits

For ATM circuits, include the `vpi` statement [edit interfaces *interface-name* atm-options] hierarchy level:

```
[edit interfaces at-fpc/pic/port]
atm-options {
  vpi vpi-identifier;
}
```

On the logical interface, include the following statements:

```
point-to-point;
encapsulation (atm-ccc-cell-relay | atm-ccc-vc-mux | atm-tcc-vc-mux | atm-tcc-snap);
vci vpi-identifier.vci-identifier;
```

You can include the logical interface statements at the following hierarchy levels:

- [edit interfaces at-fpc/pic/port `unit logical-unit-number`]
- [edit logical-systems *logical-system-name* interfaces at-fpc/pic/port `unit logical-unit-number`]

For each VC, configure whether it is a circuit or a regular logical interface. The default interface type is point-to-point.

## Configuring Frame Relay Circuits

For Frame Relay circuits, include the `encapsulation` statement at the [edit interfaces *interface-name*] hierarchy level:

```
[edit interfaces interface-name]
encapsulation type;
```

On the logical interface, include the following statements:

```
point-to-point;
encapsulation type;
dlci dlci-identifier;
```

You can include the logical interface statements at the following hierarchy levels:

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

The encapsulation type can be one of the following:

- Flexible Frame Relay (**flexible-frame-relay**)—Intelligent queuing (IQ) interfaces can use flexible Frame Relay encapsulation. You use flexible Frame Relay encapsulation when you want to configure multiple per-unit Frame Relay encapsulations. This encapsulation type allows you to configure any combination of TCC, CCC, and standard Frame Relay encapsulations on a single physical port. Also, each logical interface can have any DLCI value from 1 through 1022.
- Frame Relay CCC version (**frame-relay-ccc**)—For E1, E3, SONET/SDH, T1, and T3 interfaces, this encapsulation type is the same as standard Frame Relay for DLCIs 0 through 511. DLCIs 512 through 1022 are dedicated to CCC. The logical interface must also have **frame-relay-ccc** encapsulation. When you use this encapsulation type, you can configure the **ccc** family only.
- Frame Relay TCC version (**frame-relay-tcc**)—Similar to Frame Relay CCC and has the same configuration restrictions, but used for circuits with different media on either side of the connection.
- Extended CCC version (**extended-frame-relay-ccc**)—This encapsulation type allows you to dedicate DLCIs 1 through 1022 to CCC. The logical interface must have **frame-relay-ccc** encapsulation. When you use this encapsulation type, you can configure the **ccc** family only.
- Extended TCC version (**extended-frame-relay-tcc**)—Similar to extended Frame Relay CCC, this encapsulation type allows you to dedicate DLCIs 1 through 1022 to TCC, which is used for circuits with different media on either side of the connection.
- Port CCC version (**frame-relay-port-ccc**)—Defined in the IETF document *Frame Relay Encapsulation over Pseudo-Wires* (expired December 2002). This encapsulation type allows you to transparently carry all the DLCIs between two customer edge (CE) routers without explicitly configuring each DLCI on the two provider edge (PE) routers with Frame Relay transport. The connection between the two CE routers can be either user-to-network interface (UNI) or network-to-network interface (NNI); this is completely transparent to the PE routers. The logical interface does not require an encapsulation statement. When you use this encapsulation type, you can configure the **ccc** family only.

For each DLCI, configure whether it is a circuit or a regular logical interface. The DLCI for regular interfaces must be from 1 through 511. For CCC and TCC interfaces, it must be from 512 through 1022. This restriction does not apply to IQ interfaces. The default interface type is point to point.

## Configuring Ethernet CCC Circuits

You can configure Ethernet CCC encapsulation on Fast Ethernet, Gigabit Ethernet, and aggregated Ethernet interfaces.



**NOTE:** CCC over aggregated Ethernet requires an M Series Enhanced Flexible PIC Concentrator (FPC).

For Ethernet CCC circuits, specify the encapsulation by including the **encapsulation** statement at the **[edit interfaces *interface-name*]** hierarchy level. This statement configures the entire physical device.

```
[edit interfaces interface-name]  
encapsulation ethernet-ccc;  
unit logical-unit-number {  
  ...  
}  
[edit interfaces aex]  
encapsulation ethernet-ccc;  
unit logical-unit-number {  
  ...  
}
```

## Configuring Ethernet VLAN Circuits

You can configure Ethernet virtual local area network (VLAN) circuits on Fast Ethernet, Gigabit Ethernet, and aggregated Ethernet interfaces. For Ethernet VLAN circuits, specify the encapsulation by including the **encapsulation** statement at the **[edit interfaces *interface-name*]** hierarchy level. This statement configures the entire physical device. You must also enable VLAN tagging. To do this, include the following statements:

```
[edit interfaces interface-name]  
vlan-tagging;  
encapsulation (extended-vlan-ccc | vlan-ccc);  
[edit interfaces aex]  
vlan-tagging;  
encapsulation vlan-ccc;
```

On the logical interface, include the following statements:

```
encapsulation vlan-ccc;  
vlan-id number;
```

You can include the logical interface statements at the following hierarchy levels:

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

Ethernet interfaces in VLAN mode can have multiple logical interfaces. For encapsulation type **vlan-ccc**, VLAN IDs 1 through 511 are reserved for normal VLANs, and VLAN IDs 512 through 1023 are reserved for CCC VLANs. For encapsulation type **extended-vlan-ccc**, VLAN IDs 1 through 4094 are valid. VLAN ID 0 is reserved for tagging the priority of frames.

---

## Defining the Connection for Switching Cross-Connects

To configure Layer 2 switching cross-connects, define the connection between the two circuits. You configure this on the router that is acting as the switch (Router B in [Figure 9 on page 254](#)). The connection joins the interface that comes from the circuit's source to the interface that leads to the circuit's destination. When you specify the interface names, include the logical portion of the name, which corresponds to the logical unit number.

The cross-connect is bidirectional, so packets received on the first interface are transmitted out the second interface, and those received on the second interface are transmitted out the first interface.

```
[edit protocols]
connections {
  remote-interface-switch connection-name {
    interface interface-name.unit-number;
  }
  lsp-switch connection-name {
    transmit-lsp lsp-number;
    receive-lsp lsp-number;
  }
}
```

## Configuring MPLS for Switching Cross-Connects

For Layer 2 switching cross-connects to work, you must configure MPLS. The following is a minimal MPLS configuration:

```
[edit protocols]
mpls {
  interface (interface-name | all);
}
```

For more information, see the *Junos OS MPLS Applications Library for Routing Devices*.

### Related Documentation

- [Defining the Connection for Switching Cross-Connects on page 258](#)

## Configuring IS-IS or MPLS Traffic for TCC Interfaces

Layer 2.5 VPNs on T Series, M120, MX Series, and M320 routers support IPv4, IS-IS, and MPLS traffic types. By default, IPv4 traffic runs on T Series, M120, MX Series, and M320 routers and over TCC interfaces. To configure IS-IS (ISO traffic) or MPLS traffic on Layer 2.5 VPNs, you must configure the same traffic type on both ends of the Layer 2.5 VPN.

To specify which traffic can run over a TCC interface, include the **protocols** statement with the appropriate value (**inet**, **mpls**, and **iso**) at the **[edit interfaces *interface-name* unit *logical-unit-number* family tcc]** hierarchy level:

```
[edit interfaces interface-name unit logical-unit-number family tcc]
protocols [ inet iso mpls ];
```



**NOTE:** Layer 2.5 VPNs running on M Series Multiservice Edge Routers support only IPv4 traffic. IPv6 is not supported on Layer 2.5 VPNs.

When enabling ISO over a Layer 2.5 VPN that is configured on a CE Ethernet interface, you must also include the **point-to-point** statement at the **[edit protocols isis interface *interface-name*]** hierarchy level:

```
[edit protocols isis interface interface-name]
```

point-to-point;

For more information about Layer 2.5 VPNs, see the *Junos OS VPNs Library for Routing Devices* and the *Translational Cross-Connect and Layer 2.5 VPNs Feature Guide*.

## Configuring ATM-to-Ethernet Interworking

---

The ATM-to-Ethernet interworking feature is useful where ATM2 interfaces are used to terminate ATM DSLAM traffic. The ATM traffic can be forwarded with encapsulation type **ccc** (circuit cross-connect) to a local or remote Gigabit Ethernet IQ2 and IQ2-E or 10-Gigabit Ethernet IQ2 and IQ2-E interface or label-switched path (LSP). The ATM VPI and VCI are converted to stacked VLAN inner and outer VLAN tags.

These ATM-to-Ethernet interworking circuits can be mapped to individual logical interfaces configured on an ATM2 IQ interface and Gigabit Ethernet IQ2 and IQ2-E or 10-Gigabit Ethernet IQ2 and IQ2-E physical interface.

The ATM-to-Ethernet interworking cross-connect essentially provides Layer 2 switching, and statistics are reported at the logical interface level.

During conversion from ATM to Ethernet, the least significant 12 bits of the ATM cell VCI are copied to the Ethernet frame inner VLAN tag. Cells received on an ATM logical interface configured with encapsulation type **vlan-vci-ccc** and falling within the configured VCI range are reassembled into packets and forwarded to a designated Ethernet logical interface that is configured with encapsulation type **vlan-vci-ccc**.

During conversion from Ethernet to ATM, the Ethernet frame inner VLAN tags that fall within the configured range, are copied to the least significant 12 bits of the ATM cell VCI. The ATM logical interface uses its configured VPI when segmenting the Ethernet packets into cells.

ATM-to-Ethernet interworking is supported on M120, M320, and T Series routers.

ATM-to-Ethernet interworking is supported on MX Series routers with aggregated Ethernet, Gigabit Ethernet, and 10-Gigabit Ethernet interfaces. This feature is available on all Enhanced Queuing (EQ) DPCs and Enhanced DPCS for MX Series routers.



**NOTE:** This feature is *not* supported on MX Series routers with ATM interfaces.

---

For more information on MX Series ATM-to-Ethernet interworking, see the *MX Series Solutions Guide*.

The following sections discuss ATM-to-Ethernet interworking:

- [Enabling ATM-to-Ethernet Interworking on page 261](#)
- [Configuring the Ethernet Interface on page 261](#)
- [Configuring Ethernet Encapsulation on page 261](#)
- [Configuring the Outer VLAN Identifier on page 261](#)
- [Configuring the Inner VLAN Identifier Range on page 262](#)

- [Configuring the Physical Interface VPI on page 262](#)
- [Configuring the ATM Logical Interface on page 262](#)
- [Configuring the Protocol Family on page 263](#)
- [Configuring the Logical Interface VPI on page 263](#)
- [Configuring the Logical Interface VCI on page 263](#)

## Enabling ATM-to-Ethernet Interworking

To enable the ATM-to-Ethernet interworking cross-connect function, include the **vlan-vci-tagging** statement at the **[edit interfaces *interface-name*]** hierarchy level:

```
[edit interfaces interface-name]  
vlan-vci-tagging;
```

## Configuring the Ethernet Interface

Configure the Ethernet or aggregated Ethernet physical interface by including the **encapsulation** statement with the **vlan-vci-ccc** option at the **[edit interfaces *interface-name*]** hierarchy level:

```
[edit interfaces interface-name]  
encapsulation vlan-vci-ccc;
```

When the encapsulation type **vlan-vci-ccc** is configured on the physical interface, all logical interfaces configured on the Ethernet interface must also have the encapsulation type set to **vlan-vci-ccc**.

## Configuring Ethernet Encapsulation

Configure the Ethernet logical interface by including the **encapsulation** statement with the **vlan-vci-ccc** option at the **[edit interfaces *interface-name* unit *logical-unit-number*]** hierarchy level:

```
[edit interfaces interface-name unit logical-unit-number]  
encapsulation vlan-vci-ccc;
```

The chassis configuration cannot contain the **atm-l2circuit-mode** statement if any logical interfaces are configured with the **vlan-vci-ccc** encapsulation option.

## Configuring the Outer VLAN Identifier

Configure the Ethernet logical interface outer VLAN ID by including the **vlan-id** statement specifying the outer VLAN ID at the **[edit interfaces *interface-name* unit *logical-unit-number*]** hierarchy level:

```
[edit interfaces interface-name unit logical-unit-number]  
vlan-id outer-vlan-identifier;
```

It is the administrator's responsibility to ensure that the outer VLAN tag and VPI match and the inner VLAN tags fall within the VCI range of the VPI.

The allowable VPI range is from 0 to 255. So the outer VLAN tags must not be configured for values above 255.

## Configuring the Inner VLAN Identifier Range

Configure the Ethernet logical interface inner VLAN ID range by including the **inner-vlan-id-range** statement and specifying the starting VLAN ID and ending VLAN ID at the **[edit interfaces *interface-name* unit *logical-unit-number*]** hierarchy level:

```
[edit interfaces interface-name unit logical-unit-number]  
  inner-vlan-id-range start start-id end end-id;
```

VLAN IDs 0 and 4095 are reserved by IEEE 801.1q and must not be used for the inner or outer VLAN ID.

VCIs 0 through 31 are reserved for ATM management purposes by convention. Therefore inner VLAN IDs 1 through 31 should not be used.

VLAN ID 1 might be used by Ethernet switches for certain bridge management services, so using VLAN ID 1 for the inner or outer VLAN ID is discouraged.

## Configuring the Physical Interface VPI

Configure the ATM physical interface VPI by including the **vpi** statement at the **[edit interfaces *interface-name* atm-options]** hierarchy level:

```
[edit interfaces interface-name atm-options]  
  vpi virtual-path-identifier;
```

VPI 0 is reserved, and must not be used.

ATM F4/F5 OAM is not supported for VPIs used in ATM-to-Ethernet interworking cross-connects. Any F4/F5 OAM cells received are discarded.

Only one logical interface may be declared per virtual path specified in the **atm-options** statement hierarchy.

It is not necessary to dedicate all the VPIs of an ATM2 interface for ATM-to-Ethernet interworking cross-connects.

## Configuring the ATM Logical Interface

Configure the ATM logical interface by including the **encapsulation** statement and specifying the encapsulation type **vlan-vci-ccc** at the **[edit interfaces *interface-name* unit *logical-unit-number*]** hierarchy level:

```
[edit interfaces interface-name unit logical-unit-number]  
  encapsulation vlan-vci-ccc;
```

An ATM logical interface configured with the encapsulation type **vlan-vci-ccc** only supports the **epd-threshold**, **shaping**, **traps | no-traps**, **disable**, and **description** statements. No other configuration statements are supported. ATM interface CoS features are not supported by logical interfaces configured with the encapsulation type **vlan-vci-ccc**.

The ATM2 OC48 PIC does not support the encapsulation type **vlan-vci-ccc**.

The encapsulation type **vlan-vci-ccc** only supports the **ccc** protocol family. Attempts to configure any other interface protocol family are rejected.



## Configuring the Protocol Family

Configure the ATM logical interface protocol family by including the **family** statement and specifying the **ccc** option at the **[edit interfaces *interface-name* unit *logical-unit-number*]** hierarchy level:

```
[edit interfaces interface-name unit logical-unit-number]  
family ccc;
```

## Configuring the Logical Interface VPI

Configure the ATM logical interface virtual path identifier by including the **vpi** statement at the **[edit interfaces *interface-name* unit *logical-unit-number*]** hierarchy level:

```
[edit interfaces interface-name unit logical-unit-number]  
vpi virtual-path-identifier;
```

VPI 0 is reserved, and must not be used.

It is the administrator's responsibility to ensure the outer VLAN tag and VPI match and the inner VLAN tags fall within the VCI range of the VPI.

Once a VPI is used in an ATM-to-Ethernet interworking cross-connect, it cannot be used with any other logical interface, even if the **vpi.vci** value falls outside the VCI range for the cross-connect.

## Configuring the Logical Interface VCI

Configure the ATM logical interface virtual channel identifier range by including the **vci-range** statement and specifying the starting VCI and ending VCI at the **[edit interfaces *interface-name* unit *logical-unit-number*]** hierarchy level:

```
[edit interfaces interface-name unit logical-unit-number]  
vci-range start start-vci end end-vci;
```

Do not use VCIs 0 through 31, which are reserved for ATM management purposes by convention.

### Related Documentation

- [encapsulation on page 450](#)
- [family on page 473](#)
- [inner-vlan-id-range on page 524](#)
- [vci-range on page 846](#)
- [vlan-id on page 848](#)
- [vlan-vci-tagging on page 864](#)
- [vpi \(ATM CCC Cell-Relay Promiscuous Mode\) on page 865](#)
- [vpi \(Logical Interface and Interworking\) on page 867](#)

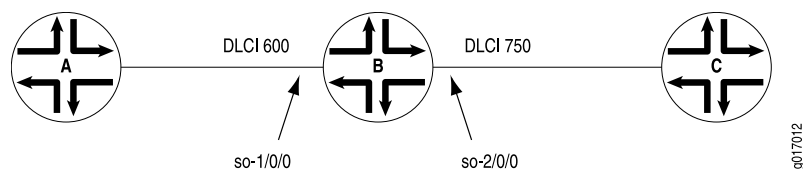
## Examples: Configuring Switching Cross-Connects

- [Example: Configuring a CCC over Frame Relay Encapsulated Interface on page 264](#)
- [Example: Configuring a TCC on page 265](#)
- [Example: Configuring CCC over Aggregated Ethernet on page 266](#)
- [Example: Configuring a Remote LSP CCC over Aggregated Ethernet on page 268](#)
- [Example: Configuring ATM-to-Ethernet Interworking on page 270](#)

### Example: Configuring a CCC over Frame Relay Encapsulated Interface

Configure a full-duplex Layer 2 switching circuit cross-connect between Router A and Router C, using a Juniper Networks router, Router B, as the virtual switch. See the topology in [Figure 10 on page 264](#).

**Figure 10: Example Topology of a Switching Circuit Cross-Connect with Frame Relay CCC Encapsulation**



```
[edit]
interfaces {
  so-1/0/0 {
    encapsulation frame-relay-ccc;
    unit 1 {
      point-to-point;
      eui-64 frame-relay-ccc;
      dlci 600;
    }
  }
  so-2/0/0 {
    encapsulation frame-relay-ccc;
    unit 2 {
      point-to-point;
      encapsulation frame-relay-ccc;
      dlci 750;
    }
  }
}
protocols {
  connections {
    interface-switch router-a-router-c {
      interface so-1/0/0.1;
      interface so-2/0/0.2;
    }
  }
  mpls {
    interface all;
  }
}
```

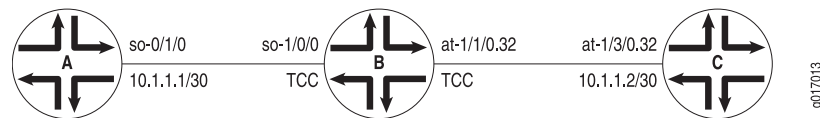
}

## Example: Configuring a TCC

Configure a full-duplex switching translational cross-connect with PPP TCC encapsulation between Router A and Router C, using a Juniper Networks router, Router B, as the virtual switch. See the topology in [Figure 11 on page 265](#).

In this topology, Router B has a PPP connection to Router A and an ATM connection to Router C.

**Figure 11: Layer 2.5 Switching Translational Cross-Connect**



**On Router A**

```
[edit]
interfaces {
  so-0/1/0 {
    description "to Router B so-1/0/0";
    encapsulation ppp;
    unit 0 {
      family inet {
        address 10.1.1.1/30;
      }
    }
  }
}
```

**On Router B**

```
[edit]
interfaces {
  so-1/0/0 {
    description "to Router A so-0/1/0";
    encapsulation ppp-tcc;
    unit 0 {
    }
  }
  at-1/1/0 {
    description "to Router C at-0/3/0";
    atm-options {
      vpi 0 maximum-vcs 2000;
    }
    unit 32 {
      vci 32;
      encapsulation atm-tcc-vc-mux;
    }
  }
}
[edit]
protocols {
  mpls {
    interface so-1/0/0.0;
    interface at-1/1/0.32;
  }
}
```

```

connections {
  interface-switch PPP-to-ATM {
    interface so-1/0/0.0;
    interface at-1/1/0.32;
  }
}

```

On Router C

```

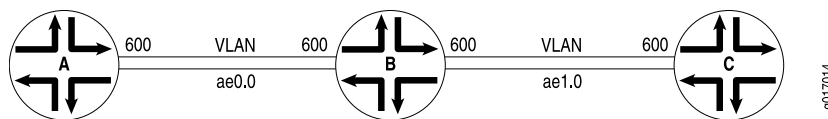
[edit]
interfaces {
  at-0/3/0 {
    description "to Router B at-1/1/0";
    atm-options {
      vpi 0 maximum-vc 2000;
    }
    unit 32 {
      vci 32;
      encapsulation atm-vc-mux;
      family inet {
        address 10.1.1.2/30;
      }
    }
  }
}

```

### Example: Configuring CCC over Aggregated Ethernet

See the topology in [Figure 12 on page 266](#). In this topology, CE Routers A and C have aggregated Ethernet connections to PE Router B. With CCC, you specify that the circuit from Router A is connected to the circuit from Router C. Router B functions as a cross-connect switch between the two circuits. For a back-to-back connection, all VLAN IDs must be the same on Router A through Router C. You configure Router A and Router C as standard aggregated Ethernet interfaces. For more information about aggregated Ethernet, see *Aggregated Ethernet Interfaces Overview*.

**Figure 12: Interface-to-Interface Circuit Cross-Connect over Aggregated Ethernet Interfaces**



On Router A

```

[edit interfaces]
ae0 {
  vlan-tagging;
  aggregated-ether-options {
    minimum-links 1;
    link-speed 1g;
  }
}
unit 0 {
  vlan-id 600;
  family inet {
    address 192.168.1.1/30;
  }
}

```

```

    }
  }

```

```

On Router B [edit interfaces]
ae0 {
  encapsulation vlan-ccc;
  vlan-tagging;
  aggregated-ether-options {
    minimum-links 1;
    link-speed 1g;
  }
  unit 0 { # CCC switch
    encapsulation vlan-ccc;
    vlan-id 600;
    family ccc;
  }
ae1 {
  encapsulation vlan-ccc;
  vlan-tagging;
  aggregated-ether-options {
    minimum-links 1;
    link-speed 100m;
  }
  unit 0 {
    encapsulation vlan-ccc;
    vlan-id 600;
    family ccc;
  }
}
[edit protocols]
mpls {
  interface all;
}
connections {
  interface-switch layer2-cross-connect {
    interface ae0.0;
    interface ae1.0;
  }
}

```

```

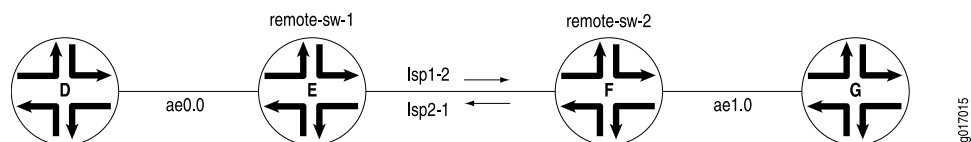
On Router C [edit interfaces]
ae1 {
  vlan-tagging;
  aggregated-ether-options {
    minimum-links 1;
    link-speed 1g;
  }
  unit 0 {
    vlan-id 600;
    family inet {
      address 192.168.1.2/30;
    }
  }
}

```

## Example: Configuring a Remote LSP CCC over Aggregated Ethernet

See the topology in [Figure 13 on page 268](#). In this topology, CE Router G has an aggregated Ethernet connection to PE Router F. CE Router D has an aggregated Ethernet connection to PE Router E. Router E and Router F have an MPLS LSP between them. With remote CCC, you specify that the circuit from Router D is connected to the circuit from Router G. The circuit from Router D is connected to the LSP on Router E; the circuit from Router G is connected to the LSP on Router F. In other words, **ae0.0** and **ae1.0** are connected using **lsp1-2** and **lsp2-1**. You configure Router D and Router G as standard aggregated Ethernet interfaces. For more information about aggregated Ethernet, see *Aggregated Ethernet Interfaces Overview*.

**Figure 13: Remote Interface-LSP-Interface Circuit Cross-Connect over Aggregated Ethernet Interfaces**



**On Router D**

```
[edit interface]
ae0 {
  aggregated-ether-options {
    minimum-links 1;
    link-speed 1g;
    lacp {
      active;
      periodic fast;
    }
  }
  unit 0 {
    family inet {
      address 192.168.2.1/30;
    }
  }
}
```

**On Router E**

```
[edit interfaces]
ae0 {
  encapsulation ethernet-ccc;
  aggregated-ether-options {
    minimum-links 1;
    link-speed 100m;
    lacp {
      active;
      periodic fast;
    }
  }
  unit 0 {
    encapsulation vlan-ccc; # default
    family ccc; # default
  }
}
[edit protocols]
```

```

mpls {
  interface all;
}
connections {
  remote-interface-switch remote-sw-1 {
    interface ae0.0;
    receive-lsp lsp2_1;
    transmit-lsp lsp1_2;
  }
}

```

**On Router F**

```

[edit interfaces]
ae1 {
  encapsulation ethernet-ccc;
  aggregated-ether-options {
    minimum-links 1;
    link-speed 100m;
    lacp {
      active;
      periodic fast;
    }
  }
}
unit 0 {
  encapsulation vlan-ccc; # default
  family ccc; # default
}
}
[edit protocols]
mpls {
  interface all;
}
connections {
  remote-interface-switch remote-sw-2 {
    interface ae1.0;
    receive-lsp lsp1_2;
    transmit-lsp lsp2_1;
  }
}

```

**On Router G**

```

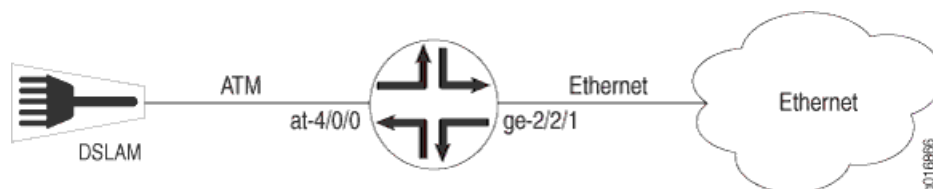
[edit interface]
ae1 {
  aggregated-ether-options {
    minimum-links 1;
    link-speed 1g;
    lacp {
      active;
      periodic fast;
    }
  }
}
unit 0 {
  family inet {
    address 192.168.2.2/30;
  }
}
}

```

## Example: Configuring ATM-to-Ethernet Interworking

The following example shows the configuration of the ATM and Ethernet interfaces for an ATM-to-Ethernet interworking cross connect. In the example ATM DSLAM traffic is terminated on an ATM2 interface. The ATM traffic is forwarded using encapsulation type **vlan-vci-ccc** to a local Ethernet IQ2 and IQ2-E interface. See the topology in [Figure 14 on page 270](#).

Figure 14: ATM-to-Ethernet Interworking



In this example, the ATM traffic comes from the DSLAM to the router on ATM interface **at-4/0/0** and is forwarded out on Ethernet interface **ge-2/2/1**.

```
[edit interfaces]
ge-2/2/1 {
  vlan-vci-tagging;
  encapsulation vlan-vci-ccc;
  unit 0 {
    encapsulation vlan-vci-ccc;
    vlan-id 100;
    inner-vlan-id-range start 100 end 500;
  }
}
at-4/0/0 {
  atm-options {
    vpi 100;
  }
  unit 0 {
    encapsulation vlan-vci-ccc;
    family ccc;
    vpi 100;
    vci-range start 100 end 500;
  }
}
```



## CHAPTER 7

# Tracing Interface Operations

- [Tracing Interface Operations Overview on page 271](#)
- [Tracing Operations of an Individual Router or Switch Interface on page 271](#)
- [Tracing Operations of the Interface Process on page 272](#)

### Tracing Interface Operations Overview

---

You can trace the operations of individual router interfaces and those of the interface process (dcd). For a general discussion of tracing and of the precedence of multiple tracing operations, see the *Junos OS Administration Library for Routing Devices*.

For information about the operations of Virtual Router Resolution Protocol (VRRP)-enabled interfaces, see the *Junos OS High Availability Library for Routing Devices*.

#### Related Documentation

- [Tracing Operations of an Individual Router Interface on page 167](#)
- [Tracing Operations of the Interface Process on page 272](#)

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

---

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

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

You can specify the following interface tracing flags:

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

The interfaces **traceoptions** statement does not support a trace file. The logging is done by the kernel, so the tracing information is placed in the system **syslog** files.

- Related Documentation**
- [Tracing Operations of the Interface Process on page 272](#)
  - [Tracing Interface Operations Overview on page 271](#)

---

## Tracing Operations of the Interface Process

To trace the operations of the router or switch interface process, dcd, perform the following steps:

1. In configuration mode, go to the **[edit interfaces]** hierarchy level:

```
[edit]
user@host# edit interfaces
```

2. Configure the **traceoptions** statement.

```
[edit interfaces]
user@host# edit traceoptions
```

3. Configure the **no-remote-trace** option to disable remote tracing.

```
[edit interfaces traceoptions]
user@host# set no-remote-trace
```

4. Configure the **file filename** option.

```
[edit interfaces traceoptions]
user@host# edit file
```

5. Configure the **files number** option, **match regular-expression** option, **size size** option, and **world-readable | no-world-readable** option.

```
[edit interfaces traceoptions file]
user@host# set files number
user@host# set match regular-expression
user@host# set size size
user@host# set word-readable | no-world-readable
```

6. Configure the tracing flag.

```
[edit interfaces traceoptions]
user@host# set flag flag-option
```

7. Configure the **disable** option in **flag flag-option** statement to disable the tracing operation. You can use this option to disable a single operation when you have defined a broad group of tracing operations, such as **all**.

```
[edit interfaces traceoptions]
user@host# set flag flag-option disable
```

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

- **all**—Enable all configuration logging.
- **change-events**—Log changes that produce configuration events.
- **gres-events**—Log the events related to GRES.
- **resource-usage**—Log the resource usage for different states.

- **config-states**—Log the configuration state machine changes.
- **kernel**—Log configuration IPC messages to kernel.
- **kernel-detail**—Log details of configuration messages to kernel.
- **select-events**—Log the events on select state machine.

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

For general information about tracing, see the tracing and logging information in the *Junos OS Administration Library for Routing Devices*.

**Related  
Documentation**

- [Tracing Interface Operations Overview on page 271](#)
- [Tracing Operations of an Individual Router Interface on page 167](#)
- [traceoptions on page 809](#)



## PART 3

# Configuring Special Router Interfaces

- [Configuring Discard Interfaces on page 277](#)
- [Configuring Demultiplexing Interfaces on page 279](#)
- [Configuring the Loopback Interface on page 289](#)



## CHAPTER 8

# Configuring Discard Interfaces

- [Discard Interfaces Overview on page 277](#)
- [Example: Discard Interface on page 278](#)

### Discard Interfaces Overview

---

On the routing platform, you can configure one physical discard interface, **dsc**. The discard interface allows you to identify the ingress point of a denial-of-service (DoS) attack. When your network is under attack, the target host IP address is identified, and the local policy forwards attacking packets to the discard interface. When traffic is routed out of the discard interface, the traffic is silently discarded.

You can configure the **inet** family protocol on the discard interface, which allows you to apply an output filter to the interface. If you apply an output filter to the interface, the action specified by the filter is executed before the traffic is discarded.

Once you configure a discard interface, you must then configure a local policy to forward attacking traffic to the discard interface. For a complete discussion about using the discard interface to protect your network against DoS attacks, see the *Routing Policy Feature Guide for Routing Devices*.

Keep the following guidelines in mind when configuring the discard interface:

- Only the logical interface unit 0 is supported.
- The **filter** and **address** statements are optional.
- Although you can configure an input filter and a filter group, these configuration statements have no effect because traffic is not transmitted from the discard interface.
- The **show interface** command is not relevant for the discard interface.
- The discard interface does not support class of service (CoS).

#### Related Documentation

- [Example: Discard Interface on page 278](#)

## Example: Discard Interface

---

To configure a discard interface, include the following statements at the **[edit interfaces]** hierarchy level:

```
[edit interfaces]
dsc {
  unit 0 {
    family inet {
      filter {
        output filter-name;
      }
      address address {
        destination address;
      }
    }
  }
}
```



## CHAPTER 9

# Configuring Demultiplexing Interfaces

- [Demultiplexing Interface Overview on page 279](#)
- [Configuring an IP Demultiplexing Interface on page 280](#)
- [Configuring an IP Demux Underlying Interface on page 281](#)
- [Configuring a VLAN Demultiplexing Interface on page 282](#)
- [Configuring a VLAN Demux Underlying Interface on page 283](#)
- [Specifying the Demux Underlying Interface on page 283](#)
- [Configuring IP Demux Prefixes on page 284](#)
- [Configuring MAC Address Validation on Static Demux Interfaces on page 285](#)
- [Example: Configuring a Demux Interface on page 285](#)

## Demultiplexing Interface Overview

---

Demultiplexing (demux) interfaces are logical interfaces that share a common, underlying interface. You can configure either IP demultiplexing interfaces or VLAN demultiplexing interfaces. IP demux interfaces use the IP source or destination address to demultiplex received packets when the subscriber is not uniquely identified by a Layer 2 circuit. VLAN demux interfaces use the VLAN ID to demultiplex received packets when the subscriber is not uniquely identified. Demux interfaces are supported on M120 or MX Series routers only.



**NOTE:** You can also configure demux interfaces dynamically. For information about how to configure dynamic IP demux or dynamic VLAN demux interfaces, see the *Subscriber Access Configuration Guide*.

### Related Documentation

- [Configuring an IP Demultiplexing Interface on page 280](#)
- [Configuring an IP Demux Underlying Interface on page 281](#)
- [Configuring a VLAN Demultiplexing Interface on page 282](#)
- [Configuring a VLAN Demux Underlying Interface on page 283](#)
- [Specifying the Demux Underlying Interface on page 283](#)
- [Configuring IP Demux Prefixes on page 284](#)

- *Binding VLAN IDs to Logical Interfaces*
- *Associating VLAN IDs to VLAN Demux Interfaces*
- [Example: Configuring a Demux Interface on page 285](#)
- *Subscriber Interfaces and Demultiplexing Overview*

---

## Configuring an IP Demultiplexing Interface

To configure a demux interface, include the following statements at the **[edit interfaces]** hierarchy level:

```
[edit interfaces]
interface-name {
  unit logical-unit-number {
    ... logical-interface-configuration ...
  }
}
demux0 {
  unit logical-unit-number {
    demux-options {
      underlying-interface interface-name;
    }
    family family {
      demux-destination {
        destination-prefix;
      }
      demux-source {
        source-prefix;
      }
      mac-validate (loose | strict)
      unnumbered-address interface-name <preferred-source-address address>;
    }
  }
}
```

Keep the following guidelines in mind when configuring the demux interface:

- Demux interfaces are supported on M120 or MX Series routers only.
- You can configure only one **demux0** interface per chassis, but you can define logical demux interfaces on top of it (for example, **demux0.1**, **demux0.2**, and so on).
- You must associate demux interfaces with an underlying logical interface.



**NOTE:** IP demux interfaces currently support only Gigabit Ethernet, Fast Ethernet, 10-Gigabit Ethernet, and aggregated Ethernet underlying interfaces.

---

- The demux underlying interface must reside on the same logical system as the demux interfaces that you configure over it.

- IP demux interfaces currently supports the Internet Protocol version 4 (IPv4) suite **inet** and Internet Protocol version 6 (IPv6) suite **inet6** family types.
- You can configure more than one demux prefix for a given demux unit. However, you cannot configure the exact same demux prefix on two different demux units with the same underlying interface.
- You can configure overlapping demux prefixes on two different demux units with the same underlying prefix. However, under this configuration, best match rules apply (in other words, the most specific prefix wins).
- If the address in a received packet does not match any demux prefix, the packet is logically received on the underlying interface. For this reason, the underlying interface is often referred to as the “primary” interface.

**Related  
Documentation**

- [Configuring an IP Demux Underlying Interface on page 281](#)
- [Specifying the Demux Underlying Interface on page 283](#)
- [Demultiplexing Interface Overview on page 279](#)
- [Configuring IP Demux Prefixes on page 284](#)

## Configuring an IP Demux Underlying Interface

An IP demux interface uses an underlying logical interface to receive packets.



**NOTE:** IP demux interfaces support only Gigabit Ethernet, Fast Ethernet, 10-Gigabit Ethernet, or aggregated Ethernet underlying interfaces.

To determine which IP demux interface to use, the destination or source prefix is matched against the destination or source address of packets that the underlying interface receives. The underlying interface family type must match the demux interface prefix type.

To configure a logical interface as an IP demux underlying interface, configure the logical demultiplexing destination or source family type. To configure, include the **demux-destination** or **demux-source** statement:

```
interfaces {
  interface-name {
    unit logical-unit-number {
      (demux-destination family | demux-source family);
    }
  }
}
```

You can include these statements at the following hierarchy levels:

- [edit]
- [edit logical-system *logical-system-name*]
- [edit logical-system *logical-system-name* routing-instances *routing-instance-name*]

- Related Documentation**
- [Specifying the Demux Underlying Interface on page 283](#)
  - [Demultiplexing Interface Overview on page 279](#)
  - [Configuring an IP Demultiplexing Interface on page 280](#)
  - [Configuring IP Demux Prefixes on page 284](#)

---

## Configuring a VLAN Demultiplexing Interface

---

To configure a VLAN demux interface, include the following statements at the **[edit interfaces]** hierarchy level:

```
[edit interfaces]
demux0 {
  unit logical-unit-number {
    vlan-id number;
    demux-options {
      underlying-interface interface-name;
    }
    family family {
      demux-destination {
        destination-prefix;
      }
      demux-destination {
        source-prefix;
      }
      mac-validate (loose | strict)
      unnumbered-address interface-name <preferred-source-address address>;
    }
  }
}
```

Keep the following guidelines in mind when configuring the demux interface:

- Demux interfaces are supported on M120, M320, or MX Series routers only.
- You can configure only one **demux0** interface per chassis.
- You must associate VLAN demux interfaces with an underlying physical interface.



**NOTE:** VLAN demux interfaces currently support Gigabit Ethernet, Fast Ethernet, 10-Gigabit Ethernet, and aggregated Ethernet underlying interfaces.

---

- The demux underlying interface must reside on the same logical system as the demux interfaces that you configure over it.
- VLAN demux interfaces support the Internet Protocol version 4 (IPv4) suite **inet** and Internet Protocol version 6 (IPv6) **inet6** family types.
- If the address in a received packet does not match any demux VLAN ID, the packet is logically received on the underlying interface. For this reason, the underlying interface is often referred to as the “primary” interface.

## Configuring a VLAN Demux Underlying Interface

A VLAN demux interface uses an underlying logical interface to receive packets.



**NOTE:** VLAN demux interfaces support only Gigabit Ethernet, Fast Ethernet, 10-Gigabit Ethernet, or aggregated Ethernet underlying interfaces.

VLAN demux subscriber interfaces over aggregated Ethernet physical interfaces are supported only for MX Series routers that have only Trio MPCs installed. If the router has other cards in addition to Trio MPCs, the CLI accepts the configuration but errors are reported when the subscriber interfaces are brought up.

To determine which VLAN demux interface to use, the VLAN ID is matched against that which the underlying interface receives.

To configure a logical interface as an VLAN demux underlying interface, include the **underlying-interface** statement at the **[edit interfaces *demux0* unit *logical-unit-number* demux-options]** hierarchy level and the **vlan-id** statement at the **[edit interfaces *demux0* unit *logical-unit-number*]** hierarchy level:

```
interfaces {
  demux0 {
    unit logical-unit-number {
      vlan-id number;
      demux-options {
        underlying-interface interface-name;
      }
      family family {
        address address;
      }
    }
  }
}
```

You can include these statements at the following hierarchy levels:

- **[edit]**
- **[edit logical-system *logical-system-name*]**
- **[edit logical-system *logical-system-name* routing-instances *routing-instance-name*]**

## Specifying the Demux Underlying Interface

You must specify an underlying interface for static demux interfaces to use. This underlying interface must reside on the same logical system as the demux interface.

To specify the logical underlying interface, include the **underlying-interface** statement:

```
interfaces {
  demux0 {
```

```
    unit logical-unit-number {  
      demux-options {  
        underlying-interface interface-name;  
      }  
    }  
  }  
}
```

You can include these statements at the following hierarchy levels:

- [edit]
- [edit logical-systems *logical-system-name*]
- [edit logical-systems *logical-system-name* routing-instances *routing-instance-name*]

#### Related Documentation

- [Configuring IP Demux Prefixes on page 284](#)
- [Demultiplexing Interface Overview on page 279](#)
- [Configuring an IP Demultiplexing Interface on page 280](#)
- [Configuring an IP Demux Underlying Interface on page 281](#)
- [Configuring a VLAN Demultiplexing Interface on page 282](#)
- [Configuring a VLAN Demux Underlying Interface on page 283](#)

---

## Configuring IP Demux Prefixes

You configure demux prefixes for use by the underlying interface. The demux prefixes can represent individual hosts or networks. For a given demux interface unit, you can configure either demux source or demux destination prefixes but not both. You can choose not to configure a demux source or demux destination prefix. This type of configuration results in a transmit-only interface.

To configure IP demux prefixes, include the **demux-destination** or **demux-source** statement:

```
interfaces {  
  demux0 {  
    unit logical-unit-number {  
      family family;  
      demux-destination {  
        destination-prefix;  
      }  
    }  
    family family;  
    demux-source {  
      source-prefix;  
    }  
  }  
}
```

You can include these statements at the following hierarchy levels:

- **[edit]**
- **[edit logical-systems *logical-system-name*]**
- **[edit logical-systems *logical-system-name* routing-instances *routing-instance-name*]**

#### Related Documentation

- [Demultiplexing Interface Overview on page 279](#)
- [Configuring an IP Demultiplexing Interface on page 280](#)
- [Configuring an IP Demux Underlying Interface on page 281](#)
- [Specifying the Demux Underlying Interface on page 283](#)

## Configuring MAC Address Validation on Static Demux Interfaces

MAC address validation enables the router to validate that received packets contain a trusted IP source and an Ethernet MAC source address.

MAC address validation is supported on static demux interfaces on MX Series routers only.

There are two types of MAC address validation that you can configure:

- **Loose**—Forwards packets when both the IP source address and the MAC source address match one of the trusted address tuples.

Drops packets when the IP source address matches one of the trusted tuples, but the MAC address does not support the MAC address of the tuple

Continues to forward packets when the source address of the incoming packet does not match any of the trusted IP addresses.

- **Strict**—Forwards packets when both the IP source address and the MAC source address match one of the trusted address tuples.

Drops packets when the MAC address does not match the tuple's MAC source address, or when IP source address of the incoming packet does not match any of the trusted IP addresses.

To configure MAC address validation on static Ethernet interfaces, include the **mac-validate (loose | strict)** statement at the **[edit interfaces demux0 unit *logical-unit-number* family *family*]** hierarchy level.

```
[edit interfaces demux0 unit logical-unit-number family family]  
  mac-validate (loose | strict);
```

## Example: Configuring a Demux Interface

Configure two VLANs, each with two IP demux interfaces. One VLAN demultiplexes based on the source address; the other VLAN demultiplexes based on the destination address.



**NOTE:** This example is not intended to depict any realistic deployment; it is intended to demonstrate many possible CLI variations.

```
[edit]
interfaces {
  fe-0/0/0 {
    vlan-tagging;
    unit 100 {
      vlan-id 100;
      demux-source inet; # Enable demux of inet prefixes
      family inet {
        address 10.1.1.1/24;
        filter {
          input vlan1-primary-in-filter;
          output vlan1-primary-out-filter;
        }
        mac-validate loose;
      }
    }
    unit 200 {
      vlan-id 200;
      demux-destination inet; # Enable demux of inet using destination addresses
      family inet {
        address 20.1.1.1/24;
      }
    }
    unit 300 {
      vlan-id 300;
      demux-source inet; # Enable demux of inet using source addresses
      family inet {
        address 20.1.2.1/24;
      }
    }
  }
  demux0 {
    unit 101 {
      description vlan1-sub1;
      demux-options {
        underlying-interface fe-0/0/0.100;
      }
      family inet {
        demux-source 10.1.1.0/24;
        filter {
          input vlan1-sub1-in-filter;
          output vlan1-sub1-out-filter;
        }
        mac-validate loose;
      }
    }
    unit 102 {
      description vlan1-sub2;
      demux-options {
        underlying-interface fe-0/0/0.100;
      }
    }
  }
}
```



```

    }
    family inet {
        demux-source {
            10.1.0.0/16;
            10.2.1.0/24;
        }
        filter {
            input vlan1-sub2-in-filter;
            output vlan1-sub2-out-filter;
        }
        mac-validate loose;
    }
}
unit 202 {
    description vlan2-sub2;
    demux-options {
        underlying-interface fe-0/0/0.200;
    }
    family inet {
        demux-destination 100.1.2.0/24;
    }
}
unit 302 {
    description vlan2-sub2;
    demux-options {
        underlying-interface fe-0/0/0.300;
    }
    family inet {
        demux-source 100.1.2.0/24;
    }
}
}
}
}

```

**Related Documentation** • [Demultiplexing Interface Overview on page 279](#)



# Configuring the Loopback Interface

- [Configuring the Loopback Interface on page 289](#)

## Configuring the Loopback Interface

---

On the router, you can configure one physical loopback interface, **lo0**, and one or more addresses on the interface.

To configure the physical loopback interface, include the following statements at the **[edit interfaces]** hierarchy level:

```
[edit interfaces]
lo0 {
  unit 0 {
    family inet {
      address loopback-address;
      address <loopback-address2>;
      ...
    }
    family inet6 {
      address loopback-address;
    }
  }
}
```

When specifying the loopback address, do not include a destination prefix. Also, in most cases, do not specify a loopback address on any unit other than unit 0.



**NOTE:** For Layer 3 virtual private networks (VPNs), you can configure multiple logical units for the loopback interface. This allows you to configure a logical loopback interface for each virtual routing and forwarding (VRF) routing instance. For more information, see the *Junos OS VPNs Library for Routing Devices*.

For some applications, such as SSL for Junos XML protocol, the address for the interface **lo0.0** must be 127.0.0.1.

You can configure loopback interfaces using a subnetwork address for both **inet** and **inet6** address families. Many protocols require a subnetwork address as their source

address. Configuring a subnetwork loopback address as a donor interface enables these protocols to run on unnumbered interfaces.

If you configure the loopback interface, it is automatically used for unnumbered interfaces. If you do not configure the loopback interface, the router chooses the first interface to come online as the default. If you configure more than one address on the loopback interface, we recommend that you configure one to be the primary address to ensure that it is selected for use with unnumbered interfaces. By default, the primary address is used as the source address when packets originate from the interface.

For more information about unnumbered interfaces, see [“Configuring an Unnumbered Interface” on page 213](#). For more information about primary addresses, see [“Configuring the Interface Address” on page 204](#).

### Example: Configuring the Loopback Interface

Configure two addresses on the loopback interface with host routes:

```
[edit]
user@host# edit interfaces lo0 unit 0 family inet
[edit interfaces lo0 unit 0 family inet]
user@host# set address 172.16.0.1
[edit interfaces lo0 unit 0 family inet]
user@host# set address 10.0.0.1
[edit interfaces lo0 unit 0 family inet]
user@host# top
[edit]
user@host# show
interfaces {
  lo0 {
    unit 0 {
      family inet {
        10.0.0.1;
        127.0.0.1;
        172.16.0.1;
      }
    }
  }
}
```

Configure two addresses on the loopback interface with subnetwork routes:

```
[edit]
user@host# edit interfaces lo0 unit 0 family inet
[edit interfaces lo0 unit 0 family inet]
user@host# set address 192.16.0.1/24
[edit interfaces lo0 unit 0 family inet]
user@host# set address 10.2.0.1/16
[edit interfaces lo0 unit 0 family inet]
user@host# top
[edit]
user@host# show
interfaces {
  lo0 {
    unit 0 {
```

```

        family inet {
            10.2.0.1/16;
            127.0.0.1/32;
            192.16.0.1/24;
        }
    }
}

```

Configure an IP and an IPv6 address on the loopback interface with subnetwork routes:

```

[edit]
user@host# edit interfaces lo0 unit 0 family inet
[edit interfaces lo0 unit 0 family inet]
user@host# set address 192.16.0.1/24
[edit interfaces lo0 unit 0 family inet]
user@host# up
[edit interfaces lo0 unit 0 family]
user@host# edit interfaces lo0 unit 0 family inet6
[edit interfaces lo0 unit 0 family inet6]
user@host# set address 3ffe::1:200:f8ff:fe75:50df/64
[edit interfaces lo0 unit 0 family inet6]
user@host# top
[edit]
user@host# show
interfaces {
    lo0 {
        unit 0 {
            family inet {
                127.0.0.1/32;
                192.16.0.1/24;
            }
            family inet6 {
                3ffe::1:200:f8ff:fe75:50df/64;
            }
        }
    }
}

```



## PART 4

# Configuring Serial Interfaces

- [Configuring Serial Interfaces on page 295](#)





## CHAPTER 11

# Configuring Serial Interfaces

- [Serial Interfaces Overview on page 295](#)
- [Example: Physical Interface Configuration Statements for Serial Interfaces on page 296](#)
- [Configuring the Serial Line Protocol on page 297](#)
- [Configuring the Serial Clocking Mode on page 301](#)
- [Configuring the Serial Idle Cycle Flag on page 303](#)
- [Configuring the Serial Signal Handling on page 303](#)
- [Configuring the Serial DTR Circuit on page 306](#)
- [Configuring Serial Signal Polarities on page 306](#)
- [Configuring Serial Loopback Capability on page 307](#)
- [Configuring Serial Line Encoding on page 309](#)

### Serial Interfaces Overview

---

Devices that communicate over a serial interface are divided into two classes: data terminal equipment (DTE) and data circuit-terminating equipment (DCE). Juniper Networks Serial Physical Interface Cards (PICs) have two ports per PIC and support full-duplex data transmission. These PICs support DTE mode only. On the Serial PIC, you can configure three types of serial interfaces:

- EIA-530—An Electronics Industries Alliance (EIA) standard for the interconnection of DTE and DCE using serial binary data interchange with control information exchanged on separate control circuits.
- V.35—An ITU-T standard describing a synchronous, physical layer protocol used for communications between a network access device and a packet network. V.35 is most commonly used in the United States and in Europe.
- X.21—An ITU-T standard for serial communications over synchronous digital lines. The X.21 protocol is used primarily in Europe and Japan.

The following standards apply to serial interfaces:

- TIA/EIA Standard 530, *High-Speed 25-Position Interface for Data Terminal Equipment and Data Circuit-Terminating Equipment*, defines the signals on the cable and specifies the connector at the end of the cable.
- TIA/EIA Standard 232, *Interface between Data Terminal Equipment and Data Circuit-Terminating Equipment Employing Serial Binary Data Interchange*, describes the physical interface and protocol for serial data communication.
- ITU-T Recommendation V.35, *Data Transmission at 48 kbit/s Using 60-108 kHz Group Band Circuits*. Note that the Juniper Networks Serial PIC supports V.35 interfaces with speeds higher than 48 kilobits per second.
- ITU-T Recommendation X.21, *Interface Between Data Terminal Equipment and Data Circuit-Terminating Equipment for Synchronous Operation on Public Data Networks*.

There are no serial interface-specific logical properties. For information about general logical properties that you can configure, see *Configuring Logical Interface Properties*. On J Series routers, link fragmentation and interleaving (LFI) and Multilink Point-to-Point Protocol (MLPPP) support has been extended to serial interfaces. This support on serial interfaces is the same as the existing LFI and MLPPP support on T1 and E1 interfaces.

**Related Documentation**

- [Example: Physical Interface Configuration Statements for Serial Interfaces on page 296](#)
- [Configuring the Serial Line Protocol on page 297](#)
- [Configuring the Serial Clocking Mode on page 301](#)
- [Configuring the Serial Idle Cycle Flag on page 303](#)
- [Configuring the Serial Signal Handling on page 303](#)
- [Configuring the Serial DTR Circuit on page 306](#)
- [Configuring Serial Signal Polarities on page 306](#)
- [Configuring Serial Loopback Capability on page 307](#)
- [Configuring Serial Line Encoding on page 309](#)

---

## Example: Physical Interface Configuration Statements for Serial Interfaces

To configure serial physical interface properties, include the **serial-options** statement at the **[edit interfaces se-*pim*/*O*/*port* ]** hierarchy level for J Series routers, or at the **[edit interfaces se-*fpc*/*pic*/*port*]** hierarchy level for M Series and T Series routers:

```
[edit interfaces se-fpc/pic/port]  
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 (negative | positive);
dtr-polarity (negative | positive);
encoding (nrz | nrzi);
idle-cycle-flag flag;
indication-polarity (negative | positive);
line-protocol protocol;
loopback mode;
rts-polarity (negative | positive);
tm-polarity (negative | positive);
transmit-clock invert;
}

```

## Configuring the Serial Line Protocol

By default, serial interfaces use the EIA-530 line protocol. You can configure each port on the PIC independently to use one of the following line protocols:

- EIA-530
- V.35
- X.21

To configure the serial line protocol, include the **line-protocol** statement, specifying the **eia530**, **v.35**, or **x.21** option:

```
line-protocol protocol;
```

You can include these statements at the following hierarchy levels:

- [edit interfaces *se-pim*/0/*port* serial-options]
- [edit interfaces *se-fpc*/*pic*/*port* serial-options]

For more information about serial interfaces, see the following sections:

- [Serial Interface Default Settings on page 298](#)
- [Invalid Serial Interface Statements on page 299](#)

## Serial Interface Default Settings

- [EIA-530 Interface Default Settings on page 298](#)
- [V.35 Interface Default Settings on page 298](#)
- [X.21 Interface Default Settings on page 299](#)

---

### EIA-530 Interface Default Settings

If you do not include the **line-protocol** statement or if you explicitly configure the default EIA-530 line protocol, the default settings are as follows:

```
dce-options | dte-options {  
  cts normal;  
  dcd normal;  
  dsr normal;  
  dtr normal;  
  rts normal;  
  tm normal;  
}  
clock-rate 16.384mhz;  
clocking-mode loop;  
cts-polarity positive;  
dcd-polarity positive;  
dsr-polarity positive;  
dtr-circuit balanced;  
dtr-polarity positive;  
encoding nrz;  
rts-polarity positive;  
tm-polarity positive;
```



**NOTE:** On M Series routers, you can set the DCE clocking mode for EIA-530 interfaces and commit. An error message is not displayed and the CLI is not blocked.

You can include the **line-protocol** statement at the following hierarchy levels:

- **[edit interfaces se-*pim*/0/*port* serial-options]**
- **[edit interfaces se-*fpc*/*pic*/*port* serial-options]**

---

### V.35 Interface Default Settings

If you include the **line-protocol v.35** statement, the default settings are as follows:

```
dce-options | dte-options {  
  cts normal;  
  dcd normal;  
  dsr normal;
```

```

    dtr normal;
    rts normal;
}
clock-rate 16.384mhz;
clocking-mode loop;
cts-polarity positive;
dcd-polarity positive;
dsr-polarity positive;
dtr-circuit balanced;
dtr-polarity positive;
encoding nrz;
rts-polarity positive;

```

You can include the **line-protocol** statement at the following hierarchy levels:

- **[edit interfaces se-*pim*/0/*port* serial-options]**
- **[edit interfaces se-*fpc*/*pic*/*port* serial-options]**

### X.21 Interface Default Settings

If you include the **line-protocol x.21** statement, the default settings are as follows:

```

dce-options | dte-options {
    control-signal normal;
    indication normal;
}
clock-rate 16.384mhz;
clocking-mode loop;
control-polarity positive;
encoding nrz;
indication-polarity positive;

```

You can include the **line-protocol** statement at the following hierarchy levels:

- **[edit interfaces se-*pim*/0/*port* serial-options]**
- **[edit interfaces se-*fpc*/*pic*/*port* serial-options]**

## Invalid Serial Interface Statements

The following sections show the invalid configuration statements for each type of serial interface. If you include the following statements in the configuration, an error message indicates the location of the error and the configuration is not activated.

- [Invalid EIA-530 Interface Statements on page 299](#)
- [Invalid V.35 interface Statements on page 300](#)
- [Invalid X.21 Interface Statements on page 300](#)

### Invalid EIA-530 Interface Statements

If you do not include the **line-protocol** statement or if you explicitly configure the default EIA-530 line protocol, the following statements are invalid:

```

dce-options | dte-options {

```

```
control-signal (assert | de-assert | normal);
indication (ignore | normal | require);
}
control-polarity (negative | positive);
indication-polarity (negative | positive);
```

You can include the **line-protocol** statement at the following hierarchy levels:

- [edit interfaces *se-pim/0/port* serial-options]
- [edit interfaces *se-fpc/pic/port* serial-options]

---

### Invalid V.35 interface Statements

If you include the **line-protocol v.35** statement, the following statements are invalid:

```
dce-options | dte-options {
  control-signal (assert | de-assert | normal);
  indication (ignore | normal | require);
  tm (ignore | normal | require);
}
control-polarity (negative | positive);
indication-polarity (negative | positive);
loopback (dce-local | dce-remote);
tm-polarity (negative | positive);
```

You can include the **line-protocol** statement at the following hierarchy levels:

- [edit interfaces *se-pim/0/port* serial-options]
- [edit interfaces *se-fpc/pic/port* serial-options]

---

### Invalid X.21 Interface Statements

If you include the **line-protocol x.21** statement, the following statements are invalid:

```
dce-options | dte-options {
  cts (ignore | normal | require);
  dcd (ignore | normal | require);
  dsr (ignore | normal | require);
  dtr (assert | de-assert | normal);
  rts (assert | de-assert | normal);
  tm (ignore | normal | require);
}
clocking-mode (dce | internal);
cts-polarity (negative | positive);
dce-polarity (negative | positive);
dsr-polarity (negative | positive);
dtr-circuit (balanced | unbalanced);
dtr-polarity (negative | positive);
loopback (dce-local | dce-remote);
rts-polarity (negative | positive);
tm-polarity (negative | positive);
```

You can include the **line-protocol** statement at the following hierarchy levels:

- [edit interfaces *se-pim/0/port* serial-options]

- [edit interfaces *se-fpc/pic/port* serial-options]

## Configuring the Serial Clocking Mode

By default, serial interfaces use loop clocking mode. For EIA-530 and V.35 interfaces, you can configure each port on the PIC independently to use loop, DCE, or internal clocking mode. For X.21 interfaces, only loop clocking mode is supported.

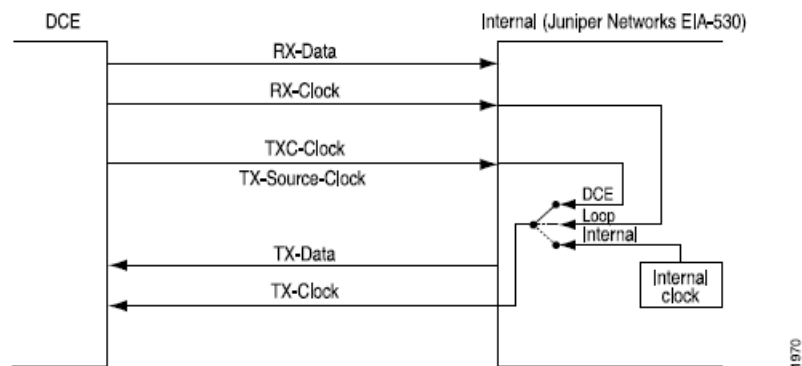
The three clocking modes work as follows:

- Loop clocking mode—Uses the DCE's RX clock to clock data from the DCE to the DTE.
- DCE clocking mode—Uses the TXC clock, which is generated by the DCE specifically to be used by the DTE as the DTE's transmit clock.
- Internal clocking mode—Also known as line timing, uses an internally generated clock. You can configure the speed of this clock by including the **clock-rate** statement at the [edit interfaces *se-pim/0/port* serial-options] or [edit interfaces *se-fpc/pic/port* dte-options] hierarchy levels. For more information about the DTE clock rate, see [“Configuring the DTE Clock Rate” on page 302](#).

Note that DCE clocking mode and loop clocking mode use external clocks generated by the DCE.

Figure 15 on page 301 shows the clock sources of loop, DCE, and internal clocking modes.

Figure 15: Serial Interface Clocking Mode



To configure the clocking mode of a serial interface, include the **clocking-mode** statement:

```
clocking-mode (dce | internal | loop);
```

You can include this statement at the following hierarchy levels:

- [edit interfaces *se-pim/0/port* serial-options]
- [edit interfaces *se-fpc/pic/port* serial-options]

For more information about clocking on serial interfaces, see the following sections:

- [Inverting the Serial Interface Transmit Clock on page 302](#)
- [Configuring the DTE Clock Rate on page 302](#)

## Inverting the Serial Interface Transmit Clock

When an externally timed clocking mode (DCE or loop) is used, long cables might introduce a phase shift of the DTE-transmitted clock and data. At high speeds, this phase shift might cause errors. Inverting the transmit clock corrects the phase shift, thereby reducing error rates.

By default, the transmit clock is not inverted. To invert the transmit clock, include the **transmit-clock invert** statement:

```
transmit-clock invert;
```

You can include this statement at the following hierarchy levels:

- **[edit interfaces se-pim/0/port serial-options]**
- **[edit interfaces se-fpc/pic/port serial-options]**

## Configuring the DTE Clock Rate

By default, the serial interface has a clock rate of 16.384 MHz. For EIA-530 and V.35 interfaces with internal clocking mode configured, you can configure the clock rate. For more information about internal clocking mode, see [“Configuring the Serial Clocking Mode” on page 301](#).

To configure the clock rate, include the **clock-rate** statement:

```
clock-rate rate;
```

You can include this statement at the following hierarchy levels:

- **[edit interfaces se-pim/0/port serial-options]**
- **[edit interfaces se-fpc/pic/port serial-options]**

You can configure the following interface speeds:

- 2.048 MHz
- 2.341 MHz
- 2.731 MHz
- 3.277 MHz
- 4.096 MHz
- 5.461 MHz
- 8.192 MHz
- 16.384 MHz



Although the serial interface is intended for use at the default rate of 16.384 MHz, you might need to use a slower rate if any of the following conditions prevail:

- The interconnecting cable is too long for effective operation.
- The interconnecting cable is exposed to an extraneous noise source that might cause an unwanted voltage in excess of +1 volt measured differentially between the signal conductor and circuit common at the load end of the cable, with a 50-ohm resistor substituted for the generator.
- You need to minimize interference with other signals.
- You need to invert signals.

For detailed information about the relationship between signaling rate and interface cable distance, see the following standards:

- EIA-422-A, *Electrical Characteristics of Balanced Voltage Digital Interface Circuits*
- EIA-423-A, *Electrical Characteristics of Unbalanced Voltage Digital Interface Circuits*

## Configuring the Serial Idle Cycle Flag

By default, a serial interface on J Series routers transmits the value 0x7E in the idle cycles. To have the interface transmit the value 0xFF (all ones) instead, include the **idle-cycle-flag** statement at the **[edit interfaces *interface-name* serial-options]** hierarchy level, specifying the **ones** option:

```
[edit interfaces interface-name serial-options]
idle-cycle-flag ones;
```

To explicitly configure the default value of 0x7E, include the **idle-cycle-flag** statement with the **flags** option:

```
[edit interfaces interface-name serial-options]
idle-cycle-flag flags;
```

## Configuring the Serial Signal Handling

By default, normal signal handling is enabled for all signals. For each signal, the **normal** option applies to the normal signal handling for that signal, as defined by the following standards:

- TIA/EIA Standard 530
- ITU-T Recommendation V.35
- ITU-T Recommendation X.21

Table 31 on page 304 shows the serial interface modes that support each signal type.

Table 31: Signal Handling by Serial Interface Type

| Signal                    | Serial Interfaces |
|---------------------------|-------------------|
| <b>From-DCE signals</b>   |                   |
| Clear to send (CTS)       | EIA-530 and V.35  |
| Data carrier detect (DCD) | EIA-530 and V.35  |
| Data set ready (DSR)      | EIA-530 and V.35  |
| Indication                | X.21 only         |
| Test mode (TM)            | EIA-530 only      |
| <b>To-DCE signals</b>     |                   |
| Control signal            | X.21 only         |
| Data transfer ready (DTR) | EIA-530 and V.35  |
| Request to send (RTS)     | EIA-530 and V.35  |

You configure serial interface signal characteristics by including the **dce-options** or **dte-options** statement:

```
dce-options | 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);
}
```

You can include these statements at the following hierarchy levels:

- [edit interfaces *se-pim/0/port* serial-options]
- [edit interfaces *se-fpc/pic/port* serial-options]

For EIA-530 and V.35 interfaces, configure to-DCE signals by including the **dtr** and **rts** statements, specifying the **assert**, **de-assert**, or **normal** option:

```
dtr (assert | de-assert | normal);
rts (assert | de-assert | normal);
```

For X.21 interfaces, configure to-DCE signals by including the **control-signal** statement, specifying the **assert**, **de-assert**, or **normal** option:

```
control-signal (assert | de-assert | normal);
```

*Assertion* is when the positive side of a given signal is at potential high-level output voltage (Voh), while the negative side of the same signal is at potential low-level output voltage (Vol). *Deassertion* is when the positive side of a given signal is at potential Vol, while the negative side of the same signal is at potential Voh.

For the DTR signal, you can configure normal signal handling using the signal for automatic resynchronization by including the **dtr** statement, and specifying the **auto-synchronize** option:

```
dtr {
  auto-synchronize {
    duration milliseconds;
    interval seconds;
  }
}
```

The pulse duration of resynchronization can be from 1 through 1000 milliseconds. The offset interval for resynchronization can be from 1 through 31 seconds.

For EIA-530 and V.35 interfaces, configure from-DCE signals by including the **cts**, **dcd**, and **dsr** statements, specifying the **ignore**, **normal**, or **require** option:

```
cts (ignore | normal | require);
dcd (ignore | normal | require);
dsr (ignore | normal | require);
```

For X.21 interfaces, configure from-DCE signals by including the **indication** statement, specifying the **ignore**, **normal**, or **require** option:

```
indication (ignore | normal | require);
```

For EIA-530 interfaces only, you can configure from-DCE test-mode (TM) signaling by including the **tm** statement, specifying the **ignore**, **normal**, or **require** option:

```
tm (ignore | normal | require);
```

To specify that the from-DCE signal must be asserted, include the **require** option in the configuration. To specify that the from-DCE signal must be ignored, include the **ignore** option in the configuration.



**NOTE:** For V.35 and X.21 interfaces, you cannot include the **tm** statement in the configuration.

For X.21 interfaces, you cannot include the **cts**, **dcd**, **dsr**, **dtr**, and **rts** statements in the configuration.

For EIA-530 and V.35 interfaces, you cannot include the **control-signal** and **indication** statements in the configuration.

For a complete list of serial options statements that are not supported by each serial interface mode, see [“Invalid Serial Interface Statements” on page 299](#).

To return to the default normal signal handling, delete the **require**, **ignore**, **assert**, **de-assert**, or **auto-synchronize** statement from the configuration, as shown in the following example:

```
[edit]
user@host# delete interfaces se-fpc/pic/port dte-options control-leads cts require
```

To explicitly configure normal signal handling, include the **control-signal** statement with the **normal** option:

```
control-signal normal;
```

You can configure the serial interface to ignore all control leads by including the **ignore-all** statement:

```
ignore-all;
```

You can include the **ignore-all** statement in the configuration only if you do not explicitly enable other signal handling options at the **[edit interfaces se-pim/0/port serial-options dce-options]** or **[edit interfaces se-fpc/pic/port serial-options dte-options]** hierarchy levels.

You can include the **control-signal**, **cts**, **dcd**, **dsr**, **dtr**, **indication**, **rts**, and **tm** statements at the following hierarchy levels:

- **[edit interfaces se-pim/0/port serial-options dte-options]**
- **[edit interfaces se-fpc/pic/port serial-options dte-options]**

---

## Configuring the Serial DTR Circuit

A balanced circuit has two currents that are equal in magnitude and opposite in phase. An unbalanced circuit has one current and a ground; if a pair of terminals is unbalanced, one side is connected to electrical ground and the other carries the signal. By default, the DTR circuit is balanced.

For EIA-530 and V.35 interfaces, configure the DTR circuit by including the **dtr-circuit** statement:

```
dtr-circuit (balanced | unbalanced);
```

You can include this statement at the following hierarchy levels:

- **[edit interfaces se-pim/0/port serial-options]**
- **[edit interfaces se-fpc/pic/port serial-options]**

---

## Configuring Serial Signal Polarities

Serial interfaces use a differential protocol signaling technique. Of the two serial signals associated with a circuit, the one referred to as the A signal is denoted with a plus sign, and the one referred to as the B signal is denoted with a minus sign; for example, DTR+ and DTR-. If DTR is low, then DTR+ is negative with respect to DTR-. If DTR is high, then DTR+ is positive with respect to DTR-.

By default, all signal polarities are positive. You can reverse this polarity on a Juniper Networks serial interface. You might need to do this if signals are miswired as a result of reversed polarities.

For EIA-530 and V.35 interfaces, configure signal polarities by including the **cts-polarity**, **dcd-polarity**, **dsr-polarity**, **dtr-polarity**, **rts-polarity**, and **tm-polarity** statements:

```
cts-polarity (negative | positive);
dcd-polarity (negative | positive);
dsr-polarity (negative | positive);
dtr-polarity (negative | positive);
rts-polarity (negative | positive);
tm-polarity (negative | positive);
```

You can include these statements at the following hierarchy levels:

- [edit interfaces *se-pim/0/port* serial-options]
- [edit interfaces *se-fpc/pic/port* serial-options]

For X.21 interfaces, configure signal polarities by including the **control-polarity** and **indication-polarity** statements:

```
control-polarity (negative | positive);
indication-polarity (negative | positive);
```

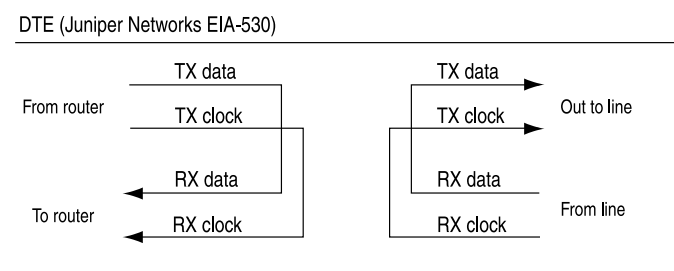
You can include these statements at the following hierarchy levels:

- [edit interfaces *se-pim/0/port* serial-options]
- [edit interfaces *se-fpc/pic/port* serial-options]

## Configuring Serial Loopback Capability

From the router, remote line interface unit (LIU) loopback loops the TX (transmit) data and TX clock back to the router as RX (receive) data and RX clock. From the line, LIU loopback loops the RX data and RX clock back out the line as TX data and TX clock, as shown in [Figure 16 on page 307](#).

**Figure 16: Serial Interface LIU Loopback**

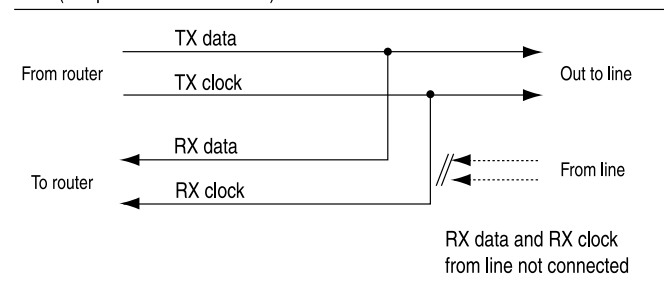


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DCE local and DCE remote control the EIA-530 interface-specific signals for enabling local and remote loopback on the link partner DCE. Local loopback is shown in [Figure 17 on page 308](#).

**Figure 17: Serial Interface Local Loopback**

DTE (Juniper Networks EIA-530)



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For EIA-530 interfaces, you can configure DCE local, DCE remote, local, and remote (LIU) loopback capability.

For V.35, you can configure remote LIU and local loopback capability. DCE local and DCE remote loopbacks are not supported on V.35 and X.21 interfaces. Local and remote loopbacks are not supported on X.21 interfaces.

To configure the loopback capability on a serial interface, include the **loopback** statement, specifying the **dce-local**, **dce-remote**, **local**, or **remote** option:

```
loopback mode;
```

You can include this statement at the following hierarchy levels:

- [edit interfaces *se-pim/0/port* serial-options]
- [edit interfaces *se-fpc/pic/port* serial-options]

To disable the loopback capability, remove the **loopback** statement from the configuration:

```
[edit]
user@host# delete interfaces se-fpc/pic/port serial-options loopback
```

You can determine whether there is an internal or external problem by checking the error counters in the output of the **show interface *se-fpc/pic/port* extensive** command:

```
user@host> show interfaces se-fpc/pic/port extensive
```

### Example: Configuring Serial Loopback Capability

To determine the source of a problem, loop packets on the local router, the local DCE, the remote DCE, and the remote line interface unit (LIU). To do this, include the **no-keepalives** and **encapsulation cisco-hdlc** statements at the [edit interfaces *se-fpc/pic/port*] hierarchy level, and the **loopback local** option at the [edit interfaces *se-pim/0/port* serial-options] or [edit interfaces *se-fpc/pic/port* serial-options] hierarchy level. With this configuration, the link stays up, so you can loop ping packets to a remote router. The **loopback local** statement causes the interface to loop within the PIC just before the data reaches the transceiver.

```
[edit interfaces]
se-1/0/0 {
  no-keepalives;
  encapsulation cisco-hdlc;
```

```
serial-options {  
    loopback local;  
}  
unit 0 {  
    family inet {  
        address 10.100.100.1/24;  
    }  
}
```

## Configuring Serial Line Encoding

By default, serial interfaces use non-return to zero (NRZ) line encoding. You can configure non-return to zero inverted (NRZI) line encoding if necessary.

To have the interface use NRZI line encoding, include the **encoding** statement, specifying the **nrzi** option:

```
encoding nrzi;
```

To explicitly configure the default NRZ line encoding, include the **encoding** statement, specifying the **nrz** option:

```
encoding nrz;
```

You can include this statement at the following hierarchy levels:

- [edit interfaces *se-pim/0/port* serial-options]
- [edit interfaces *se-fpc/pic/port* serial-options]

When setting the line encoding parameter, you must set the same value for paired ports. Ports 0 and 1 must share the same value.





## PART 5

# Interfaces Fundamentals Configuration Statements

- [Summary of Interfaces Fundamentals Configuration Statements on page 313](#)



## CHAPTER 12

# Summary of Interfaces Fundamentals Configuration Statements

The following descriptions explain each of the interface configuration statements. The statements are organized alphabetically.



### 802.3ad

---

|                          |  |
|--------------------------|--|
| Syntax                   | <pre>802.3ad {<br/>    ae <i>interface-number</i> (primary   backup);<br/>    lacp {<br/>        port-priority;<br/>    }<br/>}</pre>  |
| Hierarchy Level          | [edit interfaces <i>interface-name</i> <a href="#">fastether-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">gigether-options</a> ]   |
| Release Information      | Statement introduced before Junos OS Release 7.4.<br><b>primary</b> and <b>backup</b> options added in Junos OS Release 8.3.   |
| Description              | Specify aggregated Ethernet logical interface number.  |
| Options                  | <b>ae <i>interface-number</i></b> —Aggregated Ethernet logical interface number.<br><b>Range:</b> 0 through 15<br><br><b>primary</b> —For link protection configurations, specify the primary link for egress traffic.<br><br><b>backup</b> —For link protection configurations, specify the backup link for egress traffic. |
| Required Privilege Level | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| Related Documentation    | <ul style="list-style-type: none"><li>• <i>Configuring an Aggregated Ethernet Interface</i></li><li>• <i>Configuring Aggregated Ethernet Link Protection</i></li></ul>   |

## accept

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>accept (any   dhcp-v4   dhcp-v6   inet   inet6   pppoe);</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> auto-configure stacked-vlan-ranges <b>dynamic-profile</b> <i>profile-name</i> ],<br>[edit interfaces <i>interface-name</i> auto-configure vlan-ranges <b>dynamic-profile</b> <i>profile-name</i> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.5.<br><b>dhcp-v4</b> option added in Junos OS Release 10.0.<br><b>dhcp-v6</b> , <b>inet6</b> and <b>pppoe</b> options added in Junos OS Release 10.2.<br><b>any</b> option added in Junos OS Release 10.4.  |
| <b>Description</b>              | Specify the type of VLAN Ethernet packet accepted by an interface that is associated with a VLAN dynamic profile or stacked VLAN dynamic profile.  |
| <b>Options</b>                  | <p><b>any</b>—Any packet type. Specifies that any incoming packets trigger the dynamic creation of a VLAN with properties determined by the auto-configure interface configuration stanza and associated profile attributes. This option is used when configuring wholesaling in a Layer 2 network.</p> <p><b>dhcp-v4</b>—IPv4 DHCP packet type. Specifies that incoming IPv4 DHCP discover packets trigger the dynamic creation of a VLAN with properties determined by the auto-configure interface configuration stanza and associated profile attributes</p> <div> <b>NOTE:</b> The DHCP-specific <b>mac-address</b> and <b>option-82</b> options are rejected if the <b>accept</b> statement is not set to <b>dhcp-v4</b>.</div> <p><b>dhcp-v6</b>—IPv6 DHCP packet type. Specifies that incoming IPv6 DHCP discover packets trigger the dynamic creation of a VLAN with properties determined by the auto-configure interface configuration stanza and associated profile attributes.</p> <p><b>inet</b>—IPv4 Ethernet and ARP packet type.</p> <p><b>inet6</b>—IPv6 Ethernet packet type.</p> <p><b>pppoe</b>—Point-to-Point Protocol over Ethernet packet type.</p> <div> <b>NOTE:</b> The <b>pppoe</b> VLAN Ethernet packet type option is supported only for Trio MPC/MIC interfaces on MX Series Routers.</div> |
| <b>Required Privilege Level</b> | <b>interface</b> —To view this statement in the configuration.<br><b>interface-control</b> —To add this statement to the configuration.  |

- Related Documentation**
- *Configuring the VLAN Ethernet Packet Type for Single-Tag VLAN Dynamic Profiles*
  - *Configuring the VLAN Ethernet Packet Type for Stacked VLAN Dynamic Profiles*
  - *Configuring VLAN Interfaces for the Layer 2 Wholesale Solution*

## accept-source-mac

**Syntax**

```
accept-source-mac {
  mac-address mac-address {
    policer {
      input cos-policer-name;
      output cos-policer-name;
    }
  }
}
```

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

**Release Information** Statement introduced before Junos OS Release 7.4.  
Statement introduced in Junos OS Release 12.1X48 for PTX Packet Transport Routers.

**Description** For Gigabit Ethernet intelligent queuing (IQ) interfaces only, accept traffic from and to the specified remote media access control (MAC) address.

The **accept-source-mac** statement is equivalent to the **source-address-filter** statement, which is valid for aggregated Ethernet, Fast Ethernet, and Gigabit Ethernet interfaces only.

On untagged Gigabit Ethernet interfaces, you should not configure the **source-address-filter** statement and the **accept-source-mac** statement simultaneously. On tagged Gigabit Ethernet interfaces, you should not configure the **source-address-filter** statement and the **accept-source-mac** statement with an identical MAC address specified in both filters.

The statements are explained separately.




**NOTE:** The **policer** statement is not supported on PTX Series Packet Transport Routers.

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

- Related Documentation**
- *Configuring MAC Address Filtering*
  - *Configuring MAC Filtering on PTX Series Packet Transport Routers*
  - [source-filtering on page 770](#)

## access-concentrator

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>access-concentrator <i>name</i>;</code>  |
| <b>Hierarchy Level</b>          | <p>[edit dynamic-profiles <i>profile-name</i> interfaces demux0 unit <i>logical-unit-number</i> family pppoe],</p> <p>[edit dynamic-profiles <i>profile-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family pppoe],</p> <p>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>family</b> pppoe],</p> <p>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>pppoe-options</b>],</p> <p>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>pppoe-underlying-options</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>family</b> pppoe],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>pppoe-options</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>pppoe-underlying-options</b>]</p> |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Support at the [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>pppoe-underlying-options</b>] and [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>pppoe-underlying-options</b>] hierarchy levels introduced in Junos OS Release 10.1.</p> <p>Support at the [edit ... <b>family pppoe</b>] hierarchies introduced in Junos OS Release 11.2.</p>  |
| <b>Description</b>              | <p>(J Series Services Routers with Point-to-Point Protocol over Ethernet (PPPoE) interfaces) Configure the name of the access concentrator. If you configure a specific access concentrator name on the client and the same access concentrator name server is available, then a PPPoE session is established. If there is a mismatch between the access concentrator names of the client and the server, the PPPoE session gets closed.</p> <p>If you do not configure the access concentrator name, the PPPoE session starts using any available server in the network.</p> <p>(Intelligent Queuing 2 (IQ2) PICs on M120 and M320 routers; MPCs on MX Series routers) Configure an alternative access concentrator name in the AC-NAME tag in a PPPoE control packet for use with a dynamic PPPoE subscriber interface. If you do not configure the access concentrator name, the AC-NAME tag contains the system name.</p>  |
|                                 | <div>  <p><b>NOTE:</b> The [edit ... <b>family pppoe</b>] hierarchies are supported only on MX Series routers with MPCs.</p> </div>   |
| <b>Options</b>                  | <i>name</i> —Name of the access concentrator.  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |

- Related Documentation**
- *Identifying the Access Concentrator*
  - *Configuring the PPPoE Family for an Underlying Interface*
  - *Configuring Dynamic PPPoE Subscriber Interfaces Using Dynamic Profiles*
  - *Junos OS Interfaces and Routing Configuration Guide*

## access-profile

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>access-profile name;</code>   |
| <b>Hierarchy Level</b>          | <code>[edit interfaces interface-name auto-configure vlan-ranges],</code><br><code>[edit interfaces interface-name auto-configure stacked-vlan-ranges],</code><br><code>[edit interfaces interface-name ppp-options chap],</code><br><code>[edit interfaces interface-name ppp-options pap],</code><br><code>[edit interfaces interface-name unit logical-unit-number ppp-options chap],</code><br><code>[edit interfaces interface-name unit logical-unit-number ppp-options pap],</code><br><code>[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number ppp-options chap],</code><br><code>[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number ppp-options pap]</code>  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Support for PAP added in Junos OS Release 8.3.<br>Support for VLAN and stacked VLAN ranges added in Junos OS Release 10.0.   |
| <b>Description</b>              | <p>For CHAP authentication, the mapping between peer names (or “clients” ) and the secrets associated with their respective links. For PAP authentication, the peer's username and password.</p> <p>For Asynchronous Transfer Mode 2 (ATM2) IQ interfaces only, you can configure a Challenge Handshake Authentication Protocol (CHAP) access profile on the logical interface unit if the logical interface is configured with one of the following PPP over ATM encapsulation types:</p> <ul style="list-style-type: none"><li>• <b>atm-ppp-llc</b>—PPP over AAL5 logical link control (LLC) encapsulation.</li><li>• <b>atm-ppp-vc-mux</b>—PPP over AAL5 multiplex encapsulation.</li></ul> <p>For VLAN and stacked VLAN authentication, the access profile containing the RADIUS accounting and authentication information for the VLAN or stacked VLAN ranges.</p> |
| <b>Options</b>                  | <b>name</b> —Name of the access profile.  |
| <b>Required Privilege Level</b> | <b>interface</b> —To view this statement in the configuration.<br><b>interface-control</b> —To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the PPP Challenge Handshake Authentication Protocol on page 136</a></li><li>• <a href="#">Configuring the PPP Password Authentication Protocol on page 139</a></li><li>• <a href="#">default-chap-secret on page 410</a></li><li>• <i>Junos OS Administration Library for Routing Devices</i></li></ul>   |



## accounting

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>accounting {   destination-class-usage;   source-class-usage {     direction;   } }</pre>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> inet],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> inet] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Enable IP packet counters on an interface.<br><br>The statements are explained separately.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Enabling Source Class and Destination Class Usage on page 241</a></li> </ul>  |

## accounting-profile

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>accounting-profile <i>name</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ],<br>[edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit interfaces interface-range <i>name</i> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.   |
| <b>Description</b>              | Enable collection of accounting data for the specified physical or logical interface or interface range.  |
| <b>Options</b>                  | <b><i>name</i></b> —Name of the accounting profile.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Applying an Accounting Profile to the Physical Interface on page 160</a></li> <li>• <a href="#">Applying an Accounting Profile to the Logical Interface on page 188</a></li> </ul> |

## acfc

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | acfc;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">ppp-options compression</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">unit logical-unit-number</a> <a href="#">ppp-options compression</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit logical-unit-number</a> <a href="#">ppp-options compression</a> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | <p>For interfaces with PPP encapsulation, configure compression of the Data Link Layer address and control fields. The <b>acfc</b> option is not supported with <b>frame-relay-ppp</b> encapsulation.</p> <p>On M320, M120, and T Series routers, address and control field compression (ACFC) is not supported for any ISO family protocols. Do not include the <b>acfc</b> statement at the [edit interfaces <i>interface-name</i> <a href="#">ppp-options compression</a>] hierarchy level when you include the <b>family iso</b> statement at the [edit interfaces <i>interface-name</i> <a href="#">unit logical-unit-number</a>] hierarchy level.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring PPP Address and Control Field Compression on page 145</a></li></ul>   |

## acknowledge-retries

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>acknowledge-retries <i>number</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">mlfr-uni-nni-bundle-options</a> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For link services and voice services interfaces only, configure the number of retransmission attempts to be made for consecutive hello or remove link messages following the expiration of the acknowledgment timer.                    |
| <b>Options</b>                  | <b><i>number</i></b> —Number of retransmission attempts to be made following the expiration of the acknowledgment timer.<br><b>Range:</b> 1 through 5<br><b>Default:</b> 2  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li><li>• <a href="#">action-red-differential-delay on page 327</a></li><li>• <a href="#">hello-timer on page 499</a></li></ul> |

## acknowledge-timer

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>acknowledge-timer <i>milliseconds</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">mlfr-uni-nni-bundle-options</a> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For link services and voice services interfaces only, configure the maximum time, in milliseconds, to wait for an add link acknowledgment, hello acknowledgment, or remove link acknowledgment message.  |
| <b>Options</b>                  | <p><code>milliseconds</code>—Time, in milliseconds, to wait for an add link acknowledgment, hello acknowledgment, or remove link acknowledgment message.</p> <p><b>Range:</b> 1 through 10 milliseconds</p> <p><b>Default:</b> 4 milliseconds</p>          |
| <b>Required Privilege Level</b> | <p><code>interface</code>—To view this statement in the configuration.</p> <p><code>interface-control</code>—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li><li>• <a href="#">address on page 329</a>, <a href="#">hello-timer on page 499</a></li><li>• <a href="#">hello-timer on page 499</a></li></ul> |

## action

See the following sections:

- [action \(OAM\) on page 323](#)
- [action \(Policer\) on page 323](#)

### action (OAM)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>action {   link-down;   send-critical-event;   syslog; }</pre>  |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet link-fault-management action-profile</a> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.  |
| <b>Description</b>              | Define the action or actions to be taken when the OAM fault event occurs.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Specifying the Actions to Be Taken for Link-Fault Management Events</i></li> </ul> |

### action (Policer)

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>action {   loss-priority high then discard; }</pre>  |
| <b>Hierarchy Level</b>          | [edit firewall three-color-policer <i>policer-name</i> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.2.   |
| <b>Description</b>              | This statement discards high loss priority traffic as part of a configuration using tricolor marking on a logical interface.  |
| <b>Required Privilege Level</b> | firewall—To view this statement in the configuration.<br>firewall-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Class of Service Library for Routing Devices</i></li> <li>• <a href="#">logical-interface-policer on page 583</a></li> </ul> |

## action-profile

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See the following sections:

- [action-profile \(Applying to CFM\) on page 324](#)
- [action-profile \(Defining for CFM\) on page 325](#)
- [action-profile \(Defining for LFM\) on page 326](#)

### action-profile (Applying to CFM)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>action-profile <i>profile-name</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit protocols oam ethernet connectivity-fault-management maintenance-domain <i>domain-name</i> maintenance-association <i>ma-name</i> mep <i>mep-id</i> <a href="#">remote-mep</a> <i>mep-id</i> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.  |
| <b>Description</b>              | Identify the action profile to use.  |
| <b>Options</b>                  | <i>profile-name</i> —Name of the action profile to use.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring a Maintenance Endpoint</a></li></ul>   |

## action-profile (Defining for CFM)

**Syntax**    `action-profile profile-name {  
              event {  
                  adjacency-loss;  
                  interface-status-tlv (down | lower-layer-down);  
                  port-status-tlv blocked;  
                  rdi;  
              }  
              action {  
                  interface-down;  
              }  
              default-actions {  
                  interface-down;  
              }  
          }`

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

**Release Information**    Statement introduced in Junos OS Release 8.4.

**Description**    Configure a name and default action for an action profile.

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

The remaining statements are explained separately.

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

**Related Documentation**

- [Configuring a Connectivity Fault Management Action Profile](#)
- [default-actions on page 409](#)
- [event \(CFM\)](#)
- [interface-down on page 533](#)

## action-profile (Defining for LFM)

**Syntax**    `action-profile profile-name {`  
              `action {`  
                  `link-down;`  
                  `send-critical-event;`  
                  `syslog;`  
              `}`  
              `event {`  
                  `link-adjacency-loss;`  
                  `link-event-rate {`  
                      `frame-error count;`  
                      `frame-period count;`  
                      `frame-period-summary count;`  
                      `symbol-period count;`  
                  `}`  
                  `protocol-down;`  
              `}`  
              `}`

**Hierarchy Level**    `[edit protocols oam ethernet link-fault-management]`

**Release Information**    Statement introduced in Junos OS Release 8.5.

**Description**    Configure a name, one or more actions, and the events that trigger the action for an action profile.

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

The remaining statements are explained separately.

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

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

**Related Documentation**

- *Configuring an OAM Action Profile*



## action-red-differential-delay

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>action-red-differential-delay (disable-tx   remove-link);</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">mlfr-uni-nni-bundle-options</a> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For link services and voice services interfaces only, configure the action to be taken when the differential delay exceeds the red limit.  |
| <b>Options</b>                  | <p><b>disable-tx</b>—Disable transmission on the bundle link.</p> <p><b>remove-link</b>—Remove bundle link from service.</p> <p><b>Default:</b> <b>disable-tx</b></p>  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> <li>• <a href="#">remote on page 723</a></li> <li>• <a href="#">yellow-differential-delay on page 874</a></li> </ul> |

## activation-delay

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>activation-delay <i>seconds</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>dlIn</i> unit <i>logical-unit-number</i> <a href="#">dialer-options</a> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | (J Series Services Routers) For ISDN interfaces, configure the ISDN dialer activation delay. Used only for dialer backup and dialer watch cases.                        |
| <b>Options</b>                  | <p><b>seconds</b>—Interval before the backup interface is activated after the primary interface has gone down.</p> <p><b>Range:</b> 1 through 4,294,967,295 seconds</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring the Dialer Interface</i></li> <li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li> </ul>       |

## activation-priority

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>activation-priority <i>priority</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">dynamic-call-admission-control</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">dynamic-call-admission-control</a> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.2.  |
| <b>Description</b>              | (J4350 and J6350 Services Routers supporting voice over IP with the TGM550 media gateway module) For Fast Ethernet and Gigabit Ethernet interfaces, ISDN BRI interfaces, and serial interfaces with PPP or Frame Relay encapsulation, configure the dynamic call admission control (dynamic CAC) activation priority value.  |
| <b>Options</b>                  | <p><b><i>priority</i></b>—The activation priority in which the interface is used for providing call bandwidth. The interface with the highest activation priority value is used as the primary link for providing call bandwidth. If the primary link becomes unavailable, the TGM550 switches over to the next active interface with the highest activation priority value, and so on.</p> <p><b>Range:</b> 0 through 255</p> <p><b>Default:</b> 50</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Dynamic Call Admission Control on page 196</a></li><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li><li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li></ul>  |

## address

```

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

```

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

**Release Information** Statement introduced before Junos OS Release 7.4.  
Statement introduced in Junos OS Release 11.1 for the QFX Series.

**Description** Configure the interface address.

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

The remaining statements are explained separately.



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

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

**Related Documentation**

- [Configuring the Protocol Family on page 202](#)
- [negotiate-address on page 633](#)
- [unnumbered-address \(Ethernet\) on page 838](#)
- *Junos OS Administration Library for Routing Devices*
- *family*

---

## advertise-interval

---

**Syntax** `advertise-interval milliseconds;`

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

**Release Information** Statement introduced before Junos OS Release 7.4.

**Description** Modify the Automatic Protection Switching (APS) interval at which the protect and working routers send packets to their neighbors to advertise that they are operational. A router considers its neighbor to be operational for a period, called the hold time, that is, by default, three times the advertisement interval.

**Options** *milliseconds*—Interval between advertisement packets.  
**Range:** 1 through 65,534 milliseconds  
**Default:** 1000 milliseconds

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

**Related Documentation**

- *Configuring APS Timers*

## age

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | age (30m   10m   1m   30s   10s);   |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam</a> <a href="#">ethernet</a> <a href="#">connectivity-fault-management</a> linktrace]                                   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.   |
| <b>Description</b>              | Time to wait (in minutes or seconds) for a response. If no response is received, the request and response entry is deleted from the linktrace database. |
| <b>Default</b>                  | 10 minutes  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Linktrace Protocol in CFM</i></li></ul>  |

## agent-specifier

---

**Syntax**    agent-specifier {  
              aci *circuit-id-string* ari *remote-id-string* {  
                  drop;  
                  delay *seconds*;  
                  terminate;  
                  dynamic-profile *profile-name*;  
                  routing-instance *routing-instance-name*;  
                  static-interface *interface-name*;  
              }  
              }

**Hierarchy Level**    [edit protocols pppoe service-name-tables *table-name* **service** *service-name*]

**Release Information**    Statement introduced in Junos OS Release 10.0.  
                              **drop**, **delay**, **terminate**, **dynamic-profile**, **routing-instance**, and **static-interface** options introduced in Junos OS Release 10.2.

**Description**    Specify the action taken by the interface for the specified agent circuit identifier/agent remote identifier (ACI/ARI) pair when the interface receives a PPPoE Active Discovery Initiation (PADI) control packet that includes the vendor-specific tag with ACI/ARI pair information. You can configure an ACI/ARI pair for a named service, **empty** service, or **any** service in a PPPoE service name table. A maximum of 8000 ACI/ARI pairs are supported per PPPoE service name table. You can distribute the ACI/ARI pairs in any combination among the named, **empty**, and **any** service entries in the service name table.

You can use an asterisk (\*) as a wildcard character to match ACI/ARI pairs, the ACI alone, or the ARI alone. The asterisk can be placed only at the beginning, the end, or both the beginning and end of the identifier string. You can also specify an asterisk alone for either the ACI or the ARI. You cannot specify only an asterisk for both the ACI and the ARI. When you specify a single asterisk as the identifier, that identifier is ignored in the PADI packet.

For example, suppose you care about matching only the ACI and do not care what value the ARI has in the PADI packet, or even whether the packet contains an ARI value. In this case you can set the **remote-id-string** to a single asterisk. Then the interface ignores the ARI received in the packet and the interface takes action based only on matching the specified ACI.

**Default**    The default action is terminate.

**Options**    **aci *circuit-id-string***—Identifier for the agent circuit ID that corresponds to the DSLAM interface that initiated the service request. This is a string of up to 63 characters.

**ari *remote-id-string***—Identifier for the subscriber associated with the DSLAM interface that initiated the service request. This is a string of up to 63 characters.

The remaining statements are explained separately.

|                              |   |
|------------------------------|---|
| <b>Required Privilege</b>    | interface—To view this statement in the configuration.  |
| <b>Level</b>                 | interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b> | <ul style="list-style-type: none"><li>• <i>Configuring PPPoE Service Name Tables</i></li><li>• <i>Assigning an ACI/ARI Pair to a Service Name and Configuring the Action Taken When the Client Request Includes ACI/ARI Information</i></li></ul> |

## aggregate

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See the following sections:

- [aggregate \(Gigabit Ethernet CoS Policer\) on page 334](#)
- [aggregate \(Hierarchical Policer\) on page 335](#)
- [aggregate \(SONET/SDH\) on page 335](#)

### aggregate (Gigabit Ethernet CoS Policer)

|                          |   |
|--------------------------|---|
| Syntax                   | <pre>aggregate {<br/>    bandwidth-limit <i>bps</i>;<br/>    burst-size-limit <i>bytes</i>;<br/>}</pre>   |
| Hierarchy Level          | [edit interfaces <i>interface-name</i> gigether-options <a href="#">ethernet-switch-profile</a> <a href="#">ethernet-policer-profile</a> <a href="#">policer</a> <i>cos-policer-name</i> ]                                    |
| Release Information      | Statement introduced before Junos OS Release 7.4.   |
| Description              | Define a policer to apply to nonpremium traffic.<br><br>The statements are explained separately.  |
| Required Privilege Level | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| Related Documentation    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Gigabit Ethernet Policers</a></li><li>• <a href="#">premium (Hierarchical Policer) on page 697</a></li><li>• <a href="#">ieee802.1p on page 510</a></li></ul> |



## aggregate (Hierarchical Policer)

**Syntax**

```

aggregate {
  if-exceeding {
    bandwidth-limit bandwidth;
    burst-size-limit burst;
  }
  then {
    discard;
  }
}

```

**Hierarchy Level** [edit firewall [hierarchical-policer](#)]

**Release Information** Statement introduced in Junos OS Release 9.5.

**Description** On M40e, M120, and M320 (with FFPC and SFPC) edge routers and T320, T640, and T1600 core routers with Enhanced Intelligent Queuing (IQE) PICs, T4000 routers with Type 5 FPC and Enhanced Scaling Type 4 FPC, configure an aggregate hierarchical policer.

**Options** Options are described separately.

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

**Related Documentation**

- [Applying Policers on page 222](#)
- *Junos OS Class of Service Library for Routing Devices*

## aggregate (SONET/SDH)

**Syntax** aggregate *asx*;

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

**Release Information** Statement introduced before Junos OS Release 7.4.

**Description** Specify aggregated SONET/SDH logical interface number.

**Options** *asx*—Aggregated SONET/SDH logical interface number.  
**Range:** 0 through 15

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

**Related Documentation**

- *Configuring Aggregated SONET/SDH Interfaces*

## aggregate-ports

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | aggregate-ports;   |
| <b>Hierarchy Level</b>          | [edit chassis fpc <i>slot-number</i> pic <i>pic-number</i> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.1.  |
| <b>Description</b>              | For T Series routers only, specify OC768-over-OC192 mode on the 4-port OC192C PIC. Four OC192 links are aggregated into one OC768 link with one logical interface. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring 4-Port OC192 PIC to Operate in OC768-over-OC192 Mode on page 116</a></li></ul>                     |

## aggregated-ether-options

```
Syntax  aggregated-ether-options {
        ethernet-switch-profile {
            ethernet-policer-profile {
                input-priority-map {
                    ieee802.1p premium [ values ];
                }
                output-priority-map {
                    classifier {
                        premium {
                            forwarding-class class-name {
                                loss-priority (high | low);
                            }
                        }
                    }
                }
            }
            policer cos-policer-name {
                aggregate {
                    bandwidth-limit bps;
                    burst-size-limit bytes;
                }
                premium {
                    bandwidth-limit bps;
                    burst-size-limit bytes;
                }
            }
        }
        (mac-learn-enable | no-mac-learn-enable);
    }
    (flow-control | no-flow-control);
    lacp {
        (active | passive);
        link-protection {
            disable;
            (revertive | non-revertive);
            periodic interval;
            system-priority priority;
            system-id system-id;
        }
        link-protection;
        link-speed speed;
        logical-interface-chassis-redundancy;
        logical-interface-fpc-redundancy;
        (loopback | no-loopback);
        minimum-links number;
        rebalance-periodic time hour:minute <interval hours>;
        source-address-filter {
            mac-address;
            (source-filtering | no-source-filtering);
        }
    }
}
```

Hierarchy Level [edit interfaces aex]

|                                 |   |
|---------------------------------|---|
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | Configure aggregated Ethernet-specific interface properties.<br><br>The statements are explained separately.            |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Ethernet Interfaces Overview</i></li></ul>                                   |

---

## aggregated-sonet-options

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>aggregated-sonet-options {<br/>    link-speed <i>speed</i>;<br/>    minimum-links <i>number</i>;<br/>}</pre>       |
| <b>Hierarchy Level</b>          | [edit interfaces asx]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | Configure aggregated SONET/SDH-specific interface properties.<br><br>The statements are explained separately.           |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Aggregated SONET/SDH Interfaces</i></li></ul>                    |

## alarm (optics-options)

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | alarm low-light-alarm {<br>(link-down   syslog);<br>}   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>optics-options</b> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.<br>Statement introduced in Junos OS Release 12.1 for EX Series switches.   |
| <b>Description</b>              | Specify the action to take if the receiving optics signal is below the optics low-light alarm threshold.  |
| <b>Options</b>                  | <b>link-down</b> —Drop the 10-Gigabit Ethernet link and marks link as down.<br><br><b>syslog</b> —Write the optics information to the system log.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring 10-Gigabit Ethernet Link Down Notification for Optics Options Alarm or Warning</i></li> <li>• <i>100-Gigabit Ethernet OTN Options Configuration Overview</i></li> </ul> |

## allow-any-vci

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | allow-any-vci;  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit 0],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit 0]    |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access routers. |
| <b>Description</b>              | Dedicate entire ATM device to ATM cell relay circuit.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring an ATM1 Cell-Relay Circuit</i></li> </ul>   |

## allow-fragmentation

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | allow-fragmentation;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>gr-fpc/pic/port</i> unit <i>logical-unit-number</i> tunnel],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>gr-fpc/pic/port</i> unit <i>logical-unit-number</i> tunnel] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.2.  |
| <b>Description</b>              | Enable fragmentation of generic routing encapsulation (GRE) encapsulated packets regardless of maximum transmission unit (MTU) value.  |
| <b>Default</b>                  | By default, the GRE encapsulated packets are dropped if the packet size exceeds the MTU setting of the egress interface.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li><li>• <a href="#">reassemble-packets on page 717</a></li></ul>                                     |

## allow-remote-loopback

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | allow-remote-loopback;  |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam</a> <a href="#">link-fault-management</a> <a href="#">interface</a> <i>interface-name</i> <a href="#">negotiation-options</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.   |
| <b>Description</b>              | Enable the remote loopback on IQ2 and IQ2-E Gigabit Ethernet interfaces, and Ethernet interfaces on the MX Series routers and EX Series switches.               |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Enabling Remote Loopback Support on the Local Interface</i></li></ul>  |

## annex

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>annex (annex-a   annex-b);</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>shdsl-options</b> ],<br>[edit interfaces <i>interface-name</i> sonet-options aps],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>shdsl-options</b> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 7.4.  |
| <b>Description</b>              | For J Series Services Routers only, configure the type of SHDSL annex.<br><br>For M320 and M120 routers only, for Multiplex Section Protection (MSP) switching on SDH interfaces, set <b>annex-b</b> . You must also configure the <b>working protection circuit</b> under the [edit interfaces <i>so-fpc/pic/port</i> sonet-options aps] hierarchy level. |
| <b>Default</b>                  | <b>annex-b</b>   |
| <b>Options</b>                  | <b>annex-a</b> —Use for North American SHDSL network implementations.<br><br><b>annex-b</b> —Use for European SHDSL network implementations.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>ATM-over-SHDSL Overview</i></li> </ul>   |

## apply-action-profile

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>apply-action-profile <i>profile-name</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit protocols <b>oam ethernet link-fault-management interface</b> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.   |
| <b>Description</b>              | Apply the specified action profile to the interface for link-fault management.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Applying an Action Profile</i></li> </ul>                                   |

## aps

---

**Syntax**    `aps {  
          advertise-interval milliseconds;  
          annex-b  
          authentication-key key;  
          (break-before-make | no-break-before-make);  
          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;  
          }`

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

**Release Information**    Statement introduced before Junos OS Release 7.4.

**Description**    Configure Automatic Protection Switching (APS) on the router.

For DS3 channels on a channelized OC12 interface, configure APS on channel 0 only. If you configure APS on channels 1 through 11, it is ignored.

The statements are explained separately.


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

**Related Documentation**

- *Automatic Protection Switching and Multiplex Section Protection Overview*



## arp (Interfaces)

|   |   |
|---|---|
| <b>Syntax</b>   | <code>arp <i>ip-address</i> (mac   multicast-mac) <i>mac-address</i> publish;</code>  |
| <b>Hierarchy Level</b>  | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inetaddress <i>address</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inetaddress <i>address</i> ]  |
| <b>Release Information</b>  | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 11.1 for the QFX Series.  |
| <b>Description</b>  | For Ethernet, Fast Ethernet, and Gigabit Ethernet interfaces only, configure Address Resolution Protocol (ARP) table entries, mapping IP addresses to MAC addresses.  |
| <b>Options</b>  | <p><b><i>ip-address</i></b>—IP address to map to the MAC address. The IP address specified must be part of the subnet defined in the enclosing <b>address</b> statement.</p> <p><b>mac <i>mac-address</i></b>—MAC address to map to the IP address. Specify the MAC address as six hexadecimal bytes in one of the following formats: <i>nnnn.nnnn.nnnn</i> or <i>nn:nn:nn:nn:nn:nn</i>. For example, <b>0011.2233.4455</b> or <b>00:11:22:33:44:55</b>.</p> <p><b>multicast-mac <i>mac-address</i></b>—Multicast MAC address to map to the IP address. Specify the multicast MAC address as six hexadecimal bytes in one of the following formats: <i>nnnn.nnnn.nnnn</i> or <i>nn:nn:nn:nn:nn:nn</i>. For example, <b>0011.2233.4455</b> or <b>00:11:22:33:44:55</b>.</p> <p><b>publish</b>—(Optional) Have the router or switch reply to ARP requests for the specified IP address. If you omit this option, the router or switch uses the entry to reach the destination but does not reply to ARP requests.</p> |
| <div>  <p><b>NOTE:</b> The <code>edit logical-systems</code> hierarchy is not available on QFabric systems.</p> </div> |   |
| <b>Required Privilege Level</b>   | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>  | <ul style="list-style-type: none"> <li>• <i>Configuring Static ARP Table Entries</i></li> <li>• <i>Configuring Static ARP Entries</i></li> </ul>  |

## asynchronous-notification

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | (asynchronous-notification   no-asynchronous-notification);  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>ge-fpc/pic/port</i> gigether-options ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.3.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.  |
| <b>Description</b>              | For all 10-Gigabit Ethernet interfaces, M120, M320, and T Series routers, configure support for notification of link down alarm generation and transfer. <ul style="list-style-type: none"><li>• <b>asynchronous-notification</b>—Support notification of link down alarm generation and transfer.</li><li>• <b>no-asynchronous-notification</b>—Prohibit notification of link down alarm generation and transfer.</li></ul> |
| <b>Default</b>                  | Support for notification of link down alarm generation and transfer is not enabled.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>10-Gigabit Ethernet Notification of Link Down Alarm Overview</i></li></ul>  |

## atm-encapsulation

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | atm-encapsulation (direct   plcp);   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>at-fpc/pic/port</i> e3-options],<br>[edit interfaces <i>at-fpc/pic/port</i> t3-options]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Configure encapsulation for E3 and T3 traffic over ATM interfaces.   |
| <b>Default</b>                  | Physical Layer Convergence Protocol (PLCP) encapsulation is the default for T3 traffic and for E3 traffic using G.751 framing.   |
| <b>Options</b>                  | <b>direct</b> —Use direct encapsulation. G.832 framing on E3 interfaces requires direct encapsulation.<br><br><b>plcp</b> —Use PLCP encapsulation.                                   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring E3 and T3 Parameters on ATM Interfaces</i></li><li>• <a href="#">encapsulation (Physical Interface) on page 454</a></li></ul> |

## atm-options

```
Syntax  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 {
                up-count cells;
                down-count cells;
            }
            oam-period (disable | seconds);
            shaping {
                (cbr rate | rtvbr peak rate sustained rate burst length | vbr peak rate sustained rate burst
                length);
                queue-length number;
            }
        }
    }
```

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

**Release Information** Statement introduced before Junos OS Release 7.4.  
Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.

**Description** Configure ATM-specific physical interface properties.  
  
The statements are explained separately.



NOTE: Certain options apply only to specific platforms.

---

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

**Related Documentation**

- [Interface Encapsulations Overview on page 51](#)
- [multipoint-destination on page 624](#)
- [shaping on page 757](#)
- [vci on page 845](#)

---

## atm-scheduler-map

---

**Syntax** atm-scheduler-map (*map-name* | default);

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

**Release Information** Statement introduced before Junos OS Release 7.4.

**Description** Associate a scheduler map with a virtual circuit on a logical interface.

**Options** *map-name*—Name of scheduler map that you define at the [edit interfaces *interface-name* [atm-options scheduler-maps](#)] hierarchy level.

*default*—The default scheduler mapping.

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

**Related Documentation**

- [Configuring ATM2 IQ VC Tunnel CoS Components](#)
- [scheduler-maps on page 742](#)

## authentication

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre> authentication {   password <i>password-string</i>;   username-include {     <i>circuit-type</i>;     delimiter <i>delimiter-character</i>;     domain-name <i>domain-name-string</i>;     interface-name;     mac-address;     option-82 &lt;circuit-id&gt; &lt;remote-id&gt;;     radius-realm <i>radius-realm-string</i>;     user-prefix <i>user-prefix-string</i>;   } }</pre> |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> auto-configure <a href="#">vlan-ranges</a> ],<br>[edit interfaces <i>interface-name</i> auto-configure <a href="#">stacked-vlan-ranges</a> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.  |
| <b>Description</b>              | <p>Specify the authentication parameters that trigger the Access-Request message to AAA for the interface.</p> <p>The remaining statements are explained separately.</p>  |
| <b>Required Privilege Level</b> | system—To view this statement in the configuration.<br>system-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Subscribers over Static Interfaces</i></li> <li>• <i>Configuring the Static Subscriber Global Authentication Password</i></li> </ul>  |

## authentication-key

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>authentication-key key;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> sonet-options <a href="#">aps</a> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | Configure the Automatic Protection Switching (APS) authentication key (password).   |
| <b>Options</b>                  | <b>key</b> —Authentication password. It can be 1 through 8 characters long. Configure the same key for both the working and protect routers.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Basic Automatic Protect Switching</i></li><li>• For information about the <b>authentication-key</b> statement at the [edit interfaces <i>interface-name</i> unit <i>unit-number</i> family inet address <i>address</i> (vrrp-group   vrrp-inet6-group) <i>group-number</i>] or [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>unit-number</i> family (inet   inet6) address <i>address</i> (vrrp-group   vrrp-inet6-group) <i>group-number</i>] hierarchy level, see the <i>Junos OS High Availability Library for Routing Devices</i>.</li></ul> |

## authentication-profile-name

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>authentication-profile-name access-profile-name;</code>   |
| <b>Hierarchy Level</b>          | [edit protocols dot1x <a href="#">authenticator</a> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.3.   |
| <b>Description</b>              | Specify the RADIUS authentication profile to use for user authentication when establishing an IEEE 802.1x Port-Based Network Access Control ( <b>dot1x</b> ) connection.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>IEEE 802.1x Port-Based Network Access Control Overview</i></li><li>• <a href="#">authenticator on page 349</a></li><li>• <a href="#">dot1x on page 434</a></li></ul> |

## authenticator

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre> authenticator {   authentication-profile-name <i>access-profile-name</i>;   interface <i>interface-id</i> {     maximum-requests <i>integer</i>;     quiet-period <i>seconds</i>;     reauthentication (disable   interval <i>seconds</i>);     retries <i>integer</i>;     server-timeout <i>seconds</i>;     supplicant (<i>single</i>);     supplicant-timeout <i>seconds</i>;     transmit-period <i>seconds</i>;   } }</pre> |
| <b>Hierarchy Level</b>          | [edit protocols dot1x]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.3.   |
| <b>Description</b>              | Specify an authentication profile for user or client authentication and configure the Ethernet interface for 802.1x protocol operation.   |
| <b>Options</b>                  | <p><b>authentication-profile-name <i>access-profile-name</i></b>—Specifies the RADIUS authentication profile for user or client authentication.</p> <p>The remaining statements are explained separately.</p>   |
| <b>Required Privilege Level</b> | <p>protocols—To view this statement in the configuration.</p> <p>protocols-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>IEEE 802.1x Port-Based Network Access Control Overview</i></li> <li>• <a href="#">authentication-profile-name on page 348</a></li> <li>• <a href="#">dot1x on page 434</a></li> </ul>   |

## auto-configure

```
Syntax auto-configure {
  vlan-ranges {
    access-profile profile-name;
    authentication {
      password password-string;
      username-include {
        circuit-type;
        delimiter delimiter-character;
        domain-name domain-name-string;
        interface-name;
        mac-address;
        option-18;
        option-37;
        option-82 <circuit-id> <remote-id>;
        radius-realm radius-realm-string;
        user-prefix user-prefix-string;
      }
    }
  }
  dynamic-profile profile-name {
    accept (any | dhcp-v4 | dhcp-v6 | inet | inet6 | pppoe);
    ranges (any | low-tag)–(any | high-tag);
  }
  override;
}
stacked-vlan-ranges {
  access-profile profile-name;
  authentication {
    password password-string;
    username-include {
      circuit-type;
      delimiter delimiter-character;
      domain-name domain-name-string;
      interface-name;
      mac-address;
      option-18;
      option-37;
      option-82 <circuit-id> <remote-id>;
      radius-realm radius-realm-string;
      user-prefix user-prefix-string;
    }
  }
  dynamic-profile profile-name {
    accept (any | dhcp-v4 | dhcp-v6 | inet | inet6 | pppoe);
    ranges (any | low-tag-high-tag), (any | low-tag-high-tag);
  }
  override;
}
remove-when-no-subscribers;
}
```

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



|                                 |   |
|---------------------------------|---|
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.5.   |
| <b>Description</b>              | Enable the configuration of dynamic, auto-sensed VLANs.<br><br>The remaining statements are explained separately.       |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring VLAN Interfaces to Use Dynamic Profiles</i></li></ul>            |

---

## auto-discovery

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | auto-discovery;  |
| <b>Hierarchy Level</b>          | [edit protocols <b>oam ethernet connectivity-fault-management</b> maintenance-domain <i>domain-name</i> maintenance-association <i>ma-name</i> <b>mep</b> <i>mep-id</i> ]                              |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.  |
| <b>Description</b>              | Enable the MEP to accept continuity check messages from all remote MEPs.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring a Maintenance Endpoint</i></li><li>• <i>Example: Configuring Connectivity Fault Management for a PBB Network on MX Series Routers</i></li></ul> |

## auto-negotiation

---

|                            |  |
|----------------------------|--|
| <b>Syntax</b>              | (auto-negotiation   no-auto-negotiation) <remote-fault (local-interface-online   local-interface-offline)>;  |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> ether-options],<br>[edit interfaces <i>interface-name</i> <b>gigether-options</b> ],<br>[edit interfaces <i>ge-pim</i> /0/0 <b>switch-options</b> <b>switch-port</b> <i>port-number</i> ]   |
| <b>Release Information</b> | Statement introduced in Junos OS Release 7.6.<br>Statement introduced in Junos OS Release 8.4 for J Series Services Routers.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers. |
| <b>Description</b>         | For Gigabit Ethernet interfaces on M Series, MX Series, T Series, TX Matrix routers, and ACX Series routers explicitly enable autonegotiation and remote fault. For EX Series switches and J Series Services Routers, explicitly enable autonegotiation only.                                  |

- **auto-negotiation**—Enables autonegotiation. This is the default.
- **no-auto-negotiation**—Disable autonegotiation. When autonegotiation is disabled, you must explicitly configure the link mode and speed.

When you configure Tri-Rate Ethernet copper interfaces to operate at 1 Gbps, autonegotiation must be enabled.



**NOTE:** On EX Series switches, an interface configuration that disables autonegotiation and manually sets the link speed to 1 Gbps is accepted when you commit the configuration; however, if the interface you are configuring is a Tri-Rate Ethernet copper interface, the configuration is ignored as invalid and autonegotiation is enabled by default.

To correct the invalid configuration and disable autonegotiation:

1. Delete the **no-auto-negotiation** statement and commit the configuration.
2. Set the link speed to 10 or 100 Mbps, set **no-auto-negotiation**, and commit the configuration.

On J Series Services Routers with universal Physical Interface Modules (uPIMs) and on EX Series switches, if the link speed and duplex mode are also configured, the interfaces use the values configured as the desired values in the negotiation. If autonegotiation is disabled, the link speed and link mode must be configured.



**NOTE:** On T4000 routers, the **auto-negotiation** command is ignored for interfaces other than Gigabit Ethernet.

|                                 |  |
|---------------------------------|--|
| <b>Default</b>                  | Autonegotiation is automatically enabled. No explicit action is taken after the autonegotiation is complete or if the negotiation fails.   |
| <b>Options</b>                  | <b>remote-fault (local-interface-online   local-interface-offline)</b> —(Optional) For M Series, MX Series, T Series, TX Matrix routers, and ACX Series routers only, manually configure remote fault on an interface.<br><b>Default:</b> local-interface-online   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Gigabit Ethernet Autonegotiation Overview</i></li> <li>• <i>Configuring J Series Services Router Switching Interfaces</i></li> <li>• <i>Configuring Gigabit Ethernet Interfaces (CLI Procedure)</i></li> <li>• <i>Configuring Gigabit Ethernet Interfaces (CLI Procedure)</i></li> </ul> |

## auto-reconnect

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | auto-reconnect <i>seconds</i> ;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>pppoe-options</b> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>pppoe-options</b> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For J Series Services Routers with PPP over Ethernet interfaces, configure the amount of time to wait before reconnecting after a session has terminated.   |
| <b>Options</b>                  | <b>seconds</b> —Time to wait before reconnecting after a session has terminated.<br><b>Range:</b> 0 through 4,294,967,295 seconds<br><b>Default:</b> 0 (immediately)  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring the PPPoE Automatic Reconnect Wait Timer</i></li> <li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li> </ul>   |

## backup-destination

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>backup-destination <i>address</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">tunnel</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">tunnel</a> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For tunnel interfaces, specify the remote address of the backup tunnel.  |
| <b>Options</b>                  | <b><i>address</i></b> —Address of the remote side of the connection.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li><li>• <a href="#">destination (Tunnels) on page 422</a></li></ul>  |

## backup-interface

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>backup-interface <i>es-fpc/pic/port</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>es-fpc/pic/port</i> <a href="#">es-options</a> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Configure a backup ES Physical Interface Card (PIC). If the primary ES PIC fails, the backup becomes active, inherits all the tunnels and security associations (SAs), and acts as the new next hop for IP Security (IPsec) traffic. |
| <b>Options</b>                  | <b><i>es-fpc/pic/port</i></b> —Name of ES interface to serve as the backup.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>  |

## backup-options

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>backup-options {<br/>  interface <i>interface-name</i>;<br/>}</pre>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ]               |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | <p>Configure an interface to be used as a backup interface if the primary interface goes down. This is used to support ISDN dial backup operation.</p> <p>The remaining statement is explained separately.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring an ISDN Dialer Interface as a Backup Interface</i></li><li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li></ul>                       |

## bandwidth (Interfaces)

---

|                            |  |
|----------------------------|--|
| <b>Syntax</b>              | <code>bandwidth rate;</code>   |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ] |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.  |
| <b>Description</b>         | Configure an informational-only bandwidth value for an interface. This statement is valid for all logical interface types except multilink and aggregated interfaces.  |



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

$$\text{cost} = \text{reference-bandwidth} / \text{bandwidth},$$

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

|                                 |   |
|---------------------------------|---|
| <b>Options</b>                  | <b>rate</b> —Peak rate, in bits per second (bps) or cells per second (cps). You can specify a value in bits per second either as a complete decimal number or as a decimal number followed by the abbreviation <b>k</b> (1000), <b>m</b> (1,000,000), or <b>g</b> (1,000,000,000). You can also specify a value in cells per second by entering a decimal number followed by the abbreviation <b>c</b> ; values expressed in cells per second are converted to bits per second by means of the formula 1 cps = 384 bps.<br><b>Range:</b> Not limited. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the Interface Bandwidth on page 189</a></li></ul>   |

## bandwidth-limit

See the following sections:

- [bandwidth-limit \(Hierarchical Policer\) on page 357](#)
- [bandwidth-limit \(Policer for Gigabit Ethernet Interfaces\) on page 358](#)

### bandwidth-limit (Hierarchical Policer)

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>bandwidth-limit <i>bps</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit dynamic-profiles <i>profile-name</i> firewall hierarchical-policer aggregate if-exceeding],<br>[edit dynamic-profiles <i>profile-name</i> firewall hierarchical-policer <b>premium</b> if-exceeding],<br>[edit firewall hierarchical-policer aggregate if-exceeding],<br>[edit firewall hierarchical-policer <b>premium</b> if-exceeding]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.5.<br>Support at the [edit dynamic-profiles ... if-exceeding] hierarchy level introduced in Junos OS Release 11.4.   |
| <b>Description</b>              | For M40e, M120, and M320 (with FFPC and SFPC) edge routers and T320, T640, and T1600 core routers with Enhanced Intelligent Queuing (IQE) PICs, T4000 routers with Type 5 FPC and Enhanced Scaling Type 4 FPC, configure the maximum average bandwidth for premium or aggregate traffic in a hierarchical policer.  |
| <b>Options</b>                  | <b>bps</b> —You can specify the number of bits per second either as a decimal number or as a decimal number followed by the abbreviation <b>k</b> (1000), <b>m</b> (1,000,000), or <b>g</b> (1,000,000,000).<br><b>Range:</b> 32,000 through 50,000,000,000   |
| <b>Required Privilege Level</b> | firewall—To view this statement in the configuration.<br>firewall-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Hierarchical Policer Configuration Overview</i></li> <li>• <i>Policer Bandwidth and Burst-Size Limits</i></li> <li>• <i>Policer Color-Marking and Actions</i></li> <li>• <i>Single Token Bucket Algorithm</i></li> <li>• <i>Determining Proper Burst Size for Traffic Policers</i></li> <li>• <i>aggregate (Hierarchical Policer)</i></li> <li>• <a href="#">burst-size-limit (Hierarchical Policer) on page 370</a></li> <li>• <a href="#">premium (Hierarchical Policer) on page 697</a></li> </ul> |

## bandwidth-limit (Policer for Gigabit Ethernet Interfaces)

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>bandwidth-limit <i>bps</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <i>gigether-options</i> <a href="#">ethernet-switch-profile ethernet-policer-profile</a> <i>policer cos-policer-name</i> <a href="#">aggregate</a> ],<br>[edit interfaces <i>interface-name</i> <i>gigether-options</i> <a href="#">ethernet-switch-profile ethernet-policer-profile</a> <i>policer cos-policer-name</i> <a href="#">premium</a> ]                               |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | Define a policer to apply to nonpremium traffic.  |
| <b>Options</b>                  | <b><i>bps</i></b> —Bandwidth limit, in bits per second. Specify either as a complete decimal number or as a decimal number followed by the abbreviation <b>k</b> (1000), <b>m</b> (1,000,000), or <b>g</b> (1,000,000,000).<br><b>Range:</b> 32 Kbps through 32 gigabits per second (Gbps). For IQ2 and IQ2-E interfaces 65,536 bps through 1 Gbps. For 10-Gigabit IQ2 and IQ2-E interfaces 65,536 bps through 10 Gbps. |
| <b>Required Privilege Level</b> | <b>interface</b> —To view this statement in the configuration.<br><b>interface-control</b> —To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Gigabit Ethernet Policers</i></li><li>• <a href="#">burst-size-limit (Policer for Gigabit Ethernet Interfaces) on page 371</a></li></ul>   |

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## bchannel-allocation

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>bchannel-allocation (ascending   descending);</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">isdn-options</a> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.3.   |
| <b>Description</b>              | (J Series Services Routers equipped with a Dual-Port Channelized T1/E1 PIM) For Integrated Services Digital Network Primary Rate Interfaces (ISDN PRI), allocate PRI dialout B-channels in ascending or descending order. |
| <b>Options</b>                  | <b>(ascending   descending)</b> —Allocate the B-channels in ascending (from low to high) or descending (from high to low) order.<br><b>Default:</b> Descending order  |
| <b>Required Privilege Level</b> | <b>interface</b> —To view this statement in the configuration.<br><b>interface-control</b> —To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Allocating B-Channels for Dialout</i></li><li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li></ul>   |



## bearer-bandwidth-limit

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>bearer-bandwidth-limit <i>kilobits-per-second</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">dynamic-call-admission-control</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">dynamic-call-admission-control</a> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.2.  |
| <b>Description</b>              | (J4350 and J6350 Services Routers supporting voice over IP with the TGM550 media gateway module) For Fast Ethernet and Gigabit Ethernet interfaces, ISDN BRI interfaces, and serial interfaces with PPP or Frame Relay encapsulation, configure the bearer bandwidth limit (BBL). BBL is used for dynamic call admission control (dynamic CAC) to provide enhanced control over WAN bandwidth. |
| <b>Options</b>                  | <p><b><i>kilobits-per-second</i></b>—The bearer bandwidth limit to be reported to a TGM550 media gateway module, in kilobits per second (kbps).</p> <p><b>Range:</b> 0 through 9999 kbps</p> <p><b>Default:</b> 1 (dynamic CAC is not enabled on the interface)</p>  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Dynamic Call Admission Control on page 196</a></li> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> <li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li> </ul>  |

## bert-algorithm

|                            |   |
|----------------------------|---|
| <b>Syntax</b>              | <code>bert-algorithm <i>algorithm</i>;</code>   |
| <b>Hierarchy Level</b>     | <code>[edit interfaces ce1-fpc/pic/port],</code><br><code>[edit interfaces ct1-fpc/pic/port],</code><br><code>[edit interfaces interface-name ds0-options],</code><br><code>[edit interfaces interface-name e1-options],</code><br><code>[edit interfaces interface-name e3-options],</code><br><code>[edit interfaces interface-name t1-options],</code><br><code>[edit interfaces interface-name t3-options]</code> |
| <b>Release Information</b> | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.</p>  |
| <b>Description</b>         | Configure the pattern to send in the bit stream during a bit error rate test (BERT). Applies to T1, E3, T3, and multichannel DS3 interfaces, the channelized interfaces (DS3, OC12, STM1), and channelized IQ and IQE interfaces (E1, E3 and DS3).  |



**NOTE:** When configuring CE1 or CT1 interfaces on 10-port Channelized E1/T1 IQE PICs, the `bert-algorithm` statement must be included at the `[edit interfaces ce1-fpc/pic/port]` or `[edit interfaces ct1-fpc/pic/port]` hierarchy level as appropriate.

|                |   |
|----------------|---|
| <b>Options</b> | <p><b><i>algorithm</i></b>—Pattern to send in the bit stream. There are two categories of test patterns: pseudorandom and repetitive. Both patterns conform to CCITT/ITU O.151, O.152, O.153, and O.161 standards. The algorithm can be one of the following patterns:</p> <ul style="list-style-type: none"> <li>• <b>all-ones-repeating</b>—Pattern is all ones.</li> <li>• <b>all-zeros-repeating</b>—Pattern is all zeros.</li> <li>• <b>alternating-double-ones-zeros</b>—Pattern is alternating pairs of ones and zeros.</li> <li>• <b>alternating-ones-zeros</b>—Pattern is alternating ones and zeros.</li> <li>• <b>pseudo-2e3</b>—Pattern is <math>2^3 - 1</math>.</li> <li>• <b>pseudo-2e4</b>—Pattern is <math>2^4 - 1</math>.</li> <li>• <b>pseudo-2e5</b>—Pattern is <math>2^5 - 1</math>.</li> <li>• <b>pseudo-2e6</b>—Pattern is <math>2^6 - 1</math>.</li> <li>• <b>pseudo-2e7</b>—Pattern is <math>2^7 - 1</math>.</li> <li>• <b>pseudo-2e9-o153</b>—Pattern is <math>2^9 - 1</math>, as defined in the O153 standard.</li> <li>• <b>pseudo-2e10</b>—Pattern is <math>2^{10} - 1</math>.</li> <li>• <b>pseudo-2e11-o152</b>—Pattern is <math>2^{11} - 1</math>, as defined in the O152 standard.</li> </ul> |
|----------------|---|

- **pseudo-2e15-o151**—Pattern is  $2^{15} - 1$ , as defined in the O151 standard.
- **pseudo-2e17**—Pattern is  $2^{17} - 1$ .
- **pseudo-2e18**—Pattern is  $2^{18} - 1$ .
- **pseudo-2e20-o151**—Pattern is  $2^{20} - 1$ , as defined in the O151 standard.
- **pseudo-2e20-o153**—Pattern is  $2^{20} - 1$ , as defined in the O153 standard.
- **pseudo-2e21**—Pattern is  $2^{21} - 1$ .
- **pseudo-2e22**—Pattern is  $2^{22} - 1$ .
- **pseudo-2e23-o151**—Pattern is  $2^{23} - 1$ , as defined in the O151 standard.
- **pseudo-2e25**—Pattern is  $2^{25} - 1$ .
- **pseudo-2e28**—Pattern is  $2^{28} - 1$ .
- **pseudo-2e29**—Pattern is  $2^{29} - 1$ .
- **pseudo-2e31**—Pattern is  $2^{31} - 1$ .
- **pseudo-2e32**—Pattern is  $2^{32} - 1$ .
- **repeating-1-in-4**—One bit in four is set to 1; the others are set to 0.
- **repeating-1-in-8**—One bit in eight is set to 1; the others are set to 0.
- **repeating-3-in-24**—Three bits in twenty four are set to 1; the others are set to 0.

**Default:** pseudo-2e3

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

**Related Documentation**

- [Interface Diagnostics on page 163](#)
- *Configuring E1 BERT Properties*
- *Configuring E3 BERT Properties*
- *Configuring T1 BERT Properties*
- *Configuring T3 BERT Properties*
- *Examples: Configuring T3 Interfaces*
- [bert-error-rate on page 362](#)
- [bert-period on page 364](#)

## bert-error-rate

|                            |   |
|----------------------------|---|
| <b>Syntax</b>              | <code>bert-error-rate rate;</code>  |
| <b>Hierarchy Level</b>     | <code>[edit interfaces ce1-fpc/pic/port],</code><br><code>[edit interfaces ct1-fpc/pic/port],</code><br><code>[edit interfaces interface-name ds0-options],</code><br><code>[edit interfaces interface-name e1-options],</code><br><code>[edit interfaces interface-name e3-options],</code><br><code>[edit interfaces interface-name t1-options],</code><br><code>[edit interfaces interface-name t3-options]</code> |
| <b>Release Information</b> | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.</p>  |
| <b>Description</b>         | Configure the bit error rate to use in a BERT procedure. Applies to E1, E3, T1, or T3 interfaces, and to the channelized interfaces (DS3, OC3, OC12, and STM1).   |



**NOTE:** When configuring CE1 or CT1 interfaces on 10-port Channelized E1/T1 IQE PICs, the `bert-error-rate` statement must be included at the `[edit interfaces ce1-fpc/pic/port]` or `[edit interfaces ct1-fpc/pic/port]` hierarchy level as appropriate.


When configuring `t3-options bert-error-rate` on J Series routers, only 0 and 3 through 7 are valid values. If you enter 1 or 2, Junos OS will return the error message `configuration check-out failed`.

|                                 |  |
|---------------------------------|--|
| <b>Options</b>                  | <p><b>rate</b>—Bit error rate.</p> <p><b>Range:</b> 0 through 7, which corresponds to <math>10^{-1}</math> (1 error per bit) to <math>10^{-7}</math> (1 error per 10 million bits)</p> <p><b>Default:</b> 0</p>  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">bert-algorithm on page 360</a></li> <li>• <a href="#">bert-period on page 364</a></li> <li>• <a href="#">ds0-options on page 437</a></li> <li>• <a href="#">e1-options on page 446</a></li> <li>• <a href="#">e3-options on page 447</a></li> <li>• <a href="#">t1-options on page 793</a></li> <li>• <a href="#">t3-options on page 796</a></li> </ul> |

- [Interface Diagnostics on page 163](#)
- *Configuring E1 BERT Properties*
- *Configuring E3 BERT Properties*
- *Configuring T1 BERT Properties*
- *Configuring T3 BERT Properties*
- *Examples: Configuring T3 Interfaces*

## bert-period

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>bert-period seconds;</code>   |
| <b>Hierarchy Level</b>          | <code>[edit interfaces ce1-fpc/pic/port],</code><br><code>[edit interfaces ct1-fpc/pic/port],</code><br><code>[edit interfaces interface-name ds0-options],</code><br><code>[edit interfaces interface-name e1-options],</code><br><code>[edit interfaces interface-name e3-options],</code><br><code>[edit interfaces interface-name t1-options],</code><br><code>[edit interfaces interface-name t3-options]</code>   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.   |
| <b>Description</b>              | <p>Configure the duration of a BERT test. Applies to E1, E3, T1, and T3 interfaces, and to E1, E3, T1, and T3 partitions on the channelized interfaces (CE1, CT1, DS3, OC3, OC12, OC48, STM1, STM4, and STM16).</p> <p>E1 and T1 IQ, IQE, and standard interfaces support an extended BERT period range, up to 86,400 seconds (24 hours).</p> <div><p><b>NOTE:</b> When configuring CE1 or CT1 interfaces on 10-port Channelized E1/T1 IQE PICs, the <code>bert-period</code> statement must be included at the <code>[edit interfaces ce1-fpc/pic/port]</code> or <code>[edit interfaces ct1-fpc/pic/port]</code> hierarchy level as appropriate.</p></div> |
| <b>Options</b>                  | <p><b>seconds</b>—Test duration. Range and default values vary by interface type.</p> <p><b>Range:</b></p> <ul style="list-style-type: none"><li>• PIC-dependent—Normal BERT period: either 1 through 239 seconds or 1 through 240 seconds</li><li>• PIC-dependent—Extended BERT period: from 1 through 86,400 seconds</li></ul> <p><b>Default:</b></p> <ul style="list-style-type: none"><li>• Normal BERT period: 10 seconds</li><li>• Extended BERT period (on supported E1 interfaces): 10 seconds</li><li>• Extended BERT period (on supported T1 interfaces): 240 seconds</li></ul>   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Interface Diagnostics on page 163</a></li><li>• <a href="#">Configuring E1 BERT Properties</a></li></ul>  |


- *Configuring E3 BERT Properties*
- *Configuring T1 BERT Properties*
- *Configuring T3 BERT Properties*
- [bert-algorithm on page 360](#)
- [bert-error-rate on page 362](#)

## bridge-domain

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | bridge-domain <i>name</i> ;<br>vlan-id [ <i>vlan-identifiers</i> ];<br>}   |
| <b>Hierarchy Level</b>          | [edit protocols oam ethernet connectivity-fault-management maintenance-domain <i>maintenance-domain-name</i> ],<br>[edit protocols oam ethernet connectivity-fault-management maintenance-domain <i>maintenance-domain-name</i> virtual-switch <i>virtual-switch-name</i> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.4.  |
| <b>Description</b>              | (MX Series routers only) Specify the OAM Ethernet CFM maintenance domain bridge domain.  |
| <b>Options</b>                  | <i>name</i> —Specify the name of the bridge domain.<br><br><i>vlan-identifiers</i> —Specify one or more VLAN identifiers.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Maintenance Intermediate Points</i></li> <li>• <i>Example: Configuring Connectivity Fault Management for a PBB Network on MX Series Routers</i></li> <li>• <a href="#">maintenance-domain on page 601</a></li> </ul> |

## broadcast

---

|  |   |
|--|---|
| <b>Syntax</b>  | <code>broadcast address;</code>   |
| <b>Hierarchy Level</b>   | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> address <i>address</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> <b>address</b> <i>address</i> ] |
| <b>Release Information</b>   | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 11.1 for the QFX Series.  |
| <b>Description</b>   | Set the broadcast address on the network or subnet. On a subnet you cannot specify a host address of 0, nor can you specify a broadcast address.  |
| <b>Default</b>   | The default broadcast address has a host portion of all ones.   |
| <b>Options</b>   | <b>address</b> —Broadcast address. The address must have a host portion of either all ones or all zeros. You cannot specify the addresses <b>0.0.0.0</b> or <b>255.255.255.255</b> .  |
| <div> <b>NOTE:</b> The edit logical-systems hierarchy is not available on QFabric systems.</div> |   |
| <b>Required Privilege Level</b>  | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>   | <ul style="list-style-type: none"><li>• <a href="#">Configuring the Interface Address on page 204</a></li></ul>   |



## buildout

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See the following sections:

- [buildout \(E3 or T3 over ATM Interfaces\) on page 367](#)
- [buildout \(T1 Interfaces\) on page 368](#)

### buildout (E3 or T3 over ATM Interfaces)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>buildout <i>feet</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces at- <i>fpc/pic/port</i> e3-options],<br>[edit interfaces at- <i>fpc/pic/port</i> t3-options]                          |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For E3 and T3 traffic over ATM interfaces, set the buildout value.   |
| <b>Options</b>                  | <b><i>feet</i></b> —The buildout value in feet.<br><b>Range:</b> 0 through 450 feet (137 meters)<br><b>Default:</b> 10 feet (3 meters) |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring E3 and T3 Parameters on ATM Interfaces</a></li></ul>                   |

## buildout (T1 Interfaces)


|                            |   |
|----------------------------|---|
| <b>Syntax</b>              | <code>buildout value;</code>  |
| <b>Hierarchy Level</b>     | [edit interfaces <i>ct1-fpc/pic/port</i> ]<br>[edit interfaces <i>interface-name</i> <b>t1-options</b> ]  |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers. |
| <b>Description</b>         | For T1 interfaces, set the buildout value.  |



**NOTE:** When configuring CT1 interfaces on 10-port Channelized E1/T1 IQE PICs and 16-Port Channelized E1/T1 Circuit Emulation MICs, the **buildout** statement must be included at the hierarchy level.

|                                 |   |
|---------------------------------|---|
| <b>Default</b>                  | The default buildout value is 0 through 132 feet.   |
| <b>Options</b>                  | <p>You can set the buildout value to one of the following:</p> <ul style="list-style-type: none"><li>• <b>0-132</b>—0 through 132 feet (0 through 40 meters)</li><li>• <b>133-265</b>—133 through 265 feet (40 through 81 meters)</li><li>• <b>266-398</b>—266 through 398 feet (81 through 121 meters)</li><li>• <b>399-531</b>—399 through 531 feet (121 through 162 meters)</li><li>• <b>532-655</b>—532 through 655 feet (162 through 200 meters)</li><li>• <b>long-0db</b>—For J Series routers only, long buildout with 0 decibel (dB) transmit attenuation</li><li>• <b>long-7.5db</b>—For MX Series and J Series routers only, long buildout with 7.5 dB transmit attenuation</li><li>• <b>long-15db</b>—For MX Series and J Series routers only, long buildout with 15 dB transmit attenuation</li><li>• <b>long-22.5db</b>—For MX Series and J Series routers only, long buildout with 22.5 dB transmit attenuation</li></ul> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring the T1 Buildout</i></li><li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li></ul>   |

## bundle

|  |   |
|--|---|
| <b>Syntax</b>  | <code>bundle (ml-<i>fpc/pic/port</i>   ls-<i>fpc/pic/port</i>);</code>  |
| <b>Hierarchy Level</b>   | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>family</b> <i>family</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>family</i> ] |
| <b>Release Information</b>   | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>   | Associate the multilink interface with the logical interface it is joining. You can include this statement for the <b>mlfr-end-to-end</b> and <b>mlfr-uni-nni</b> protocol families only.   |
| <div>  <p><b>NOTE:</b></p> <p>For M Series routers and T Series routers, the following caveats apply:</p> <ul style="list-style-type: none"> <li>Maximum supported throughput on the bundle interfaces is 45 Mbps.</li> <li>Bundling of the logical interfaces under a T3 physical interface into the same or different bundles is not supported.</li> </ul> </div> |   |
| <b>Options</b>   | <p><b>ml-<i>fpc/pic/port</i></b>—Name of the multilink interface you are linking.</p> <p><b>ls-<i>fpc/pic/port</i></b>—Name of the link services interface you are linking.</p>   |
| <b>Required Privilege Level</b>  | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>   | <ul style="list-style-type: none"> <li><i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>   |

## burst-size-limit

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See the following sections:

- [burst-size-limit \(Hierarchical Policer\) on page 370](#)
- [burst-size-limit \(Policer for Gigabit Ethernet Interfaces\) on page 371](#)

### burst-size-limit (Hierarchical Policer)


|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>burst-size-limit bytes;</code>   |
| <b>Hierarchy Level</b>          | <code>[edit dynamic-profiles <i>profile-name</i> firewall hierarchical-policer aggregate if-exceeding]</code> ,<br><code>[edit dynamic-profiles <i>profile-name</i> firewall hierarchical-policer <b>premium</b> if-exceeding]</code> ,<br><code>[edit firewall hierarchical-policer aggregate if-exceeding]</code> ,<br><code>[edit firewall hierarchical-policer <b>premium</b> if-exceeding]</code>   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.5.<br>Support at the <code>[edit dynamic-profiles ... if exceeding]</code> hierarchy level introduced in Junos OS Release 11.4.   |
| <b>Description</b>              | For M40e, M120, and M320 (with FFPC and SFPC) edge routers and T320, T640, and T1600 core routers with Enhanced Intelligent Queuing (IQE) PICs, T4000 routers with Type 5 FPC and Enhanced Scaling Type 4 FPC, configure the burst-size limit for premium or aggregate traffic in a hierarchical policer.  |
| <b>Options</b>                  | <b>bytes</b> —Burst-size limit in bytes. The minimum recommended value is the maximum transmission unit (MTU) of the IP packets being policed. You can specify the value either as a complete decimal number or as a decimal number followed by the abbreviation <b>k</b> (1000), <b>m</b> (1,000,000), or <b>g</b> (1,000,000,000).<br><b>Range:</b> 1500 through 2,147,450,880   |
| <b>Required Privilege Level</b> | <b>firewall</b> —To view this statement in the configuration.<br><b>firewall-control</b> —To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Hierarchical Policer Configuration Overview</i></li><li>• <i>Policer Bandwidth and Burst-Size Limits</i></li><li>• <i>Policer Color-Marking and Actions</i></li><li>• <i>Single Token Bucket Algorithm</i></li><li>• <i>Determining Proper Burst Size for Traffic Policers</i></li><li>• <i>Hierarchical Policers</i></li><li>• <i>aggregate (Hierarchical Policer)</i></li><li>• <a href="#">bandwidth-limit (Hierarchical Policer) on page 357</a></li><li>• <a href="#">premium (Hierarchical Policer) on page 697</a></li></ul> |

## burst-size-limit (Policer for Gigabit Ethernet Interfaces)

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>burst-size-limit <i>bytes</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> gigether-options <a href="#">ethernet-switch-profile ethernet-policer-profile</a> policer <i>cos-policer-name</i> <a href="#">aggregate</a> ],<br>[edit interfaces <i>interface-name</i> gigether-options <a href="#">ethernet-switch-profile ethernet-policer-profile</a> policer <i>cos-policer-name</i> <a href="#">premium</a> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | Define a policer to apply to nonpremium traffic.  |
| <b>Options</b>                  | <b><i>bytes</i></b> —Burst length.<br><b>Range:</b> 1500 through 100,000,000 bytes  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Gigabit Ethernet Policers</i></li><li>• <a href="#">bandwidth-limit (Policer for Gigabit Ethernet Interfaces)</a> on page 358</li></ul>  |

## byte-encoding

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | byte-encoding (nx56   nx64);   |
| <b>Hierarchy Level</b>          | [edit interfaces t1- <i>fpc/pic/port</i> ],<br>[edit interfaces <i>interface-name</i> ds0-options],<br>[edit interfaces <i>interface-name</i> t1-options]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.  |
| <b>Description</b>              | Set the byte encoding on a DS0 or T1 interface to use 7 bits per byte or 8 bits per byte.  |
|                                 | <div> <b>NOTE:</b> When configuring T1 interfaces on the 10-port Channelized E1/T1 IQE PIC, the byte-encoding statement must be included at the [edit interfaces t1-<i>fpc/pic/port</i>] hierarchy level.</div> |
| <b>Default</b>                  | The default byte encoding is 8 bits per byte (nx64).   |
| <b>Options</b>                  | nx56—Use 7 bits per byte.<br><br>nx64—Use 8 bits per byte.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring T1 Byte Encoding</i></li></ul>  |

## bytes

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>bytes {   c2 <i>value</i>;   e1-quiet <i>value</i>;   f1 <i>value</i>;   f2 <i>value</i>;   s1 <i>value</i>;   z3 <i>value</i>;   z4 <i>value</i>; }</pre>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>sonet-options</b> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Set values in some SONET/SDH header bytes.   |
| <b>Options</b>                  | <p><b>c2 <i>value</i></b>—Path signal label SONET/SDH overhead byte. SONET/SDH frames use the C2 byte to indicate the contents of the payload inside the frame. SONET/SDH interfaces use the C2 byte to indicate whether the payload is scrambled.</p> <p><b>Range:</b> 0 through 255</p> <p><b>Default:</b> 0xCF</p> <p><b>e1-quiet <i>value</i></b>—Default idle byte sent on the orderwire SONET/SDH overhead bytes. The router does not support the orderwire channel, and hence sends this byte continuously.</p> <p><b>Range:</b> 0 through 255</p> <p><b>Default:</b> 0x7F</p> <p><b>f1 <i>value</i>, f2 <i>value</i>, z3 <i>value</i>, z4 <i>value</i></b>—SONET/SDH overhead bytes.</p> <p><b>Range:</b> 0 through 255</p> <p><b>Default:</b> 0x00</p> <p><b>s1 <i>value</i></b>—Synchronization message SONET overhead byte. This byte is normally controlled as a side effect of the system reference clock configuration and the state of the external clock coming from an interface if the system reference clocks have been configured to use an external reference.</p> <p><b>Range:</b> 0 through 255</p> <p><b>Default:</b> 0xCC</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>Configuring SONET/SDH Header Byte Values</li> <li>no-concatenate</li> </ul>   |

## calculation-weight

---

|                            |   |
|----------------------------|---|
| <b>Syntax</b>              | <code>calculation-weight {<br/>    <code>delay</code> <i>delay-value</i>;<br/>    <code>delay-variation</code> <i>delay-variation-value</i>;<br/>}</code> |
| <b>Hierarchy Level</b>     | [edit protocols <code>oam ethernet connectivity-fault-management performance-monitoring sla-iterator-profiles</code> <i>profile-name</i> ]                |
| <b>Release Information</b> | Statement introduced in Junos OS Release 11.1.<br>Statement introduced in Junos OS Release 11.4 for EX Series switches.                                   |
| <b>Description</b>         | Configure the calculation weight for delay and delay variation.   |




NOTE: This option is applicable only for two-way delay measurement.

The remaining statements are explained separately.

|                                 |   |
|---------------------------------|---|
| <b>Required Privilege Level</b> | Configure—To enter configuration mode.<br>Control—To modify any configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring an Iterator Profile</i></li><li>• <i>Configuring an Iterator Profile on a Switch (CLI Procedure)</i></li><li>• <a href="#">delay on page 412</a></li><li>• <a href="#">delay-variation on page 413</a></li></ul> |



## callback

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | callback;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>dl n</i> unit <i>logical-unit-number</i> <b>dialer-options incoming-map</b> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>dl n</i> unit <i>logical-unit-number</i> <b>dialer-options incoming-map</b> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 7.5.   |
| <b>Description</b>              | On J Series Services Routers with interfaces configured for ISDN, configure the dialer to terminate the incoming call and call back the originator after the callback wait period. The default wait time is 5 seconds. To configure the wait time, include the <b>callback-wait-period</b> statement at the [edit interfaces <i>dl n</i> unit <i>logical-unit-number</i> <b>dialer-options</b> ] hierarchy level.                           |
|                                 | <div>  <p><b>NOTE:</b> The <b>incoming-map</b> statement is mandatory for the router to accept any incoming ISDN calls.</p> </div> <p>If the <b>callback</b> statement is configured, you cannot use the <b>caller caller-id</b> statement at the [edit interfaces <i>dl n</i> unit <i>logical-unit-number</i> <b>dialer-options</b>] hierarchy level.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Dial-In and Callback</i></li> <li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li> <li>• <a href="#">callback-wait-period on page 376</a></li> </ul>   |

## callback-wait-period

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>callback-wait-period <i>time</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>dl</i> n unit <i>logical-unit-number</i> <b>dialer-options</b> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>dl</i> n unit <i>logical-unit-number</i> <b>dialer-options</b> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 7.5.   |
| <b>Description</b>              | <p>On J Series Services Routers with interfaces configured for ISDN with callback, specify the amount of time the dialer waits before calling back the caller. The default wait time is 5 seconds. The wait time is necessary because, when a call is rejected, the switch waits for up to 4 seconds on point-to-multipoint connections to ensure no other device accepts the call before sending the DISCONNECT message to the originator of the call. However, the default time of 5 seconds may not be sufficient for different switches or may not be needed on point-to-point connections.</p> <p>To configure callback mode, include the <b>callback</b> statement at the [edit interfaces <i>dl</i>n unit <i>logical-unit-number</i> <b>dialer-options</b>] hierarchy level.</p> <p>If the <b>callback</b> statement is configured, you cannot use the <b>caller <i>caller-id</i></b> statement at the [edit interfaces <i>dl</i>n unit <i>logical-unit-number</i> <b>dialer-options</b>] hierarchy level.</p> |
| <b>Options</b>                  | <b><i>time</i></b> —Time the dialer waits before calling back the caller.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Dial-In and Callback</i></li><li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li></ul>  |

## caller

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>caller (caller-id   accept-all);</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>dl</i> n unit <i>logical-unit-number</i> <b>dialer-options incoming-map</b> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>dl</i> n unit <i>logical-unit-number</i> <b>dialer-options incoming-map</b> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 7.5.   |
| <b>Description</b>              | On J Series Services Routers with interfaces configured for ISDN, specify the dialer to accept a specified caller number or accept all incoming calls.  |
| <b>Options</b>                  | <p><b>caller-id</b>—Incoming caller number. You can configure multiple caller IDs on a dialer. The caller ID of the incoming call is matched against all caller IDs configured on all dialers. The dialer matching the caller ID is looked at for further processing. Only a precise match is a valid match. For example, the configured caller ID 1-222-333-4444 or 222-333-4444 will match the incoming caller ID 1-222-333-4444.</p> <p>If the incoming caller ID has fewer digits than the number configured, it is not a valid match. Duplicate caller IDs are not allowed on different dialers; however, for example, the numbers 1-408-532-1091, 408-532-1091, and 532-1091 can still be configured on different dialers.</p> <p>Only one B-channel can map to one dialer. If one dialer is already mapped, any other call mapping to the same dialer is rejected (except in the case of a multilink dialer). If no dialer caller is configured on a dialer, that dialer will not accept any calls.</p> <p><b>accept-all</b>—Any incoming call in an associated interface is accepted.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>ISDN Interfaces Overview</i></li> <li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li> </ul>   |

## calling-number

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>calling-number <i>number</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>br-pim</i> /0/ <i>port</i> <a href="#">isdn-options</a> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | On J Series Services Routers with ISDN interfaces, configure the calling number to include in outgoing calls.  |
| <b>Options</b>                  | <i>number</i> —Calling number.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li><i>Configuring ISDN Physical Interface Properties</i></li><li><i>Junos OS Interfaces and Routing Configuration Guide</i></li></ul> |

## cbit-parity

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>(cbit-parity   no-cbit-parity);</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">t3-options</a> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For T3 interfaces only, enable or disable C-bit parity mode, which controls the type of framing that is present on the transmitted T3 signal. When C-bit parity mode is enabled, the C-bit positions are used for the far-end block error (FEBE), far-end alarm and control (FEAC), terminal data link, path parity, and mode indicator bits, as defined in ANSI T1.107a-1989. For ATM and ATM2 IQ2 and IQ2-E interfaces, M23 framing is used when the <b>no-cbit-parity</b> statement is included. For all other interfaces, M13 framing is used when the <b>no-cbit-parity</b> statement is included. |
| <b>Default</b>                  | C-bit parity mode is enabled.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li><i>Configuring E3 and T3 Parameters on ATM Interfaces</i></li><li><i>Disabling T3 C-Bit Parity Mode</i></li></ul>   |

## cbr


|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>cbr rate;</code>  |
| <b>Hierarchy Level</b>          | <p>[edit interfaces at-<i>fpc/pic/port</i> atm-options vpi <i>vpi-identifier</i> shaping],</p> <p>[edit interfaces at-<i>fpc/pic/port</i> unit <i>logical-unit-number</i> address <i>address</i> family <i>family</i> multipoint-destination <i>address</i> shaping],</p> <p>[edit interfaces at-<i>fpc/pic/ port</i> unit <i>logical-unit-number</i> shaping],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces at-<i>fpc/pic/port</i> unit <i>logical-unit-number</i> address <i>address</i> family <i>family</i> multipoint-destination <i>address</i> shaping],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces at-<i>fpc/pic/port</i> unit <i>logical-unit-number</i> shaping]</p>  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For ATM encapsulation only, define a constant bit rate bandwidth utilization in the traffic-shaping profile.  |
| <b>Default</b>                  | Unspecified bit rate (UBR); that is, bandwidth utilization is unlimited.  |
| <b>Options</b>                  | <p><b>rate</b>—Peak rate, in bits per second (bps) or cells per second (cps). You can specify a value in bits per second either as a complete decimal number or as a decimal number followed by the abbreviation <b>k</b> (1000), <b>m</b> (1,000,000), or <b>g</b> (1,000,000,000). You can also specify a value in cells per second by entering a decimal number followed by the abbreviation <b>c</b>; values expressed in cells per second are converted to bits per second by means of the formula 1 cps = 384 bps.</p> <p>For ATM1 and ATM2 OC3 interfaces, the maximum available rate is 100 percent of <i>line-rate</i>, or 135,600,000 bps. For ATM1 OC12 interfaces, the maximum available rate is 50 percent of <i>line-rate</i>, or 271,263,396 bps. For ATM2 IQ interfaces, the maximum available rate is 542,526,792 bps.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Defining the ATM Traffic-Shaping Profile</a></li> <li>• <a href="#">rtvbr on page 737</a></li> <li>• <a href="#">shaping on page 757</a></li> <li>• <a href="#">vbr on page 843</a></li> </ul>   |

## cell-bundle-size

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>cell-bundle-size <i>cells</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces at- <i>fpc/pic/port</i> atm-options],<br>[edit interfaces at- <i>fpc/pic/port</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces at- <i>fpc/pic/port</i> <b>unit</b> <i>logical-unit-number</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For ATM2 IQ interfaces using ATM Layer 2 circuit cell-relay transport mode only, configure the maximum number of ATM cells per frame.   |
| <b>Options</b>                  | <b><i>cells</i></b> —Maximum number of cells.<br><b>Default:</b> 1 cell<br><b>Range:</b> 1 through 176 cells  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring the Layer 2 Circuit Cell-Relay Cell Maximum</i></li></ul>  |

## chap

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre> chap {   access-profile name;   challenge-length minimum <i>minimum-length</i> maximum <i>maximum-length</i>;   default-chap-secret name;   local-name name;   passive; } </pre>   |
| <b>Hierarchy Level</b>          | <pre> [edit interfaces <i>interface-name</i> <b>ppp-options</b>], [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>ppp-options</b>], [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>ppp-options</b>] </pre>   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | <p>Allow each side of a link to challenge its peer, using a “secret” known only to the authenticator and that peer. The secret is not sent over the link.</p> <p>By default, PPP CHAP is disabled. If CHAP is not explicitly enabled, the interface makes no CHAP challenges and denies all incoming CHAP challenges.</p> <p>For ATM2 IQ interfaces only, you can configure CHAP on the logical interface unit if the logical interface is configured with one of the following PPP over ATM encapsulation types:</p> <ul style="list-style-type: none"> <li>• <b>atm-ppp-llc</b>—PPP over AAL5 LLC encapsulation.</li> <li>• <b>atm-ppp-vc-mux</b>—PPP over AAL5 multiplex encapsulation.</li> </ul> <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;">  <p><b>BEST PRACTICE:</b> On inline service (si) interfaces for L2TP, only the chap statement itself is typically used for subscriber management. We recommend that you leave the subordinate statements at their default values.</p> </div> <p>The remaining statements are explained separately.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring the PPP Challenge Handshake Authentication Protocol on page 136</a></li> <li>• <i>Junos OS Administration Library for Routing Devices</i></li> <li>• <i>Applying PPP Attributes to L2TP LNS Subscribers Per Inline Service Interface</i></li> </ul>   |

## chap-secret

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|  |  |
|--|--|
| <b>Syntax</b>  | <code>chap-secret <i>chap-secret</i>;</code>   |
| <b>Hierarchy Level</b>   | [edit access profile <i>profile-name</i> client <i>client-name</i> ]   |
| <b>Release Information</b>   | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>   | For interfaces with PPP encapsulation on which the PPP Challenge Handshake Authentication Protocol (CHAP) is configured, configure the shared secret (the CHAP secret key associated with a peer), as defined in RFC 1994.   |
| <div> <b>NOTE:</b> This statement is not supported for L2TP LNS on MX Series routers.</div> |  |
| <b>Options</b>   | <i>chap-secret</i> —The secret key associated with a peer.   |
| <b>Required Privilege Level</b>  | admin—To view this statement in the configuration.<br>admin-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>   | <ul style="list-style-type: none"><li>• <a href="#">Configuring the CHAP Secret for an L2TP Profile</a></li><li>• <a href="#">Configuring PPP CHAP Authentication on page 194</a></li><li>• <a href="#">pap-password on page 661</a></li><li>• <a href="#">Junos OS Administration Library for Routing Devices</a></li></ul> |

## circuit-type

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>circuit-type;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> auto-configure <a href="#">vlan-ranges authentication username-include</a> ],<br>[edit interfaces <i>interface-name</i> auto-configure <a href="#">stacked-vlan-ranges authentication username-include</a> ], |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.   |
| <b>Description</b>              | Specify that the circuit type is concatenated with the username during the subscriber authentication process.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring VLAN Interface Username Information for AAA Authentication</a></li></ul>   |



## cisco-interoperability

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>cisco-interoperability send-lip-remove-link-for-link-reject;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> mlfr-uni-nni-bundle-options]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 7.4.   |
| <b>Description</b>              | FRF.16 interoperability settings.   |
| <b>Options</b>                  | <b>send-lip-remove-link-for-link-reject</b> —Send Link Integrity Protocol remove link when an add-link rejection message is received. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>                   |

## classifier

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre> classifier {   per-unit-scheduler {     forwarding-class <i>class-name</i> {       loss-priority (high   low);     }   } } </pre>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> gigether-options <b>ethernet-switch-profile</b> <b>ethernet-policer-profile</b> <b>output-priority-map</b> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | <p>For Gigabit Ethernet IQ and 10-Gigabit Ethernet interfaces only, define the classifier for the output priority map to be applied to outgoing frames on this interface.</p> <p>The statements are explained separately.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Specifying an Output Priority Map</i></li> <li>• <b>input-priority-map on page 525</b></li> </ul>   |

## clear-dont-fragment-bit

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|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | clear-dont-fragment-bit;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Clear the don't-fragment (DF) bit on all IP version 4 (IPv4) packets entering a generic routing encapsulation (GRE) tunnel. If the encapsulated packet's size exceeds the tunnel's maximum transmission unit (MTU), the packet is fragmented before encapsulation. The statement is supported only on MX Series routers and all M Series routers except the M320 router. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>  |

## client

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | client;   |
| <b>Hierarchy Level</b>          | [edit interfaces pp0 unit <i>logical-unit-number</i> <b>pppoe-options</b> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces pp0 <b>unit</b> <i>logical-unit-number</i> <b>pppoe-options</b> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.   |
| <b>Description</b>              | On J Series Services Routers, configure the router to operate in the PPPoE client mode.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring the PPPoE Client Mode</i></li></ul>  |

## clock-rate

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>clock-rate rate;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For EIA-530 and V.35 interfaces, configure the interface speed, in megahertz (MHz).   |
| <b>Options</b>                  | <p><b>rate</b>—You can specify one of the following rates:</p> <ul style="list-style-type: none"><li>• 2.048 MHz</li><li>• 2.341 MHz</li><li>• 2.731 MHz</li><li>• 3.277 MHz</li><li>• 4.096 MHz</li><li>• 5.461 MHz</li><li>• 8.192 MHz</li><li>• 16.384 MHz</li></ul> <p><b>Default:</b> 16.384 MHz</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the Serial Clocking Mode on page 301</a></li></ul>  |

## clocking

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|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | clocking (external [interface <i>interface-name</i> ]   internal);   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br><b>interface</b> option added in Junos OS Release 8.2.<br>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.  |
| <b>Description</b>              | For interfaces that can use various clock sources, configure the source of the transmit clock on each interface.   |
| <b>Options</b>                  | <b>external</b> —The clock source is provided by the data communication equipment (DCE).<br><br><b>interface <i>interface-name</i></b> —For interfaces operating on T1/E1 PIMs for J Series Services Routers only, configure clocking for the drop-and insert feature. When configuring this feature, both ports must use the same clock source: either the router's internal clock or an external clock on one of the interfaces. If an external clock source is required, one interface must specify clocking external and the other must specify the same clock.<br><br><b>internal</b> —Use the internal stratum 3 clock as the reference clock.<br><b>Default:</b> internal |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the Clock Source on page 156</a></li><li>• <i>Configuring the Clock Source on SONET/SDH Interfaces</i></li><li>• <i>Clock Sources on Channelized Interfaces</i></li><li>• <i>Configuring a Channelized T1/E1 Interface to Drop and Insert Time Slots</i></li><li>• <a href="#">loop-timing on page 585</a></li></ul>   |

## clocking-mode

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | clocking-mode (dce   internal   loop);  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For EIA-530 and V.35 interfaces, configure the clock mode. You cannot configure <b>clocking-mode dce</b> on a DTE router using an X.21 serial line protocol (detected automatically when an X.21 cable is plugged into the serial interface). |
| <b>Options</b>                  | <b>dce</b> —DCE timing (DTE mode only, not valid for X.21).<br><br><b>internal</b> —Internal baud timing.<br><br><b>loop</b> —Loop timing.<br><b>Default:</b> loop  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the Serial Clocking Mode on page 301</a></li></ul>  |


## compatibility-mode

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|                            |   |
|----------------------------|---|
| <b>Syntax</b>              | <code>compatibility-mode (adtran   digital-link   kentrox   larscom   verilink) &lt;subrate value&gt;;</code>                               |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> <a href="#">e3-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">t3-options</a> ] |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>         | Configure the E3 or T3 interface to be compatible with the channel service unit (CSU) at the remote end of the line.                        |



**NOTE:** The `compatibility-mode` statement at the [edit interfaces *interface-name* [e3-options](#)] hierarchy level is not valid for IQE PICs.

|                                 |  |
|---------------------------------|--|
| <b>Default</b>                  | If you omit this option, the full E3 or T3 rate is used.   |
| <b>Options</b>                  | <p><b>adtran</b>—For T3 IQ interfaces only, configure compatibility with Adtran CSUs.</p> <p><b>digital-link</b>—Configure compatibility with Digital Link CSUs. If you include this option on an E3 interface, you must also disable payload scrambling.</p> <p><b>kentrox</b>—Configure compatibility with Kentrox CSUs. Kentrox subrate is valid for E3 IQ and T3 IQ interfaces only.</p> <p><b>larscom</b>—For T3 and T3 IQ interfaces only, configure compatibility with Larscom CSUs.</p> <p><b>verilink</b>—For T3 IQ and T3 IQE interfaces only, configure compatibility with Verilink CSUs.</p> |
|                                 | <p> <b>NOTE:</b> Verilink configuration is not functional if an IQ interface is paired with an IQE interface.</p>   |
|                                 | <p><b>subrate value</b>—Subrate of the E3 or T3 line.</p> <p><b>Range:</b> For Kentrox CSUs on E3 IQ interfaces and T3 IQ interfaces the subrate value must match the value configured on the CSU. Each increment of the subrate value corresponds to a rate increment of about 0.5 Mbps.</p>  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring the E3 CSU Compatibility Mode</i></li><li>• <i>Configuring the T3 CSU Compatibility Mode</i></li><li>• <a href="#">payload-scrambler on page 668</a></li></ul>  |

## compression

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See the following sections:

- [compression \(PPP Properties\) on page 389](#)
- [compression \(Voice Services\) on page 390](#)

### compression (PPP Properties)

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>compression {   acfc;   pfc; }</pre>   |
| <b>Hierarchy Level</b>          | <p>[edit interfaces <i>interface-name</i> <a href="#">ppp-options</a>],</p> <p>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">ppp-options</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">ppp-options</a>]</p> |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | <p>For interfaces with PPP encapsulation, set Link Control Protocol (LCP) compression options.</p> <p>The statements are explained separately.</p>  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring PPP Address and Control Field Compression on page 145</a></li> <li>• <a href="#">Configuring the PPP Protocol Field Compression on page 147</a></li> </ul>   |

## compression (Voice Services)

|                          |  |
|--------------------------|--|
| Syntax                   | <pre>compression {<br/>  rtp {<br/>    f-max-period <i>number</i>;<br/>    queues [ <i>queue-numbers</i> ];<br/>    port {<br/>      minimum <i>port-number</i>;<br/>      maximum <i>port-number</i>;<br/>    }<br/>  }<br/>}</pre> |
| Hierarchy Level          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ]                       |
| Release Information      | Statement introduced before Junos OS Release 7.4.  |
| Description              | Configure the compression properties for voice services traffic.<br><br>The remaining statements are described separately.   |
| Required Privilege Level | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| Related Documentation    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>  |

## compression-device

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|                          |  |
|--------------------------|--|
| Syntax                   | <pre>compression-device <i>interface-name</i>;</pre>   |
| Hierarchy Level          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ] |
| Release Information      | Statement introduced before Junos OS Release 7.4.  |
| Description              | Specify the compression interface for voice services traffic.  |
| Options                  | <i>interface-name</i> —Logical interface used for compression.   |
| Required Privilege Level | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| Related Documentation    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li><li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li></ul>                         |



## connections

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>connections {<br/>  interface-switch connection-name {<br/>    interface interface-name.unit-number;<br/>    interface interface-name.unit-number;<br/>  }<br/>}</pre>                                |
| <b>Hierarchy Level</b>          | [edit protocols]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | <p>Define the connection between two circuits in a circuit cross-connect (CCC) connection.</p> <p>The statements are explained separately.</p>   |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Defining the Connection for Switching Cross-Connects on page 258</a></li><li>• <i>Junos OS MPLS Applications Library for Routing Devices</i></li></ul> |

## connectivity-fault-management

```

Syntax connectivity-fault-management {
  action-profile profile-name {
    default-actions {
      interface-down;
    }
    event {
      adjacency-loss;
      interface-status-tlv (down | lower-layer-down);
      port-status-tlv blocked;
      rdi;
    }
  }
  performance-monitoring {
    delegate-server-processing;
    hardware-assisted-timestamping;
    sla-iterator-profiles {
      profile-name {
        disable;
        calculation-weight {
          delay delay-weight;
          delay-variation delay-variation-weight;
        }
        cycle-time milliseconds;
        iteration-period connections;
        measurement-type (loss | statistical-frame-loss | two-way-delay);
      }
    }
  }
  linktrace {
    age (30m | 10m | 1m | 30s | 10s);
    path-database-size path-database-size;
  }
  maintenance-domain domain-name {
    bridge-domain <vlan-id [ vlan-ids ]>;
    instance routing-instance-name;
    interface interface-name;
    level number;
    name-format (character-string | none | dns | mac+2oct);
    maintenance-association ma-name {
      protect-maintenance-association protect-ma-name;
      remote-maintenance-association remote-ma-name;
      short-name-format (character-string | vlan | 2octet | rfc-2685-vpn-id);
      continuity-check {
        convey-loss-threshold;
        hold-interval minutes;
        interface-status-tlv;
        interval (10m | 10s | 1m | 1s | 100ms);
        loss-threshold number;
        port-status-tlv;
      }
    }
    mep mep-id {
      auto-discovery;
    }
  }
}

```

```

    direction (up | down);
    interface interface-name (protect | working);
    lowest-priority-defect (all-defects | err-xcon | mac-rem-err-xcon | no-defect |
        rem-err-xcon | xcon );
    priority number;
    remote-mep mep-id {
        action-profile profile-name;
        sla-iterator-profile profile-name {
            data-tlv-size size;
            iteration-count count-value;
            priority priority-value;
        }
    }
}
}
}
virtual-switch routing-instance-name {
    bridge-domain name <vlan-ids [ vlan-ids ]>;
}
}
}

```

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

**Release Information** Statement introduced in Junos OS Release 8.4.

**Description** For Ethernet interfaces on M7i and M10i routers with Enhanced CFEB (CFEB-E), and on M120, M320, MX Series, and T Series routers, specify connectivity fault management for IEEE 802.1ag Operation, Administration, and Management (OAM) support. In Junos OS Release 9.3 and later, this statement is also supported on aggregated Ethernet interfaces.

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**

- *IEEE 802.1ag OAM Connectivity Fault Management Overview*
- *Example: Configuring Connectivity Fault Management for a PBB Network on MX Series Routers*

## container-devices

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | container-devices {<br>device-count <i>number</i> ;<br>}  |
| <b>Hierarchy Level</b>          | [edit chassis]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.2.   |
| <b>Description</b>              | Specify the container devices configuration. The <b>number</b> option specifies the number of sequentially numbered container interfaces, from <b>ci0</b> to <b>ci127</b> maximum.                  |
| <b>Options</b>                  | <b>number</b> —Number of container devices.<br><b>Range:</b> 1 through 128  |
| <b>Required Privilege Level</b> | chassis—To view this statement in the configuration.<br>chassis-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Displaying APS Using a Container Interface with ATM Encapsulation</i></li><li>• <i>Configuring Container Interfaces for APS on SONET Links</i></li></ul> |

## container-list

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | container-list [ <i>container-interface-names</i> ];  |
| <b>Hierarchy Level</b>          | [edit interfaces <a href="#">container-options</a> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.2.   |
| <b>Description</b>              | Specify a list of container interfaces; for example: <b>ci0</b> , <b>ci1</b> , and up to <b>ci127</b> .   |
| <b>Options</b>                  | <b>container-interface-names</b> —Name of each container interface.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Displaying APS Using a Container Interface with ATM Encapsulation</i></li><li>• <i>Configuring Container Interfaces for APS on SONET Links</i></li><li>• <a href="#">container-options on page 395</a></li></ul> |

## container-options

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre> container-options {   container-list [ container-interface-names ];   container-type aps;   member-interface-type sonet {     member-interface-speed [ speed ];   } } </pre>   |
| <b>Hierarchy Level</b>          | [edit interfaces]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.2.  |
| <b>Description</b>              | Specify the container interface options.   |
| <b>Options</b>                  | <p><b>interface-name</b>—Name of the SONET or the container interface.</p> <p><b>aps</b>—Specify the member link interface type of the container as APS.</p> <p><b>sonet</b>—Protocol type of the container interface.</p> <p><b>speed</b>—Set interface speed to OC3, OC12, OC48, OC192, OC768, or mixed.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Displaying APS Using a Container Interface with ATM Encapsulation</i></li> <li>• <i>Configuring Container Interfaces for APS on SONET Links</i></li> </ul>   |

## container-type

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre> container-type aps; </pre>   |
| <b>Hierarchy Level</b>          | [edit interfaces <a href="#">container-options</a> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.2.  |
| <b>Description</b>              | Specify the container-options interface type.  |
| <b>Options</b>                  | <b>aps</b> —Configure the interface type to be Automatic Protection Switching (APS).   |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Displaying APS Using a Container Interface with ATM Encapsulation</i></li> <li>• <i>Configuring Container Interfaces for APS on SONET Links</i></li> </ul> |

## continuity-check

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>continuity-check {<br/>  convey-loss-threshold;<br/>  hold-interval <i>minutes</i>;<br/>  interface-status-tlv;<br/>  interval (10m   10s   1m   1s  100ms   10ms);<br/>  loss-threshold <i>number</i>;<br/>  port-status-tlv;<br/>}</pre>   |
| <b>Hierarchy Level</b>          | [edit protocols oam ethernet connectivity-fault-management maintenance-domain <i>domain-name</i> maintenance-association <i>ma-name</i> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.   |
| <b>Description</b>              | Specify continuity check protocol options.  |
| <b>Options</b>                  | <p><b>convey-loss-threshold</b>—Enable loss-threshold-tlv transmission.</p> <p><b>hold-interval</b> <i>minutes</i>—Specify the continuity check hold-interval, in minutes.</p> <p><b>interface-status-tlv</b>—Enable interface-status-tlv transmission.</p> <p><b>interval</b> (<i>10m   10s   1m   1s  100ms   10ms</i>)—Specify the continuity check interval.</p> <p><b>loss-threshold</b> <i>minutes</i>—Specify the loss-threshold, in minutes.</p> <p><b>port-status-tlv</b>—Enable port-status-tlv transmission.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Continuity Check Protocol</i></li><li>• <i>Example: Configuring Connectivity Fault Management for a PBB Network on MX Series Routers</i></li></ul>   |

## control-channel

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>control-channel <i>channel-name</i> {<br/>    vlan <i>vlan-id</i>;<br/>}</code>   |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">protection-group ethernet-ring name</a> ( <a href="#">east-interface</a>   <a href="#">west-interface</a> )]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.4.<br>Statement introduced in Junos OS Release 12.1 for EX Series switches.  |
| <b>Description</b>              | Configure the Ethernet RPS control channel logical interface to carry the RAPS PDU. The related physical interface is the physical ring port.   |
| <b>Options</b>                  | <b>vlan <i>vlan-id</i></b> —If the control channel logical interface is a trunk port, then a dedicated <b>vlan <i>vlan-id</i></b> defines the dedicated VLAN channel to carry the RAPS traffic. Only configure the <b>vlan-id</b> when the control channel logical interface is the trunk port. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Ethernet Ring Protection Switching Overview</i></li> <li>• <i>Example: Configuring Ethernet Ring Protection Switching on EX Series Switches</i></li> <li>• <i>Configuring Ethernet Ring Protection Switching (CLI Procedure)</i></li> </ul>         |

## control-polarity

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>control-polarity (negative   positive);</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For X.21 interfaces only, configure the control signal polarity.  |
| <b>Options</b>                  | <b>positive</b> —Positive signal polarity.<br><b>negative</b> —Negative signal polarity.<br><b>Default:</b> positive    |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Serial Signal Polarities on page 306</a></li> </ul>    |

## control-signal

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | control-signal (assert   de-assert   normal);  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> <a href="#">dce-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">serial-options</a> <a href="#">dte-options</a> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For X.21 interfaces only, configure the to-DCE signal.   |
| <b>Options</b>                  | <b>assert</b> —The to-DCE signal must be asserted.<br><br><b>de-assert</b> —The to-DCE signal must be deasserted.<br><br><b>normal</b> —Normal request-to-send (RTS) signal handling, as defined by ITU-T Recommendation X.21.<br><b>Default:</b> normal |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the Serial Signal Handling on page 303</a></li></ul>   |

## copy-tos-to-outer-ip-header

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | copy-tos-to-outer-ip-header;   |
| <b>Hierarchy Level</b>          | [edit interfaces at- <i>fpc/pic/port</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces at- <i>fpc/pic/port</i> unit <i>logical-unit-number</i> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.2.  |
| <b>Description</b>              | For GRE tunnel interfaces only, enable the inner IP header's TOS bits to be copied to the outer IP packet header.  |
| <b>Default</b>                  | If you omit this statement, the TOS bits in the outer IP header are set to 0.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Junos OS Class of Service Library for Routing Devices</a></li></ul>  |



## core-dump

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | (core-dump   no-core-dump);   |
| <b>Hierarchy Level</b>          | [edit interfaces mo- <i>fpc/pic/port</i> multiservice-options]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | <p>For monitoring services interfaces only, a useful tool for isolating the cause of a problem. Core dumping is enabled by default. The directory <b>/var/tmp</b> contains core files. The Junos OS saves the current core file (0) and the four previous core files, which are numbered 1 through 4 (from newest to oldest):</p> <ul style="list-style-type: none"><li>• <b>core-dump</b>—Enable the core dumping operation.</li><li>• <b>no-core-dump</b>—Disable the core dumping operation.</li></ul> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Multiservice Physical Interface Properties on page 168</a></li><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>  |

## crc-major-alarm-threshold

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | crc-major-alarm-threshold (1e-3   5e-4   1e-4   5e-5   1e-5);  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> t1-options]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.<br>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.  |
| <b>Description</b>              | Major alarm error thresholds for T1 CRC errors. When the threshold is exceeded for one second, a defect condition is declared. If the defect condition continues for the monitoring period, an alarm condition is declared.  |
| <b>Default</b>                  | 10-second monitoring period for all settings except 1e-5. The 1e-5 value uses a 50-second monitoring period.   |
| <b>Options</b>                  | <p>1e-3—Error rate expressed as the number of errors per number of bits. The value 1e-3 is one crc error in 10<sup>3</sup> bits.</p> <p>1e-4—Error rate expressed as the number of errors per number of bits. The value 1e-4 is one crc error in 10<sup>4</sup> bits.</p> <p>1e-5—Error rate expressed as the number of errors per number of bits. The value 1e-5 is one crc error in 10<sup>5</sup> bits.</p> <p>5e-4—Error rate expressed as the number of errors per number of bits. The value 5e-4 is five crc errors in 10<sup>4</sup> bits.</p> <p>5e-5—Error rate expressed as the number of errors per number of bits. The value 5e-5 is five crc errors in 10<sup>5</sup> bits.</p> <p><b>Default: 5e-5</b></p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>Configuring T1 CRC Error Major Alarm Thresholds</li></ul>  |

## crc-minor-alarm-threshold

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | crc-minor-alarm-threshold (1e-3   5e-4   1e-4   5e-5   1e-5   5e-6   1e-6);   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> t1-options]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.<br>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.   |
| <b>Description</b>              | Minor alarm error thresholds for T1 CRC errors. When the threshold is exceeded for one second, a defect condition is declared. If the defect condition continues for the monitoring period, an alarm condition is declared.   |
| <b>Default</b>                  | 10-second monitoring period for values <b>1e-3</b> , <b>5e-4</b> , <b>1e-4</b> , and <b>5e-5</b> . The <b>1e-5</b> value uses a 50-second monitoring period. The <b>5e-6</b> value uses a 100-second monitoring period. The <b>1e-6</b> value uses a 500-second monitoring period.  |
| <b>Options</b>                  | <p><b>1e-3</b>—Error rate expressed as the number of errors per number of bits. The value <b>1e-3</b> is one crc error in <math>10^3</math> bits.</p> <p><b>1e-4</b>—Error rate expressed as the number of errors per number of bits. The value <b>1e-4</b> is one crc error in <math>10^4</math> bits.</p> <p><b>1e-5</b>—Error rate expressed as the number of errors per number of bits. The value <b>1e-5</b> is one crc error in <math>10^5</math> bits.</p> <p><b>1e-6</b>—Error rate expressed as the number of errors per number of bits. The value <b>1e-5</b> is one crc error in <math>10^6</math> bits.</p> <p><b>5e-4</b>—Error rate expressed as the number of errors per number of bits. The value <b>5e-4</b> is five crc errors in <math>10^4</math> bits.</p> <p><b>5e-5</b>—Error rate expressed as the number of errors per number of bits. The value <b>5e-5</b> is five crc errors in <math>10^5</math> bits.</p> <p><b>5e-6</b>—Error rate expressed as the number of errors per number of bits. The value <b>5e-5</b> is five crc errors in <math>10^6</math> bits.</p> <p><b>Default: 5e-6</b></p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><i>Configuring T1 CRC Error Minor Alarm Thresholds</i></li> </ul>  |

## cts

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | cts (ignore   normal   require);   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options dce-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">serial-options dte-options</a> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For EIA-530 and V.35 interfaces only, configure the from-DCE signal, clear-to-send (CTS).  |
| <b>Options</b>                  | <b>ignore</b> —The from-DCE signal is ignored.<br><br><b>normal</b> —Normal CTS signal handling as defined by the TIA/EIA Standard 530.<br><br><b>require</b> —The from-DCE signal must be asserted.<br><b>Default:</b> normal |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the Serial Signal Handling on page 303</a></li></ul>   |

## cts-polarity

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | cts-polarity (negative   positive);  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Configure CTS signal polarity.   |
| <b>Options</b>                  | <b>positive</b> —Positive signal polarity.<br><br><b>negative</b> —Negative signal polarity.<br><b>Default:</b> positive |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Serial Signal Polarities on page 306</a></li></ul>       |

## current

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>current margin;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>shdsl-options</b> snr-margin],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>shdsl-options</b> snr-margin]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 7.4.  |
| <b>Description</b>              | For J Series Services Routers only, configure the current target signal-to-noise ratio (SNR) margin to be used when training the SHDSL line. The current margin is the difference between desired SNR and the actual SNR. When configured, the line trains at higher than the current margin plus SNR threshold. |
| <b>Options</b>                  | <b>margin</b> —Desired current SNR margin. Specify either <b>disabled</b> or a value from 0 dB through 10 dB.<br><b>Default:</b> 0 dB  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>ATM-over-SHDSL Overview</i></li> </ul>   |

## cycle-time

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>cycle-time cycle-time-value;</code>  |
| <b>Hierarchy Level</b>          | [edit protocols <b>oam ethernet connectivity-fault-management performance-monitoring sla-iterator-profiles</b> <i>profile-name</i> ]                                     |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.1.<br>Statement introduced in Junos OS Release 11.4 for EX Series switches.  |
| <b>Description</b>              | Configure the time (in milliseconds) taken between back-to-back transmissions of SLA frames for a single connection.   |
| <b>Options</b>                  | <b>cycle-time-value</b> —Cycle time value in milliseconds.<br><b>Range:</b> 10 through 3,600,000<br><b>Default:</b> 1000   |
| <b>Required Privilege Level</b> | Configure—To enter configuration mode.<br>Control—To modify any configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring an Iterator Profile</i></li> <li>• <i>Configuring an Iterator Profile on a Switch (CLI Procedure)</i></li> </ul> |

## data-channel

---


|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>data-channel {<br/>    vlan <i>number</i>;<br/>}</code>  |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">protection-group ethernet-ring</a> <i>ring-name</i> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.2.<br>Statement introduced in Junos OS Release 12.1 for EX Series switches.  |
| <b>Description</b>              | <p>For Ethernet ring protection, configure a data channel to define a set of VLAN IDs that belong to a ring instance.</p> <p>VLANs specified in the data channel use the same topology used by the ERPS PDU in the control channel. Therefore, if a ring interface is blocked in the control channel, all traffic in the data channel is also blocked on that interface.</p> |
| <b>Options</b>                  | <b>vlan <i>number</i></b> —Specify (by VLAN ID) one or more VLANs that belong to a ring instance.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Ethernet Ring Protection Using Ring Instances for Load Balancing</i></li><li>• <i>Example: Configuring Load Balancing Within Ethernet Ring Protection for MX Series Routers</i></li><li>• <i>Configuring Ethernet Ring Protection Switching (CLI Procedure)</i></li></ul>   |

## data-input

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>data-input (system   interface <i>interface-name</i>);</code>  |
| <b>Hierarchy Level</b>          | <code>[edit interfaces <i>ds-pim</i>/0/<i>port:channel</i>]</code>   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.2.  |
| <b>Description</b>              | <p>For interfaces operating on T1/E1 PIMs for J Series Services Routers only, configure whether an interface should send and receive data from the Routing Engine or from a given interface name. On channelized T1/E1 interfaces partitioned into channels, you can insert time slots from one port directly into the other port on the same PIM, to replace time slots coming through the Routing Engine.</p> <p>To avoid slips, both ports must use the same clock source: either the router's internal clock or an external clock on one of the interfaces. If an external clock source is required, one interface must specify clocking external and the other must specify the same clock by including the <b>clocking external interface <i>interface-name</i></b> statement at the <code>[edit interfaces <i>interface-name</i>]</code> hierarchy level.</p> |
| <b>Options</b>                  | <p><b>system</b>—Interface sends and receives data from the Routing Engine.</p> <p><b>interface <i>interface-name</i></b>—Interface sends and receives data from a specific interface.</p> <p><b>Default:</b> Data is sent and received from the Routing Engine (system).</p>  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring a Channelized T1/E1 Interface to Drop and Insert Time Slots</i></li> <li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li> <li>• <a href="#">clocking on page 386</a></li> </ul>   |

## data-tlv-size

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|   |  |
|---|--|
| Syntax  | <code>data-tlv-size size;</code>   |
| Hierarchy Level   | [edit protocols <a href="#">oam</a> <a href="#">ethernet</a> <a href="#">connectivity-fault-management</a> <a href="#">maintenance-domain</a> <i>md-name</i> <a href="#">maintenance-association</a> <i>ma-name</i> <a href="#">mep</a> <i>mep-id</i> <a href="#">remote-mep</a> <i>remote-mep-id</i> <a href="#">sla-iterator-profile</a> <i>profile-name</i> ] |
| Release Information   | Statement introduced in Junos OS Release 11.1.   |
| Description   | Configure the size of the data TLV portion of the Y.1731 data frame.   |
| Options   | <i>size</i> —Size of the data TLV portion of the Y.1731 data frame.  |
| <div> <b>NOTE:</b> This option is applicable only for two-way delay measurement.</div> |  |
| <b>Range:</b> 1 through 1400 bytes  |  |
| <b>Default:</b> 1   |  |
| Required Privilege Level  | Configure—To enter configuration mode.<br>Control—To modify any configuration.   |
| Related Documentation   | <ul style="list-style-type: none"><li>• <a href="#">sla-iterator-profile on page 761</a></li><li>• <i>Configuring a Remote MEP with an Iterator Profile</i></li></ul>  |



## dcd

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | dcd (ignore   normal   require);   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options dce-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">serial-options dte-options</a> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For EIA-530 and V.35 interfaces only, configure the from-DCE signal, data-carrier-detect (DCD).  |
| <b>Options</b>                  | <p><b>ignore</b>—The from-DCE signal is ignored.</p> <p><b>normal</b>—Normal DCD signal handling as defined by the TIA/EIA Standard 530.</p> <p><b>require</b>—The from-DCE signal must be asserted.</p> <p><b>Default:</b> normal</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring the Serial Signal Handling on page 303</a></li> </ul>   |

## dcd-polarity

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | dcd-polarity (negative   positive);  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Configure DCD signal polarity.   |
| <b>Options</b>                  | <p><b>positive</b>—Positive signal polarity.</p> <p><b>negative</b>—Negative signal polarity.</p> <p><b>Default:</b> positive</p>  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p> |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Serial Signal Polarities on page 306</a></li> </ul>               |

## dce

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | dce;  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ],<br>[edit interfaces <i>interface-name</i> <b>serial-options</b> <b>clocking-mode</b> ]                          |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For Frame Relay only, respond to status enquiry message keepalives.<br><br>When you configure the router to be a DCE, keepalives are disabled by default. |
| <b>Default</b>                  | The router operates in DTE mode.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the Router as a DCE with Frame Relay Encapsulation on page 157</a></li></ul>              |

## dce-options

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | dce-options {<br><b>control-signal</b> (assert   de-assert   normal);<br><b>cts</b> (ignore   normal   require);<br><b>dcd</b> (ignore   normal   require);<br><b>dsr</b> (ignore   normal   require);<br><b>dtr</b> <i>signal-handling-option</i> ;<br><b>ignore-all</b> ;<br><b>indication</b> (ignore   normal   require);<br><b>rts</b> (assert   de-assert   normal);<br><b>tm</b> (ignore   normal   require);<br>} |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>serial-options</b> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.3.<br>Statement previously known as <b>control-leads</b> .   |
| <b>Description</b>              | For J Series Services Routers, configure the serial interface signal characteristics.<br><br>The statements are explained separately.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the Serial Signal Handling on page 303</a></li></ul>  |

## deactivation-delay

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>deactivation-delay seconds;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>dl</i> unit <i>logical-unit-number</i> <b>dialer-options</b> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | On J Series Services Routers with ISDN interfaces, configure the ISDN deactivation delay. Used only for dialer backup and dialer watch cases.  |
| <b>Options</b>                  | <p><b>seconds</b>—Interval before the backup interface is deactivated after the primary interface has comes up.</p> <p><b>Range:</b> 1 through 4,294,967,295 seconds</p> <p><b>Default:</b> 0 (zero)</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring ISDN Logical Interface Properties</i></li> <li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li> </ul>                           |

## default-actions

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>default-actions {   interface-down; }</pre>   |
| <b>Hierarchy Level</b>          | [edit protocols oam ethernet <b>connectivity-fault-management action-profile</b> <i>profile-name</i> ]                             |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.  |
| <b>Description</b>              | Define the action to be taken when connectivity to the remote MEP is lost.   |
| <b>Default</b>                  | If no action is configured, no action is taken.  |
| <b>Options</b>                  | <b>interface-down</b> —When a remote MEP connectivity failure is detected, bring the interface down.                               |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p> |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring a Connectivity Fault Management Action Profile</i></li> </ul>              |

## default-chap-secret

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>default-chap-secret name;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ppp-options <a href="#">chap</a> ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ppp-options <a href="#">chap</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> ppp-options <a href="#">chap</a> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.0.   |
| <b>Description</b>              | <p>Define the default CHAP secret to be used when no matching CHAP access profile exists.</p> <p>For ATM2 IQ interfaces only, you can configure a default CHAP secret on the logical interface unit if the logical interface is configured with one of the following PPP over ATM encapsulation types:</p> <ul style="list-style-type: none"><li>• <b>atm-ppp-llc</b>—PPP over AAL5 LLC encapsulation.</li><li>• <b>atm-ppp-vc-mux</b>—PPP over AAL5 multiplex encapsulation.</li></ul> |
| <b>Default</b>                  | If you do not include the <b>default-chap-secret</b> statement in the configuration, and an interface receives a CHAP challenge or response from a peer that is not in the applied access profile, the link is immediately dropped.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring a Default CHAP Secret on page 137</a></li><li>• <a href="#">access-profile on page 318</a></li></ul>  |

## default-pap-password

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|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>default-pap-password password;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">ppp-options pap</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">ppp-options pap</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.3.  |
| <b>Description</b>              | For PAP authentication, the default PAP password.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring a Default PAP Password on page 195</a></li><li>• <a href="#">access-profile on page 318</a></li></ul>  |

## delay (PPPoE Service Name Tables)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>delay seconds;</code>  |
| <b>Hierarchy Level</b>          | [edit protocols pppoe service-name-tables <i>table-name</i> <b>service</b> <i>service-name</i> ],<br>[edit protocols pppoe service-name-tables <i>table-name</i> service <i>service-name</i> <b>agent-specifier</b><br><i>aci circuit-id-string ari remote-id-string</i> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.<br>Support at [edit protocols pppoe service-name-tables <i>table-name</i> <b>service</b> <i>service-name</i><br><b>agent-specifier</b> <i>aci circuit-id-string ari remote-id-string</i> ] hierarchy level introduced in Junos<br>OS Release 10.2.  |
| <b>Description</b>              | <p>Configure the PPPoE underlying interface on the router to wait a specified number of seconds after receiving a PPPoE Active Discovery Initiation (PADI) control packet from a PPPoE client before sending a PPPoE Active Discovery Offer (PADO) packet to indicate that it can service the client request</p> <p>The router (PPPoE server) does not check whether another server has already sent a PADO packet during the delay period in response to the PPPoE client's PADI packet. It is up to the PPPoE client to determine whether another PPPoE server has responded to its PADI request, or if it must respond to the delayed PADO packet to establish a PPPoE session.</p> |
| <b>Options</b>                  | <p><b>seconds</b>—Number of seconds that the PPPoE underlying interface waits after receiving a PADI packet from a PPPoE client before sending a PADO packet in response.</p> <p><b>Range:</b> 1 through 120 seconds</p>   |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>Configuring PPPoE Service Name Tables</li> </ul>  |

## delay

---

|   |  |
|---|--|
| <b>Syntax</b>   | <code>delay <i>delay-value</i>;</code>   |
| <b>Hierarchy Level</b>  | [edit protocols <a href="#">oam ethernet connectivity-fault-management performance-monitoring sla-iterator-profiles</a> <i>profile-name</i> <a href="#">calculation-weight</a> ]   |
| <b>Release Information</b>  | Statement introduced in Junos OS Release 11.1.<br>Statement introduced in Junos OS Release 11.4 for EX Series switches.  |
| <b>Description</b>  | Configure the calculation weight for delay.  |
| <b>Options</b>  | <i>delay-value</i> —Calculation weight for delay.  |
| <div> <b>NOTE:</b> This option is applicable only for two-way delay measurement.</div> |  |
| <div><b>Range:</b> 1 through 65,535<br/><b>Default:</b> 1</div>   |  |
| <b>Required Privilege Level</b>   | Configure—To enter configuration mode.<br>Control—To modify any configuration.   |
| <b>Related Documentation</b>  | <ul style="list-style-type: none"><li>• <i>Configuring an Iterator Profile</i></li><li>• <i>Configuring an Iterator Profile on a Switch (CLI Procedure)</i></li><li>• <a href="#">calculation-weight on page 374</a></li></ul> |

## delay-variation

|                            |  |
|----------------------------|--|
| <b>Syntax</b>              | <code>delay-variation <i>delay-variation-value</i>;</code>   |
| <b>Hierarchy Level</b>     | [edit protocols <a href="#">oam</a> <a href="#">ethernet</a> <a href="#">connectivity-fault-management</a> <a href="#">performance-monitoring</a> <a href="#">sla-iterator-profiles</a> <i>profile-name</i> <a href="#">calculation-weight</a> ] |
| <b>Release Information</b> | Statement introduced in Junos OS Release 11.1.<br>Statement introduced in Junos OS Release 11.4 for EX Series switches.  |
| <b>Description</b>         | Configure the calculation weight for delay variation.  |
| <b>Options</b>             | <i>delay-variation-value</i> —Calculation weight for delay variation.  |



**NOTE:** This option is applicable only for two-way delay measurement.

**Range:** 1 through 65,535

**Default:** 1

|                                 |  |
|---------------------------------|--|
| <b>Required Privilege Level</b> | Configure—To enter configuration mode.<br>Control—To modify any configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring an Iterator Profile</i></li> <li>• <i>Configuring an Iterator Profile on a Switch (CLI Procedure)</i></li> <li>• <a href="#">calculation-weight on page 374</a></li> </ul> |

## delegate-server-processing

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>delegate-server-processing;</code>   |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam</a> <a href="#">ethernet</a> <a href="#">connectivity-fault-management</a> <a href="#">performance-monitoring</a> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.1.   |
| <b>Description</b>              | For Ethernet interfaces on MX Series routers, enable server-side processing for two-way delay measurement and loss measurement.<br><br>By default, the processing is done by the Routing Engine. |
| <b>Required Privilege Level</b> | trace—To view this statement in the configuration.<br>trace-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Ethernet Frame Delay Measurements Overview</i></li> </ul>  |

## delimiter

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>delimiter <i>delimiter-character</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> auto-configure <a href="#">vlan-ranges authentication username-include</a> ],<br>[edit interfaces <i>interface-name</i> auto-configure <a href="#">stacked-vlan-ranges authentication username-include</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.  |
| <b>Description</b>              | Specify the character used as the delimiter between the concatenated components of the username. You cannot use the semicolon (;) as a delimiter.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring VLAN Interface Username Information for AAA Authentication</i></li></ul>   |




## demux-destination

See the following sections:

- [demux-destination \(Underlying Interface\) on page 415](#)
- [demux-destination \(Demux Interface\) on page 416](#)

### demux-destination (Underlying Interface)

|  |   |
|--|---|
| <b>Syntax</b>  | <code>demux-destination family;</code>  |
| <b>Hierarchy Level</b>   | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ] |
| <b>Release Information</b>   | Statement introduced in Junos OS Release 9.0.<br>Support for aggregated Ethernet added in Junos OS Release 9.4.   |
| <b>Description</b>   | Configure the logical demultiplexing (demux) destination family type on the IP demux underlying interface.  |
| <div>  <p><b>NOTE:</b> The IP demux interface feature currently supports only Fast Ethernet, Gigabit Ethernet, 10-Gigabit Ethernet, or aggregated Ethernet underlying interfaces.</p> </div> |   |
| <b>Required Privilege Level</b>  | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>   | <ul style="list-style-type: none"> <li>• <a href="#">Configuring an IP Demux Underlying Interface on page 281</a></li> </ul>  |

## demux-destination (Demux Interface)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>demux-destination {<br/>    <code>destination-prefix</code>;<br/>}</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> ],<br>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.0.<br>Support for aggregated Ethernet added in Junos OS Release 9.4.  |
| <b>Description</b>              | Configure one or more logical demultiplexing (demux) destination prefixes. The prefixes are matched against the destination address of packets that the underlying interface receives. When a match occurs, the packet is processed as if it was received on the demux interface.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring IP Demux Prefixes on page 284</a></li></ul>  |

## demux-options (Static Interface)

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|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>demux-options {<br/>    <code>underlying-interface</code> <i>interface-name</i><br/>}</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.0.  |
| <b>Description</b>              | Configure logical demultiplexing (demux) interface options.<br><br>The statement is explained separately.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Specifying the Demux Underlying Interface on page 283</a></li></ul>  |

## demux-source

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See the following sections:

- [demux-source \(Demux Interface\) on page 417](#)
- [demux-source \(Underlying Interface\) on page 418](#)

### demux-source (Demux Interface)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>demux-source {<br/>    source-prefix;<br/>}</pre>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> ],<br>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.0.<br>Support for aggregated Ethernet added in Junos OS Release 9.4.  |
| <b>Description</b>              | Configure one or more logical demultiplexing (demux) source prefixes. The prefixes are matched against the source address of packets that the underlying interface receives. When a match occurs, the packet is processed as if it was received on the demux interface.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring IP Demux Prefixes on page 284</a></li></ul>  |

## demux-source (Underlying Interface)

|  |  |
|--|--|
| <b>Syntax</b>  | <code>demux-source <i>family</i>;</code>   |
| <b>Hierarchy Level</b>   | <code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i>],</code><br><code>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i>],</code><br><code>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> interfaces</code><br><code>    <i>interface-name</i> unit <i>logical-unit-number</i>],</code> |
| <b>Release Information</b>   | Statement introduced in Junos OS Release 9.0.<br>Support for aggregated Ethernet added in Junos OS Release 9.4.  |
| <b>Description</b>   | Configure the logical demultiplexing (demux) source family type on the IP demux underlying interface.  |
| <div> <b>NOTE:</b> The IP demux interface feature currently supports only Fast Ethernet, Gigabit Ethernet, 10-Gigabit Ethernet, or aggregated Ethernet underlying interfaces.</div> |  |
| <b>Required Privilege Level</b>  | <code>interface</code> —To view this statement in the configuration.<br><code>interface-control</code> —To add this statement to the configuration.  |
| <b>Related Documentation</b>   | <ul style="list-style-type: none"><li>• <a href="#">Configuring an IP Demux Underlying Interface on page 281</a></li></ul>   |

## demux0 (Static Interface)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre> demux0 {     unit <i>logical-unit-number</i> {         demux-options {             underlying-interface <i>interface-name</i>         }         family <i>family</i> {             access-concentrator <i>name</i>;             {                 destination-prefix;             }             duplicate-protection;             dynamic-profile <i>profile-name</i>;             {                 source-prefix;             }             max-sessions <i>number</i>;             service-name-table <i>table-name</i>             targeted-distribution;             unnumbered-address <i>interface-name</i> &lt;preferred-source-address <i>address</i>&gt;;         }         vlan-id <i>number</i>;         vlan-tags outer [<i>tpid</i>].<i>vlan-id</i> [inner [<i>tpid</i>].<i>vlan-id</i>];     } } </pre> |
| <b>Hierarchy Level</b>          | [edit interfaces],<br>[edit logical-systems <i>logical-system-name</i> interfaces]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.0.  |
| <b>Description</b>              | <p>Configure the logical demultiplexing (demux) interface.</p> <p>Logical IP demux interfaces do not support IPv4 and IPv6 dual stack.</p> <p>The remaining statements are explained separately.</p>   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Specifying the Demux Underlying Interface on page 283</a></li> <li>• <a href="#">Configuring IP Demux Prefixes on page 284</a></li> </ul>   |

## description (Interfaces)

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>description text;</code>   |
| <b>Hierarchy Level</b>          | <code>[edit interfaces <i>interface-name</i>],</code><br><code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i>],</code><br><code>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i>]</code>  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 11.1 for the QFX Series.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.   |
| <b>Description</b>              | <p>Provide a textual description of the interface or the logical unit. Any descriptive text you include is displayed in the output of the <b>show interfaces</b> commands, and is also exposed in the <b>ifAlias</b> Management Information Base (MIB) object. It has no effect on the operation of the interface on the router or switch.</p> <p>The textual description can also be included in the extended DHCP relay option 82 Agent Circuit ID suboption.</p>  |
| <b>Options</b>                  | <b>text</b> —Text to describe the interface. If the text includes spaces, enclose the entire text in quotation marks.  |
| <b>Required Privilege Level</b> | <b>interface</b> —To view this statement in the configuration.<br><b>interface-control</b> —To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Interface Description on page 117</a></li><li>• <a href="#">Adding a Logical Unit Description to the Configuration on page 186</a></li><li>• <i>Configuring Gigabit Ethernet Interfaces (CLI Procedure)</i></li><li>• <i>Configuring Gigabit Ethernet Interfaces (CLI Procedure)</i></li><li>• <i>Configuring Gigabit and 10-Gigabit Ethernet Interfaces</i></li><li>• <i>Enabling and Disabling Insertion of Option 82 Information</i></li><li>• <i>Junos OS Network Interfaces Library for Routing Devices</i></li><li>• <i>Example: Connecting Access Switches to a Distribution Switch</i></li></ul> |

## destination

See the following sections:

- [destination \(IPCP\) on page 421](#)
- [destination \(Routing Instance\) on page 422](#)
- [destination \(Tunnels\) on page 422](#)



**NOTE:** For information about the destination statement at the [edit interfaces *interface-name* unit *unit-number* family inet address *address* (vrrp-group | vrrp-inet6-group) *group-number*] or [edit logical-systems *logical-system-name* interfaces *interface-name* unit *unit-number* family (inet | inet6) address *address* (vrrp-group | vrrp-inet6-group) *group-number*] hierarchy level, see the *Junos OS High Availability Library for Routing Devices*.

### destination (IPCP)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>destination address <a href="#">destination-profile</a> <i>profile-name</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet unnumbered-address <i>interface-name</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet unnumbered-address <i>interface-name</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For unnumbered interfaces with PPP encapsulation, specify the IP address of the remote interface.  |
| <b>Options</b>                  | <i>address</i> —IP address of the remote interface.<br><br>The remaining statement is explained separately.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring IPCP Options on page 210</a></li> <li>• <a href="#">address on page 329</a></li> <li>• <a href="#">negotiate-address on page 633</a></li> <li>• <i>Junos OS Administration Library for Routing Devices</i></li> </ul>                     |

## destination (Routing Instance)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>destination <i>routing-instance-name</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> tunnel routing-instance],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> tunnel routing-instance] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Specify the destination routing instance that points to the routing table containing the tunnel destination address.   |
| <b>Default</b>                  | The default Internet routing table <code>inet.0</code> .   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>  |

## destination (Tunnels)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>destination <i>address</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>family</b> inet address <i>address</i> ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>family</b> inet <b>unnumbered-address</b> <i>interface-name</i> ],<br>[edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> tunnel],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>family</b> inet address <i>address</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>family</b> inet <b>unnumbered-address</b> <i>interface-name</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> tunnel] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.1 for EX Series switches.   |
| <b>Description</b>              | For encrypted, PPP-encapsulated, and tunnel interfaces, specify the remote address of the connection.  |
| <b>Options</b>                  | <b><i>address</i></b> —Address of the remote side of the connection.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the Interface Address on page 204</a></li><li>• <i>Configuring Generic Routing Encapsulation Tunneling (CLI Procedure)</i></li><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li><li>• <a href="#">point-to-point on page 678</a></li></ul>  |



## destination-class-usage

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>destination-class-usage;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>family</b> inet <b>accounting</b> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> inet <b>accounting</b> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | Enable packet counters on an interface that count packets that arrive from specific customers and are destined for specific prefixes on the provider core router.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Enabling Source Class and Destination Class Usage on page 241</a></li> <li>• <a href="#">accounting on page 319</a></li> <li>• <a href="#">source-class-usage on page 769</a></li> </ul>                                     |

## destination-profile

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>destination-profile <i>name</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>family</b> inet address <i>address</i> ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>family</b> inet unnumbered-address <i>interface-name</i> destination <i>address</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>family</b> inet address <i>address</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>family</b> inet unnumbered-address <i>interface-name</i> destination <i>address</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 11.1 for the QFX Series.  |
| <b>Description</b>              | For interfaces with PPP encapsulation, assign PPP properties to the remote destination end. You define the profile at the <b>[edit access group-profile <i>name</i> ppp]</b> hierarchy level.   |
| <b>Options</b>                  | <i>name</i> —Profile name defined at the <b>[edit access group-profile <i>name</i> ppp]</b> hierarchy level.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring IPCP Options on page 210</a></li> <li>• <a href="#">destination (IPCP) on page 421</a></li> <li>• <i>Junos OS Administration Library for Routing Devices</i></li> </ul>  |

## dial-options

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>dial-options {<br/>  ipsec-interface-id <i>name</i>;<br/>  l2tp-interface-id <i>name</i>;<br/>  (shared   dedicated);<br/>}</pre>  |
| <b>Hierarchy Level</b>          | <pre>[edit interfaces <i>sp-fpc/pic/port</i> unit <i>logical-unit-number</i>],<br/>[edit interfaces <i>si-fpc/pic/port</i> unit <i>logical-unit-number</i>],<br/>[edit logical-systems <i>logical-system-name</i> interfaces <i>sp-fpc/pic/port</i> unit <i>logical-unit-number</i>],<br/>[edit logical-systems <i>logical-system-name</i> interfaces <i>si-fpc/pic/port</i> unit <i>logical-unit-number</i>]</pre>   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>The <b>[edit ...si-...]</b> hierarchy levels introduced in Junos OS Release 11.4.  |
| <b>Description</b>              | Specify the options for configuring logical interfaces for group and user sessions in L2TP or IPsec dynamic endpoint tunneling.   |
| <b>Options</b>                  | <p><b>dedicated</b>—(LNS on M Series routers and MX Series routers only) Specify that a logical interface can host only one session at a time.</p> <p><b>ipsec-interface-id <i>name</i></b>—(M Series routers only) Interface identifier for group of dynamic peers. This identifier must be replicated at the <b>[edit access profile <i>name</i> client * ike]</b> hierarchy level.</p> <p><b>l2tp-interface-id <i>name</i></b>—Interface identifier that must be replicated at the <b>[edit access profile <i>name</i>]</b> hierarchy level.</p> <p><b>shared</b>—(LNS on M Series routers only) Specify that a logical interface can host multiple (shared) sessions at a time.</p> |
| <b>Required Privilege Level</b> | <p><b>interface</b>—To view this statement in the configuration.</p> <p><b>interface-control</b>—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring the Identifier for Logical Interfaces that Provide L2TP Services</i></li><li>• <i>Configuring Dynamic Endpoints for IPsec Tunnels</i></li><li>• <i>Configuring Options for the LNS Inline Services Logical Interface</i></li></ul>   |

## dial-string

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>dial-string [ <i>dial-string-numbers</i> ];</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>br-pim</i> /O/ <i>port</i> unit <i>logical-unit-number</i> <a href="#">dialer-options</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>br-pim</i> /O/ <i>port</i> unit <i>logical-unit-number</i> <a href="#">dialer-options</a> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | On J Series Services Routers with ISDN interfaces, specify one or more ISDN dial strings used to reach a destination subnetwork.   |
| <b>Options</b>                  | <i>dial-string-numbers</i> —One or more strings of numbers to call.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring the Dialer Interface</i></li> </ul>  |

## dialer

---


|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>dialer <i>filter-name</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> family <i>family</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> family <i>family</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Apply a dialer filter to an interface. To create the dialer filter, include the <b>dialer-filter</b> statement at the [edit firewall filter family <i>family</i> ] hierarchy level.  |
| <b>Options</b>                  | <i>filter-name</i> —Dialer filter name.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Applying the Dial-on-Demand Dialer Filter to the Dialer Interfaces</i></li> <li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li> </ul>  |

## dialer-options

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>dialer-options {<br/>  activation-delay seconds;<br/>  callback;<br/>  callback-wait-period time;<br/>  deactivation-delay seconds;<br/>  dial-string [ dial-string-numbers ];<br/>  idle-timeout seconds;<br/>  incoming-map {<br/>    caller caller-number   accept-all;<br/>    initial-route-check seconds;<br/>    load-interval seconds;<br/>    load-threshold percent;<br/>    pool pool-name;<br/>    redial-delay time;<br/>    watch-list {<br/>      [ routes ];<br/>    }<br/>  }<br/>}</pre> |
| <b>Hierarchy Level</b>          | <pre>[edit interfaces umd0],<br/>[edit interfaces dln unit logical-unit-number],<br/>[edit logical-systems logical-system-name interfaces dln unit logical-unit-number]</pre>   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | <p>Specify the dialer options for configuring logical interfaces for group and user sessions.</p> <p>The statements are explained separately.</p>   |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring ISDN Logical Interface Properties</i></li><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>  |

## direction

|   |   |
|---|---|
| <b>Syntax</b>   | direction (up   down);  |
| <b>Hierarchy Level</b>  | [edit protocols <b>oam ethernet connectivity-fault-management</b> maintenance-domain <i>domain-name</i> maintenance-association <i>ma-name</i> <b>mep</b> <i>mep-id</i> ]   |
| <b>Release Information</b>  | Statement introduced in Junos OS Release 8.4.   |
| <b>Description</b>  | Configure the direction of the MEP.   |
| <b>Options</b>  | <b>up</b> —An UP MEP CCM is transmitted out of every logical interface which is part of the same bridging or vpls instance except for the interface configured on this MEP.   |
| <div>  <p><b>NOTE:</b> The up direction for MEP is not supported on T Series routers.</p> </div> |   |
|   | <b>down</b> —Down MEP CCMs are transmitted only out the interface configured on this MEP.   |
| <b>Required Privilege Level</b>   | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>  | <ul style="list-style-type: none"> <li>• <i>Configuring a Maintenance Endpoint</i></li> <li>• <i>Example: Configuring Connectivity Fault Management for a PBB Network on MX Series Routers</i></li> <li>• <i>IEEE 802.1ag OAM Connectivity Fault Management Overview</i></li> </ul> |

## disable

---

See the following sections:

- [disable \(Interface\) on page 429](#)
- [disable \(Link Protection\) on page 430](#)

**disable (Interface)**

|                            |  |
|----------------------------|--|
| <b>Syntax</b>              | disable;   |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ] |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.                                  |
| <b>Description</b>         | Disable a physical or a logical interface, effectively unconfiguring it.   |

**CAUTION:**

- Dynamic subscribers and logical interfaces use physical interfaces for connection to the network. The Junos OS allows you to set the interface to disable and commit the change while dynamic subscribers and logical interfaces are still active. This action results in the loss of all subscriber connections on the interface. Use care when disabling interfaces.
- If aggregated SONET links are configured between a T1600 router and a T4000 router, interface traffic is disrupted when you disable the physical interface configured on the T1600 router. If you want to remove the interface, we recommend that you deactivate the interface instead of disabling it.

**NOTE:**

- When you use the disable statement at the [edit interfaces] hierarchy level, depending on the PIC type, the interface might or might not turn off the laser. Older PIC transceivers do not support turning off the laser, but newer Gigabit Ethernet (GE) PICs with SFP and XFP transceivers do support it and the laser will be turned off when the interface is disabled.
- When you disable or deactivate an interface, then all the references made to the deactivated interface must be removed from the routing instance.



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

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

- Related Documentation**
- [Disabling a Physical Interface on page 171](#)
  - [Disabling a Logical Interface on page 197](#)

### **disable (Link Protection)**

- Syntax**      `disable;`
- Hierarchy Level**    `[edit interfaces aeX aggregated-ether-options lacp link-protection]`
- Release Information**    Statement introduced in Junos OS Release 9.3.  
Statement introduced in Junos OS Release 11.4 for EX Series switches.
- Description**      Disable LACP link protection on the interface.
- Required Privilege Level**    interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.
- Related Documentation**
- *Configuring Aggregated Ethernet LACP*
  - *Configuring LACP Link Protection of Aggregated Ethernet Interfaces (CLI Procedure)*

### **disable-mlppp-inner-ppp-pfc**

---

- Syntax**      `disable-mlppp-inner-ppp-pfc;`
- Hierarchy Level**    `[edit interfaces interface-name unit logical-unit-number],`  
`[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number]`
- Release Information**    Statement introduced in Junos OS Release 8.2.
- Description**      For MLPPP interfaces only, disable compression of the inner PPP header in the MLPPP payload. By default, compression is enabled.
- Required Privilege Level**    interface—To view this statement in the configuration.  
interface-control—To add this statement to the configuration.
- Related Documentation**
- *Junos OS Services Interfaces Library for Routing Devices*



## dlci

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>dlci <i>dlci-identifier</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | <p>For Frame Relay and Multilink Frame Relay (MLFR) user-to-network interface (UNI) network-to-network interface (NNI) encapsulation only, and for link services, voice services and point-to-point interfaces only, configure the data-link connection identifier (DLCI) for a permanent virtual circuit (PVC) or an switched virtual circuit (SVC).</p> <p>To configure a DLCI for a point-to-multipoint interface, use the <b>multipoint-destination</b> statement to specify the DLCI.</p> |
| <b>Options</b>                  | <p><b><i>dlci-identifier</i></b>—Data-link connection identifier.</p> <p><b>Range:</b> 16 through 1022.</p>  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Data-Link Connection Identifiers on Channelized Interfaces</i></li> <li>• <i>Configuring Frame Relay DLCIs</i></li> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> <li>• <a href="#">encapsulation (Logical Interface) on page 450</a></li> <li>• <a href="#">multicast-dlci on page 619</a></li> <li>• <a href="#">multipoint-destination on page 624</a></li> </ul>  |

## do-not-fragment

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | do-not-fragment;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>gr-fpc/pic/port</i> unit <i>logical-unit-number</i> tunnel],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>gr-fpc/pic/port</i> unit <i>logical-unit-number</i> tunnel] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.2.  |
| <b>Description</b>              | Disable fragmentation of GRE encapsulated packets.   |
| <b>Default</b>                  | By default fragmentation is disabled.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li><li>• <a href="#">reassemble-packets on page 717</a></li></ul>                                     |

## domain-name

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>domain-name <i>domain-name-string</i>;</code>  |
| <b>Hierarchy Level</b>          | <p>[edit forwarding-options dhcp-relay authentication username-include],</p> <p>[edit forwarding-options dhcp-relay group <i>group-name</i> authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> forwarding-options dhcp-relay group <i>group-name</i> authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay authentication username-include],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> authentication username-include],</p> <p>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay authentication username-include],</p> <p>[edit routing-instances <i>routing-instance-name</i> forwarding-options dhcp-relay group <i>group-name</i> authentication username-include]</p> |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.1.  |
| <b>Description</b>              | Specify the domain name that is concatenated with the username during the subscriber authentication process.   |
| <b>Options</b>                  | <i>domain-name-string</i> —The domain name formatted string.   |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Using External AAA Authentication Services with DHCP</i></li> </ul>  |

## dot1x

---

**Syntax**    dot1x {  
              **authenticator** {  
                  **authentication-profile-name** *access-profile-name*;  
                  **interface** *interface-id* {  
                      **maximum-requests** *integer*;  
                      **quiet-period** *seconds*;  
                      **reauthentication** (*disable* | *interval seconds*);  
                      **retries** *integer*;  
                      **server-timeout** *seconds*;  
                      **supplicant** (*single*);  
                      **supplicant-timeout** *seconds*;  
                      **transmit-period** *seconds*;  
                  }  
              }  
          }

**Hierarchy Level**    [edit protocols]

**Release Information**    Statement introduced in Junos OS Release 9.3.

**Description**    For the MX Series only, specifies settings for using 802.1x Port-Based Network Access Control.

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**

- *IEEE 802.1x Port-Based Network Access Control Overview*
- [authenticator on page 349](#)
- [authentication-profile-name on page 348](#)
- [interface \(IEEE 802.1x\) on page 530](#)

## down-count

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>down-count <i>cells</i>;</code>  |
| <b>Hierarchy Level</b>          | <p>[edit interfaces <i>interface-name</i> atm-options vpi <i>vpi-identifier</i> <b>oam-liveness</b>],</p> <p>[edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>oam-liveness</b>],</p> <p>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>family</b> <i>family</i> <b>address</b> <i>address</i> multipoint-destination <i>address</i> <b>oam-liveness</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>oam-liveness</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>family</b> <i>family</i> <b>address</b> <i>address</i> multipoint-destination <i>address</i> <b>oam-liveness</b>]</p> |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | <p>For ATM encapsulation only, configure Operation, Administration, and Maintenance (OAM) F5 loopback cell count thresholds. This feature is not supported on ATM-over-SHDSL interfaces.</p> <p>For ATM2 IQ PICs only, configure OAM F4 loopback cell count thresholds at the [edit interfaces <i>interface-name</i> atm-options vpi <i>vpi-identifier</i>] hierarchy level.</p>   |
| <b>Options</b>                  | <p><b>cells</b>—Minimum number of consecutive OAM F4 or F5 loopback cells lost before a VC is declared down.</p> <p><b>Range:</b> 1 through 255</p> <p><b>Default:</b> 5 cells</p>   |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>Configuring the ATM OAM F5 Loopback Cell Threshold</li> </ul>   |

## drop (PPPoE Service Name Tables)

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>drop;</code>   |
| <b>Hierarchy Level</b>          | [edit protocols pppoe service-name-tables <i>table-name</i> <b>service</b> <i>service-name</i> ],<br>[edit protocols pppoe service-name-tables <i>table-name</i> service <i>service-name</i> <b>agent-specifier</b><br><i>aci circuit-id-string ari remote-id-string</i> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.<br>Support at [edit protocols pppoe service-name-tables <i>table-name</i> <b>service</b> <i>service-name</i> <b>agent-specifier</b> <i>aci circuit-id-string ari remote-id-string</i> ] hierarchy level introduced in Junos OS Release 10.2.  |
| <b>Description</b>              | Direct the router to drop (ignore) a PPPoE Active Discovery Initiation (PADI) control packet received from a PPPoE client that contains the specified service name tag or agent circuit identifier/agent remote identifier (ACI/ARI) information. This action effectively denies the client's request to provide the specified service, or to accept requests from the subscriber or subscribers represented by the ACI/ARI information. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring PPPoE Service Name Tables</i></li></ul>   |

## drop-timeout

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>drop-timeout <i>milliseconds</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>mlfr-uni-nni-bundle-options</b> ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For link services, multilink, and voice services interfaces only, configure the drop timeout period, in milliseconds.  |
| <b>Options</b>                  | <b><i>milliseconds</i></b> —Drop timeout period.<br><b>Range:</b> 0 through 2000 milliseconds<br><b>Default:</b> 0 ms (disabled)   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>  |

## ds0-options

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>ds0-options {   bert-algorithm <i>algorithm</i>;   bert-error-rate <i>rate</i>;   bert-period <i>seconds</i>;   byte-encoding (nx56   nx64);   fcs (16   32);   idle-cycle-flag (flags   ones);   invert-data;   loopback <i>payload</i>;   start-end-flag (filler   shared); }</pre> |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | <p>Configure DS0-specific physical interface properties.</p> <p>The statements are explained separately.</p>   |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Channelized DS3-to-DS0 Interfaces</i></li> </ul>   |

## dsl-options

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>dsl-options {   loopback <i>local</i>;   operating-mode <i>mode</i>; }</pre>   |
| <b>Hierarchy Level</b>          | [edit interfaces at- <i>fpc/pic/port</i> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | <p>For J Series Services Routers only, modify the properties of the digital subscriber line for an ATM interface.</p> <p>The statements are explained separately.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>ATM-over-ADSL Overview</i></li> <li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li> </ul>               |

## dsr

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>dsr (ignore   normal   require);</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options dce-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">serial-options dte-options</a> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For EIA-530 and V.35 interfaces only, configure the from-DCE signal, data-set-ready (DSR).   |
| <b>Options</b>                  | <b>ignore</b> —The from-DCE signal is ignored.<br><br><b>normal</b> —Normal DSR signal handling as defined by the TIA/EIA Standard 530.<br><br><b>require</b> —The from-DCE signal must be asserted.<br><b>Default:</b> normal |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the Serial Signal Handling on page 303</a></li></ul>   |

## dsr-polarity

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|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>dsr-polarity (negative   positive);</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Configure DSR signal polarity.   |
| <b>Options</b>                  | <b>positive</b> —Positive signal polarity.<br><br><b>negative</b> —Negative signal polarity.<br><b>Default:</b> positive |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Serial Signal Polarities on page 306</a></li></ul>       |



## dte-options

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre> 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); } </pre> |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.3.<br>Statement previously known as <b>control-leads</b> .  |
| <b>Description</b>              | For M Series and T Series routers, configure the serial interface signal characteristics.<br><br>The statements are explained separately.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring the Serial Signal Handling on page 303</a></li> </ul>   |

## dtr

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>dtr <i>signal-handling-option</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> <a href="#">dce-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">serial-options</a> <a href="#">dte-options</a> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For EIA-530 and V.35 interfaces only, configure the to-DCE signal, data-transmit-ready (DTR).   |
| <b>Options</b>                  | <p><b><i>signal-handling-option</i></b>—Signal handling for the DTR signal. The signal handling can be one of the following:</p> <p><b>assert</b>—The to-DCE signal must be asserted.</p> <p><b>auto-synchronize</b>—Normal DTR signal with automatic synchronization. This statement has two substatements:</p> <p><b>duration <i>milliseconds</i></b>—Pulse duration of resynchronization.<br/><b>Range:</b> 1 through 1000 milliseconds<br/><b>Default:</b> 1000 milliseconds</p> <p><b>interval <i>seconds</i></b>—Offset interval for resynchronization.<br/><b>Range:</b> 1 through 31 seconds<br/><b>Default:</b> 15 seconds</p> <p><b>de-assert</b>—The to-DCE signal must be deasserted.</p> <p><b>normal</b>—Normal DTR signal handling as defined by the TIA/EIA Standard 530.<br/><b>Default:</b> <b>normal</b></p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the Serial Signal Handling on page 303</a></li></ul>  |

## dtr-circuit

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | dtr-circuit (balanced   unbalanced);  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For EIA-530 and V.35 interfaces only, configure a DTR circuit.  |
| <b>Options</b>                  | <b>balanced</b> —Balanced DTR signal.<br><b>unbalanced</b> —Unbalanced DTR signal.<br><b>Default:</b> balanced          |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring the Serial DTR Circuit on page 306</a></li> </ul>      |

## dtr-polarity

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | dtr-polarity (negative   positive);   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | Configure DTR signal polarity.  |
| <b>Options</b>                  | <b>positive</b> —Positive signal polarity.<br><b>negative</b> —Negative signal polarity.<br><b>Default:</b> positive    |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Serial Signal Polarities on page 306</a></li> </ul>    |

## dump-on-flow-control

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | dump-on-flow-control;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> multiservice-options]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.5.   |
| <b>Description</b>              | This option supports high availability functionality and can be used with various service interfaces, including <b>rsp</b> , <b>rms</b> , <b>lsq</b> , and <b>rlsq</b> .  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Multiservice Physical Interface Properties on page 168</a></li><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li><li>• <a href="#">passive-monitor-mode on page 665</a></li></ul> |

## dynamic-call-admission-control

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | dynamic-call-admission-control {<br>activation-priority <i>priority</i> ;<br>bearer-bandwidth-limit <i>kilobits-per-second</i> ;<br>}  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.2.  |
| <b>Description</b>              | <p>(J4350 and J6350 Services Routers supporting voice over IP with the TGM550 media gateway module) For Fast Ethernet and Gigabit Ethernet interfaces, ISDN BRI interfaces, and serial interfaces with PPP or Frame Relay encapsulation, configure dynamic call admission control (CAC). Dynamic CAC provides enhanced control over WAN bandwidth. When dynamic CAC is configured on an interface responsible for providing call bandwidth, the TGM550 informs the Media Gateway Controller (MGC) of the bandwidth limit available for voice packets on the interface and requests the MGC to block new calls when the bandwidth is exhausted.</p> <p>Dynamic CAC must be configured on each Services Router interface responsible for providing call bandwidth.</p> <p>The statements are explained separately.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Dynamic Call Admission Control on page 196</a></li> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> <li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li> </ul>  |

## dynamic-profile

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See the following sections:

- [dynamic-profile \(PPPoE Service Name Tables\) on page 444](#)
- [dynamic-profile \(Stacked VLAN\) on page 445](#)
- [dynamic-profile \(VLAN\) on page 445](#)

### dynamic-profile (PPPoE Service Name Tables)

|                          |   |
|--------------------------|---|
| Syntax                   | <code>dynamic-profile <i>profile-name</i>;</code>   |
| Hierarchy Level          | <code>[edit protocols pppoe service-name-tables <i>table-name</i> <a href="#">service</a> <i>service-name</i>],</code><br><code>[edit protocols pppoe service-name-tables <i>table-name</i> service <i>service-name</i> <a href="#">agent-specifier</a></code><br><code>aci <i>circuit-id-string</i> ari <i>remote-id-string</i>]</code>  |
| Release Information      | Statement introduced in Junos OS Release 10.2.  |
| Description              | <p>Specify a dynamic profile to instantiate a dynamic PPPoE interface. You can associate a dynamic profile with a named service entry, <b>empty</b> service entry, or <b>any</b> service entry configured in a PPPoE service name table, or with an agent circuit identifier/agent remote identifier (ACI/ARI) pair defined for these services.</p> <p>The dynamic profile associated with a service entry in a PPPoE service name table overrides the dynamic profile associated with the PPPoE underlying interface on which the dynamic PPPoE interface is created.</p> <p>If you include the <b>dynamic-profile</b> statement at the <code>[edit protocols pppoe service-name-tables <i>table-name</i> service <i>service-name</i> <a href="#">agent-specifier</a> aci <i>circuit-id-string</i> ari <i>remote-id-string</i>]</code> hierarchy level, you cannot also include the <b>static-interface</b> statement at this level. The <b>dynamic-profile</b> and <b>static-interface</b> statements are mutually exclusive for ACI/ARI pair configurations.</p> |
| Options                  | <b><i>profile-name</i></b> —Name of the dynamic profile that the router uses to instantiate a dynamic PPPoE interface.  |
| Required Privilege Level | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| Related Documentation    | <ul style="list-style-type: none"><li>• <a href="#">Configuring PPPoE Service Name Tables</a></li><li>• <a href="#">Assigning a Dynamic Profile and Routing Instance to a Service Name or ACI/ARI Pair for Dynamic PPPoE Interface Creation</a></li></ul>   |

## dynamic-profile (Stacked VLAN)

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | dynamic-profile <i>profile-name</i> {<br><b>accept</b> (any   dhcp-v4   dhcp-v6   inet   inet6   pppoe);<br><b>ranges</b> (any   <i>low-tag-high-tag</i> ) ,(any   <i>low-tag-high-tag</i> );<br>}                        |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>auto-configure stacked-vlan-ranges</b> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.5.   |
| <b>Description</b>              | Configure a dynamic profile for use when configuring dynamic stacked VLANs.   |
| <b>Options</b>                  | <p><b>profile-name</b>—Name of the dynamic profile that you want to use when configuring dynamic stacked VLANs.</p> <p>The remaining statements are explained separately.</p>   |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Dynamic Profiles Overview</i></li> <li>• <i>Configuring a Basic Dynamic Profile</i></li> <li>• <i>Associating a Stacked VLAN Dynamic Profile with an Interface</i></li> </ul> |

## dynamic-profile (VLAN)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | dynamic-profile <i>profile-name</i> {<br><b>accept</b> (any   dhcp-v4   dhcp-v6   inet   inet6   pppoe);<br><b>ranges</b> (any   <i>low-tag</i> )—(any   <i>high-tag</i> );<br>}   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>auto-configure vlan-ranges</b> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.5.  |
| <b>Description</b>              | Configure a dynamic profile for use when configuring dynamic VLANs.  |
| <b>Options</b>                  | <p><b>profile-name</b>—Name of the dynamic profile that you want to use when configuring dynamic VLANs.</p> <p>The remaining statements are explained separately.</p>  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Dynamic Profiles Overview</i></li> <li>• <i>Configuring a Basic Dynamic Profile</i></li> <li>• <i>Associating a Single-Tag VLAN Dynamic Profile with an Interface</i></li> </ul> |

## e1-options

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|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>e1-options {<br/>    bert-algorithm <i>algorithm</i>;<br/>    bert-error-rate <i>rate</i>;<br/>    bert-period <i>seconds</i>;<br/>    fcs (16   32);<br/>    framing (g704   g704-no-crc4   unframed);<br/>    idle-cycle-flag (flags   ones);<br/>    invert-data;<br/>    loopback (local   remote);<br/>    start-end-flag (filler   shared);<br/>    timeslots <i>time-slot-range</i>;<br/>}</pre> |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.  |
| <b>Description</b>              | Configure E1-specific physical interface properties.<br><br>The statements are explained separately.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Channelized E1 IQ and IQE Interfaces Overview</i></li><li>• <i>Channelized STM1 Interfaces Overview</i></li><li>• <i>E1 Interfaces Overview</i></li><li>• <i>T1 Interfaces Overview</i></li></ul>   |



## e3-options

**Syntax** e3-options {  
     atm-encapsulation (direct | plcp);  
     bert-algorithm *algorithm*;  
     bert-error-rate *rate*;  
     bert-period *seconds*;  
     buildout *feet*;  
     compatibility-mode (digital-link | kentrox | larscom) <subrate *value*>;  
     fcs (16 | 32);  
     framing (g.751 | g.832);  
     idle-cycle-flag *value*;  
     invert-data;  
     loopback (local | remote);  
     (payload-scrambler | no-payload-scrambler);  
     start-end-flag *value*;  
     (unframed | no-unframed);  
 }

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

**Release Information** Statement introduced before Junos OS Release 7.4.

**Description** Configure E3-specific physical interface properties.

For ATM1 interfaces, you can configure a subset of E3 options statements.

The statements are explained separately.



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

**Related Documentation**

- *E3 Interfaces Overview*
- *T3 Interfaces Overview*
- [atm-options on page 345](#)

## east-interface

---

|  |  |
|--|--|
| Syntax                                   | <pre>east-interface {<br/>    node-id mac-address;<br/>    control-channel channel-name {<br/>        interface-name<br/>        ring-protection-link-end;<br/>    }<br/>}</pre>   |
| Hierarchy Level                          | [edit protocols <b>protection-group ethernet-ring</b> ring-name]   |
| Release Information                      | Statement introduced in Junos OS Release 9.4.<br>Statement introduced in Junos OS Release 12.1 for EX Series switches.   |
| Description                              | <p>Define one of the two interface ports for Ethernet ring protection, the other being defined by the <b>west-interface</b> statement at the same hierarchy level. The interface must use the control channel's logical interface name. The control channel is a dedicated VLAN channel for the ring port.</p> <p>EX Series switches do not use the node-id statement--the node ID is automatically configured on the switches using the MAC address.</p> <div><p><b>NOTE:</b> Always configure this port first, before configuring the <b>west-interface</b> statement.</p></div> <div><p><b>NOTE:</b> The Node ID is not configurable on EX Series switches. The node ID is automatically configured using the MAC address.</p></div> |
| The statements are explained separately. |  |
| Required Privilege Level                 | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| Related Documentation                    | <ul style="list-style-type: none"><li>• <i>Ethernet Ring Protection Switching Overview</i></li><li>• <i>Ethernet Ring Protection Using Ring Instances for Load Balancing</i></li><li>• <a href="#">west-interface on page 873</a></li><li>• <a href="#">ethernet-ring on page 465</a></li><li>• <i>Example: Configuring Ethernet Ring Protection Switching on EX Series Switches</i></li><li>• <i>Configuring Ethernet Ring Protection Switching (CLI Procedure)</i></li></ul>   |

## encapsulation

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See the following sections:

- [encapsulation \(Container Interface\) on page 449](#)
- [encapsulation \(Logical Interface\) on page 450](#)
- [encapsulation \(Physical Interface\) on page 454](#)

### encapsulation (Container Interface)

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>encapsulation (cisco-hdlc   ppp);</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>cin</i> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.2.   |
| <b>Description</b>              | Container link-layer encapsulation type.  |
| <b>Options</b>                  | <b>cisco-hdlc</b> —Use Cisco-compatible High-Level Data Link Control (HDLC) framing.<br><b>ppp</b> —Use serial PPP encapsulation.   |
| <b>Required Privilege Level</b> | <b>interface</b> —To view this statement in the configuration.<br><b>interface-control</b> —To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Displaying APS Using a Container Interface with ATM Encapsulation</i></li><li>• <i>Configuring Container Interfaces for APS on SONET Links</i></li></ul> |

## encapsulation (Logical Interface)

|                            |   |
|----------------------------|---|
| <b>Syntax</b>              | <code>encapsulation (atm-ccc-cell-relay   atm-ccc-vc-mux   atm-cisco-nlpid   atm-mlppp-llc   atm-nlpid   atm-ppp-llc   atm-ppp-vc-mux   atm-snap   atm-tcc-snap   atm-tcc-vc-mux   atm-vc-mux   ether-over-atm-llc   ether-vpls-over-atm-llc   ether-vpls-over-fr   ether-vpls-over-ppp   ethernet   ethernet-ccc   ethernet-vpls   ethernet-vpls-fr   frame-relay-ccc   frame-relay-ether-type   frame-relay-ether-type-tcc   frame-relay-ppp   frame-relay-tcc   gre-fragmentation   multilink-frame-relay-end-to-end   multilink-ppp   ppp-over-ether   ppp-over-ether-over-atm-llc   vlan-bridge   vlan-ccc   vlan-vci-ccc   vlan-tcc   vlan-vpls);</code>  |
| <b>Hierarchy Level</b>     | <code>[edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i>],</code><br><code>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i>],</code><br><code>[edit interfaces rlsq <i>number</i> unit <i>logical-unit-number</i>]</code>  |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.1X48 for PTX Series Packet Transport Routers ( <b>vlan-ccc</b> and <b>vlan-tcc</b> options only).<br>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers. Only the <b>atm-ccc-cell-relay</b> and <b>atm-ccc-vc-mux</b> options are supported on ACX Series routers.  |
| <b>Description</b>         | Configure a logical link-layer encapsulation type.  |
| <b>Options</b>             | <b>atm-ccc-cell-relay</b> —Use ATM cell-relay encapsulation.<br><br><b>atm-ccc-vc-mux</b> —Use ATM virtual circuit (VC) multiplex encapsulation on CCC circuits.<br>When you use this encapsulation type, you can configure the <b>ccc</b> family only.<br><br><b>atm-cisco-nlpid</b> —Use Cisco ATM network layer protocol identifier (NLPID) encapsulation.<br>When you use this encapsulation type, you can configure the <b>inet</b> family only.<br><br><b>atm-mlppp-llc</b> —For ATM2 IQ interfaces only, use Multilink Point-to-Point (MLPPP) over AAL5 LLC. For this encapsulation type, your router must be equipped with a Link Services or Voice Services PIC. MLPPP over ATM encapsulation is not supported on ATM2 IQ OC48 interfaces.<br><br><b>atm-nlpid</b> —Use ATM NLPID encapsulation. When you use this encapsulation type, you can configure the <b>inet</b> family only.<br><br><b>atm-ppp-llc</b> —(ATM2 IQ interfaces and MX Series routers with MPC/MIC interfaces using the ATM MIC with SFP only) Use PPP over AAL5 LLC encapsulation.<br><br><b>atm-ppp-vc-mux</b> —(ATM2 IQ interfaces and MX Series routers with MPC/MIC interfaces using the ATM MIC with SFP only) Use PPP over ATM AAL5 multiplex encapsulation.<br><br><b>atm-snap</b> —(All interfaces including MX Series routers with MPC/MIC interfaces using the ATM MIC with SFP) Use ATM subnetwork attachment point (SNAP) encapsulation.<br><br><b>atm-tcc-snap</b> —Use ATM SNAP encapsulation on translational cross-connect (TCC) circuits. |

**atm-tcc-vc-mux**—Use ATM VC multiplex encapsulation on TCC circuits. When you use this encapsulation type, you can configure the **tcc** family only.

**atm-vc-mux**—(All interfaces including MX Series routers with MPC/MIC interfaces using the ATM MIC with SFP) Use ATM VC multiplex encapsulation. When you use this encapsulation type, you can configure the **inet** family only.

**ether-over-atm-llc**—(All IP interfaces including MX Series routers with MPC/MIC interfaces using the ATM MIC with SFP) For interfaces that carry IP traffic, use Ethernet over ATM LLC encapsulation. When you use this encapsulation type, you cannot configure multipoint interfaces.

**ether-vpls-over-atm-llc**—For ATM2 IQ interfaces only, use the Ethernet virtual private LAN service (VPLS) over ATM LLC encapsulation to bridge Ethernet interfaces and ATM interfaces over a VPLS routing instance (as described in RFC 2684, *Multiprotocol Encapsulation over ATM Adaptation Layer 5*). Packets from the ATM interfaces are converted to standard ENET2/802.3 encapsulated Ethernet frames with the frame check sequence (FCS) field removed.

**ether-vpls-over-fr**—For E1, T1, E3, T3, and SONET interfaces only, use the Ethernet virtual private LAN service (VPLS) over Frame Relay encapsulation to support Bridged Ethernet over Frame Relay encapsulated TDM interfaces for VPLS applications, per RFC 2427, *Multiprotocol Interconnect over Frame Relay*.



**NOTE:** The SONET/SDH OC3/STM1 (Multi-Rate) MIC with SFP, the Channelized SONET/SDH OC3/STM1 (Multi-Rate) MIC with SFP, and the DS3/E3 MIC do not support Ethernet over Frame Relay encapsulation.

**ether-vpls-over-ppp**—For E1, T1, E3, T3, and SONET interfaces only, use the Ethernet virtual private LAN service (VPLS) over Point-to-Point Protocol (PPP) encapsulation to support Bridged Ethernet over PPP-encapsulated TDM interfaces for VPLS applications.

**ethernet**—Use Ethernet II encapsulation (as described in RFC 894, *A Standard for the Transmission of IP Datagrams over Ethernet Networks*).

**ethernet-ccc**—Use Ethernet CCC encapsulation on Ethernet interfaces.

**ethernet-vpls**—Use Ethernet VPLS encapsulation on Ethernet interfaces that have VPLS enabled and that must accept packets carrying standard Tag Protocol ID (TPID) values.



**NOTE:** The built-in Gigabit Ethernet PIC on an M7i router does not support extended VLAN VPLS encapsulation.

**ethernet-vpls-fr**—Use in a VPLS setup when a CE device is connected to a PE device over a time-division multiplexing (TDM) link. This encapsulation type enables the PE device to terminate the outer layer 2 Frame Relay connection, use the 802.1p bits inside the inner Ethernet header to classify the packets, look at the MAC address from the Ethernet header, and use the MAC address to forward the packet into a given VPLS instance.

**frame-relay-ccc**—Use Frame Relay encapsulation on CCC circuits. When you use this encapsulation type, you can configure the **ccc** family only.

**frame-relay-ether-type**—Use Frame Relay ether type encapsulation for compatibility with Cisco Frame Relay. The physical interface must be configured with flexible-frame-relay encapsulation.

**frame-relay-ether-type-tcc**—Use Frame Relay ether type TCC for Cisco-compatible Frame Relay on TCC circuits to connect different media. The physical interface must be configured with flexible-frame-relay encapsulation.

**frame-relay-ppp**—Use PPP over Frame Relay circuits. When you use this encapsulation type, you can configure the **ppp** family only. J Series routers do not support frame-relay-ppp encapsulation.

**frame-relay-tcc**—Use Frame Relay encapsulation on TCC circuits for connecting different media. When you use this encapsulation type, you can configure the **tcc** family only.

**gre-fragmentation**—For adaptive services interfaces only, use GRE fragmentation encapsulation to enable fragmentation of IPv4 packets in GRE tunnels. This encapsulation clears the do not fragment (DF) bit in the packet header. If the packet's size exceeds the tunnel's maximum transmission unit (MTU) value, the packet is fragmented before encapsulation.

**multilink-frame-relay-end-to-end**—Use MLFR FRF.15 encapsulation. This encapsulation is used only on multilink, link services, and voice services interfaces and their constituent T1 or E1 interfaces, and is supported on LSQ and redundant LSQ interfaces.

**multilink-ppp**—Use MLPPP encapsulation. This encapsulation is used only on multilink, link services, and voice services interfaces and their constituent T1 or E1 interfaces.

**ppp-over-ether**—For underlying Ethernet interfaces on J Series routers, use PPP over Ethernet encapsulation. When you use this encapsulation type, you cannot configure the interface address. Instead, configure the interface address on the PPP interface. You also use PPP over Ethernet encapsulation to configure an underlying Ethernet interface for a dynamic PPPoE logical interface on M120 and M320 routers with Intelligent Queuing 2 (IQ2) PICs, and on MX Series routers with MPCs.

**ppp-over-ether-over-atm-llc**—(J Series routers and MX Series routers with MPCs using the ATM MIC with SFP only) For underlying ATM interfaces, use PPP over Ethernet over ATM LLC encapsulation. When you use this encapsulation type, you cannot configure the interface address. Instead, configure the interface address on the PPP interface.

**vlan-bridge**—Use Ethernet VLAN bridge encapsulation on Ethernet interfaces that have IEEE 802.1Q tagging, flexible-ethernet-services, and bridging enabled and that must accept packets carrying TPID 0x8100 or a user-defined TPID.

**vlan-ccc**—Use Ethernet virtual LAN (VLAN) encapsulation on CCC circuits. When you use this encapsulation type, you can configure the **ccc** family only.

**vlan-vci-ccc**—Use ATM-to-Ethernet interworking encapsulation on CCC circuits. When you use this encapsulation type, you can configure the **ccc** family only.

**vlan-tcc**—Use Ethernet VLAN encapsulation on TCC circuits. When you use this encapsulation type, you can configure the **tcc** family only.

**vlan-vpls**—Use Ethernet VLAN encapsulation on VPLS circuits.

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

**Related Documentation**

- *Configuring Layer 2 Switching Cross-Connects Using CCC*
- *Configuring the Encapsulation for Layer 2 Switching TCCs*
- [Configuring Interface Encapsulation on Logical Interfaces on page 190](#)
- *Configuring MPLS LSP Tunnel Cross-Connects Using CCC*
- [Circuit and Translational Cross-Connects Overview on page 253](#)
- *Identifying the Access Concentrator*
- *Configuring ATM Interface Encapsulation*
- *Configuring VLAN Encapsulation*
- *Configuring Extended VLAN Encapsulation*
- *Configuring ISDN Logical Interface Properties*
- [Configuring ATM-to-Ethernet Interworking on page 260](#)
- *Configuring Interface Encapsulation on PTX Series Packet Transport Routers*
- *Configuring CCC Encapsulation for Layer 2 VPNs*
- *Configuring TCC Encapsulation for Layer 2 VPNs and Layer 2 Circuits*
- *Configuring ATM for Subscriber Access*
- *Junos OS Services Interfaces Library for Routing Devices*
- *CoS on ATM IMA Pseudowire Interfaces Overview*
- *Configuring Policing on an ATM IMA Pseudowire*

## encapsulation (Physical Interface)

|                            |  |
|----------------------------|--|
| <b>Syntax</b>              | <code>encapsulation (atm-ccc-cell-relay   atm-pvc   cisco-hdlc   cisco-hdlc-ccc   cisco-hdlc-tcc   ethernet-bridge   ethernet-ccc   ethernet-over-atm   ethernet-tcc   ethernet-vpls   ethernet-vpls-fr   ether-vpls-over-atm-llc   ethernet-vpls-ppp   extended-frame-relay-ccc   extended-frame-relay-ether-type-tcc   extended-frame-relay-tcc   extended-vlan-bridge   extended-vlan-ccc   extended-vlan-tcc   extended-vlan-vpls   flexible-ethernet-services   flexible-frame-relay   frame-relay   frame-relay-ccc   frame-relay-ether-type   frame-relay-ether-type-tcc   frame-relay-port-ccc   frame-relay-tcc   generic-services   multilink-frame-relay-uni-nni   ppp   ppp-ccc   ppp-tcc   vlan-ccc   vlan-vci-ccc   vlan-vpls);</code>   |
| <b>Hierarchy Level</b>     | <code>[edit interfaces <i>interface-name</i>],</code><br><code>[edit interfaces rlsq <i>number:number</i>]</code>  |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 11.1 for EX Series switches.<br>Statement introduced in Junos OS Release 12.1X48 for PTX Series Packet Transport Routers ( <b>flexible-ethernet-services</b> , <b>ethernet-ccc</b> , and <b>ethernet-tcc</b> options only).  |
| <b>Description</b>         | Specify the physical link-layer encapsulation type. Not all encapsulation types are supported on the switches. See the switch CLI.   |
| <b>Default</b>             | <b>ppp</b> —Use serial PPP encapsulation.  |
| <b>Options</b>             | <b>atm-ccc-cell-relay</b> —Use ATM cell-relay encapsulation.<br><br><b>atm-pvc</b> —Use ATM PVC encapsulation.<br><br><b>cisco-hdlc</b> —Use Cisco-compatible High-Level Data Link Control (HDLC) framing.<br><br><b>cisco-hdlc-ccc</b> —Use Cisco-compatible HDLC framing on CCC circuits.<br><br><b>cisco-hdlc-tcc</b> —Use Cisco-compatible HDLC framing on TCC circuits for connecting different media.<br><br><b>ethernet-bridge</b> —Use Ethernet bridge encapsulation on Ethernet interfaces that have bridging enabled and that must accept all packets.<br><br><b>ethernet-ccc</b> —Use Ethernet CCC encapsulation on Ethernet interfaces that must accept packets carrying standard Tag Protocol ID (TPID) values. For 8-port, 12-port, and 48-port Fast Ethernet PICs, CCC is not supported.<br><br><b>ethernet-over-atm</b> —For interfaces that carry IPv4 traffic, use Ethernet over ATM encapsulation. When you use this encapsulation type, you cannot configure multipoint interfaces. As defined in RFC 2684, <i>Multiprotocol Encapsulation over ATM Adaptation Layer 5</i> , this encapsulation type allows ATM interfaces to connect to devices that support only bridge protocol data units (BPDUs). Junos OS does not completely support bridging, but accepts BPDU packets as a default gateway. If you use the router as an edge device, then the router acts as a default gateway. It accepts Ethernet LLC/SNAP frames with IP or ARP in the payload, and drops the rest. For packets destined to the Ethernet LAN, a route lookup is done using the destination |



IP address. If the route lookup yields a full address match, the packet is encapsulated with an LLC/SNAP and MAC header, and the packet is forwarded to the ATM interface.

**ethernet-tcc**—For interfaces that carry IPv4 traffic, use Ethernet TCC encapsulation on interfaces that must accept packets carrying standard TPID values. For 8-port, 12-port, and 48-port Fast Ethernet PICs, TCC is not supported.

**ethernet-vpls**—Use Ethernet VPLS encapsulation on Ethernet interfaces that have VPLS enabled and that must accept packets carrying standard TPID values. On M Series routers, except the M320 router, the 4-port Fast Ethernet TX PIC and the 1-port, 2-port, and 4-port, 4-slot Gigabit Ethernet PICs can use the Ethernet VPLS encapsulation type.

**ethernet-vpls-fr**—Use in a VPLS setup when a CE device is connected to a PE device over a time division multiplexing (TDM) link. This encapsulation type enables the PE device to terminate the outer layer 2 Frame Relay connection, use the 802.1p bits inside the inner Ethernet header to classify the packets, look at the MAC address from the Ethernet header, and use the MAC address to forward the packet into a given VPLS instance.

**ethernet-vpls-ppp**—Use in a VPLS setup when a CE device is connected to a PE device over a time division multiplexing (TDM) link. This encapsulation type enables the PE device to terminate the outer layer 2 PPP connection, use the 802.1p bits inside the inner Ethernet header to classify the packets, look at the MAC address from the Ethernet header, and use it to forward the packet into a given VPLS instance.

**ether-vpls-over-atm-llc**—For ATM intelligent queuing (IQ) interfaces only, use the Ethernet virtual private LAN service (VPLS) over ATM LLC encapsulation to bridge Ethernet interfaces and ATM interfaces over a VPLS routing instance (as described in RFC 2684, *Multiprotocol Encapsulation over ATM Adaptation Layer 5*). Packets from the ATM interfaces are converted to standard ENET2/802.3 encapsulated Ethernet frames with the frame check sequence (FCS) field removed.

**extended-frame-relay-ccc**—Use Frame Relay encapsulation on CCC circuits. This encapsulation type allows you to dedicate DLCIs 1 through 1022 to CCC.

**extended-frame-relay-ether-type-tcc**—Use extended Frame Relay ether type TCC for Cisco-compatible Frame Relay for DLCIs 1 through 1022. This encapsulation type is used for circuits with different media on either side of the connection.

**extended-frame-relay-tcc**—Use Frame Relay encapsulation on TCC circuits to connect different media. This encapsulation type allows you to dedicate DLCIs 1 through 1022 to TCC.

**extended-vlan-bridge**—Use extended VLAN bridge encapsulation on Ethernet interfaces that have IEEE 802.1Q VLAN tagging and bridging enabled and that must accept packets carrying TPID 0x8100 or a user-defined TPID.

**extended-vlan-ccc**—Use extended VLAN encapsulation on CCC circuits with Gigabit Ethernet and 4-port Fast Ethernet interfaces that must accept packets carrying 802.1Q values. For 8-port, 12-port, and 48-port Fast Ethernet PICs, extended VLAN CCC is not supported. For 4-port Gigabit Ethernet PICs, extended VLAN CCC is not supported.

**extended-vlan-tcc**—For interfaces that carry IPv4 traffic, use extended VLAN encapsulation on TCC circuits with Gigabit Ethernet interfaces on which you want to use 802.1Q tagging. For 4-port Gigabit Ethernet PICs, extended VLAN TCC is not supported.

**extended-vlan-vpls**—Use extended VLAN VPLS encapsulation on Ethernet interfaces that have VLAN 802.1Q tagging and VPLS enabled and that must accept packets carrying TPIDs 0x8100, 0x9100, and 0x9901. On M Series routers, except the M320 router, the 4-port Fast Ethernet TX PIC and the 1-port, 2-port, and 4-port, 4-slot Gigabit Ethernet PICs can use the Ethernet VPLS encapsulation type.



**NOTE:** The built-in Gigabit Ethernet PIC on an M7i router does not support extended VLAN VPLS encapsulation.

**flexible-ethernet-services**—For Gigabit Ethernet IQ interfaces and Gigabit Ethernet PICs with small form-factor pluggable transceivers (SFPs) (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router), use flexible Ethernet services encapsulation when you want to configure multiple per-unit Ethernet encapsulations. Aggregated Ethernet bundles can use this encapsulation type. This encapsulation type allows you to configure any combination of route, TCC, CCC, Layer 2 virtual private networks (VPNs), and VPLS encapsulations on a single physical port. If you configure flexible Ethernet services encapsulation on the physical interface, VLAN IDs from 1 through 511 are no longer reserved for normal VLANs.

**flexible-frame-relay**—For IQ interfaces only, use flexible Frame Relay encapsulation when you want to configure multiple per-unit Frame Relay encapsulations. This encapsulation type allows you to configure any combination of TCC, CCC, and standard Frame Relay encapsulations on a single physical port. Also, each logical interface can have any DLCI value from 1 through 1022.

**frame-relay**—Use Frame Relay encapsulation.

**frame-relay-ccc**—Use Frame Relay encapsulation on CCC circuits.

**frame-relay-ether-type**—Use Frame Relay ether type encapsulation for compatibility with the Cisco Frame Relay.

**frame-relay-ether-type-tcc**—Use Frame Relay ether type TCC for Cisco-compatible Frame Relay on TCC circuits to connect different media.

**frame-relay-port-ccc**—Use Frame Relay port CCC encapsulation to transparently carry all the DLCIs between two customer edge (CE) routers without explicitly configuring each DLCI on the two provider edge (PE) routers with Frame Relay transport. When you use this encapsulation type, you can configure the **ccc** family only.

**frame-relay-tcc**—Use Frame Relay encapsulation on TCC circuits to connect different media.

**generic-services**—Use generic services encapsulation for services with a hierarchical scheduler.

**multilink-frame-relay-uni-nni**—Use MLFR UNI NNI encapsulation. This encapsulation is used on link services, voice services interfaces functioning as FRF.16 bundles, and their constituent T1 or E1 interfaces, and is supported on LSQ and redundant LSQ interfaces.

**ppp**—Use serial PPP encapsulation.

**ppp-ccc**—Use serial PPP encapsulation on CCC circuits. When you use this encapsulation type, you can configure the **ccc** family only.

**ppp-tcc**—Use serial PPP encapsulation on TCC circuits for connecting different media. When you use this encapsulation type, you can configure the **tcc** family only.

**vlan-ccc**—Use Ethernet VLAN encapsulation on CCC circuits.

**vlan-vci-ccc**—Use ATM-to-Ethernet interworking encapsulation on CCC circuits. When you use this encapsulation type, you can configure the **ccc** family only. All logical interfaces configured on the Ethernet interface must also have the encapsulation type set to **vlan-vci-ccc**.

**vlan-vpls**—Use VLAN VPLS encapsulation on Ethernet interfaces with VLAN tagging and VPLS enabled. Interfaces with VLAN VPLS encapsulation accept packets carrying standard TPID values only. On M Series routers, except the M320 router, the 4-port Fast Ethernet TX PIC and the 1-port, 2-port, and 4-port, 4-slot Gigabit Ethernet PICs can use the Ethernet VPLS encapsulation type.



**NOTE:** Label-switched interfaces (LSIs) do not support VLAN VPLS encapsulation. Therefore, you can only use VLAN VPLS encapsulation on a PE-router-to-CE-router interface and not a core-facing interface.

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

|                              |  |
|------------------------------|--|
| <b>Related Documentation</b> | <ul style="list-style-type: none"><li>• <a href="#">Configuring Interface Encapsulation on Physical Interfaces on page 130</a></li><li>• <i>Configuring CCC Encapsulation for Layer 2 VPNs</i></li><li>• <i>Configuring Layer 2 Switching Cross-Connects Using CCC</i></li><li>• <i>Configuring TCC Encapsulation for Layer 2 VPNs and Layer 2 Circuits</i></li><li>• <i>Configuring ATM Interface Encapsulation</i></li><li>• <a href="#">Configuring ATM-to-Ethernet Interworking on page 260</a></li><li>• <i>Configuring VLAN Encapsulation</i></li><li>• <i>Configuring Extended VLAN Encapsulation</i></li><li>• <i>Configuring Encapsulation for Layer 2 Wholesale VLAN Interfaces</i></li><li>• <i>Configuring Interfaces for Layer 2 Circuits</i></li><li>• <i>Configuring Interface Encapsulation on PTX Series Packet Transport Routers</i></li><li>• <i>Configuring an MPLS-Based Layer 2 VPN (CLI Procedure)</i></li><li>• <i>Configuring MPLS LSP Tunnel Cross-Connects Using CCC</i></li><li>• <i>Configuring TCC</i></li><li>• <i>Configuring VPLS Interface Encapsulation</i></li><li>• <i>Configuring Interfaces for VPLS Routing</i></li><li>• <a href="#">Defining the Encapsulation for Switching Cross-Connects on page 255</a></li><li>• <i>Understanding Encapsulation on an Interface</i></li></ul> |
|------------------------------|--|

---

## encoding

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | encoding (nrz   nrzi);   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For serial interfaces, set the line encoding format.   |
| <b>Default</b>                  | The default line encoding is non-return to zero (NRZ).   |
| <b>Options</b>                  | <p>nrz—Use NRZ line encoding.</p> <p>nrzi—Use non-return to zero inverted (NRZI) line encoding.</p>                                |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p> |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Serial Line Encoding on page 309</a></li></ul>                     |

## epd-threshold

See the following sections:

- [epd-threshold \(Logical Interface\) on page 459](#)
- [epd-threshold \(Physical Interface\) on page 460](#)

### epd-threshold (Logical Interface)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>epd-threshold <i>cells</i> <b>plp1</b> <i>cells</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> address <i>address</i> family <i>family</i> multipoint-destination <i>address</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> address <i>address</i> <b>family</b> <i>family</i> multipoint-destination <i>address</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 11.1 for the QFX Series.   |
| <b>Description</b>              | For ATM2 IQ interfaces only, define the early packet discard (EPD) threshold on a VC. The EPD threshold is a limit on the number of transmit packets that can be queued. Packets that exceed the limit are discarded. For interfaces configured in trunk mode, you can also configure dual EPD thresholds depending on the packet loss priorities (PLPs).  |
| <b>Default</b>                  | Approximately 1 percent of the available cell buffers. If shaping is enabled, the default EPD threshold is proportional to the shaping rate according to the following formula:<br><br>$\text{default epd-threshold} = \text{number of buffers} * \text{shaping rate} / \text{line rate}$ <p>The minimum EPD threshold value is 48 cells. If the default EPD threshold formula results in an EPD threshold of less than 48 cells, the result will be ignored, and the minimum value of 48 cells will be used.</p>  |
| <b>Options</b>                  | <b>cells</b> —Maximum number of cells.<br><b>Range:</b> For 1-port and 2-port OC12 interfaces, 48 through 425,984 cells  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring the ATM2 IQ EPD Threshold</i></li> <li>• <i>Configuring Two EPD Thresholds per Queue</i></li> </ul>  |

## epd-threshold (Physical Interface)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>epd-threshold cells <b>plp1</b> cells;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces at- <i>fpc/pic/port</i> atm-options scheduler-maps <i>map-name</i> <b>forwarding-class</b> <i>class-name</i> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For ATM2 IQ interfaces only, define the EPD threshold on a VC. The EPD threshold is a limit on the number of transmit packets that can be queued. Packets that exceed the limit are discarded.   |
| <b>Default</b>                  | If you do not include either the <b>epd-threshold</b> or the <b>linear-red-profile</b> statement in the forwarding class configuration, the Junos OS uses an EPD threshold based on the available bandwidth and other parameters.  |
| <b>Options</b>                  | <b>cells</b> —Maximum number of cells.<br><b>Range:</b> For 1-port and 2-port OC12 interfaces, 48 through 425,984 cells. For 1-port OC48 interfaces, 48 through 425,984 cells. For 2-port OC3, DS3, and E3 interfaces, 48 through 212,992 cells. For 4-port DS3 and E3 interfaces, 48 through 106,496 cells.<br><br>The <b>plp1</b> statement is explained separately. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring an ATM Scheduler Map</i></li><li>• <a href="#">linear-red-profile on page 560</a></li></ul>   |

---

## es-options

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>es-options {<br/>    <b>backup-interface</b> <i>interface-name</i>;<br/>}</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces es- <i>fpc/pic/port</i> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | On ES interfaces, configure ES interface-specific interface properties.<br><br>The <b>backup-interface</b> statement is explained separately. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>                             |

## ethernet (Protocols OAM)

```
Syntax ethernet {
    connectivity-fault-management {
        action-profile profile-name {
            default-actions {
                interface-down;
            }
        }
    }
    performance-monitoring {
        delegate-server-processing;
        hardware-assisted-timestamping;
        sla-iterator-profiles {
            profile-name {
                disable;
                calculation-weight {
                    delay delay-weight;
                    delay-variation delay-variation-weight;
                }
                cycle-time milliseconds;
                iteration-period connections;
                measurement-type (loss | statistical-frame-loss | two-way-delay);
            }
        }
    }
    linktrace {
        age (30m | 10m | 1m | 30s | 10s);
        path-database-size path-database-size;
    }
    maintenance-domain domain-name {
        level number;
        name-format (character-string | none | dns | mac+2octet);
        maintenance-association ma-name {
            short-name-format (character-string | vlan | 2octet | rfc-2685-vpn-id);
            protect-maintenance-association protect-ma-name;
            remote-maintenance-association remote-ma-name;
            continuity-check {
                convey-loss-threshold;
                hold-interval minutes;
                interface-status-tlv;
                interval (10m | 10s | 1m | 1s | 100ms);
                loss-threshold number;
                port-status-tlv;
            }
        }
        mep mep-id {
            auto-discovery;
            direction (up | down);
            interface interface-name (protect | working);
            lowest-priority-defect (all-defects | err-xcon | mac-rem-err-xcon | no-defect |
                rem-err-xcon | xcon );
            priority number;
            remote-mep mep-id {
                action-profile profile-name;
                sla-iterator-profile profile-name {
```

```

    data-tlv-size size;
    iteration-count count-value;
    priority priority-value;
}
}
}
}
}
}
evcs evc-id {
    evc-protocol cfm management-domain domain-id (management-association
        association-id | vpls (routing-instance instance-id);
    remote-uni-count count;
    multipoint-to-multipoint;
}
link-fault-management {
    action-profile profile-name {
        action {
            link-down;
            send-critical-event;
            syslog;
        }
        event {
            link-adjacency-loss;
            link-event-rate {
                frame-error count;
                frame-period count;
                frame-period-summary count;
                symbol-period count;
            }
            protocol-down;
        }
    }
}
interface interface-name {
    apply-action-profile;
    link-discovery (active | passive);
    pdu-interval interval;
    pdu-threshold threshold-value;
    remote-loopback;
    event-thresholds {
        frame-error count;
        frame-period count;
        frame-period-summary count;
        symbol-period count;
    }
    negotiation-options {
        allow-remote-loopback;
        no-allow-link-events;
    }
}
}
lmi {
    status-counter count;
    polling-verification-timer value;
    interface name {
        uni-id uni-name;

```



```

    status-counter number;
    polling-verification-timer value;
    evc-map-type (all-to-one-bundling | bundling | service-multiplexing);
    evc evc-name {
        default-evc;
        vlan-list vlan-id-list;
    }
}
}
}

```

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

**Release Information** Statement introduced in Junos OS Release 8.2.

**Description** For Ethernet interfaces on EX Series switches, and M320, MX Series, and T Series routers, provide fault signaling and detection for 802.3ah Operation, Administration, and Management (OAM) support.

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**

- *Enabling IEEE 802.3ah OAM Support*
- *Example: Configuring Connectivity Fault Management for a PBB Network on MX Series Routers*

## ethernet-policer-profile

---

**Syntax** 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*;  
        }  
    }  
}

**Hierarchy Level** [edit interfaces *interface-name* gigether-options [ethernet-switch-profile](#)],  
[edit interfaces *interface-name* aggregated-ether-options [ethernet-switch-profile](#)]

**Release Information** Statement introduced before Junos OS Release 7.4.

**Description** For Gigabit Ethernet IQ, 10-Gigabit Ethernet, Gigabit Ethernet PICs with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router), and 100-Gigabit Ethernet Type 5 PIC with CFP, configure a class of service (CoS)-based policer. Policing applies to the inner VLAN identifiers, not to the outer tag. For Gigabit Ethernet interfaces with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router), the **premium** policer is not supported.

The statements are explained separately.

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

**Related Documentation**

- *Configuring Gigabit Ethernet Policers*

## ethernet-ring

```
Syntax ethernet-ring ring-name {
    control-vlan (vlan-id | vlan-name);
    data-channel {
        vlan number
    }
    east-interface {
        control-channel channel-name {
            vlan number;
        }
    }
    guard-interval number;
    node-id mac-address;
    restore-interval number;
    ring-protection-link-owner;
    west-interface {
        control-channel channel-name {
            vlan number;
        }
    }
}
```

**Hierarchy Level** [edit protocols [protection-group](#)]

**Release Information** Statement introduced in Junos OS Release 9.4.  
Statement introduced in Junos OS Release 12.1 for EX Series switches.

**Description** For Ethernet PICs on MX Series routers or for EX Series switches, , specify the Ethernet ring in an Ethernet ring protection switching configuration.

**Options** *ring-name*—Name of the Ethernet protection ring.  
  
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**

- [Ethernet Ring Protection Switching Overview](#)
- [Example: Configuring Ethernet Ring Protection Switching on EX Series Switches](#)
- [Configuring Ethernet Ring Protection Switching \(CLI Procedure\)](#)

## ethernet-switch-profile

```
Syntax ethernet-switch-profile {
    ethernet-policer-profile {
        input-priority-map {
            ieee802.1p premium [ values ];
        }
        output-priority-map {
            classifier {
                premium {
                    forwarding-class class-name {
                        loss-priority (high | low);
                    }
                }
            }
        }
        policer cos-policer-name {
            aggregate {
                bandwidth-limit bps;
                burst-size-limit bytes;
            }
            premium {
                bandwidth-limit bps;
                burst-size-limit bytes;
            }
        }
        tag-protocol-id tpid;
    }
    (mac-learn-enable | no-mac-learn-enable);
}
```

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

**Release Information** Statement introduced before Junos OS Release 7.4.  
Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.

**Description** For Gigabit Ethernet IQ, 10-Gigabit Ethernet IQ2 and IQ2-E, and Gigabit Ethernet PICs with SFPs (except the 10-port Gigabit Ethernet PIC, aggregated Ethernet with Gigabit Ethernet IQ interfaces, the built-in Gigabit Ethernet port on the M7i router), and 100-Gigabit Ethernet Type 5 PIC with CFP, configure VLAN tag and MAC address accounting and filtering properties.

The statements are explained separately.



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

on disabling MAC learning for a bridge domain, see the *MX Series Layer 2 Configuration Guide*.

---

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

## eui-64

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | eui-64;  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>number</i> <b>family</b> inet6 address <i>address</i> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.3 for EX Series switches.<br>Statement introduced in Junos OS Release 12.2 for the QFX Series. |
| <b>Description</b>              | For interfaces that carry IP version 6 (IPv6) traffic, automatically generate the host number portion of interface addresses. Not supported on QFX Series switches.                            |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring the Interface Address on page 204</a></li> </ul>  |

## evcs

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>evcs evc-id {<br/>    evc-protocol cfm management-domain <i>domain-id</i> (management-association <i>association-id</i><br/>      vpls (routing-instance <i>instance-id</i>);<br/>    remote-uni-count <i>count</i>;<br/>    multipoint-to-multipoint;<br/>}</pre>   |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam</a> <a href="#">ethernet</a> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.5.   |
| <b>Description</b>              | On MX Series routers with <b>ge</b> , <b>xe</b> , or <b>ae</b> interfaces, configure an OAM Ethernet virtual connection.  |
| <b>Options</b>                  | <p><b>evc-protocol cfm   vpls</b>—Specify connectivity fault management (CFM) or virtual private LAN service (VPLS) as the Ethernet Virtual Connection (EVC) protocol.</p> <p><b>management-domain <i>domain-id</i></b>—(Optional) For CFM, specify the CFM management domain.</p> <p><b>management-association <i>association-id</i></b>—(Optional) For CFM, specify the CFM management association.</p> <p><b>routing-instance <i>instance-id</i></b>—(Optional) For VPLS, specify the VPLS routing instance.</p> <p><b>remote-uni-count <i>count</i></b>—(Optional) Specify the number of remote UNIs in the EVC configuration, the default is 1.</p> <p><b>multipoint-to-multipoint</b>—(Optional) Specify multiple points in the EVC configuration, the default is point-to-point if <b>remote-uni-count</b> is 1.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Ethernet Local Management Interface</i></li><li>• <a href="#">lmi (Ethernet OAM) on page 576</a></li></ul>   |

## event (LFM)


|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre> event {   link-adjacency-loss;   link-event-rate {     frame-error count;     frame-period count;     frame-period-summary count;     symbol-period count;   }   protocol-down; } </pre> |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet link-fault-management action-profile</a> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.  |
| <b>Description</b>              | <p>Configure threshold values for link events in an action profile.</p> <p>The remaining statements are explained separately.</p>  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Monitoring Protocol Status</i></li> </ul>  |

## event-thresholds

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre> event-thresholds {   frame-error count;   frame-period count;   frame-period-summary count;   symbol-period count; } </pre>       |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam link-fault-management interface interface-name</a> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.   |
| <b>Description</b>              | <p>Configure threshold limit values for link events in periodic OAM PDUs.</p> <p>The remaining statements are explained separately.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Threshold Values for Local Fault Events on an Interface</i></li> </ul>          |

## fast-aps-switch

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | fast-aps-switch;  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> sonet-options <b>aps</b> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 12.1.  |
| <b>Description</b>              | (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.  |
|                                 | <div> <b>NOTE:</b><ul style="list-style-type: none"><li>• 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.</li><li>• 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.</li><li>• 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.</li><li>• The fast-aps-switch statement cannot be configured when the APS annex-b option is configured.</li><li>• The interfaces that have the fast-aps-switch statement configured cannot be used in virtual private LAN service (VPLS) environments.</li></ul></div> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Reducing APS Switchover Time in Layer 2 Circuits</i></li></ul>   |



## f-max-period

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>f-max-period <i>number</i>;</code>  |
| <b>Hierarchy Level</b>          | <code>[edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i>],</code><br><code>[edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>rtp</b>]</code>  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For all adaptive services interfaces and for ISDN interfaces on J Series Services Routers. Specify the maximum number of compressed packets allowed between the transmission of full headers in a compressed Real-Time Transport Protocol (RTP) traffic stream. |
| <b>Options</b>                  | <i>number</i> —Maximum number of packets. The value can be from 1 through 65535.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Bandwidth on Demand</i></li> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>   |

## facility-override

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>facility-override <i>facility-name</i>;</code>  |
| <b>Hierarchy Level</b>          | <code>[edit interfaces <i>interface-name</i> <b>services-options</b> <b>sysloghost</b> <i>hostname</i>]</code>          |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | Override default facility for system log reporting.   |
| <b>Options</b>                  | <i>facility-name</i> —Name of facility that overrides the default assignment.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>     |

## failover-delay

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>failover-delay <i>milliseconds</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit protocols vrrp]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.4.   |
| <b>Description</b>              | Configure the failover delay for VRRP and VRRP for IPv6 operations.   |
| <b>Options</b>                  | <i>milliseconds</i> —Specify the failover delay time, in milliseconds.<br><b>Range:</b> 50 through 2000                 |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring VRRP and VRRP for IPv6</i></li></ul>                             |

## 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 ...
        }
        bridge-domain-type (bvlan | svlan);
        bundle interface-name;
        core-facing;
        demux-destination {
            destination-prefix;
        }
        demux-source {
            source-prefix;
        }
        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;
        isid-list all-service-groups;
        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;
    evi-64;
    master-only;
    multipoint-destination address dlc 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;
vrp-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 *interface-name* *unit* *logical-unit-number*],  
[edit logical-systems *logical-system-name* interfaces *interface-name* *unit* *logical-unit-number*]

**Release Information** Statement introduced before Junos OS Release 7.4.  
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.

- **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**

- [Configuring the Protocol Family on page 202](#)
- *Example: Configuring E-LINE and E-LAN Services for a PBB Network on MX Series Routers*
- *Junos OS Services Interfaces Library for Routing Devices*

## fastether-options

**Syntax**

```
fastether-options {
  802.3ad {
    aex (primary | backup);
    lacp {
      port-priority;
    }
  }
  (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);
}
```

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

**Release Information** Statement introduced before Junos OS Release 7.4.

**Description** Configure Fast Ethernet-specific interface properties.


The statements are explained separately.

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

**Related Documentation**

- *Ethernet Interfaces Overview*

## fcs

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | fcs (16   32);  |
| <b>Hierarchy Level</b>          | [edit interfaces e1- <i>fpc/pic/port</i> ],<br>[edit interfaces t1- <i>fpc/pic/port</i> ],<br>[edit interfaces <i>interface-name</i> ds0-options],<br>[edit interfaces <i>interface-name</i> e1-options],<br>[edit interfaces <i>interface-name</i> e3-options],<br>[edit interfaces <i>interface-name</i> sonet-options],<br>[edit interfaces <i>interface-name</i> t1-options],<br>[edit interfaces <i>interface-name</i> t3-options]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.   |
| <b>Description</b>              | <p>For E1/E3, SONET/SDH, and T1/T3 interfaces, configure the frame checksum (FCS) on the interface. The checksum must be the same on both ends of the interface.</p> <p>On a channelized OC12 interface, the SONET/SDH <b>fcs</b> statement is not supported. To configure FCS on each DS3 channel, you must include the <b>t3-options fcs</b> statement in the configuration for each channel. For SONET/SDH, the channelized OC12 interface supports DS3 to STS-1 to OC12. For SDH, the channelized OC12 interface supports NxDS3 to NxVC3 to AU3 to STM.</p> |
|                                 | <div>  <p><b>NOTE:</b> When configuring E1 or T1 interfaces on 10-port Channelized E1/T1 IQE PICs, the <b>fcs</b> statement must be included at the [edit interfaces e1-<i>fpc/pic/port</i>] or [edit interfaces t1-<i>fpc/pic/port</i>] hierarchy level as appropriate.</p> </div>  |
| <b>Options</b>                  | <p><b>16</b>—Use a 16-bit frame checksum on the interface.</p> <p><b>32</b>—Use a 32-bit frame checksum on the interface. Using a 32-bit checksum provides more reliable packet verification, but some older equipment might not support 32-bit checksums.</p> <p><b>Default:</b> 16</p>  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>Configuring the E1 Frame Checksum</li> <li>Configuring the E3 Frame Checksum</li> <li>Configuring the SONET/SDH Frame Checksum</li> <li>Configuring the T1 Frame Checksum</li> <li>Configuring the T3 Frame Checksum</li> </ul>  |



## feac-loop-respond

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | (feac-loop-respond   no-feac-loop-respond);   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>t3-options</b> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | <p>For T3 interfaces only, configure the router so a remote CSU can place the local router into loopback.</p> <p>If you configure remote or local loopback with the T3 <b>loopback</b> statement, the router does not respond to FEAC requests from the CSU even if you include the <b>feac-loop-respond</b> statement in the configuration. For the router to respond, you must delete the <b>loopback</b> statement from the configuration.</p> <p>You must rollback the setting done on the remote CSU prior to deactivating the <b>feac-loop-respond</b> statement. If the remote CSU cannot comply, clear the remote loop through local configuration to achieve the cleanup. For example, configure remote loopback on the interface and then delete the remote loopback.</p> |
| <b>Default</b>                  | The router does not respond to FEAC requests.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring the T3 FEAC Response</i></li><li>• <a href="#">loopback (ADSL, DS0, E1/E3, SONET/SDH, SHDSL, and T1/T3) on page 587</a></li><li>• <a href="#">remote-loopback-respond on page 724</a></li></ul>  |

## filter

---


|                          |  |
|--------------------------|--|
| Syntax                   | <pre>filter {<br/>  group <i>filter-group-number</i>;<br/>  input <i>filter-name</i>;<br/>  input-list [ <i>filter-names</i> ];<br/>  output <i>filter-name</i>;<br/>  output-list [ <i>filter-names</i> ];<br/>}</pre>  |
| Hierarchy Level          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>family</b> <i>family</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>family</i> ]  |
| Release Information      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.  |
| Description              | Apply a filter to an interface. You can also use filters for encrypted traffic. When you configure filters, you can configure them under the <b>family</b> <b>ethernet-switching</b> , <b>inet</b> , <b>inet6</b> , <b>mpls</b> , or <b>vpls</b> only.   |
| Options                  | <p><b>group</b> <i>filter-group-number</i>—Define an interface to be part of a filter group.<br/><b>Range:</b> 1 through 255</p> <p><b>input</b> <i>filter-name</i>—Name of one filter to evaluate when packets are received on the interface.</p> <p><b>output</b> <i>filter-name</i>—Name of one filter to evaluate when packets are transmitted on the interface.</p> <p>The remaining statements are explained separately.</p>   |
| Required Privilege Level | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| Related Documentation    | <ul style="list-style-type: none"><li>• <a href="#">Applying a Filter to an Interface on page 230</a></li><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li><li>• <i>Routing Policy Feature Guide for Routing Devices</i></li><li>• <i>Junos OS Administration Library for Routing Devices</i></li><li>• <i>Configuring Gigabit Ethernet Interfaces (CLI Procedure)</i></li><li>• <i>Configuring Gigabit Ethernet Interfaces (CLI Procedure)</i></li><li>• <i>Configuring Firewall Filters (CLI Procedure)</i></li><li>• <i>Configuring Firewall Filters and Policers for VPLS</i></li><li>• <i>family</i></li><li>• <i>family</i></li></ul> |

## flexible-vlan-tagging

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | flexible-vlan-tagging;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>ge-fpc/pic/port</i> ],<br>[edit interfaces <i>et-fpc/pic/port</i> ],<br>[edit interfaces <i>ps0</i> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.1.<br>Support for aggregated Ethernet added in Junos OS Release 9.0.<br>Statement introduced in Junos OS Release 12.1x48 for PTX Series Packet Transport Routers.   |
| <b>Description</b>              | Support simultaneous transmission of 802.1Q VLAN single-tag and dual-tag frames on logical interfaces on the same Ethernet port, and on pseudowire logical interfaces.<br><br>This statement is supported on M Series and T Series routers, for Fast Ethernet and Gigabit Ethernet interfaces only on Gigabit Ethernet IQ2 and IQ2-E, IQ, and IQE PICs, and for aggregated Ethernet interfaces with member links in IQ2, IQ2-E, and IQ PICs or in MX Series DPCs, or on Ethernet interfaces for PTX Series Packet Transport Routers or 100-Gigabit Ethernet Type 5 PIC with CFP. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Mixed Tagging</i></li> <li>• <i>Configuring Flexible VLAN Tagging on PTX Series Packet Transport Routers</i></li> </ul>  |

## flow-control

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | (flow-control   no-flow-control);  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">aggregated-ether-options</a> ],<br>[edit interfaces <i>interface-name</i> ether-options],<br>[edit interfaces <i>interface-name</i> <a href="#">fastether-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">gigether-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">multiservice-options</a> ],<br>[edit interfaces interface-range <i>name</i> <a href="#">aggregated-ether-options</a> ],<br>[edit interfaces interface-range <i>name</i> ether-options] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 in EX Series switches.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.   |
| <b>Description</b>              | For aggregated Ethernet, Fast Ethernet, and Gigabit Ethernet interfaces only, explicitly enable flow control, which regulates the flow of packets from the router or switch to the remote side of the connection. Enabling flow control is useful when the remote device is a Gigabit Ethernet switch. Flow control is not supported on the 4-port Fast Ethernet PIC.  |
|                                 | <div><p><b>NOTE:</b> On the Type 5 FPC, to prioritize control packets in case of ingress oversubscription, you must ensure that the neighboring peers support MAC flow control. If the peers do not support MAC flow control, then you must disable flow control.</p></div>  |
| <b>Default</b>                  | Flow control is enabled.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Flow Control</i></li><li>• <i>Configuring Gigabit Ethernet Interfaces (CLI Procedure)</i></li><li>• <i>Configuring Gigabit Ethernet Interfaces (CLI Procedure)</i></li></ul>  |

## flow-control-options

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>flow-control-options {   down-on-flow-control;   dump-on-flow-control;   reset-on-flow-control; }</pre>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>mo-fpc/pic/port</i> multiservice-options]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 8.4.  |
| <b>Description</b>              | <p>Configure the flow control options for application recovery in case of a prolonged flow control failure.</p> <ul style="list-style-type: none"> <li>• <b>down-on-flow-control</b>—Bring interface down during prolonged flow control.</li> <li>• <b>dump-on-flow-control</b>—Cause core dump during prolonged flow control.</li> <li>• <b>reset-on-flow-control</b>—Reset interface during prolonged flow control.</li> </ul> |
| <b>Usage Guidelines</b>         | See <i>Configuring Flow Monitoring</i> .   |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |

## force

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | force (protect   working);   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> sonet-options <a href="#">aps</a> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Perform a forced switch between the protect and working circuits. This statement is honored only if there are no higher-priority reasons to switch. It can be overridden by a signal failure on the protect circuit, thus causing a switch to the working circuit. |
| <b>Options</b>                  | <p><b>protect</b>—Request the circuit to become the protect circuit.</p> <p><b>working</b>—Request the circuit to become the working circuit.</p>  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Switching Between the Working and Protect Circuits</i></li> <li>• <a href="#">request on page 726</a></li> </ul>   |

## forward-and-send-to-re

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | forward-and-send-to-re;  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> inet <b>targeted-broadcast</b> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> inet <b>targeted-broadcast</b> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.2.   |
| <b>Description</b>              | Specify that IP packets destined for a Layer 3 broadcast address be forwarded to an egress interface and the Routing Engine. The packets are broadcast only if the egress interface is a LAN interface.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Targeted Broadcast on page 250</a></li><li>• <a href="#">targeted-broadcast on page 799</a></li><li>• <a href="#">Understanding Targeted Broadcast on page 249</a></li></ul>   |

## forward-only

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | forward-only;  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> inet <b>targeted-broadcast</b> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> inet <b>targeted-broadcast</b> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.2.   |
| <b>Description</b>              | Specify that IP packets destined for a Layer 3 broadcast address be forwarded to an egress interface only. The packets are broadcast only if the egress interface is a LAN interface.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Targeted Broadcast on page 250</a></li><li>• <a href="#">targeted-broadcast on page 799</a></li><li>• <a href="#">Understanding Targeted Broadcast on page 249</a></li></ul>   |

## forwarding-class

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See the following sections:

- [forwarding-class \(ATM2 IQ Scheduler Maps\) on page 485](#)
- [forwarding-class \(Gigabit Ethernet IQ Classifier\) on page 486](#)

### forwarding-class (ATM2 IQ Scheduler Maps)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>forwarding-class <i>class-name</i> {   <i>epd-threshold</i> <i>cells plp1 cells</i>;   <i>linear-red-profile</i> <i>profile-name</i>;   <i>priority</i> (high   low);   <i>transmit-weight</i> (<i>cells number</i>   <i>percent number</i>); }</pre> |
| <b>Hierarchy Level</b>          | [edit interfaces at- <i>fpc/pic/port</i> atm-options <i>scheduler-maps map-name</i> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For ATM2 IQ interfaces only, define forwarding class name and option values.   |
| <b>Options</b>                  | <p><i>class-name</i>—Name of forwarding class.</p> <p>The statements are explained separately.</p>   |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring ATM2 IQ VC Tunnel CoS Components</a></li> <li>• <a href="#">Configuring Scheduler Maps on ATM Interfaces</a></li> </ul>   |

## forwarding-class (Gigabit Ethernet IQ Classifier)

|                          |   |
|--------------------------|---|
| Syntax                   | <code>forwarding-class <i>class-name</i> {<br/>    <code>loss-priority</code> (high   low);<br/>}</code>  |
| Hierarchy Level          | [edit interfaces <i>interface-name</i> gigether-options <code>ethernet-switch-profile</code><br><code>ethernet-policer-profile output-priority-map classifier premium</code> ]  |
| Release Information      | Statement introduced before Junos OS Release 7.4.   |
| Description              | For Gigabit Ethernet IQ interfaces only, define forwarding class name and option values.  |
| Options                  | <code>class-name</code> —Name of forwarding class.<br><br>The statements are explained separately.  |
| Required Privilege Level | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| Related Documentation    | <ul style="list-style-type: none"><li>• <i>Specifying an Output Priority Map</i></li><li>• <a href="#">input-priority-map on page 525</a></li><li>• <code>forwarding-class</code> statement in the <i>Junos OS Class of Service Library for Routing Devices</i></li></ul> |



## forwarding-mode (100-Gigabit Ethernet)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>forwarding-mode {   (sa-multicast   ...the following vlan-steering statement...);   vlan-steering {     vlan-rule (high-low   odd-even);   } }</pre>  |
| <b>Hierarchy Level</b>          | [edit chassis fpc slot pic slot]   |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 10.4.</p> <p>Statement introduced in Junos OS Release 12.1 for MX Series routers.</p>  |
| <b>Description</b>              | <p>Configure the interoperation mode for 100-Gigabit Ethernet PIC or the 100-Gigabit Ethernet MIC.</p> <p>The remaining statements are explained separately.</p>   |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring VLAN Steering Mode for 100-Gigabit Ethernet Type 4 PIC with CFP</i></li> <li>• <i>Configuring 100-Gigabit Ethernet MICs to Interoperate with Type 4 100-Gigabit Ethernet PICs (PD-1CE-CFP-FPC4)(Type 4 1X100GE PIC for STFPC4 FPC) Using SA Multicast Mode</i></li> <li>• <i>Interoperability Between the 100-Gigabit Ethernet PICs PD-1CE-CFP-FPC4 and PF-1CGE-CFP</i></li> <li>• <i>Configuring the Interoperability Between the 100-Gigabit Ethernet PICs PF-1CGE-CFP and PD-1CE-CFP-FPC4</i></li> <li>• <a href="#">sa-multicast (100-Gigabit Ethernet) on page 739</a></li> <li>• <a href="#">vlan-rule (100-Gigabit Ethernet Type 4 PIC with CFP) on page 856</a></li> <li>• <a href="#">vlan-steering (100-Gigabit Ethernet Type 4 PIC with CFP) on page 857</a></li> </ul> |

## fragment-threshold

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | fragment-threshold <i>bytes</i> ;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">mlfr-uni-nni-bundle-options</a> ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For multilink, link services, and voice services interfaces, and for J Series Services Routers ISDN interfaces, set the fragmentation threshold.  |
| <b>Options</b>                  | <b>bytes</b> —Maximum size, in bytes, for multilink packet fragments. Any nonzero value must be a multiple of 64 bytes.<br><b>Range:</b> 128 through 16,320 bytes<br><b>Default:</b> 0 bytes (no fragmentation)   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring ISDN Logical Interface Properties</i></li><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>  |

## frame-error

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>frame-error count;</code>  |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet link-fault-management action-profile event link-event-rate</a> ],<br>[edit protocols <a href="#">oam link-fault-management interface interface-name event-thresholds</a> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.  |
| <b>Description</b>              | <p>Threshold for sending frame error events or taking the action specified in the action profile.</p> <p>A frame error is any frame error on the underlying physical layer. The threshold is reached when the number of frame errors reaches the configured value within the window.</p> <p>The window or period during which frame errors are counted is 5 seconds or multiples of it (with a maximum value of 1 minute). This window denotes the duration as intervals of 100 milliseconds, encoded as a 16-bit unsigned integer. This window is not configurable in Junos OS. According to the IEEE 802.3ah standard, the default value of the frame-errors window is 1 second. This window has a lower bound of 1 second and an upper bound of 1 minute.</p> |
| <b>Options</b>                  | <p><b>count</b>—Threshold count for frame error events.</p> <p><b>Range:</b> 1 through 100</p>   |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Threshold Values for Local Fault Events on an Interface</i></li> <li>• <i>Configuring Threshold Values for Fault Events in an Action Profile</i></li> </ul>  |

## frame-period

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>frame-period count;</code>   |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet link-fault-management action-profile event link-event-rate</a> ],<br>[edit protocols <a href="#">oam link-fault-management interface interface-name event-thresholds</a> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.  |
| <b>Description</b>              | <p>Threshold for sending frame period error events or taking the action specified in the action profile.</p> <p>A frame error is any frame error on the underlying physical layer. The frame period threshold is reached when the number of frame errors reaches the configured value within the period window. The default period window is the number of minimum-size frames that can be transmitted on the underlying physical layer in 1 second. The window is not configurable.</p> |
| <b>Options</b>                  | <p><b>count</b>—Threshold count for frame period error events.</p> <p><b>Range:</b> 1 through 100</p>  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Threshold Values for Local Fault Events on an Interface</i></li><li>• <i>Configuring Threshold Values for Fault Events in an Action Profile</i></li></ul>   |

## frame-period-summary

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>frame-period-summary count;</code>   |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet link-fault-management action-profile event link-event-rate</a> ],<br>[edit protocols <a href="#">oam link-fault-management interface interface-name event-thresholds</a> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.  |
| <b>Description</b>              | <p>Threshold for sending frame period summary error events or taking the action specified in the action profile.</p> <p>An errored frame second is any 1-second period that has at least one errored frame. This event is generated if the number of errored frame seconds is equal to or greater than the specified threshold for that period window. The default window is 60 seconds. The window is not configurable.</p> |
| <b>Options</b>                  | <p><b>count</b>—Threshold count for frame period summary error events.</p> <p><b>Range:</b> 1 through 100</p>  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Threshold Values for Local Fault Events on an Interface</i></li> <li>• <i>Configuring Threshold Values for Fault Events in an Action Profile</i></li> </ul>  |

## framing

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See the following sections:

- [framing \(E1, E3, and T1 Interfaces\) on page 493](#)
- [framing \(10-Gigabit Ethernet Interfaces\) on page 494](#)
- [framing \(SONET and SDH Interfaces\) on page 495](#)

## framing (E1, E3, and T1 Interfaces)

|                            |  |
|----------------------------|--|
| <b>Syntax</b>              | <code>framing (g704   g704-no-crc4   g.751   g.832   unframed   sf   esf);</code>  |
| <b>Hierarchy Level</b>     | <code>[edit interfaces ce1-<i>fpc/pic/port</i>],</code><br><code>[edit interfaces ct1-<i>fpc/pic/port</i>],</code><br><code>[edit interfaces at-<i>fpc/pic/port</i> e3-options],</code><br><code>[edit interfaces e1-<i>fpc/pic/port</i> e1-options],</code><br><code>[edit interfaces t1-<i>fpc/pic/port</i> t1-options]</code> |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.  |
| <b>Description</b>         | Configure the framing format.  |



**NOTE:** When configuring CE1 or CT1 interfaces on 10-port Channelized E1/T1 IQE PICs, the `framing` statement must be included at the `[edit interfaces ce1-fpc/pic/port]` or `[edit interfaces ct1-fpc/pic/port]` hierarchy level as appropriate.

|                                 |  |
|---------------------------------|--|
| <b>Default</b>                  | <code>esf</code> for T1 interfaces; <code>g704</code> for E1 interfaces. There is no default value for E3 over ATM interfaces.   |
| <b>Options</b>                  | <p><code>esf</code>—Extended superframe (ESF) mode for T1 interfaces.</p> <p><code>g704</code>—G.704 framing format for E1 interfaces.</p> <p><code>g704-no-crc4</code>—G.704 framing with no cyclic redundancy check 4 (CRC4) for E1 interfaces.</p> <p><code>g.751</code>—G.751 framing format for E3 over ATM interfaces.</p> <p><code>g.832</code>—G.832 framing format for E3 over ATM interfaces.</p> <p><code>sf</code>—Superframe (SF) mode for T1 interfaces.</p> <p><code>unframed</code>—Unframed mode for E1 interfaces.</p> |
| <b>Required Privilege Level</b> | <p><code>interface</code>—To view this statement in the configuration.</p> <p><code>interface-control</code>—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring E1 Framing</i></li> <li>• <i>Configuring E3 and T3 Parameters on ATM Interfaces</i></li> <li>• <i>Configuring T1 Framing</i></li> </ul>  |

## framing (10-Gigabit Ethernet Interfaces)

|                            |   |
|----------------------------|---|
| <b>Syntax</b>              | <code>framing (lan-phy   wan-phy);</code>   |
| <b>Hierarchy Level</b>     | <code>[edit interfaces xe-fpc/pic/port]</code><br><code>[edit interfaces et-fpc/pic/port]</code> (PTX Series Packet Transport Routers)  |
| <b>Release Information</b> | Statement introduced in Junos OS Release 8.0.<br>Statement introduced in Junos OS Release 12.3R2 for PTX Series Packet Transport Routers.   |
| <b>Description</b>         | For routers supporting the 10-Gigabit Ethernet interface, configure the framing format. WAN PHY mode is supported on MX240, MX480, MX960, T640, T1600, T4000, and PTX Series Packet Transport Routers routers only. |



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### NOTE:

- The T4000 Core Router supports only LAN PHY mode in Junos OS Release 12.1R1. Starting with Junos OS Release 12.1R2, WAN PHY mode is supported on the T4000 routers with the 12-port 10-Gigabit Ethernet LAN/WAN PIC with SFP+ (PF-12XGE-SFPP). Starting with Junos OS Release 12.2, WAN PHY mode is supported on the T4000 routers with the 24-port 10-Gigabit Ethernet LAN/WAN PIC with SFP+ (PF-24XGE-SFPP).
  - On PTX Series routers, WAN PHY mode is supported only on the 24-port 10-Gigabit Ethernet LAN/WAN PIC with SFP+ .
  - When the PHY mode changes, interface traffic is disrupted because of port reinitialization.
- 

|                                 |  |
|---------------------------------|--|
| <b>Default</b>                  | Operates in LAN PHY mode.  |
| <b>Options</b>                  | <b>lan-phy</b> —10GBASE-R interface framing format that bypasses the WIS sublayer to directly stream block-encoded Ethernet frames on a 10-Gigabit Ethernet serial interface.<br><br><b>wan-phy</b> —10GBASE-W interface framing format that allows 10-Gigabit Ethernet wide area links to use fiber-optic cables and SONET devices. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>10-Gigabit Ethernet Framing Overview</i></li><li>• <i>Configuring SONET Options for 10-Gigabit Ethernet Interfaces</i></li></ul>  |



## framing (SONET and SDH Interfaces)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>framing (sdh   sonet);</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>so-fpc/pic/port</i> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.1.  |
| <b>Description</b>              | <p>This functionality allows you to mix SONET and SDH modes on interfaces on the same PIC.</p> <ul style="list-style-type: none"><li>• For the 4-port OC48 PIC with SFP installed and the 4-port OC192 PIC in T Series and M Series routers, configure SONET or SDH framing on a per-port basis.</li><li>• For 1-port OC192/STM64 MICs with XFP on MX Series routers, configure the SONET or SDH framing on the single port.</li></ul> |
| <b>Default</b>                  | Default framing mode is <b>SONET</b> .   |
| <b>Options</b>                  | <p><b>sdh</b>—SDH framing.</p> <p><b>sonet</b>—SONET framing.</p>  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring SONET/SDH Framing Mode</i></li></ul>  |

## gigether-options

```
Syntax  gigether-options {
        802.3ad {
            aex (primary | backup);
            lacp {
                port-priority;
            }
        }
        (asynchronous-notification | no-asynchronous-notification);
        (auto-negotiation | no-auto-negotiation) remote-fault <local-interface-online |
            local-interface-offline>;
        (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);
        speed
        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;
                }
            }
        }
    }
```

}

|                                 |  |
|---------------------------------|--|
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Configure Gigabit Ethernet specific interface properties.<br><br>The statements are explained separately.                          |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Ethernet Interfaces Overview</i></li><li>• <i>gether-options (ACX Series)</i></li></ul> |

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## gratuitous-arp-reply

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | (gratuitous-arp-reply   no-gratuitous-arp-reply);  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 in EX Series switches.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers. |
| <b>Description</b>              | For Ethernet interfaces, enable updating of the Address Resolution Protocol (ARP) cache for gratuitous ARPs.   |
| <b>Default</b>                  | Updating of the ARP cache is disabled on all Ethernet interfaces.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Gratuitous ARP</i></li><li>• <a href="#">no-gratuitous-arp-request on page 635</a></li></ul>  |

## guard-interval

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>guard-interval <i>number</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">protection-group ethernet-ring <i>ring-name</i></a> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.4.<br>Statement introduced in Junos OS Release 12.1 for EX Series switches.  |
| <b>Description</b>              | When a link goes down, the ring protection link (RPL) activates. When the downed link comes back up, the RPL link receives notification, restores the link, and waits for the restore interval before issuing another block on the same link. This configuration is a global configuration and applies to all Ethernet rings if the Ethernet ring does not have a more specific configuration for this value. If no parameter is configured at the protection group level, the global configuration of this parameter uses the default value. |
| <b>Options</b>                  | <b><i>number</i></b> —Guard timer interval, in milliseconds.<br><b>Range:</b> 10 through 2000 ms<br><b>Default:</b> 500 ms  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Ethernet Ring Protection Switching Overview</i></li><li>• <i>Example: Configuring Ethernet Ring Protection Switching on EX Series Switches</i></li><li>• <i>Configuring Ethernet Ring Protection Switching (CLI Procedure)</i></li></ul>   |

## hardware-assisted-timestamping

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | hardware-assisted-timestamping;  |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam</a> <a href="#">ethernet</a> <a href="#">connectivity-fault-management</a> <a href="#">performance-monitoring</a> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.5.  |
| <b>Description</b>              | <p>For Ethernet interfaces on Enhanced and Enhanced Queuing Dense Port Concentrators (DPCs) in MX Series routers only, enable hardware-assisted timestamping support for Ethernet frame delay measurement.</p> <p>By default, the ETH-DM feature calculates frame delays using software-based timestamping of the ETH-DM PDU frames sent and received by the MEPs in the session. As an option that can increase the accuracy of ETH-DM calculations when the DPC is loaded with heavy traffic in the receive direction, you can enable hardware-assisted timestamping of session frames in the receive direction.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Ethernet Frame Delay Measurements Overview</i></li> <li>• <i>Guidelines for Configuring Routers to Support an ETH-DM Session</i></li> <li>• <i>Enabling the Hardware-Assisted Timestamping Option</i></li> </ul>   |

## hello-timer

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | hello-timer <i>milliseconds</i> ;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">mlfr-uni-nni-bundle-options</a> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For link services and voice services interfaces only, configure the rate at which hello messages are sent. A hello message is transmitted after a period defined in milliseconds has elapsed.                               |
| <b>Options</b>                  | <p><b>milliseconds</b>—The rate at which hello messages are sent.</p> <p><b>Range:</b> 1 through 180 milliseconds</p> <p><b>Default:</b> 10 milliseconds</p>  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> <li>• <a href="#">acknowledge-timer on page 322</a></li> <li>• <a href="#">address on page 329</a></li> </ul> |

## hierarchical-policer

---

**Syntax** hierarchical-policer *name* {  
    aggregate {  
        if-exceeding {  
            bandwidth-limit *bandwidth*;  
            burst-size-limit *burst*;  
        }  
        then {  
            discard;  
        }  
    }  
    premium {  
        if-exceeding {  
            bandwidth-limit *bandwidth*;  
            burst-size-limit *burst*;  
        }  
        then {  
            discard;  
        }  
    }  
}

**Hierarchy Level** [edit firewall]

**Release Information** Statement introduced in Junos OS Release 9.5.

**Description** For M40e, M120, and M320 (with FFPC and SFPC) edge routers and T320, T640, and T1600 core routers with Enhanced Intelligent Queuing (IQE) PICs, specify a hierarchical policer.

**Options** Options are described separately.

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

**Related Documentation**

- [Applying Policers on page 222](#)
- *Junos OS Class of Service Library for Routing Devices*

## hierarchical-scheduler (Subscriber Interfaces on MX Series Routers)

|                            |   |
|----------------------------|---|
| <b>Syntax</b>              | <pre> hierarchical-scheduler {   implicit-hierarchy;   maximum-hierarchy-levels <i>number</i>; } </pre>                 |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> ]  |
| <b>Release Information</b> | Statement introduced in Junos OS Release 10.1.<br><b>implicit-hierarchy</b> option introduced in Junos OS Release 13.1. |
| <b>Description</b>         | On MX Series routers with MPC/MICs, configure the parameters for hierarchical scheduling on the interface.              |



**NOTE:** To enable hierarchical scheduling on MX Series routers, configure the **hierarchical-scheduler** statement at each member physical interface level of a particular aggregated Ethernet interface as well as at that aggregated Ethernet interface level. On other routing platforms, it is enough if you include this statement at the aggregated Ethernet interface level.

**Options** **implicit-hierarchy**—Configure three-level hierarchical scheduling. When you include the **implicit-hierarchy** option, a hierarchical relationship is formed between the CoS scheduler nodes at level 1, level 2, and level 3. The **implicit-hierarchy** option is supported only on MPC/MIC subscriber interfaces and interface sets running over aggregated Ethernet on MX Series routers.

**maximum-hierarchy-levels *number***—Configure two-level hierarchical scheduling. Specify the maximum number of hierarchical scheduling levels allowed for node scaling. The only supported value is 2. The **maximum-hierarchy-levels** option is supported on MPC/MIC or EQ DPC subscriber interfaces and interface sets running over aggregated Ethernet on MX Series routers.

- If you include the **maximum-hierarchy-levels** option, interface sets are allowed only at level 3; they are not allowed at level 2. In this case, if you configure a level 2 interface set, you generate Packet Forwarding Engine errors.
- If you do not include the **maximum-hierarchy-levels** option, interface sets can be at either level 2 or level 3, depending on whether the member logical interfaces within the interface set have a traffic control profile. If any member logical interface has a traffic control profile, then the interface set is a level 2 CoS scheduler node. If no member logical interface has a traffic control profile, the interface set is at level 3.

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

- Related Documentation**
- *Understanding Two-Level and Three-level Hierarchical CoS for Subscriber Interfaces on MX Series Routers*
  - *Configuring Hierarchical CoS for a Subscriber Interface of Aggregated Ethernet Links*
  - *Junos OS Class of Service Library for Routing Devices*
  - *Configuring Hierarchical Schedulers for CoS*
  - *Hierarchical CoS on MPLS Pseudowire Subscriber Interfaces Overview*

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## high-plp-max-threshold

---

- Syntax**    `high-plp-max-threshold percent;`
- Hierarchy Level**    [edit interfaces at-*fpc/pic/port* [atm-options linear-red-profiles profile-name](#)]
- Release Information**    Statement introduced before Junos OS Release 7.4.
- Description**    For ATM2 IQ interfaces only, define the drop profile fill-level for the high PLP CoS VC. When the fill level exceeds the defined percentage, all packets are dropped.
- Options**    **percent**—Fill-level percentage when linear random early discard (RED) is applied to cells with PLP.
- Required Privilege Level**    interface—To view this statement in the configuration.  
   interface-control—To add this statement to the configuration.
- Related Documentation**
- *Configuring ATM2 IQ VC Tunnel CoS Components*
  - [low-plp-max-threshold on page 592](#)
  - [low-plp-threshold on page 593](#)
  - [queue-depth on page 712](#)



## high-plp-threshold

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>high-plp-threshold percent;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces at- <i>fpc/pic/port</i> <a href="#">atm-options linear-red-profiles profile-name</a> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For ATM2 IQ interfaces only, define CoS VC drop profile fill-level percentage when linear RED is applied to cells with high PLP. When the fill level exceeds the defined percentage, packets with high PLP are randomly dropped by RED. This statement is mandatory.   |
| <b>Options</b>                  | <i>percent</i> —Fill-level percentage when linear RED is applied to cells with PLP.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring ATM2 IQ VC Tunnel CoS Components</i></li><li>• <a href="#">high-plp-max-threshold on page 502</a></li><li>• <a href="#">low-plp-max-threshold on page 592</a></li><li>• <a href="#">low-plp-threshold on page 593</a></li><li>• <a href="#">queue-depth on page 712</a></li></ul> |

## hold-interval

---

See the following sections:

- [hold-interval \(OAM\) on page 504](#)
- [hold-interval \(Protection Group\) on page 504](#)

### hold-interval (OAM)

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>hold-interval <i>minutes</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit protocols oam ethernet connectivity-fault-management maintenance-domain <i>domain-name</i> maintenance-association <i>ma-name</i> <a href="#">continuity-check</a> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.<br>Statement introduced in junos os release 12.1X48 for PTX Series Packet Transport Routers.                                  |
| <b>Description</b>              | The time to wait before flushing the maintenance association end point (MEP) database, if no updates occur.   |
| <b>Options</b>                  | <i>minutes</i> —Time to wait, in minutes.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Continuity Check Protocol</i></li><li>• <i>Configuring Ethernet 802.1ag OAM on PTX Series Packet Transport Routers</i></li></ul> |

### hold-interval (Protection Group)

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>hold-interval <i>number</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">protection-group ethernet-ring <i>name</i></a> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.4.   |
| <b>Description</b>              | Specify the hold-off timer interval <i>for all rings</i> in 100 millisecond (ms) increments.                            |
| <b>Options</b>                  | <i>number</i> —Hold-timer interval, in milliseconds.<br><b>Range:</b> 0 through 10,000 ms<br><b>Default:</b> 100 ms     |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Ethernet Ring Protection Switching Overview</i></li></ul>                    |

## hold-time

See the following sections:

- [hold-time \(APS\) on page 505](#)
- [hold-time \(Physical Interface\) on page 506](#)
- [hold-time \(SONET/SDH Defect Triggers\) on page 507](#)




**NOTE:** For information about the hold-time statement at the [edit interfaces *interface-name* unit *logical-unit-number* *family* (inet | inet6) address *address* (vrrp-group | vrrp-inet6-group) *group-number* preempt] and [edit logical-systems *logical-system-name* interface *interface-name* unit *logical-unit-number* *family* (inet | inet6) address *address* (vrrp-group | vrrp-inet6-group) *group-number* preempt], see the *Junos OS High Availability Library for Routing Devices*.

### hold-time (APS)

|                          |  |
|--------------------------|--|
| Syntax                   | hold-time <i>milliseconds</i> ;  |
| Hierarchy Level          | [edit interfaces <i>interface-name</i> sonet-options <a href="#">aps</a> ]   |
| Release Information      | Statement introduced before Junos OS Release 7.4.  |
| Description              | Hold-time value to use to determine whether a neighbor APS router is operational.  |
| Options                  | <i>milliseconds</i> —Hold-time value.<br><b>Range:</b> 1 through 65,534 milliseconds<br><b>Default:</b> 3000 milliseconds (3 times the advertisement interval) |
| Required Privilege Level | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| Related Documentation    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring APS Timers</a></li> <li>• <a href="#">advertise-interval on page 330</a></li> </ul>           |

## hold-time (Physical Interface)

|  |   |
|--|---|
| Syntax   | hold-time up <i>milliseconds</i> down <i>milliseconds</i> ;   |
| Hierarchy Level  | [edit interfaces <i>interface-name</i> ],<br>[edit interfaces interface-range <i>interface-range-name</i> ]   |
| Release Information  | Statement introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 10.4R5 for EX Series switches.<br>Command introduced in Junos OS Release 11.1 for the QFX Series.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.   |
| Description  | Specify the hold-time value to use to damp interface transitions. When an interface goes from up to down, it is not advertised to the rest of the system as being down until it has remained down for the hold-time period. Similarly, an interface is not advertised as being up until it has remained up for the hold-time period.  |
| <div> NOTE:</div> <div><ul style="list-style-type: none"><li>• We recommend that you configure the hold-time value after determining an appropriate value by performing repeated tests in the actual hardware environment. This is because the appropriate value for hold-time depends on the hardware (XFP, SFP, SR, ER, or LR) used in the networking environment.</li><li>• The hold-time option is not available for controller interfaces.</li></ul></div> |   |
| Default  | Interface transitions are not damped.   |
| Options  | <p><b>down <i>milliseconds</i></b>—Hold time to use when an interface transitions from up to down. Junos OS advertises the transition within 100 milliseconds of the time value you specify.</p> <p><b>Range:</b> 0 through 4,294,967,295 milliseconds</p> <p><b>Default:</b> 0 milliseconds (interface transitions are not damped)</p> <p><b>up <i>milliseconds</i></b>—Hold time to use when an interface transitions from down to up. Junos OS advertises the transition within 100 milliseconds of the time value you specify.</p> <p><b>Range:</b> 0 through 4,294,967,295 milliseconds</p> <p><b>Default:</b> 0 milliseconds (interface transitions are not damped)</p> |
| Required Privilege Level   | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| Related Documentation  | <ul style="list-style-type: none"><li>• <a href="#">advertise-interval on page 330</a></li><li>• <i>interfaces (for EX Series switches)</i></li></ul>   |

## hold-time (SONET/SDH Defect Triggers)

|                            |   |
|----------------------------|---|
| <b>Syntax</b>              | hold-time up <i>milliseconds</i> down <i>milliseconds</i> ;   |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> sonet-options <b>trigger defect</b> ]  |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>         | For ATM over SONET/SDH and SONET/SDH interfaces only, apply up and down hold times to SONET/SDH defect triggers. When you apply a down hold time to a defect, the defect must remain present for at least the hold-time period before the interface is marked down. When you apply an up hold time to a defect, the defect must remain absent for at least the hold-time period before the interface is marked up, assuming no other defect is outstanding. |



### NOTE:

- When up or down hold times are applied to SONET defect triggers of a 10-Gigabit Ethernet WAN-PHY interface, only the defects generated in the WAN Interface Sublayer (WIS) are damped. Therefore, if the hold times are applied to SONET defect triggers only, a 10-Gigabit Ethernet WAN-PHY interface might be marked up or down because of the faults that are generated in other layers, such as the Physical Coding Sublayer (PCS) or Physical Medium Attachment Sublayer (PMA), 10 Gigabit Media Independent Interface (XGMII) Extender Sublayer (XGXS), and Media Access Control (MAC). To damp the interface up or down events of a 10-Gigabit Ethernet WAN-PHY interface, you need to apply up or down hold-times for the interface at the [edit interfaces *interface-name*] hierarchy level.
- On M Series and T Series platforms with Channelized SONET IQ PICs and Channelized SONET IQE PICs, the SONET defect alarm trigger hold-time statement is not supported.

|                |   |
|----------------|---|
| <b>Default</b> | If you do not include this statement, when a defect is detected the interface is marked down immediately, and when the defect becomes absent the interface is marked up immediately.  |
| <b>Options</b> | <p><b>down <i>milliseconds</i></b>—Hold time to wait before the interface is marked down.</p> <p><b>Range:</b> 1 through 65,534 milliseconds</p> <p><b>Default:</b> No hold time</p> <p><b>up <i>milliseconds</i></b>—Hold time to wait before the interface is marked up.</p> <p><b>Range:</b> 1 through 65,534 milliseconds</p> <p><b>Default:</b> No hold time</p> |

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

**Related Documentation**

- *Configuring SONET/SDH Defect Triggers*
- [hold-time \(Physical Interface\) on page 506](#)

---

## host (Interfaces)

---

**Syntax** `host hostname {  
    services severity-level;  
    facility-override facility-name;  
    log-prefix prefix-value;  
    port port-number;  
}`

**Hierarchy Level** [edit interfaces *interface-name* services-options syslog]

**Release Information** Statement introduced before Junos OS Release 7.4.

**Description** Specify the hostname for the system logging utility.

**Options** *hostname*—Name of the system logging utility host machine. This can be the local Routing Engine or an external server address.


The remaining statements are explained separately.

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

**Related Documentation**

- *Applying Filters and Services to Interfaces*

## idle-cycle-flag

|  |  |
|--|--|
| <b>Syntax</b>  | <code>idle-cycle-flag value;</code>  |
| <b>Hierarchy Level</b>   | <code>[edit interfaces e1-fpc/pic/port],</code><br><code>[edit interfaces t1-fpc/pic/port],</code><br><code>[edit interfaces interface-name ds0-options],</code><br><code>[edit interfaces interface-name e1-options],</code><br><code>[edit interfaces interface-name e3-options],</code><br><code>[edit interfaces interface-name serial-options],</code><br><code>[edit interfaces interface-name t1-options],</code><br><code>[edit interfaces interface-name t3-options]</code> |
| <b>Release Information</b>   | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.</p>   |
| <b>Description</b>   | Configure the value that the DS0, E1, E3, T1, or T3 interface transmits during idle cycles.  |
| <div>  <p><b>NOTE:</b> When configuring E1 or T1 interfaces on 10-port Channelized E1/T1 IQE PICs, the <code>idle-cycle-flag</code> statement must be included at the <code>[edit interfaces e1-fpc/pic/port]</code> or <code>[edit interfaces t1-fpc/pic/port]</code> hierarchy level as appropriate.</p> </div> |  |
| <b>Options</b>   | <p><b>value</b>—Value to transmit in the idle cycles:</p> <ul style="list-style-type: none"> <li><b>flags</b>—Transmit the value 0x7E.</li> <li><b>ones</b>—Transmit the value 0xFF (all ones).</li> </ul> <p><b>Default:</b> <code>Flags</code></p>   |
| <b>Required Privilege Level</b>  | <p><code>interface</code>—To view this statement in the configuration.</p> <p><code>interface-control</code>—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>   | <ul style="list-style-type: none"> <li><i>Configuring the E1 Idle Cycle Flag</i></li> <li><i>Configuring the E3 Idle Cycle Flag</i></li> <li><i>Configuring the T1 Idle Cycle Flag</i></li> <li><i>Configuring the T3 Idle Cycle Flag</i></li> </ul>   |

## idle-timeout

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>idle-timeout seconds;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>dln</i> unit <i>logical-unit-number</i> <a href="#">dialer-options</a> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | On J Series Services Routers with ISDN interfaces, configure the number of seconds the link is idle before losing connectivity.   |
| <b>Options</b>                  | <b>seconds</b> —Time for which the connection can remain idle. For interfaces configured to use a filter for traffic, the idle timeout is based on traffic.<br><b>Range:</b> 1 through 429497295<br><b>Default:</b> 120 seconds |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring ISDN Logical Interface Properties</i></li><li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li></ul>   |

## ieee802.1p

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>ieee802.1p premium [ values ];</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <i>gigether-options</i> <a href="#">ethernet-switch-profile</a> <a href="#">ethernet-policer-profile</a> <a href="#">input-priority-map</a> ] |
| <b>Release Information</b>      | Statement introduced before Junos Release 7.4.   |
| <b>Description</b>              | For Gigabit Ethernet IQ and 10-Gigabit Ethernet interfaces only, configure premium priority values for IEEE 802.1p input traffic.  |
| <b>Options</b>                  | <b>values</b> —Define IEEE 802.1p priority values to be treated as premium.<br><b>Range:</b> 0 through 7   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Specifying an Input Priority Map</i></li></ul>  |



## if-exceeding

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>if-exceeding {<br/>    bandwidth-limit <i>bandwidth</i>;<br/>    burst-size-limit <i>burst</i>;<br/>}</pre>   |
| <b>Hierarchy Level</b>          | [edit firewall hierarchical-policer aggregate],<br>[edit firewall hierarchical-policer premium]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.5.  |
| <b>Description</b>              | For M40e, M120, and M320 (with FFPC and SFPC) edge routers and T320, T640, and T1600 core routers with Enhanced Intelligent Queuing (IQE) PICs, specify bandwidth and burst limits for an aggregate level of a hierarchical policer. |
| <b>Options</b>                  | Options are described separately.  |
| <b>Required Privilege Level</b> | firewall—To view this statement in the configuration.<br>firewall-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Applying Policers on page 222</a></li><li>• <i>Junos OS Class of Service Library for Routing Devices</i></li></ul>   |

## igmp-snooping

---

```
Syntax  igmp-snooping {
        immediate-leave;
        interface interface-name {
            group-limit limit;
            host-only-interface;
            immediate-leave;
            multicast-router-interface;
            static {
                group ip-address {
                    source ip-address;
                }
            }
        }
        proxy {
            source-address ip-address;
        }
        query-interval seconds;
        query-last-member-interval seconds;
        query-response-interval seconds;
        robust-count number;
        vlan vlan-id {
            immediate-leave;
            interface interface-name {
                group-limit limit;
                host-only-interface;
                immediate-leave;
                multicast-router-interface;
                static {
                    group ip-address {
                        source ip-address;
                    }
                }
            }
            proxy {
                source-address ip-address;
            }
            query-interval seconds;
            query-last-member-interval seconds;
            query-response-interval seconds;
            robust-count number;
        }
    }
```

**Hierarchy Level** [edit bridge-domains *bridge-domain-name* protocols],  
[edit routing-instances *routing-instance-name* bridge-domains *bridge-domain-name* protocols]  
[edit routing-instances *routing-instance-name* protocols]  
[edit protocols]

**Release Information** Statement introduced in Junos OS Release 8.5.

**Description** Enable IGMP snooping on the router.

|                                 |   |
|---------------------------------|---|
| <b>Default</b>                  | IGMP snooping is disabled on the router.  |
| <b>Options</b>                  | The statements are explained separately.  |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Understanding IGMP Snooping</i></li><li>• <i>IGMP Snooping in MC-LAG Active-Active on MX Series Routers Overview</i></li></ul> |

---

## ignore

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | ignore;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> sonet-options <a href="#">trigger defect</a> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For ATM over SONET/SDH and SONET/SDH interfaces only, ignore a specific SONET/SDH defect trigger.   |
| <b>Default</b>                  | If you do not include this statement, all defects are honored with no hold time.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring SONET/SDH Defect Triggers</i></li><li>• <a href="#">hold-time (Physical Interface) on page 506</a></li></ul> |

---

## ignore-all

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | ignore-all;  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options dce-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">serial-options dte-options</a> ]                                  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Ignore all control leads. You can include the <b>ignore-all</b> statement in the configuration only if you do not explicitly enable other signal handling options at the <b>dte-options</b> hierarchy level. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the Serial Signal Handling on page 303</a></li></ul>   |

## ignore-l3-incompletes

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | ignore-l3-incompletes;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">fastether-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">gigether-options</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.0.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.                  |
| <b>Description</b>              | Ignore the counting of Layer 3 incomplete errors on Fast Ethernet, Gigabit Ethernet, and 10-Gigabit Ethernet interfaces.                                 |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Ignoring Layer 3 Incomplete Errors</i></li></ul>  |

## ilmi

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | ilmi;  |
| <b>Hierarchy Level</b>          | [edit interfaces at- <i>fpc/pic/port</i> atm-options]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Enable the router to communicate with directly attached ATM switches and routers. The router uses the VC 0.16 to communicate with the ATM switch or router. Once configured, you can display the IP address and port number of an ATM switch or router using the <b>show interfaces <i>interface-name</i> switch-id</b> command. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Communication with Directly Attached ATM Switches and Routers</i></li><li>• <i>show ilmi</i></li><li>• <i>show ilmi statistics</i></li></ul>  |

## ima-group-options

|                            |   |
|----------------------------|---|
| <b>Syntax</b>              | <pre> ima-group-options {     differential-delay <i>number</i>;     frame-length (32  64  128  256);     frame-synchronization {         alpha <i>number</i>;         beta <i>number</i>;         gamma <i>number</i>;     }     minimum-links <i>number</i>;     symmetry (symmetrical-config-and-operation       symmetrical-config-asymmetrical-operation);     test-procedure {         ima-test-start;         ima-test-stop;         interface <i>name</i>;         pattern <i>number</i>;         period <i>number</i>;     }     transmit-clock (common  independent);     version (1.0  1.1); } </pre>   |
| <b>Hierarchy Level</b>     | [edit interfaces (t1-fpc/pic/port:m:n   e1-fpc/pic/port:n   t1 e1-fpc/pic/port)]  |
| <b>Release Information</b> | <p>Statement introduced in Junos OS Release 10.0.</p> <p>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.</p>   |
| <b>Description</b>         | Specify IMA group options.  |
| <b>Options</b>             | <p><b>differential-delay <i>msec</i></b>—Maximum differential delay among links in msec.<br/> <b>Range:</b> 1 through 56<br/> <b>Default:</b> The default value is 25</p> <p><b>frame-length (32  64  128  256)</b>—IMA frame length in number of cells.<br/> <b>Default:</b> The default value is 128</p> <p><b>frame-synchronization</b>—IMA group frame synchronization selection.<br/>             <b>alpha <i>number</i></b>—Number of consecutive invalid ICP cells for IFSM.<br/> <b>Range:</b> 1 through 2<br/> <b>Default:</b> The default value is 2</p> <p>    <b>beta <i>number</i></b>—Number of consecutive errored ICP cells for IFSM.<br/> <b>Range:</b> 1 through 2<br/> <b>Default:</b> The default value is 2</p> <p>    <b>gamma <i>number</i></b>—Number of consecutive valid ICP cells for IFSM.<br/> <b>Range:</b> 1 through 5</p> |

**Default:** The default value is 1

**minimum-links *number***—IMA group minimum active links.

**Range:** 1 through 8

**Default:** The default value is 1

**symmetry (symmetrical-config-and-operation |  
symmetrical-config-asymmetrical-operation)**—IMA group symmetry mode selection.

**test-procedure**—Specify an IMA link interface test.

**ima-test-start**—Start IMA group test.

**ima-test-stop**—Stop IMA group test.

**interface *name***—Interface name of the IMA link to test.

**pattern *number***—IMA test pattern.

**Range:** 1 through 254

**Default:** The default value is 170

**period *seconds***—Length of IMA pattern test in seconds.

**Range:** 1 through 4294967294.

**Default:** The default value is 10

**transmit-clock (common |independent)**—Transmit clock configuration.

**Default:** The default value is common

**version (1.0 |1.1)**—IMA specification version.

|                                 |   |
|---------------------------------|---|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.        |
|                                 | interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | • <i>ATM Support on Circuit Emulation PICs Overview</i>       |
|                                 | • <a href="#">ima-link-options on page 517</a>                |
|                                 | • <i>Inverse Multiplexing for ATM (IMA) Overview</i>          |

## ima-link-options

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>ima-link-options group <i>g</i></code>   |
| <b>Hierarchy Level</b>          | <code>[edit interfaces (t1-<i>fpc/pic/port:m:n</i>   e1-<i>fpc/pic/port:n</i>   t1 e1-<i>fpc/pic/port</i>) ]</code>  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.<br>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.   |
| <b>Description</b>              | Specify an interface as a member of an IMA group.  |
| <b>Options</b>                  | <b>group <i>g</i></b> —Implying <b>at-x/y/g</b> .  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>ATM Support on Circuit Emulation PICs Overview</i></li> <li>• <a href="#">ima-group-options on page 515</a></li> <li>• <i>Inverse Multiplexing for ATM (IMA) Overview</i></li> </ul> |

## inactivity-timeout

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>inactivity-timeout <i>seconds</i>;</code>  |
| <b>Hierarchy Level</b>          | <code>[edit interfaces <i>interface-name</i> <a href="#">services-options</a>]</code>  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For adaptive services interfaces, configure the inactivity timeout period for established flows. The timeout configured in the application protocol definition overrides this value. |
| <b>Options</b>                  | <b><i>seconds</i></b> —Timeout period, in seconds.<br><b>Range:</b> 4 through 86,400 seconds<br><b>Default:</b> 30 seconds   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>  |


## incoming-called-number

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>incoming-called-number <i>number</i> &lt;reject&gt;;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>br-pim</i> /0/ <i>port</i> <a href="#">isdn-options</a> ]   |
| <b>Release Information</b>      | Statement introduced on Junos OS Release 7.5.   |
| <b>Description</b>              | On J Series Services Routers with interfaces configured for ISDN, screen incoming calls. If the incoming number is configured, the call is accepted. If the reject option is specified with the number, the call is rejected. If no numbers are configured, all calls are accepted.   |
| <b>Options</b>                  | <p><b><i>number</i></b>—(Optional) Incoming caller number. Multiple numbers can be configured, up to a maximum of 30 entries. Only a precise match is a valid match, For example, the configured caller number 1-222-333-4444 or 222-333-4444 will match the incoming caller number 1-222-333-4444.</p> <p><b><i>reject</i></b>—(Optional) Rejects the incoming number.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring an ISDN Interface to Screen Incoming Calls</i></li><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>   |



## incoming-map

|   |  |
|---|--|
| <b>Syntax</b>   | incoming-map {<br><code>caller caller-number</code>   accept-all;<br>}   |
| <b>Hierarchy Level</b>  | [edit interfaces dln unit <i>logical-unit-number</i> <code>dialer-options</code> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces dln unit <i>logical-unit-number</i> <code>dialer-options</code> ] |
| <b>Release Information</b>  | Statement introduced in Junos OS Release 7.5.  |
| <b>Description</b>  | On J Series Services Routers with interfaces configured for ISDN, specify the dialer to accept incoming calls.<br><br>The statements are explained separately.   |
| <div>  <p><b>NOTE:</b> The <code>incoming-map</code> statement is mandatory for the router to accept any incoming ISDN calls.</p> </div> |  |
| <b>Required Privilege Level</b>   | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>  | <ul style="list-style-type: none"> <li><i>Configuring Dial-In and Callback</i></li> <li><i>Junos OS Interfaces and Routing Configuration Guide</i></li> </ul>  |

## indication

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | indication (ignore   normal   require);  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options dce-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">serial-options dte-options</a> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For X.21 interfaces only, configure the from-DCE signal indication.  |
| <b>Options</b>                  | <b>ignore</b> —The from-DCE signal is ignored.<br><br><b>normal</b> —Normal indication signal handling as defined by ITU-T Recommendation X.21.<br><br><b>require</b> —The from-DCE signal must be asserted.<br><b>Default:</b> normal |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the Serial Signal Handling on page 303</a></li></ul>   |

## indication-polarity

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | indication-polarity (negative   positive);   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For X.21 interfaces only, configure the indication signal polarity.  |
| <b>Options</b>                  | <b>positive</b> —Positive signal polarity.<br><br><b>negative</b> —Negative signal polarity.<br><b>Default:</b> positive |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Serial Signal Polarities on page 306</a></li></ul>       |

## ingress-rate-limit

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>ingress-rate-limit rate;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> fastether-options]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | Perform port-based rate limiting on ingress traffic arriving on Fast Ethernet 8-port, 12-port, and 48-port PICs.        |
| <b>Options</b>                  | <b>rate</b> —Traffic rate, in megabits per second (Mbps).<br><b>Range:</b> 1 through 100 Mbps                           |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring the Ingress Rate Limit</i></li> </ul>                           |

## initial-route-check

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>initial-route-check seconds;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces dln unit <i>logical-unit-number</i> dialer-options]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | On J Series Services Routers with ISDN interfaces, allows the router to check whether the primary route is up after the initial startup of the router is complete and the timer expires. |
| <b>Options</b>                  | <b>seconds</b> —How long to wait to check if the primary interface is up after the router comes up.<br><b>Range:</b> 1 through 300 seconds<br><b>Default:</b> 120 seconds                |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>ISDN Interfaces Overview</i></li> <li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li> </ul>                                |

## inner-tag-protocol-id

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>inner-tag-protocol-id <i>tpid</i>;</code>   |
| <b>Hierarchy Level</b>          | <code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">input-vlan-map</a>],</code><br><code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">output-vlan-map</a>],</code><br><code>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i></code><br><code>  <a href="#">input-vlan-map</a>],</code><br><code>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i></code><br><code>  <a href="#">output-vlan-map</a>]</code> |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.1.<br>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.  |
| <b>Description</b>              | <p>Configure the IEEE 802.1Q TPID value to rewrite for the inner tag.</p> <p>All TPIDs you include in input and output VLAN maps must be among those you specify at the <code>[edit interfaces <i>interface-name</i> <i>gether-options</i> <a href="#">ethernet-switch-profile</a> <a href="#">tag-protocol-id</a> [ <i>tpids</i> ]]</code> hierarchy level.</p> <p>On MX Series routers, you can use this statement for Gigabit Ethernet IQ, IQ2 and IQ2-E interfaces, and for aggregated Ethernet interfaces using Gigabit Ethernet IQ2 and IQ2-E or 10-Gigabit Ethernet PICs.</p>                                    |
| <b>Default</b>                  | If the <code>inner-tag-protocol-id</code> statement is not configured, the TPID value is 0x8100.  |
| <b>Required Privilege Level</b> | <code>interface</code> —To view this statement in the configuration.<br><code>interface-control</code> —To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li><i>Configuring Inner and Outer TPIDs and VLAN IDs</i></li></ul>   |

## inner-vlan-id

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>inner-vlan-id <i>number</i>;</code>   |
| <b>Hierarchy Level</b>          | <p>[edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>input-vlan-map</b>],<br/>         [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>output-vlan-map</b>],<br/>         [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>input-vlan-map</b>],<br/>         [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>output-vlan-map</b>]</p>  |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 8.1.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>   |
| <b>Description</b>              | <p>For Gigabit Ethernet IQ, IQ2 and IQ2-E interfaces, and for aggregated Ethernet interfaces using Gigabit Ethernet IQ2 and IQ2-E or 10-Gigabit Ethernet PICs on MX Series routers or 100-Gigabit Ethernet Type 5 PIC with CFP, or on Ethernet interfaces on EX Series switches, specify the VLAN ID to rewrite for the inner tag of the final packet.</p> <p>You cannot include the <b>inner-vlan-id</b> statement with the <b>swap</b> statement, <b>swap-push</b> statement, <b>push-push</b> statement, or <b>push-swap</b> statement and the <b>inner-vlan-id</b> statement at the [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>output-vlan-map</b>] hierarchy level. If you include any of those statements in the output VLAN map, the VLAN ID in the outgoing frame is rewritten to the <b>inner-vlan-id</b> statement you include at the [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i>] hierarchy level.</p> |
| <b>Options</b>                  | <p><i>number</i>—VLAN ID number.</p> <p><b>Range:</b> 0 through 4094</p>  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>Configuring Inner and Outer TPIDs and VLAN IDs</li> </ul>  |

## inner-vlan-id-range

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>inner-vlan-id-range start <i>start-id</i> end <i>end-id</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> ], |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.0.   |
| <b>Description</b>              | The range of VLAN IDs to be used in the ATM-to-Ethernet interworking cross-connect. Specify the starting VLAN ID and ending VLAN ID.  |
| <b>Options</b>                  | <b><i>start-id</i></b> —The lowest VLAN ID to be used.<br><br><b><i>end-id</i></b> —The highest VLAN ID to be used.<br><b>Range:</b> 32 through 4094  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring ATM-to-Ethernet Interworking on page 260</a></li></ul>  |

## input

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>input {<br/>  <a href="#">service-set</a> <i>service-set-name</i> &lt;<a href="#">service-filter</a> <i>filter-name</i>&gt;;<br/>  <a href="#">post-service-filter</a> <i>filter-name</i>;<br/>}</pre>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> inet service],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> inet service] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Define one or more input service sets and filters, and one postservice filter to be applied to traffic.  |
| <b>Options</b>                  | The remaining statements are explained separately.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Junos OS Services Interfaces Library for Routing Devices</a></li></ul>   |

## input-list

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>input-list [ <i>filter-names</i> ];</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> <i>family</i> <a href="#">filter</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> <i>family</i> <a href="#">filter</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 7.6.  |
| <b>Description</b>              | Apply a group of filters to evaluate when packets are received on an interface.  |
| <b>Options</b>                  | <b>[ <i>filter-names</i> ]</b> —Name of a filter to evaluate when packets are received on the interface.<br>Up to 16 filters can be included in a filter input list.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Applying a Filter to an Interface on page 230</a></li> <li>• <i>Routing Policy Feature Guide for Routing Devices</i></li> <li>• <i>Junos OS Administration Library for Routing Devices</i></li> <li>• <a href="#">output-list on page 652</a></li> </ul>  |

## input-priority-map

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>input-priority-map {<br/>    <a href="#">ieee802.1p</a> premium [ <i>values</i> ];<br/>}</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> gigether-options <a href="#">ethernet-switch-profile</a> <a href="#">ethernet-policer-profile</a> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For Gigabit Ethernet IQ and 10-Gigabit Ethernet interfaces only, define the input policer priority map to be applied to incoming frames on this interface.<br><br>The statements are explained separately. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Specifying an Input Priority Map</i></li> <li>• <a href="#">output-priority-map on page 653</a></li> </ul>   |

## input-three-color

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>input-three-color <i>policer-name</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">layer2-policer</a> ]<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">layer2-policer</a> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.2.<br>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.  |
| <b>Description</b>              | Apply a single-rate or two-rate three-color policer to the Layer 2 input traffic at the logical interface. The <b>input-three-color</b> and <b>input-policer</b> statements are mutually exclusive.   |
| <b>Options</b>                  | <b><i>policer-name</i></b> —Name of the single-rate or two-rate three-color policer.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Two-Color and Three-Color Policers at Layer 2</i></li><li>• <i>Applying Layer 2 Policers to Gigabit Ethernet Interfaces</i></li><li>• <i>Configuring a Gigabit Ethernet Policer</i></li><li>• <i>input-policer</i></li><li>• <a href="#">layer2-policer on page 555</a></li><li>• <a href="#">logical-interface-policer on page 583</a></li><li>• <i>output-policer</i></li><li>• <a href="#">output-three-color on page 654</a></li></ul> |



## input-vlan-map

See the following sections:

- [input-vlan-map \(Aggregated Ethernet\) on page 527](#)
- [input-vlan-map \(Gigabit Ethernet IQ, 10-Gigabit Ethernet SFPP, 10-Gigabit Ethernet SFP, and 100-Gigabit Ethernet Type 5 PIC with CFP\) on page 528](#)

### input-vlan-map (Aggregated Ethernet)

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>input-vlan-map {   (pop   push   swap);   tag-protocol-id <i>tpid</i>;   vlan-id <i>number</i>; }</pre>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.2.   |
| <b>Description</b>              | <p>For aggregated Ethernet interfaces using Gigabit Ethernet IQ, 10-Gigabit Ethernet IQ2 and IQ2-E interfaces and 100-Gigabit Ethernet Type 5 PIC with CFP only, define the rewrite profile to be applied to incoming frames on this logical interface.</p> <p>The statements are explained separately.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Stacking a VLAN Tag</a></li> <li>• <a href="#">output-vlan-map (Aggregated Ethernet) on page 655</a></li> </ul>  |

## input-vlan-map (Gigabit Ethernet IQ, 10-Gigabit Ethernet SFPP, 10-Gigabit Ethernet SFP, and 100-Gigabit Ethernet Type 5 PIC with CFP)

|                          |   |
|--------------------------|---|
| Syntax                   | <pre>input-vlan-map {<br/>  (pop   pop-pop   pop-swap   push   push-push   swap   swap-push   swap-swap);<br/>  inner-tag-protocol-id <i>tpid</i>;<br/>  inner-vlan-id <i>number</i>;<br/>  tag-protocol-id <i>tpid</i>;<br/>  vlan-id <i>number</i>;<br/>}</pre>                           |
| Hierarchy Level          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ]  |
| Release Information      | Statement introduced before Junos OS Release 7.4.<br><b>pop-pop</b> , <b>pop-swap</b> , <b>push-push</b> , <b>swap-push</b> , and <b>swap-swap</b> statements introduced in Junos OS Release 8.1.   |
| Description              | For Gigabit Ethernet IQ, 10-Gigabit Ethernet SFPP interfaces, 10-Gigabit Ethernet SFP interfaces, and 100-Gigabit Ethernet Type 5 PIC with CFP only, define the rewrite profile to be applied to incoming frames on this logical interface.<br><br>The statements are explained separately. |
| Required Privilege Level | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| Related Documentation    | <ul style="list-style-type: none"><li>• <i>Stacking a VLAN Tag</i></li><li>• <a href="#">output-vlan-map (Gigabit Ethernet IQ, 10-Gigabit Ethernet with SFPP, 10-Gigabit Ethernet SFP, and 100-Gigabit Ethernet Type 5 PIC with CFP) on page 656</a></li></ul>                              |

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## instance

|                          |   |
|--------------------------|---|
| Syntax                   | <pre>instance <i>vpls-instance-name</i>;</pre>  |
| Hierarchy Level          | [edit protocols oam ethernet connectivity-fault-management maintenance-domain <i>name</i> ]   |
| Release Information      | Statement introduced in Junos OS Release 9.4.   |
| Description              | Specify the VPLS instance of the default maintenance domain.  |
| Required Privilege Level | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                       |
| Related Documentation    | <ul style="list-style-type: none"><li>• <i>Configuring Maintenance Intermediate Points</i></li><li>• <a href="#">maintenance-domain on page 601</a></li></ul> |

## interface

See the following sections:

- [interface \(Hierarchical CoS Schedulers\)](#) on page 529
- [interface \(IEEE 802.1x\)](#) on page 530
- [interface \(IEEE 802.1ag OAM Connectivity-Fault Management\)](#) on page 531
- [interface \(OAM Link-Fault Management\)](#) on page 532



**NOTE:** For information about the interface statement available at the [edit interfaces *interface-name* **unit** *logical-unit-number* **family** (inet | inet6) **address** *address* (vrrp-group | vrrp-inet6-group) *group-number* track] and [edit logical-systems *logical-system-name* interfaces *interface-name* **unit** *logical-unit-number* **family** (inet | inet6) **address** *address* (vrrp-group | vrrp-inet6-group) *group-number* track] hierarchy levels, see the *Junos OS High Availability Library for Routing Devices*.

### interface (Hierarchical CoS Schedulers)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | interface <i>interface-name</i> ;  |
| <b>Hierarchy Level</b>          | [edit interfaces <b>interface-set</b> <i>interface-set-name</i> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.  |
| <b>Description</b>              | Specify an interface that is a member of the interface set. Supported on Ethernet interfaces on an MX Series router, Ethernet interfaces on IQ2E PIC on M Series and T Series routers, and IP demux interfaces on an MX Series router. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Class of Service Library for Routing Devices</i></li> </ul>   |

## interface (IEEE 802.1x)

**Syntax**    `interface interface-id {  
              maximum-requests integer;  
              quiet-period seconds;  
              reauthentication (disable | interval seconds);  
              retries integer;  
              server-timeout seconds;  
              supplicant (single);  
              supplicant-timeout seconds;  
              transmit-period seconds;  
              }`

**Hierarchy Level**    [edit protocols [dot1x authenticator](#)]

**Release Information**    Statement introduced in Junos OS Release 9.3.

**Description**    Use this statement to configure the 802.1x Port-Based Network Access Control protocol-specific Ethernet interface options.

**Default**    The default values are provided for the options below on the respective statement pages.

**Options**    **maximum-requests**—Specify the maximum number of retransmission times for an EAPOL Request packet to the client before it times out the authentication session.

**quiet-period**—Specify the number of seconds the port remains in the wait state following a failed authentication exchange with the client, before reattempting the authentication.

**reauthentication**—Includes two options:

- **disable**—Periodic reauthentication of the client is disabled.
- **interval**—Specify the periodic reauthentication time interval.

**retries**—Specify the number of tries after which the port remains in the wait state for **quiet-period** seconds before reattempting the authentication.

**server-timeout**—Specify the number of seconds the port waits for a reply when relaying a response from the client to the authentication server before timing out and invoking the server-fail action.

**supplicant (*single*)**—Specify supplicant single mode. See the usage guidelines to configure other modes.

**supplicant-timeout**—Specify the number of seconds the port waits for a response when relaying a request from the authentication server to the client before resending the request.

**transmit-period**—Specify the number of seconds the port waits before retransmitting the initial EAPOL PDUs to the client.

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

**Related Documentation**

- *IEEE 802.1x Port-Based Network Access Control Overview*
- [authenticator on page 349](#)
- [dot1x on page 434](#)

## interface (IEEE 802.1ag OAM Connectivity-Fault Management)

**Syntax** interface (*interface-name* | ((*ge-* | *xe-*) (*fpc/pic/port* | *fpc/pic/port.unit-number* | *fpc/pic/port.unit-number* *vlan* *vlan-id*)));

**Hierarchy Level** [edit protocols [oam ethernet connectivity-fault-management](#) maintenance-domain *domain-name* maintenance-association *ma-name* [mep](#) *mep-id*]

**Release Information** Statement introduced in Junos OS Release 8.4.

**Description** For Ethernet interfaces on M320, MX Series, and T Series routers, configure IEEE 802.1ag Operation, Administration, and Management (OAM) support.

For Gigabit Ethernet interfaces and 10-Gigabit Ethernet interfaces on MX Series routers, configure IEEE 802.1ag Connectivity Fault Management (CFM) support on trunk interface ports.

**Options** **interface-name**—Interface to which the MEP is attached. It could be a physical Ethernet interface, logical Ethernet interface, or on a specific VLAN of a trunk port interface (MX Series only).

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

**Related Documentation**

- *Configuring a Maintenance Endpoint*
- *Example: Configuring Connectivity Fault Management for a PBB Network on MX Series Routers*

## interface (OAM Link-Fault Management)

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

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

**Release Information**    Statement introduced in Junos OS Release 8.2.

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

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


**Range:** 1 through 10 interfaces can be tracked.

The remaining statements are described separately.

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

**Related Documentation**    • *Enabling IEEE 802.3ah OAM Support*

## interface-transmit-statistics


|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | interface-transmit-statistics;   |
| <b>Hierarchy Level</b>          | [edit interface <i>interface-name</i> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.4 R3 for MX Series devices.  |
| <b>Description</b>              | Configure the interface to report the transmitted load statistics. If this statement is not included in the configuration, the interface statistics show the offered load on the interface, and not the actual transmitted load. |
|                                 | <div>  <p><b>NOTE:</b> This is not supported on Enhanced IQ (IQE) and Enhanced IQ2 (IQ2E) PICs.</p> </div>                                      |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Improvements to Interface Transmit Statistics Reporting on page 171</a></li> <li>• <i>show interfaces (Gigabit Ethernet)</i></li> </ul>                                     |

## interface-down

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | interface-down;   |
| <b>Hierarchy Level</b>          | [edit protocols oam ethernet <a href="#">connectivity-fault-management action-profile</a> <i>profile-name</i> <a href="#">default-actions</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.   |
| <b>Description</b>              | Bring the interface down when a remote MEP connectivity failure is detected.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring a Connectivity Fault Management Action Profile</i></li> </ul>                           |

## interface-mode

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | interface-mode (access   trunk);  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> family bridge],<br>[edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> family ethernet-switching],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> family bridge]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.2.<br>Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches.<br>Statement introduced in Junos OS Release 13.2 for the QFX Series.  |
| <b>Description</b>              | (QFX Series 3500 and 3600 standalone switches)—Determine whether the logical interface accepts or discards packets based on VLAN tags. Specify the <b>trunk</b> option to accept packets with a VLAN ID that matches the list of VLAN IDs specified in the <b>vlan-id</b> or <b>vlan-id-list</b> statement, then forward the packet within the bridge domain or VLAN configured with the matching VLAN ID. Specify the <b>access</b> option to accept packets with no VLAN ID, then forward the packet within the bridge domain or VLAN configured with the VLAN ID that matches the VLAN ID specified in the <b>vlan-id</b> statement. |
|                                 | <div> <b>NOTE:</b> On MX Series routers, if you want IGMP snooping to be functional for a bridge domain, then you should not configure <b>interface-mode</b> and <b>irb</b> for that bridge. Such a configuration commit succeeds, but IGMP snooping is not functional, and a message informing the same is displayed. For more information, see <i>Configuring a Trunk Interface on a Bridge Network</i>.</div>  |
| <b>Options</b>                  | <b>access</b> —Configure a logical interface to accept untagged packets. Specify the VLAN to which this interface belongs using the <b>vlan-id</b> statement.<br><br><b>trunk</b> —Configure a single logical interface to accept packets tagged with any VLAN ID specified with the <b>vlan-id</b> or <b>vlan-id-list</b> statement.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring a Logical Interface for Access Mode</i></li><li>• <i>Configuring a Logical Interface for Trunk Mode</i></li><li>• <i>Example: Connecting Access Switches to a Distribution Switch</i></li></ul>  |



## interface-name

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | interface-name;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> auto-configure <a href="#">vlan-ranges authentication username-include</a> ],<br>[edit interfaces <i>interface-name</i> auto-configure <a href="#">stacked-vlan-ranges authentication username-include</a> ],  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.  |
| <b>Description</b>              | <p>Append the interface name and VLAN ID or stacked VLAN ID to the username string used for authentication. The appended information takes the following format:</p> <ul style="list-style-type: none"><li>• For single VLAN—&lt;interface-name&gt;:&lt;4-digit-vlan-id&gt;</li><li>• For stack VLANs—&lt;interface-name&gt;:&lt;4-digit-svlan-id&gt;-&lt;4-digit-vlan-id&gt;</li></ul> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring VLAN Interface Username Information for AAA Authentication</i></li></ul>   |

## interface-range

**Syntax** `interface-range name {  
     member-range interface-name-fpc/pic/port to interface-name-fpc/pic/port;  
     member interface-name-fpc/pic/port;  
     member interface-name-fpc/[low-high]/*;  
     member interface-name-fpc/[pic1,pic2,pic3...picN]/port  
     /*Common config is added as part of interface-range definition, as follows*/  
     mtu 256;  
     hold-time up 10;  
     ether-options {  
         flow-control;  
         speed {  
             100m;  
         }  
         802.3ad primary;  
     }  
}`

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

**Release Information** Statement introduced in Junos OS Release 10.0.

**Description** Specify a set of identical interfaces as an interface group, to which you can apply a common configuration to the entire set of interfaces. This group can consist of both lexical member ranges of interfaces specified using the **member-range** *interface-type-fpc/pic/port* to *xx-fpc/pic/port* option (regex not supported), and of individual or non-sequential members using the **member** *interface-type-fpc/pic/port* option (with regex support to specify the *fpc/pic/port* values).

**Options** **member-range**—Adds interfaces in lexical order. Regex is not supported.

**Format:**—**member-range** <start-range> to <end-range>

**Example:**—**member-range** ge-0/0/0 to ge-4/0/40;

**member**—To add individual interfaces or multiple interfaces using regex.

**Format:**—**member** <list of interface names>

**Example:**—**member** ge-0/0/0;

**member** ge-0/1/1;

**member** ge-0/\*/\*;

**member** ge-0/[1-10]/0;

**member** ge-1/[1,3,6,10]/12

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

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

**Related Documentation** • [Configuring Interface Ranges on page 106](#)

## interface-set

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See the following sections:

- [interface-set \(Ethernet Interfaces\) on page 538](#)
- [interface-set \(IP Demux Interfaces\) on page 539](#)

### interface-set (Ethernet Interfaces)

**Syntax**     `interface-set interface-set-name {  
                  interface ethernet-interface-name {  
                    (unit unit-number | vlan-tags-outer vlan-tag);  
                  }  
                }`

**Hierarchy Level**     [edit interfaces]

**Release Information**     Statement introduced in Junos OS Release 8.5.

**Description**     The set of interfaces used to configure hierarchical CoS schedulers on Ethernet interfaces on the MX Series router and IQ2E PIC on M Series and T Series routers.

The remaining statements are described separately.

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

**Related Documentation**

- *Example: Configuring E-LINE and E-LAN Services for a PBB Network on MX Series Routers*
- *Junos OS Class of Service Library for Routing Devices*

## interface-set (IP Demux Interfaces)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>interface-set <i>interface-set-name</i> {   <b>interface</b> <i>interface-name</i> {     unit <i>unit-number</i>;   } }</pre>   |
| <b>Hierarchy Level</b>          | [edit interfaces]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.2.  |
| <b>Description</b>              | <p>The set of interfaces used to configure hierarchical CoS schedulers for subscribers on IP demux interfaces on the MX Series router.</p> <p>The remaining statements are described separately.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos Subscriber Access Configuration Guide</i></li> <li>• <i>Router Interfaces</i></li> </ul>   |

## interface-status-tlv

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | interface-status-tlv [ down lower-layer-down ];   |
| <b>Hierarchy Level</b>          | [edit protocols <b>oam ethernet</b> connectivity-fault-management <b>action-profile</b> <i>profile-name</i> event]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.6.   |
| <b>Description</b>              | Defines an <b>action-profile</b> consisting of various events and the action. Based on values of <b>interface-status-tlv</b> in the received CCM packets, specific action such as <i>interface-down</i> can be taken using <b>action-profile</b> options.   |
| <b>Options</b>                  | <p><b>down</b>—When the incoming CCM packet contains interface status TLV with value down, the action will be triggered for this action-profile.</p> <p><b>lower-layer-down</b>—When the incoming CCM packet contains interface status TLV with value lower-layer-down, the action will be triggered for this action-profile.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Remote MEP Action Profile Support</i></li> </ul>  |

## interface-switch

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|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>interface-switch <i>connection-name</i> {<br/>    interface <i>interface-name.unit-number</i>;<br/>}</code>  |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols connections],<br>[edit protocols connections]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | <p>Configure Layer 2 switching cross-connects. The cross-connect is bidirectional, so packets received on the first interface are transmitted out the second interface, and those received on the second interface are transmitted out the first.</p> <p>For Layer 2 switching cross-connects to work, you must also configure MPLS.</p> |
| <b>Options</b>                  | <p><b><i>connection-name</i></b>—Connection name.</p> <p><b><i>interface interface-name.unit-number</i></b>—Interface name. Include the logical portion of the name, which corresponds to the logical unit number.</p>   |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring the CCC Connection for Layer 2 Switching Cross-Connects</i></li><li>• <a href="#">Defining the Connection for Switching Cross-Connects on page 258</a></li><li>• <i>Junos OS MPLS Applications Library for Routing Devices</i></li></ul>  |

## interface-type (Interfaces)

|                            |  |
|----------------------------|--|
| <b>Syntax</b>              | <code>interface-type (bc   coc1   ct1   ct3   dc   ds   so   t1   t3);</code>  |
| <b>Hierarchy Level</b>     | <p>[edit interfaces <i>interface-range</i> name <b>no-partition</b>],</p> <p>[edit interfaces <i>interface-range</i> name <b>partition</b> <i>partition-number</i>],</p> <p>[edit interfaces <i>interface-range</i> name <b>partition</b> <i>partition-number</i> oc-slice <i>oc-slice-range</i>],</p> <p>[edit interfaces <i>interface-range</i> name <b>partition</b> <i>partition-number</i> timeslot <i>timeslot-range</i>]</p>  |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>         | For IQ and IQE interfaces only, configure the sublevel interface type.   |
| <b>Options</b>             | <p><b>bc</b>—Dual—Port Channelized E1 and T1 ISDN PRI interface type. You can specify this interface type at the [edit interfaces <i>interface-name</i> <b>partition</b> <i>partition-number</i> timeslot <i>timeslot-range</i>] hierarchy level to create a bearer (B) channel <b>bc-pim/O/port:channel</b> interface for each time you want to function as an ISDN PRI B-channel.</p> <p><b>coc1</b>—Channelized OC1 interface type. You can specify this interface type at the [edit interfaces <i>interface-name</i> <b>partition</b> <i>partition-number</i> <b>oc-slice</b> <i>oc-slice-range</i> interface-type <b>coc12-fpc/pic/port</b>] hierarchy level.</p> <p><b>ct1</b>—Channelized T1 interface type. You can specify this interface type at the [edit interfaces <i>interface-name</i> <b>partition</b> <i>partition-number</i> interface-type <b>ct3-fpc/pic/port&lt;:channel&gt;</b>] hierarchy level.</p> <p><b>ct3</b>—Channelized T3 interface type. You can specify this interface type at the [edit interfaces <i>interface-name</i> <b>partition</b> <i>partition-number</i> <b>oc-slice</b> <i>oc-slice-range</i> interface-type <b>coc1-fpc/pic/port:channel no-partition</b>] hierarchy level.</p> <p><b>dc</b>—Dual-Port Channelized E1 and T1 ISDN PRI interface type. You can specify this interface type at the [edit interfaces <i>interface-name</i> <b>partition</b> <i>partition-number</i> timeslot <i>timeslot-range</i>] hierarchy level to create a (D) channel <b>dc-pim/O/port</b> to control the B-channels.</p> <p><b>ds</b>—DS0 interface type. You can specify this interface type at the [edit interfaces <i>interface-name</i> <b>partition</b> <i>partition-number</i> interface-type (<b>ce1-fpc/pic/port</b>   <b>ct1-fpc/pic/port&lt;:channel&gt;</b>)] hierarchy level.</p> <p><b>so</b>—SONET/SDH interface type. You can specify this interface type at the [edit interfaces <i>interface-name</i> <b>partition</b> <i>partition-number</i> <b>oc-slice</b> <i>oc-slice-range</i> interface-type <b>coc12-fpc/pic/port</b>] hierarchy level.</p> <p><b>t1</b>—T1 interface type. You can specify this interface type at the [edit interfaces <i>interface-name</i> <b>partition</b> <i>partition-number</i> <b>oc-slice</b> <i>oc-slice-range</i> interface-type (<b>coc12-fpc/pic/port</b>   <b>coc1-fpc/pic/port</b>)] hierarchy level.</p> <p><b>t3</b>—T3 interface type. You can specify this interface type at the [edit interfaces <i>interface-name</i> <b>partition</b> <i>partition-number</i> <b>oc-slice</b> <i>oc-slice-range</i> interface-type (<b>coc12-fpc/pic/port</b>   <b>coc1-fpc/pic/port:channel no-partition</b>)] hierarchy level.</p> |

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

**Related Documentation**

- *Channelized E1 IQ and IQE Interfaces Overview*
- *Channelized OC12/STM4 IQ and IQE Interfaces Overview*
- *Configuring Channelized T3 IQ Interfaces*

---

## interfaces

---

**Syntax** interfaces { ... }

**Hierarchy Level** [edit]

**Release Information** Statement introduced before Junos OS Release 7.4.

**Description** Configure interfaces on the router or switch.

**Default** The management and internal Ethernet interfaces are automatically configured. You must configure all other interfaces.

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

**Related Documentation**

- [Physical Interface Configuration Statements Overview on page 80](#)
- *Configuring Aggregated Ethernet Link Protection*

---

## interleave-fragments

---

**Syntax** interleave-fragments;

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

**Release Information** Statement introduced before Junos OS Release 7.4.

**Description** For link services interfaces only, interleave long packets with high-priority packets.

Allows small delay-sensitive packets, such as Voice over IP (VoIP) packets, to interleave with long fragmented packets. This minimizes the latency of delay-sensitive packets.

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

**Related Documentation**

- *Junos OS Services Interfaces Library for Routing Devices*



## interval

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | interval (10m   10s   1m   1s   100ms   10ms);   |
| <b>Hierarchy Level</b>          | [edit protocols oam ethernet connectivity-fault-management maintenance-domain <i>domain-name</i> maintenance-association <i>ma-name</i> <b>continuity-check</b> ]                            |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.<br>Ten milliseconds option introduced in Junos OS Release 9.1.   |
| <b>Description</b>              | The time between continuity check messages.  |
| <b>Options</b>                  | <p><b>10m</b>—10 minutes.</p> <p><b>10s</b>—10 seconds.</p> <p><b>1m</b>—1 minute.</p> <p><b>1s</b>—1 second.</p> <p><b>100ms</b>—100 milliseconds.</p> <p><b>10ms</b>—10 milliseconds.</p>  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><i>Continuity Check Protocol</i></li> <li><i>Example: Configuring Connectivity Fault Management for a PBB Network on MX Series Routers</i></li> </ul> |

## inverse-arp

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | inverse-arp;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet address <i>address</i><br>multipoint-destination <i>destination</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i><br>family inet <b>address</b> <i>address</i> multipoint-destination <i>destination</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 11.1 for the QFX Series.   |
| <b>Description</b>              | For ATM encapsulation, enable responses to receive inverse ATM ARP requests. For Frame Relay encapsulation, enable responses to receive inverse Frame Relay ARP requests.  |
| <b>Default</b>                  | Inverse ARP is disabled on all ATM and Frame Relay interfaces.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Inverse ATM1 or ATM2 ARP</i></li><li>• <i>Configuring Inverse Frame Relay ARP</i></li></ul>   |

## invert-data

|                            |  |
|----------------------------|--|
| <b>Syntax</b>              | invert-data;   |
| <b>Hierarchy Level</b>     | [edit interfaces e1- <i>fpc/pic/port</i> ],<br>[edit interfaces t1- <i>fpc/pic/port</i> ],<br>[edit interfaces <i>interface-name</i> ds0-options],<br>[edit interfaces <i>interface-name</i> e1-options],<br>[edit interfaces <i>interface-name</i> t1-options],<br>[edit interfaces <i>interface-name</i> e3-options] |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.  |
| <b>Description</b>         | Invert the transmission of unused data bits on the DS0, E1, E3, and T1 interface.  |



**NOTE:** When configuring E1 or T1 interfaces on 10-port Channelized E1/T1 IQE PICs, the invert-data statement must be included at the [edit interfaces e1-*fpc/pic/port*] or [edit interfaces t1-*fpc/pic/port*] hierarchy level as appropriate.

|                                 |  |
|---------------------------------|--|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring E1 Data Inversion</i></li> <li>• <i>Configuring E3 Data Inversion</i></li> <li>• <i>Configuring T1 Data Inversion</i></li> </ul> |

## ipsec-sa

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>ipsec-sa sa-name;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces es-fpc/pic/port unit logical-unit-number family inet],<br>[edit logical-systems logical-system-name interfaces es-fpc/pic/port unit logical-unit-number family inet]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Specify the IP Security (IPsec) security association (SA) name associated with the interface.  |
| <b>Options</b>                  | <b>sa-name</b> —IPsec security association name.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li><li>• <i>Junos OS Administration Library for Routing Devices</i></li></ul> |

## isdn-options

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre> isdn-options {   bchannel-allocation (ascending   descending);   calling-number number;   incoming-called-number number &lt;reject&gt;;   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); } </pre> |
| <b>Hierarchy Level</b>          | <pre> [edit interfaces br-pim/0/port], [edit interfaces ct1-pim/0/port], [edit interfaces ce1-pim/0/port] </pre>  |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p><b>bchannel-allocation</b> option added in Junos OS Release 8.3.</p>  |
| <b>Description</b>              | <p>For J Series Services Routers only. Specify the ISDN options for configuring ISDN interfaces for group and user sessions.</p> <p>The statements are explained separately.</p>  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring ISDN Physical Interface Properties</i></li> <li>• <i>Allocating B-Channels for Dialout</i></li> <li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li> </ul>   |

## iteration-count

---

|                          |  |
|--------------------------|--|
| Syntax                   | iteration-count <i>count-value</i> ;   |
| Hierarchy Level          | [edit protocols <a href="#">oam</a> <a href="#">ethernet</a> <a href="#">connectivity-fault-management</a> <a href="#">maintenance-domain</a> <i>md-name</i> <a href="#">maintenance-association</a> <i>ma-name</i> <a href="#">mep</a> <i>mep-id</i> <a href="#">remote-mep</a> <i>remote-mep-id</i> <a href="#">sla-iterator-profile</a> <i>profile-name</i> ] |
| Release Information      | Statement introduced in Junos OS Release 11.1.   |
| Description              | Configure the number of iterations for which the connection partakes in the iterator for acquiring SLA measurements.   |
| Options                  | <b>count-value</b> —Number of iterations for which the connection should partake in the iterator for acquiring SLA measurements.<br><b>Range:</b> 1 through 65,535<br><b>Default:</b> 0 (or infinite iterations)   |
| Required Privilege Level | Configure—To enter configuration mode.<br>Control—To modify any configuration.   |
| Related Documentation    | <ul style="list-style-type: none"><li>• <a href="#">sla-iterator-profile on page 761</a></li><li>• <i>Configuring a Remote MEP with an Iterator Profile</i></li></ul>  |

## iteration-period

---

|                          |   |
|--------------------------|---|
| Syntax                   | iteration-period <i>iteration-period-value</i> ;  |
| Hierarchy Level          | [edit protocols <a href="#">oam</a> <a href="#">ethernet</a> <a href="#">connectivity-fault-management</a> <a href="#">performance-monitoring</a> <a href="#">sla-iterator-profiles</a> <i>profile-name</i> ] |
| Release Information      | Statement introduced in Junos OS Release 11.1.<br>Statement introduced in Junos OS Release 11.4 for EX Series switches.   |
| Description              | Configure the iteration period, which is the maximum number of cycles per iteration (that is, the number of connections registered to an iterator cannot exceed this value).                                  |
| Options                  | <b>iteration-period-value</b> —Maximum number of cycles per iteration.<br><b>Range:</b> 1 through 2000<br><b>Default:</b> 2000  |
| Required Privilege Level | Configure—To enter configuration mode.<br>Control—To modify any configuration.  |
| Related Documentation    | <ul style="list-style-type: none"><li>• <i>Configuring an Iterator Profile</i></li><li>• <i>Configuring an Iterator Profile on a Switch (CLI Procedure)</i></li></ul>   |

## keep-address-and-control

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | keep-address-and-control;  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>ccc</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>ccc</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For interfaces with encapsulation type PPP CCC, do not remove the address and control bytes before encapsulating the packet into a tunnel.   |
| <b>Default</b>                  | If you do not include this statement, address and control bytes are removed before encapsulating the packet into a tunnel.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Disabling the Removal of Address and Control Bytes on page 219</a></li></ul>   |

## keepalives

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>keepalives &lt;interval seconds&gt; &lt;down-count number&gt; &lt;up-count number&gt;;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ],<br>[edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | <p>Enable the sending of keepalives on a physical interface configured with PPP, Frame Relay, or Cisco HDLC encapsulation.</p> <p>For ATM2 IQ interfaces only, you can enable keepalives on a logical interface unit if the logical interface is configured with one of the following PPP over ATM encapsulation types:</p> <ul style="list-style-type: none"><li>• <b>atm-ppp-llc</b>—PPP over AAL5 LLC encapsulation.</li><li>• <b>atm-ppp-vc-mux</b>—PPP over AAL5 multiplex encapsulation.</li></ul>   |
| <b>Default</b>                  | Sending of keepalives is enabled by default. The default keepalive interval is 10 seconds for PPP, Frame Relay, or Cisco HDLC. The default down-count is 3 and the default up-count is 1 for PPP or Cisco HDLC.  |
| <b>Options</b>                  | <p><b>down-count <i>number</i></b>—The number of keepalive packets a destination must fail to receive before the network takes down a link.<br/><b>Range:</b> 1 through 255<br/><b>Default:</b> 3</p> <p><b>interval <i>seconds</i></b>—The time in seconds between successive keepalive requests.<br/><b>Range:</b> 1 through 32767 seconds<br/><b>Default:</b> 10 seconds</p> <p><b>up-count <i>number</i></b>—The number of keepalive packets a destination must receive to change a link's status from down to up.<br/><b>Range:</b> 1 through 255<br/><b>Default:</b> 1</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Keepalives on page 152</a></li><li>• <i>Configuring Frame Relay Keepalives</i></li><li>• <i>Applying PPP Attributes to L2TP LNS Subscribers Per Inline Service Interface</i></li></ul>   |



## key

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>key number;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>tunnel</b> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>tunnel</b> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For Adaptive Services PICs on M Series routers (except the M320 and M120 routers), identify an individual traffic flow within a tunnel, as defined in RFC 2890, <i>Key and Sequence Number Extensions to GRE</i> .                         |
| <b>Options</b>                  | <b>number</b> —Value of the key.<br><b>Range:</b> 0 through 4,294,967,295  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>  |

## l2tp-interface-id

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>l2tp-interface-id name;</code><br>(dedicated   shared);  |
| <b>Hierarchy Level</b>          | [edit interfaces sp- <i>fpc/pic/port</i> <b>unit</b> <i>logical-unit-number</i> interface],<br>[edit logical-systems <i>logical-system-name</i> interfaces sp- <i>fpc/pic/port</i> <b>unit</b> <i>logical-unit-number</i> interface]                       |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Specify the L2TP options for configuring logical interfaces for group and user sessions.   |
| <b>Options</b>                  | (dedicated   shared)—Specifies whether a logical interface can host one (dedicated) or multiple (shared) sessions at one time.<br><br><b>name</b> —Interface identifier that must be replicated at the [edit access profile <i>name</i> ] hierarchy level. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>  |

## lacp

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See the following sections:

- [lacp \(802.3ad\) on page 552](#)
- [lacp \(Aggregated Ethernet\) on page 553](#)

### lacp (802.3ad)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>lacp {   traceoptions {     file lacpd;     flag all;   }   ppm (centralized   distributed); }</pre>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> fastether-options <a href="#">802.3ad</a> ],<br>[edit interfaces <i>interface-name</i> gigether-options <a href="#">802.3ad</a> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.3.<br>The <b>ppm (centralized   distributed)</b> option introduced in Junos OS Release 9.4.   |
| <b>Description</b>              | <p>For aggregated Ethernet interfaces only, configure the Link Aggregation Control Protocol (LACP).</p> <p>On MX and T Series routers you can specify distributed or centralized periodic packet management (PPM).</p>   |
| <b>Default</b>                  | <p>If you do not specify <b>lacp</b> as either <b>active</b> or <b>passive</b>, LACP remains passive.</p> <p>If you do not specify <b>ppm</b> as either <b>centralized</b> or <b>distributed</b>, PPM is distributed.</p>  |
| <b>Options</b>                  | <ul style="list-style-type: none"><li>• <b>active</b>—Initiate transmission of LACP packets.</li><li>• <b>passive</b>—Respond to LACP packets.</li><li>• <b>ppm</b>—Set PPM to centralized or distributed.</li></ul> <p>The remaining statements are explained separately.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Aggregated Ethernet LACP</i></li></ul>  |

## lACP (Aggregated Ethernet)

**Syntax**

```
lACP {
  (active | passive);
  admin-key key;
  accept-data;
  fast-failover;
  link-protection {
    disable;
    (revertive | non-revertive);
  }
  periodic interval;
  system-id mac-address;
  system-priority priority;
}
```

**Hierarchy Level** [edit interfaces aeX **aggregated-ether-options**]

**Release Information** Statement introduced before Junos OS Release 7.4.  
Statement introduced in Junos OS Release 9.0 for EX Series switches.  
**fast-failover** option introduced in Junos OS Release 12.2.

**Description** For aggregated Ethernet interfaces only, configure the Link Aggregation Control Protocol (LACP).

When you configure the **accept-data** statement at the [edit interfaces aeX **aggregated-ether-options lACP**] hierarchy level, the router processes packets received on a member link irrespective of the LACP state if the aggregated Ethernet bundle is up.



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

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

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

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

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



NOTE: You must also configure Multichassis Link Aggregation (MC-LAG) when you configure the `admin-key`.

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

**passive**—Respond to LACP packets.

The remaining statements are explained separately.

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

|                              |  |
|------------------------------|--|
| <b>Related Documentation</b> | <ul style="list-style-type: none"><li>• <i>Configuring Aggregated Ethernet LACP</i></li><li>• <i>Configuring Aggregated Ethernet LACP (CLI Procedure)</i></li><li>• <i>Example: Configuring Aggregated Ethernet High-Speed Uplinks with LACP Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch</i></li></ul> |
|------------------------------|--|

## layer2-policer

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre> layer2-policer {   input-policer <i>policer-name</i>;   input-three-color <i>policer-name</i>;   output-policer <i>policer-name</i>;   output-three-color <i>policer-name</i>; } </pre>   |
| <b>Hierarchy Level</b>          | <p>[edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i>],<br/> [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i>],</p>  |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 8.2.<br/> Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>   |
| <b>Description</b>              | <p>For 1-Gigabit Ethernet and 10-Gigabit Ethernet IQ2 and IQ2-E interfaces on M Series, MX Series, and T Series routers, and for aggregated Ethernet, Gigabit Ethernet, and 10-Gigabit Ethernet interfaces on EX Series switches, apply Layer 2 logical interface policers. The following policers are supported:</p> <ul style="list-style-type: none"> <li>• Two-color</li> <li>• Single-rate tricolor marking (srTCM)</li> <li>• Two-rate tricolor marking (trTCM)</li> </ul> <p>Two-color and tricolor policers are configured at the <b>[edit firewall]</b> hierarchy level.</p>   |
| <b>Options</b>                  | <p><b>input-policer <i>policer-name</i></b>—Two-color input policer to associate with the interface. This statement is mutually exclusive with the <b>input-three-color</b> statement.</p> <p><b>input-three-color <i>policer-name</i></b>—Tricolor input policer to associate with the interface. This statement is mutually exclusive with the <b>input-policer</b> statement.</p> <p><b>output-policer <i>policer-name</i></b>—Two-color output policer to associate with the interface. This statement is mutually exclusive with the <b>output-three-color</b> statement.</p> <p><b>output-three-color <i>policer-name</i></b>—Tricolor output policer to associate with the interface. This statement is mutually exclusive with the <b>output-policer</b> statement.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.<br/> interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Applying Layer 2 Policers to Gigabit Ethernet Interfaces</i></li> <li>• <i>Configuring Gigabit Ethernet Two-Color and Tricolor Policers</i></li> </ul>  |

## **lcp-max-conf-req**

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>lcp-max-conf-req <i>number</i></code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>so-fpc/pic/port unit number</i> <a href="#">ppp-options</a> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.6.  |
| <b>Description</b>              | Set the maximum number of LCP Configure-Requests to be sent, after which the router goes to LCP down state.  |
| <b>Options</b>                  | <i>number</i> —From 0 to 65,535, where 0 means send infinite LCP Configure-Requests, and any other value specifies the maximum number LCP Configure-Requests to send and then stop sending.<br><br><i>Default</i> —254 |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the LCP Configure-Request Maximum Sent on page 191</a></li><li>• <a href="#">ppp-options on page 692</a></li></ul>                                     |

## **lcp-restart-timer**

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>lcp-restart-timer <i>milliseconds</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name unit logical-unit-number</i> <a href="#">ppp-options</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name unit logical-unit-number</i> <a href="#">ppp-options</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.1.  |
| <b>Description</b>              | For interfaces with PPP, PPP TCC, PPP over Ethernet, PPP over ATM, and PPP over Frame Relay encapsulations, configure a restart timer for the Link Control Protocol (LCP) component of a PPP session.                                      |
| <b>Options</b>                  | <i>milliseconds</i> —The time, in milliseconds, between successive LCP configuration requests.<br><b>Range:</b> 20 through 10000 milliseconds<br><b>Default:</b> 3 seconds   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the PPP Restart Timers on page 192</a></li></ul>   |

## level

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>level <i>number</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit protocols oam ethernet connectivity-fault-management <b>maintenance-domain</b> <i>domain-name</i> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.<br>Statement introduced in junos os release 12.1X48 for PTX Series Packet Transport Routers.  |
| <b>Description</b>              | A number used in CFM messages to identify the maintenance association.  |
| <b>Options</b>                  | <b><i>number</i></b> —A number used to identify the maintenance domain to which the CFM message belongs.<br><b>Range:</b> 0 through 7   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring the Maintenance Domain Level</i></li> <li>• <i>Example: Configuring Connectivity Fault Management for a PBB Network on MX Series Routers</i></li> <li>• <i>Configuring Ethernet 802.1ag OAM on PTX Series Packet Transport Routers</i></li> </ul> |

## line-encoding

---

|                            |   |
|----------------------------|---|
| <b>Syntax</b>              | line-encoding (ami   b8zs);   |
| <b>Hierarchy Level</b>     | [edit interfaces <i>ct1-fpc/pic/port</i> ],<br>[edit interfaces <i>interface-name</i> <b>t1-options</b> ]                                       |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers. |
| <b>Description</b>         | Set the line encoding format on the T1 interface.   |



**NOTE:** When configuring CT1 interfaces on the 10-port Channelized E1/T1 IQE PIC, the line-encoding statement must be included at the [edit interfaces *ct1-fpc/pic/port*] hierarchy level.

|                                 |   |
|---------------------------------|---|
| <b>Default</b>                  | The default line encoding is B8ZS.  |
| <b>Options</b>                  | <b>ami</b> —Use Alternate Mark Inversion (AMI) line encoding.<br><b>b8zs</b> —Use bipolar with 8-zeros substitution (B8ZS) line encoding. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring T1 Line Encoding</i></li></ul>   |



## line-protocol

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>line-protocol <i>protocol</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For serial interfaces only, configure the line protocol.   |
| <b>Options</b>                  | <p><b><i>protocol</i></b>—You can specify the one of the following line protocols:</p> <ul style="list-style-type: none"> <li>• <b>eia530</b>—Line protocol EIA-530</li> <li>• <b>v.35</b>—Line protocol V.35</li> <li>• <b>x.21</b>—Line protocol X.21</li> </ul> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring the Serial Line Protocol on page 297</a></li> </ul>   |

## line-rate

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>line-rate <i>line-rate</i>;</code>   |
| <b>Hierarchy Level</b>          | <p>[edit interfaces <i>interface-name</i> <a href="#">shdsl-options</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">shdsl-options</a>]</p>  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 7.4.  |
| <b>Description</b>              | For J Series Services Routers only, configure the SHDSL line rate.   |
| <b>Options</b>                  | <p><b><i>line-rate</i></b>—SHDSL line rate, in Kbps. Possible values are:</p> <p>2-wire (Kbps): 192, 256, 320, 384, 448, 512, 576, 640, 704, 768, 832, 896, 960, 1024, 1088, 1152, 1216, 1280, 1344, 1408, 1472, 1536, 1600, 1664, 1728, 1792, 1856, 1920, 1984, 2048, 2112, 2176, 2240, 2304, auto</p> <p>4-wire (Kbps): 384, 512, 640, 768, 896, 1024, 1152, 1280, 1408, 1536, 1664, 1792, 1920, 2048, 2176, 2304, 2432, 2560, 2688, 2816, 2944, 3072, 3200, 3328, 3456, 3584, 3712, 3840, 3968, 4096, 4224, 4352, 4480, 4608</p> <p><b>Default:</b> For 2-wire mode, <b>auto</b>; for 4-wire mode, <b>4608 Kbps</b></p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">ATM-over-SHDSL Overview</a></li> </ul>  |

## linear-red-profile

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>linear-red-profile <i>profile-name</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces at- <i>fpc/pic/port</i> atm-options scheduler-maps <i>map-name</i> forwarding-class <i>class-name</i> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For ATM2 IQ interfaces only, assign a linear RED profile to a specified forwarding class. To define the linear RED profiles, include the <a href="#">linear-red-profiles</a> statement at the [edit interfaces at- <i>fpc/pic/port</i> atm-options] hierarchy level. |
| <b>Default</b>                  | If you do not include either the <b>epd-threshold</b> or the <b>linear-red-profile</b> statement in the forwarding class configuration, the Junos OS uses an EPD threshold based on the available bandwidth and other parameters.                                    |
| <b>Options</b>                  | <i>profile-name</i> —Name of the linear RED profile.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring an ATM Scheduler Map</i></li><li>• <a href="#">linear-red-profiles on page 561</a></li><li>• <i>Configuring Scheduler Maps on ATM Interfaces</i></li><li>• <i>epd-threshold</i></li></ul>                     |

## linear-red-profiles

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>linear-red-profiles <i>profile-name</i> {<br/>    high-plp-threshold <i>percent</i>;<br/>    low-plp-threshold <i>percent</i>;<br/>    queue-depth <i>cells</i>;<br/>}</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>at-fpc/pic/port</i> <a href="#">atm-options</a> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For ATM2 IQ interfaces only, define CoS virtual circuit drop profiles for RED. When a packet arrives, RED checks the queue fill level. If the fill level corresponds to a nonzero drop probability, the RED algorithm determines whether to drop the arriving packet. |
| <b>Options</b>                  | <i>profile-name</i> —Name of the drop profile.<br><br>The statements are explained separately.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring ATM2 IQ VC Tunnel CoS Components</i></li> <li>• <i>Configuring Linear RED Profiles on ATM Interfaces</i></li> </ul>   |

## link-adjacency-loss

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>link-adjacency-loss;</code>   |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet link-fault-management action-profile event</a> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.   |
| <b>Description</b>              | Loss of adjacency with IEEE 802.3ah link-fault management peer event. When included, the loss-of-adjacency event triggers the action specified under the <b>action</b> statement. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Monitoring the Loss of Link Adjacency</i></li> </ul>  |

## link-discovery

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | link-discovery (active   passive);  |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam</a> <a href="#">ethernet</a> <a href="#">link-fault-management</a> <a href="#">interface</a> <i>interface-name</i> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.2.   |
| <b>Description</b>              | For Ethernet interfaces on EX Series switches, and M320, M120, MX Series, and T Series routers, specify the discovery mode used for IEEE 802.3ah Operation, Administration, and Management (OAM) support. The discovery process is triggered automatically when OAM 802.3ah functionality is enabled on a port. Link monitoring is done when the interface sends periodic OAM PDUs. |
| <b>Options</b>                  | (active   passive)—Passive or active mode. In active mode, the interface discovers and monitors the peer on the link if the peer also supports IEEE 802.3ah OAM functionality. In passive mode, the peer initiates the discovery process. Once the discovery process is initiated, both sides participate in discovery.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Link Discovery</i></li></ul>   |

## link-down

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | link-down;   |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam</a> <a href="#">ethernet</a> <a href="#">link-fault-management</a> ]                         |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.  |
| <b>Description</b>              | Mark the interface down for transit traffic.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Specifying the Actions to Be Taken for Link-Fault Management Events</i></li></ul> |

## link-event-rate

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>link-event-rate {<br/>    frame-error count;<br/>    frame-period count;<br/>    frame-period-summary count;<br/>    symbol-period count;<br/>}</pre> |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet link-fault-management action-profile event</a> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.  |
| <b>Description</b>              | Configure the number of link-fault management events per second.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Threshold Values for Fault Events in an Action Profile</i></li></ul>                                |

## link-fault-management

---

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

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

**Release Information** Statement introduced in Junos OS Release 8.2.

**Description** For Ethernet interfaces on M320, M120, MX Series, and T Series routers and EX Series switches, specify fault signaling and detection for IEEE 802.3ah Operation, Administration, and Management (OAM) support.

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** • *Enabling IEEE 802.3ah OAM Support*

## link-layer-overhead

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | link-layer-overhead <i>percent</i> ;  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">mlfr-uni-nni-bundle-options</a> ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For AS PIC or MultiServices PIC link services IQ interfaces ( <b>lsq</b> ) only, configure the percentage of total bundle bandwidth to be set aside for link-layer overhead.  |
| <b>Options</b>                  | <b>percent</b> —Percentage of total bundle bandwidth to be set aside for link-layer overhead.<br><b>Range:</b> 0 through 50 percent<br><b>Default:</b> 4 percent  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | • <i>Junos OS Services Interfaces Library for Routing Devices</i>   |

## link-mode

---

|                            |  |
|----------------------------|--|
| <b>Syntax</b>              | <code>link-mode mode;</code>   |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> ],<br>[edit interfaces <i>interface-name</i> ether-options],<br>[edit interfaces <i>ge-pim</i> /0/0 <i>switch-options</i> <i>switch-port</i> <i>port-number</i> ]   |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.  |
| <b>Description</b>         | Set the device's link connection characteristic.   |
| <b>Options</b>             | <i>mode</i> —Link characteristics: <ul style="list-style-type: none"><li>• <b>automatic</b>—Link mode is negotiated. This is the default for EX Series switches.</li><li>• <b>full-duplex</b>—Connection is full duplex.</li><li>• <b>half-duplex</b>—Connection is half duplex.</li></ul> <p><b>Default:</b> Fast Ethernet interfaces, except the J Series ePIM Fast Ethernet interfaces, can operate in either full-duplex or half-duplex mode. The router's management Ethernet interface, <b>fxp0</b> or <b>em0</b>, the built-in Fast Ethernet interfaces on the FIC (M7i router), and the Gigabit Ethernet ports on J Series Services Routers with uPIMs installed and configured for access switching mode autonegotiate whether to operate in full-duplex or half-duplex mode. Unless otherwise noted here, all other interfaces operate only in full-duplex mode.</p> |



**NOTE:** On J Series ePIM Fast Ethernet interfaces, if you specify half-duplex (or if full-duplex mode is not autonegotiated), the following message is written to the system log: "Half-duplex mode not supported on this PIC, forcing full-duplex mode."



**NOTE:** On EX Series switches, if **no-auto-negotiation** is specified in [edit interfaces *interface-name* ether-options], you can select only **full-duplex** or **half-duplex**. If **auto-negotiation** is specified, you can select any mode.



**NOTE:** Member links of an aggregated Ethernet bundle must not be explicitly configured with a link mode. You must remove any such link-mode configuration before committing the aggregated Ethernet configuration.



|                                 |  |
|---------------------------------|--|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring the Link Characteristics on Ethernet Interfaces</i></li><li>• <a href="#">Understanding Management Ethernet Interfaces on page 31</a></li><li>• <i>Configuring Gigabit Ethernet Interfaces (CLI Procedure)</i></li><li>• <i>Configuring Gigabit Ethernet Interfaces (CLI Procedure)</i></li></ul> |

## link-protection

---

|                          |   |
|--------------------------|---|
| Syntax                   | <pre>link-protection {<br/>    disable;<br/>    (revertive   non-revertive);<br/>}</pre>  |
| Hierarchy Level          | <pre>[edit interfaces aex aggregated-ether-options]<br/>[edit interfaces aex aggregated-ether-options lacp]</pre>   |
| Release Information      | <p>Statement introduced in Junos OS Release 8.3.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Support for <b>disable</b>, <b>revertive</b>, and <b>non-revertive</b> statements added in Junos OS Release 9.3.</p>  |
| Description              | <p>On the router, for aggregated Ethernet interfaces only, configure link protection. In addition to enabling link protection, a primary and a secondary (backup) link must be configured to specify what links egress traffic should traverse. To configure primary and secondary links on the router, include the <b>primary</b> and <b>backup</b> statements at the <b>[edit interfaces ge-fpc/pic/port gigether-options 802.3ad aex]</b> hierarchy level or the <b>[edit interfaces fe-fpc/pic/port fastether-options 802.3ad aex]</b> hierarchy level.</p> <p>On the switch, you can configure either Junos OS link protection for aggregated Ethernet interfaces or the LACP standards link protection for aggregated Ethernet interfaces.</p> <p>For Junos OS link protection, specify <b>link-protection</b> at the following hierarchy levels:</p> <ul style="list-style-type: none"><li>• <b>[edit interfaces ge-fpc/pic/port ether-options 802.3ad aex]</b></li><li>• <b>[edit interfaces xe-fpc/pic/port ether-options 802.3ad aex]</b></li></ul> <p>For LACP standards link protection, specify <b>link-protection</b> at the following hierarchy levels:</p> <ul style="list-style-type: none"><li>• For global LACP link protection, specify at <b>[edit chassis aggregated-devices ethernet lacp]</b></li><li>• For a specific aggregated Ethernet interface, specify at <b>[edit interfaces aeX aggregated-ether-options lacp]</b></li></ul> |
| Options                  | The statements are explained separately.  |
| Required Privilege Level | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| Related Documentation    | <ul style="list-style-type: none"><li>• <i>Configuring Aggregated Ethernet Link Protection</i></li><li>• <i>Configuring LACP Link Protection of Aggregated Ethernet Interfaces (CLI Procedure)</i></li></ul>  |

## link-speed

---

See the following sections:

- [link-speed \(Aggregated Ethernet\) on page 570](#)
- [link-speed \(Aggregated SONET/SDH\) on page 571](#)

## link-speed (Aggregated Ethernet)

|                            |  |
|----------------------------|--|
| <b>Syntax</b>              | <code>link-speed <i>speed</i>;</code>  |
| <b>Hierarchy Level</b>     | [edit interfaces aex <a href="#">aggregated-ether-options</a> ],<br>[edit interfaces interface-range <i>name</i> <a href="#">aggregated-ether-options</a> ],<br>[edit interfaces interface-range <i>name</i> <a href="#">aggregated-sonet-options</a> ]  |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.  |
| <b>Description</b>         | For aggregated Ethernet interfaces only, set the required link speed.  |
| <b>Options</b>             | <p><b><i>speed</i></b>—For aggregated Ethernet links, you can specify <b><i>speed</i></b> in bits per second either as a complete decimal number or as a decimal number followed by the abbreviation <b>k</b> (1000), <b>m</b> (1,000,000), or <b>g</b> (1,000,000,000).</p> <p>Aggregated Ethernet links on the M120 router can have one of the following speed values:</p> <ul style="list-style-type: none"><li>• <b>100m</b>—Links are 100 Mbps.</li><li>• <b>10g</b>—Links are 10 Gbps.</li><li>• <b>1g</b>—Links are 1 Gbps.</li><li>• <b>oc192</b>—Links are OC192 or STM64c.</li></ul> <p>Aggregated Ethernet links on EX Series switches can be configured to operate at one of the following speed values:</p> <ul style="list-style-type: none"><li>• <b>10m</b>—Links are 10 Mbps.</li><li>• <b>100m</b>—Links are 100 Mbps.</li><li>• <b>1g</b>—Links are 1 Gbps.</li><li>• <b>10g</b>—Links are 10 Gbps.</li></ul> <p>Aggregated Ethernet links on T Series routers can be configured to operate at one of the following speed values:</p> <ul style="list-style-type: none"><li>• <b>100g</b>—Links are 100 Gbps.</li><li>• <b>100m</b>—Links are 100 Mbps.</li><li>• <b>10g</b>—Links are 10 Gbps.</li><li>• <b>1g</b>—Links are 1 Gbps.</li><li>• <b>40g</b>—Links are 40 Gbps.</li><li>• <b>50g</b>—Links are 50 Gbps.</li><li>• <b>80g</b>—Links are 80 Gbps.</li><li>• <b>8g</b>—Links are 8 Gbps.</li><li>• <b>mixed</b>—Links are of various speeds.</li></ul> |

- **oc192**—Links are OC-192.

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

**Related Documentation**

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

## link-speed (Aggregated SONET/SDH)

**Syntax** link-speed (*speed* | mixed);

**Hierarchy Level** [edit interfaces asx aggregated-sonet-options]

**Release Information** Statement introduced before Junos OS Release 7.4.  
**mixed** option added in Release 8.0.

**Description** For aggregated SONET/SDH interfaces only, set the required link speed.

**Options** **speed**—Aggregated SONET/SDH links can have one of the following speed values.

- **oc3**—Links are OC3c or STM1c.
- **oc12**—Links are OC12c or STM4c.
- **oc48**—Links are OC48c or STM16c.
- **oc192**—Links are OC192c or STM64c.
- **oc768**—Links are OC768c or STM256c.

**mixed**—For aggregated SONET/SDH links on T Series routers, you can mix interface speeds in SONET/SDH aggregation bundles. Interface speeds from OC3 through OC768 are supported.

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

**Related Documentation**

- *Configuring Aggregated Ethernet Link Speed*
- *Configuring Aggregated SONET/SDH Link Speed*

## linktrace

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>linktrace {<br/>    age (30m   10m   1m   30s   10s);<br/>    path-database-size path-database-size;<br/>}</pre>   |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet connectivity-fault-management</a> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.   |
| <b>Description</b>              | Configure connectivity fault management linktrace parameters.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Linktrace Protocol in CFM</i></li></ul>                          |

## lmi

---

See the following sections:

- [lmi \(Frame Relay\) on page 574](#)
- [lmi \(Ethernet OAM\) on page 576](#)

## lmi (Frame Relay)

**Syntax** `lmi {  
    lmi-type (ansi | itu | c-lmi);  
    n391dte number;  
    n392dce seconds;  
    n392dte number;  
    n393dce number;  
    n393dte number;  
    t391dte number;  
    t392dce seconds;  
}`

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

**Release Information** Statement introduced before Junos OS Release 7.4.

**Description** Set Frame Relay keepalive parameters.

**Options** `n391dte`—DTE full status polling interval.

**Range:** 1 through 255

**Default:** 6

`n392dce`—DCE error threshold, in number of errors.

**Range:** 1 through 10

**Default:** 3

`n392dte`—DTE error threshold, in number of errors.

**Range:** 1 through 10

**Default:** 3

`n393dce`—DCE monitored event-count.

**Range:** 1 through 10

**Default:** 4

`n393dte`—DTE monitored event-count.

**Range:** 1 through 10

**Default:** 4

`t391dte`—DTE polling timer.

**Range:** 5 through 30 seconds

**Default:** 10 seconds

`t392dce`—DCE polling timer.

**Range:** 5 through 30 seconds

**Default:** 15 seconds

The remaining statements are explained separately.



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

- Related Documentation**
- *Configuring Tunable Keepalives for Frame Relay LMI*
  - [lmi-type on page 577](#)
  - [mlfr-uni-nni-bundle-options on page 612](#)

## lmi (Ethernet OAM)

|                          |   |
|--------------------------|---|
| Syntax                   | <pre>lmi {<br/>  status-counter <i>count</i>;<br/>  polling-verification-timer <i>value</i>;<br/>  interface <i>name</i> {<br/>    uni-id <i>uni-name</i>;<br/>    status-counter <i>number</i>;<br/>    polling-verification-timer <i>value</i>;<br/>    evc-map-type (all-to-one-bundling   bundling   service-multiplexing);<br/>    evc <i>evc-name</i> {<br/>      default-evc;<br/>      vlan-list <i>vlan-id-list</i>;<br/>    }<br/>  }<br/>}</pre>   |
| Hierarchy Level          | [edit protocols <a href="#">oam</a> <a href="#">ethernet</a> ]  |
| Release Information      | Statement introduced in Junos OS Release 9.5.   |
| Description              | On routers with <b>ge</b> , <b>xe</b> , or <b>ae</b> interfaces, configure an OAM Ethernet local management interface.  |
| Options                  | <p><b>status-counter <i>count</i></b>—Status counter (N393), defaults to 4.</p> <p><b>interface <i>name</i></b>—Polling verification timer (T392), defaults to 15 seconds.</p> <p><b>uni-id <i>uni-name</i></b>—(Optional) Defaults to the physical interface name.</p> <p><b>status-counter <i>number</i></b>—(Optional) Defaults to a global value.</p> <p><b>polling-verification-timer <i>value</i></b>—(Optional) Defaults to a global value.</p> <p><b>evc-map-type (all-to-one-bundling   bundling   service-multiplexing)</b>—Specify the Ethernet virtual connection (EVC) map type.</p> <p><b>evc <i>evc-name</i></b>—Specify the name of the EVC.</p> <p><b>default-evc</b>—Set the specified EVC as the default EVC.</p> <p><b>vlan-list <i>vlan-id-list</i></b>—Specify a group of VLANs to assign to the EVC.</p> |
| Required Privilege Level | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| Related Documentation    | <ul style="list-style-type: none"><li>• <i>Configuring Ethernet Local Management Interface</i></li><li>• <a href="#">evcs on page 468</a></li></ul>   |

## lmi-type

|                            |   |
|----------------------------|---|
| <b>Syntax</b>              | lmi-type (ansi   itu   c-lmi);  |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> <b>lmi</b> ],<br>[edit interfaces <i>interface-name</i> <b>mlfr-uni-nni-bundle-options</b> ] |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>         | Set Frame Relay Local Management Interface (LMI) type.  |



**NOTE:** Consortium LMI is supported on all MPCs and I-chip based FPCs.

|                                 |  |
|---------------------------------|--|
| <b>Options</b>                  | <b>ansi</b> —Use ANSI T1.167 Annex D LMIs.<br><b>itu</b> —Use ITU Q933 Annex A LMIs.<br><b>c-lmi</b> —Use Consortium LMI.<br><b>Default:</b> ansi  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Frame Relay Keepalives</i></li> <li>• <a href="#">mlfr-uni-nni-bundle-options on page 612</a></li> <li>• <a href="#">lmi (Frame Relay) on page 574</a></li> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul> |

## load-interval

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>load-interval seconds;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces dln <b>unit</b> <i>logical-unit-number</i> <b>dialer-options</b> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces dln <b>unit</b> <i>logical-unit-number</i> <b>dialer-options</b> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | On J Series Services Routers with ISDN logical interfaces, specify the interval used to calculate the average load on the network. By default, the average interface load is calculated every 60 seconds.              |
| <b>Options</b>                  | <b>seconds</b> —Number of seconds at which the average load calculation is triggered.<br><b>Range:</b> 20 through 180, in 10-second intervals<br><b>Default:</b> 60 seconds  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring ISDN Logical Interface Properties</i></li><li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li></ul>  |

## load-threshold

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | load-threshold <i>percent</i> ;  |
| <b>Hierarchy Level</b>          | [edit interfaces dln <i>unit logical-unit-number dialer-options</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces dln <i>unit logical-unit-number dialer-options</i> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | On J Series Services Routers with ISDN logical interfaces, specify the bandwidth threshold percentage used for adding interfaces. Another link is added to the multilink bundle when the load reaches the threshold value you set. Specify a percentage between 0 and 100. |
| <b>Options</b>                  | <i>percent</i> —Bandwidth threshold percentage used for adding interfaces. When set to 0, all available channels are dialed.<br><b>Range:</b> 0 through 100 seconds<br><b>Default:</b> 100 seconds   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Bandwidth on Demand</i></li> <li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li> </ul>   |

## local-name

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>local-name name;</code>  |
| <b>Hierarchy Level</b>          | <code>[edit interfaces interface-name ppp-options chap],</code><br><code>[edit interfaces interface-name ppp-options pap],</code><br><code>[edit interfaces interface-name unit logical-unit-number ppp-options chap],</code><br><code>[edit interfaces interface-name unit logical-unit-number ppp-options pap],</code><br><code>[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number ppp-options chap],</code><br><code>[edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number ppp-options pap]</code>   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Support for PAP added in Junos OS Release 8.3.  |
| <b>Description</b>              | <p>For CHAP authentication, the value sent in CHAP challenge and response packets on a per interface basis. For PAP authentication, the local hostname for sending PAP authentication requests.</p> <p>For ATM2IQ interfaces only, you can configure a CHAP local name on the logical interface unit if the logical interface is configured with one of the following PPP over ATM encapsulation types:</p> <ul style="list-style-type: none"><li>• <b>atm-ppp-llc</b>—PPP over AAL5 LLC encapsulation.</li><li>• <b>atm-ppp-vc-mux</b>—PPP over AAL5 multiplex encapsulation.</li></ul> |
| <b>Default</b>                  | For CHAP authentication, if you do not include the <b>local-name</b> statement in the configuration, the interface sends the router's system hostname in CHAP challenge and response packets.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the PPP Challenge Handshake Authentication Protocol on page 136</a></li><li>• <a href="#">Configuring the PPP Password Authentication Protocol on page 139</a></li><li>• <i>Junos OS Administration Library for Routing Devices</i></li></ul>  |

## local-password

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>local-password password;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">ppp-options pap</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">unit logical-unit-number ppp-options pap</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit logical-unit-number ppp-options pap</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.3.   |
| <b>Description</b>              | Configure the host password for sending PAP requests.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring the Local Password on page 195</a></li> <li>• <a href="#">Configuring the PPP Password Authentication Protocol on page 139</a></li> </ul>  |

## lockout

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|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>lockout;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> sonet-options <a href="#">aps</a> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Configure a lockout of protection, forcing the use of the working circuit and locking out the protect circuit regardless of anything else. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Switching Between the Working and Protect Circuits</a></li> </ul>         |

## log-prefix (Interfaces)

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | log-prefix <i>prefix-value</i> ;  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> services-options syslog <a href="#">host</a> <i>hostname</i> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | Set the system logging prefix value.  |
| <b>Options</b>                  | <i>prefix-value</i> —System logging prefix value.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li><li>• <i>Configuring System Logging for Services Interfaces</i></li></ul> |


## logical-interface-fpc-redundancy (Aggregated Ethernet Subscriber Interfaces)

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | logical-interface-fpc-redundancy;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>aenumber</i> <a href="#">aggregated-ether-options</a> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.2.  |
| <b>Description</b>              | <p>Provide module redundancy for demux subscribers on aggregated Ethernet bundles configured with targeted distribution. Backup links for a subscriber are chosen on a different EQ DPC or MPC from the primary link, based on the link with the fewest number of subscribers among the links on different modules. If all links are on a single module when this is configured, backup links are not provisioned.</p> <p>By default, link redundancy is provided for the aggregated Ethernet bundle.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Link and Module Redundancy for Demux Subscribers in an Aggregated Ethernet Interface</i></li><li>• <i>Configuring Module Redundancy for a Virtual Chassis</i></li></ul>  |



## logical-interface-policer

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | logical-interface-policer;   |
| <b>Hierarchy Level</b>          | <p>[edit dynamic-profiles <i>profile-name</i> firewall policer <i>policer-name</i>],<br/>         [edit dynamic-profiles <i>profile-name</i> firewall three-color-policer <i>name</i>],<br/>         [edit firewall atm-policer <i>atm-policer-name</i>]<br/>         [edit firewall policer <i>policer-name</i>],<br/>         [edit firewall policer <i>policer-template-name</i>],<br/>         [edit firewall three-color-policer <i>policer-name</i>],<br/>         [edit logical-systems <i>logical-system-name</i> firewall policer <i>policer-name</i>],<br/>         [edit logical-systems <i>logical-system-name</i> firewall three-color-policer <i>name</i>]</p> |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Support at the [edit firewall three-color-policer <i>policer-name</i>] hierarchy level introduced in Junos OS Release 8.2.</p> <p>Logical systems support introduced in Junos OS Release 9.3.</p> <p>Support at the [edit dynamic-profiles ... policer <i>policer-name</i>] and [edit dynamic-profiles ... three-color-policer <i>name</i>] hierarchy levels introduced in Junos OS Release 11.4.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>   |
| <b>Description</b>              | Configure a logical interface policer.   |
|                                 | <div>  <p><b>NOTE:</b> Starting in Junos OS Release 12.2R2, on T Series Core Routers only, you can configure an MPLS LSP policer for a specific LSP to be shared across different protocol family types. You must include the logical-interface-policer statement to do so.</p> </div>  |
| <b>Required Privilege Level</b> | <p>firewall—To view this statement in the configuration.</p> <p>firewall-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Two-Color and Three-Color Logical Interface Policers</i></li> <li>• <i>Traffic Policer Types</i></li> <li>• <i>Configuring Tricolor Marking Policers</i></li> <li>• <i>action</i></li> <li>• <i>Configuring Gigabit Ethernet Two-Color and Tricolor Policers</i></li> <li>• <a href="#">action on page 323</a></li> </ul>  |

## logical-systems

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|                          |  |
|--------------------------|--|
| Syntax                   | <pre>logical-systems {<br/>    logical-system-name {<br/>        ...logical-system-configuration...<br/>    }<br/>}</pre>        |
| Hierarchy Level          | [edit]   |
| Release Information      | Statement introduced before Junos OS Release 7.4.<br>Statement name changed from <b>logical-routers</b> in Junos OS Release 9.3. |
| Description              | Configure a logical system.  |
| Options                  | <b>logical-system-name</b> —Name of the logical system.  |
| Required Privilege Level | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.              |
| Related Documentation    | <ul style="list-style-type: none"><li>• <i>Logical Systems Feature Guide for Routing Devices</i></li></ul>                       |

## long-buildout

---

|                          |  |
|--------------------------|--|
| Syntax                   | (long-buildout   no-long-buildout);  |
| Hierarchy Level          | [edit interfaces <i>interface-name</i> <b>t3-options</b> ]   |
| Release Information      | Statement introduced before Junos OS Release 7.4.  |
| Description              | <p>Configure the T3 line buildout. A T3 interface has two settings for the T3 line buildout: a short setting, which is less than 255 feet (68 meters), and a long setting, which is greater than 255 feet and shorter than 450 feet (137 meters).</p> <p>This statement applies to copper-cable-based T3 interfaces only. You cannot configure a line buildout for a DS3 channel on a channelized OC12 interface, which runs over fiber-optic cable.</p> |
| Default                  | A T3 interface uses the short line buildout setting ( <b>no-long-buildout</b> ) for wires shorter than 255 feet (68 meters).   |
| Required Privilege Level | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| Related Documentation    | <ul style="list-style-type: none"><li>• <i>Configuring the T3 Line Buildout</i></li></ul>  |

## loop-timing

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | (loop-timing   no-loop-timing);  |
| <b>Hierarchy Level</b>          | [edit interfaces ct3- <i>fpc/pic/port</i> <a href="#">t3-options</a> ],<br>[edit interfaces e1- <i>fpc/pic/port:0</i> <a href="#">sonet-options</a> ],<br>[edit interfaces stm1- <i>fpc/pic/port</i> <a href="#">sonet-options</a> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For channelized IQ interfaces and non-IQ channelized STM1 interfaces only, configure the SONET/SDH or DS3-level clocking source.   |
|                                 | <div>  <p><b>NOTE:</b> On M Series, MX Series, and T Series routers, under E1 channels, loop timing can be configured only at channel 0. When you configure on channel 0, it is applicable on all channels as internal by default.</p> </div> |
| <b>Options</b>                  | <p><b>loop-timing</b>—Configure loop timing (external) clocking.</p> <p><b>no-loop-timing</b>—Configure line timing (internal) clocking.</p> <p><b>Default:</b> no-loop-timing</p>   |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Channelized IQ and IQE SONET/SDH Loop Timing</i></li> <li>• <i>Configuring the Channelized T3 Loop Timing</i></li> <li>• <a href="#">clocking on page 386</a></li> </ul>   |



## loopback

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See the following sections:

- [loopback \(ADSL, DS0, E1/E3, SONET/SDH, SHDSL, and T1/T3\) on page 587](#)
- [loopback \(Aggregated Ethernet, Fast Ethernet, and Gigabit Ethernet\) on page 589](#)
- [loopback \(Serial\) on page 590](#)

**loopback (ADSL, DS0, E1/E3, SONET/SDH, SHDSL, and T1/T3)**

|  |  |
|--|--|
| <b>Syntax</b>  | <code>loopback (local   payload   remote);</code>  |
| <b>Hierarchy Level</b>   | <code>[edit interfaces ce1-fpc/pic/port],</code><br><code>[edit interfaces ct1-fpc/pic/port],</code><br><code>[edit interfaces t1-fpc/pic/port],</code><br><code>[edit interfaces interface-name ds0-options],</code><br><code>[edit interfaces interface-name dsl-options],</code><br><code>[edit interfaces interface-name e1-options],</code><br><code>[edit interfaces interface-name e3-options],</code><br><code>[edit interfaces interface-name shdsl-options],</code><br><code>[edit interfaces interface-name sonet-options],</code><br><code>[edit interfaces interface-name t1-options],</code><br><code>[edit interfaces interface-name t3-options]</code> |
| <b>Release Information</b>   | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.</p>   |
| <b>Description</b>   | Configure a loopback connection. To turn off the loopback capability, remove the <b>loopback</b> statement from the configuration.   |
| <div>  <p><b>NOTE:</b> When configuring CE1 or CT1 interfaces on 10-port Channelized E1/T1 IQE PICs, the <b>loopback</b> statement must be included with the <b>local</b> or <b>remote</b> option at the <code>[edit interfaces ce1-fpc/pic/port]</code> or <code>[edit interfaces ct1-fpc/pic/port]</code> hierarchy level as appropriate.</p> <p>When configuring T1 interfaces on 10-port Channelized E1/T1 IQE PICs, the <b>loopback</b> statement must be included with the <b>payload</b> option at the <code>[edit interfaces t1-fpc/pic/port]</code> hierarchy level.</p> </div> |  |
| <div>  <p><b>NOTE:</b> When configuring CE1 or CT1 interfaces on the 16-port Channelized E1/T1 MIC (MIC-3D-16CHE1-T1-CE), you must include the <b>loopback</b> statement at the <code>[edit interfaces ce1-fpc/pic/port]</code> hierarchy level, or <code>[edit interfaces ct1-fpc/pic/port]</code></p> </div>  |  |
| <p>To configure loopback on channelized IQ and IQE PICs, SONET/SDH level, use the <b>sonet-options loopback</b> statement <b>local</b> and <b>remote</b> options at the controller interface (<code>coc48</code>, <code>cstm16</code>, <code>coc12</code>, <code>cstm4</code>, <code>coc3</code>, <code>cstm1</code>). It is ignored for path-level interfaces <b>so-fpc/pic/port</b> or <b>so-fpc/pic/port:channel</b>.</p>   |  |
| <b>Options</b>   | <p><b>local</b>—Loop packets, including both data and timing information, back on the local router's PIC. NxDS0 IQ interfaces do not support local loopback.</p>   |

**payload**—For channelized T3, T1, and NxDSO IQ interfaces only, loop back data only (without clocking information) on the remote router's PIC. With payload loopback, overhead is recalculated. Neither ATM-over-asymmetrical digital subscriber line (ADSL) interfaces nor ATM-over-SHDSL interfaces support payload loopback.


**remote**—Loop packets, including both data and timing information, back on the remote router's interface card. NxDSO IQ interfaces do not support remote loopback.

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

**Related Documentation**

- *Configuring E3 and T3 Parameters on ATM Interfaces*
- *Configuring E1 Loopback Capability*
- *Configuring E3 Loopback Capability*
- *Configuring SONET/SDH Loopback Capability*
- *Configuring SHDSL Operating Mode on an ATM Physical Interface*
- *Configuring T1 Loopback Capability*
- *Configuring T3 Loopback Capability*
- [feac-loop-respond on page 479](#)

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

|  |  |
|--|--|
| <b>Syntax</b>  | (loopback   no-loopback);  |
| <b>Hierarchy Level</b>   | [edit interfaces <i>interface-name</i> <a href="#">aggregated-ether-options</a> ],<br>[edit interfaces <i>interface-name</i> ether-options],<br>[edit interfaces <i>interface-name</i> <a href="#">fastether-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">gigether-options</a> ],<br>[edit interfaces interface-range <i>name</i> ether-options] |
| <b>Release Information</b>   | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.  |
| <b>Description</b>   | For aggregated Ethernet, Fast Ethernet, Gigabit Ethernet, and 10-Gigabit Ethernet interfaces, enable or disable loopback mode.   |
| <div style="display: flex; align-items: center;">  <div> <p><b>NOTE:</b> By default, local aggregated Ethernet, Fast Ethernet, Tri-Rate Ethernet copper, Gigabit Ethernet, and 10-Gigabit Ethernet interfaces connect to a remote system.</p> </div> </div> |  |
| <b>Required Privilege Level</b>  | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>   | <ul style="list-style-type: none"> <li><i>Configuring Ethernet Loopback Capability</i></li> </ul>  |

## loopback (Serial)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>loopback <i>mode</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Configure a loopback connection.   |
| <b>Default</b>                  | If you do not include this statement, there is no loopback connection.   |
| <b>Options</b>                  | <b><i>mode</i></b> —You can specify the one of the following loopback modes: <ul style="list-style-type: none"><li>• <b>dce-local</b>—For EIA-530 interfaces only, loop packets back on the local DCE.</li><li>• <b>dce-remote</b>—For EIA-530 interfaces only, loop packets back on the remote DCE.</li><li>• <b>local</b>—Loop packets back on the local router's PIC.</li><li>• <b>remote</b>—Loop packets back on the line interface unit (LIU).</li></ul> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Serial Loopback Capability on page 307</a></li></ul>   |



## loopback-clear-timer

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>loopback-clear-timer seconds;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">ppp-options</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">ppp-options</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.  |
| <b>Description</b>              | For interfaces with PPP, PPP TCC, PPP over Ethernet, PPP over ATM, and PPP over Frame Relay encapsulations, configure a loop detection clear timer for the Link Control Protocol (LCP) component of a PPP session.   |
| <b>Options</b>                  | <b>seconds</b> —The time in seconds to wait before the loop detection flag is cleared if it is not cleared by the protocol.<br><b>Range:</b> 1 through 60 seconds<br><b>Default:</b> 9 seconds   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring the PPP Clear Loop Detected Timer on page 193</a></li> </ul>  |

## loss-priority

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>loss-priority (high   low);</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">gigether-options</a> <a href="#">ethernet-switch-profile</a> <a href="#">ethernet-policer-profile</a> <a href="#">output-priority-map</a> <a href="#">classifier</a> <a href="#">premium</a> <a href="#">forwarding-class</a> <a href="#">class-name</a> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | Specify the packet loss priority value.   |
| <b>Options</b>                  | <b>high</b> —Packet has high loss priority.<br><b>low</b> —Packet has low loss priority.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Specifying an Output Priority Map</a></li> </ul>   |

## loss-threshold

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>loss-threshold <i>number</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit protocols oam ethernet connectivity-fault-management maintenance-domain <i>domain-name</i> maintenance-association <i>ma-name</i> <a href="#">continuity-check</a> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.<br>Statement introduced in Junos OS Release 12.1X48 for PTX Series Packet Transport Routers.                                  |
| <b>Description</b>              | Specify the number of continuity check messages lost before marking the remote MEP as down.   |
| <b>Options</b>                  | <i>number</i> —The number of continuity check messages that can be lost before the remote MEP is considered down.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Continuity Check Protocol</i></li><li>• <i>Configuring Ethernet 802.1ag OAM on PTX Series Packet Transport Routers</i></li></ul> |

## low-plp-max-threshold

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>low-plp-max-threshold <i>percent</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces at- <i>fpc/pic/port</i> <a href="#">atm-options</a> <a href="#">linear-red-profiles</a> <i>profile-name</i> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For ATM2 IQ interfaces only, define the drop profile fill-level for the low PLP CoS VC. When the fill level exceeds the defined percentage, all packets are dropped.  |
| <b>Options</b>                  | <i>percent</i> —Fill-level percentage when linear RED is applied to cells with PLP.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring ATM2 IQ VC Tunnel CoS Components</i></li><li>• <a href="#">high-plp-max-threshold on page 502</a></li><li>• <a href="#">low-plp-threshold on page 593</a></li><li>• <i>Configuring Linear RED Profiles on ATM Interfaces</i></li><li>• <i>high-plp-max-threshold</i></li><li>• <a href="#">queue-depth on page 712</a></li></ul> |

## low-plp-threshold

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>low-plp-threshold <i>percent</i>;</code>  |
| <b>Hierarchy Level</b>          | <code>[edit interfaces at-<i>fpc/pic/port</i> <a href="#">atm-options</a> <a href="#">linear-red-profiles</a> <i>profile-name</i>]</code>   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For ATM2 IQ interfaces only, define the CoS VC drop profile fill-level percentage when linear RED is applied to cells with low PLP. When the fill level exceeds the defined percentage, packets with low PLP are randomly dropped by RED. This statement is mandatory.  |
| <b>Options</b>                  | <b><i>percent</i></b> —Fill-level percentage when linear RED is applied to cells with low PLP.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring ATM2 IQ VC Tunnel CoS Components</i></li> <li>• <a href="#">high-plp-max-threshold on page 502</a></li> <li>• <a href="#">high-plp-threshold on page 503</a></li> <li>• <i>Configuring Linear RED Profiles on ATM Interfaces</i></li> <li>• <i>high-plp-max-threshold</i></li> <li>• <i>high-plp-threshold</i></li> <li>• <a href="#">low-plp-max-threshold on page 592</a></li> <li>• <a href="#">queue-depth on page 712</a></li> </ul> |

## lowest-priority-defect

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | lowest-priority-defect (all-defects   err-xcon   mac-rem-err-xcon   no-defect   rem-err-xcon   xcon)  |
| <b>Hierarchy Level</b>          | [edit protocols oam ethernet connectivity-fault-management maintenance-domain <i>domain-name</i> maintenance-association <i>ma-name</i> mep <i>mep-id</i> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.  |
| <b>Description</b>              | Specify the lowest priority defect that is allowed to generate a Fault Alarm whenever CFM detects a defect. This configuration is done at the MEP level.  |
| <b>Options</b>                  | <p>Specify one of the following lowest priority defect options:</p> <p><b>all-defects</b>—Allows all defects.</p> <p><b>err-xcon</b>—Allows only erroneous CCM and cross-connect CCM defects.</p> <p><b>mac-rem-err-xcon</b>—Allows only MAC, not receiving CCM, erroneous CCM, and cross-connect defects.</p> <p><b>no-defect</b>—Allows no defects.</p> <p><b>rem-err-xcon</b>—Allows only not receiving CCM, erroneous CCM, and cross-connect CCM defects.</p> <p><b>xcon</b>—Allows only cross-connect CCM defects.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring the Maintenance End Point Lowest Priority Defect</i></li></ul>   |

## lsq-failure-options

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | lsq-failure-options {<br>no-termination-request;<br>[trigger-link-failure <i>interface-name</i> ];<br>}                       |
| <b>Hierarchy Level</b>          | [edit interfaces lsq- <i>fpc/pic/port</i> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 7.4.   |
| <b>Description</b>              | For AS PIC or MultiServices PIC link services IQ ( <b>lsq</b> ) interfaces only, define the failure recovery option settings. |
| <b>Options</b>                  | The remaining statements are explained separately.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>           |

## mac

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | mac <i>mac-address</i> ;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Set the MAC address of the interface. You can configure the MAC address on the management Ethernet interface ( <b>fxp0</b> or <b>em0</b> ) only.   |
| <b>Options</b>                  | <b>mac-address</b> —MAC address. Specify the MAC address as six hexadecimal bytes in one of the following formats: <i>nnnn.nnnn.nnnn</i> or <i>nn:nn:nn:nn:nn:nn</i> . For example, 0011.2233.4455 or 00:11:22:33:44:55. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring the MAC Address on the Management Ethernet Interface</i></li> </ul>  |

## mac-address

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See the following sections:

- [mac-address \(Accept Source Mac\) on page 596](#)
- [mac-address \(VLAN and Stacked VLAN Interfaces\) on page 597](#)

### mac-address (Accept Source Mac)


|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>mac-address <i>mac-address</i> <a href="#">policer</a>;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">accept-source-mac</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">accept-source-mac</a> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.   |
| <b>Description</b>              | For Gigabit Ethernet IQ and Gigabit Ethernet PICs with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router), for Gigabit Ethernet DPCs on MX Series routers, and 100-Gigabit Ethernet Type 5 PIC with CFP, specify a remote MAC address on which to count incoming and outgoing packets. |
| <b>Options</b>                  | <b><i>mac-address</i></b> —MAC address. Specify the MAC address as six hexadecimal bytes in one of the following formats: <i>nnnn.nnnn.nnnn</i> or <i>nn:nn:nn:nn:nn:nn</i> . For example, 0011.2233.4455 or 00:11:22:33:44:55.<br><br><b><i>policer</i></b> —MAC policer. For more information, see <a href="#">policer (MAC)</a> .        |
| <b>Required Privilege Level</b> | <b>interface</b> —To view this statement in the configuration.<br><b>interface-control</b> —To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring MAC Address Filtering</a></li></ul>   |

## mac-address (VLAN and Stacked VLAN Interfaces)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | mac-address;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> auto-configure <a href="#">vlan-ranges authentication username-include</a> ],<br>[edit interfaces <i>interface-name</i> auto-configure <a href="#">stacked-vlan-ranges authentication username-include</a> ], |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.   |
| <b>Description</b>              | Specify that the client hardware address (chaddr) from the incoming DHCP discover packet be concatenated with the username during the subscriber authentication process.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring VLAN Interface Username Information for AAA Authentication</i></li></ul>  |

## mac-learn-enable

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|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | (mac-learn-enable   no-mac-learn-enable);  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> gigether-options <a href="#">ethernet-switch-profile</a> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | <p>For Gigabit Ethernet IQ and Gigabit Ethernet PICs with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router), for Gigabit Ethernet DPCs on MX Series routers, and 100-Gigabit Ethernet Type 5 PIC with CFP configure whether source and destination MAC addresses are dynamically learned:</p> <ul style="list-style-type: none"><li>• <b>mac-learn-enable</b>—Allow the interface to dynamically learn source and destination MAC addresses.</li><li>• <b>no-mac-learn-enable</b>—Prohibit the interface from dynamically learning source and destination MAC addresses.</li></ul> <p>MAC address learning is based on source addresses. You can start accounting for traffic after there has been traffic sent from the MAC address. Once the MAC address is learned, the frames and bytes transmitted to or received from the MAC address can be tracked.</p> <div><p><b>NOTE:</b> When you gather interfaces into a bridge domain, the <b>no-mac-learn-enable</b> statement at the [edit interfaces <i>interface-name</i> gigether-options ethernet-switch-profile] hierarchy level is not supported. You must use the <b>no-mac-learning</b> statement at the [edit bridge-domains <i>bridge-domain-name</i> bridge-options interface <i>interface-name</i>] hierarchy level to disable MAC learning on an interface in a bridge domain. For information on disabling MAC learning for a bridge domain, see <i>MX Series Layer 2 Configuration Guide</i>.</p></div> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring MAC Address Filtering</i></li></ul>   |



## mac-validate

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | mac-validate (loose   strict);  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>family</i> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.3.   |
| <b>Description</b>              | Enable IP and MAC address validation for static Ethernet and IP demux interfaces. Supported on MX Series routers only.  |
| <b>Options</b>                  | <p><b>loose</b>—Forwards incoming packets when both the IP source address and the MAC source address match one of the trusted address tuples. Drops packets when the IP source address matches one of the trusted tuples, but the MAC address does not match the MAC address of the tuple. Continues to forward incoming packets when the source address of the incoming packet does not match any of the trusted IP addresses.</p> <p><b>strict</b>—Forwards incoming packets when both the IP source address and the MAC source address match one of the trusted address tuples. Drops packets when the MAC address does not match the tuple's MAC source address, or when IP source address of the incoming packet does not match any of the trusted IP addresses.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>MAC Address Validation on Static Ethernet Interfaces Overview</i></li> <li>• <a href="#">Configuring MAC Address Validation on Static Demux Interfaces on page 285</a></li> </ul>   |

## maintenance-association

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre> maintenance-association <i>ma-name</i> {   <b>short-name-format</b> (character-string   vlan   2octet   rfc-2685-vpn-id);   protect-maintenance-association <i>protect-ma-name</i>;   remote-maintenance-association <i>remote-ma-name</i>;   continuity-check {     hold-interval <i>minutes</i>;     interval (10m   10s   1m   1s   100ms);     loss-threshold <i>number</i>;   }   mep <i>mep-id</i> {     auto-discovery;     direction (up   down);     interface <i>interface-name</i> (protect   working);     lowest-priority-defect (all-defects   err-xcon   mac-rem-err-xcon   no-defect         rem-err-xcon   xcon );     priority <i>number</i>;     remote-mep <i>mep-id</i> {       action-profile <i>profile-name</i>;       sla-iterator-profile <i>profile-name</i> {         data-tlv-size <i>size</i>;         iteration-count <i>count-value</i>;         priority <i>priority-value</i>;       }     }   } } </pre> |
| <b>Hierarchy Level</b>          | [edit protocols <b>oam</b> <b>ethernet connectivity-fault-management maintenance-domain</b> <i>domain-name</i> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.<br>Statement introduced in Junos OS Release 12.1X48 for PTX Series Packet Transport Routers.  |
| <b>Description</b>              | Configure the name of the maintenance association in IEEE-compliant format.   |
| <b>Options</b>                  | <b>ma-name</b> —The name of the maintenance association within the maintenance domain.<br><br>The remaining statements are explained separately.  |
| <b>Required Privilege Level</b> | <b>interface</b> —To view this statement in the configuration.<br><b>interface-control</b> —To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Creating a Maintenance Association</i></li> <li>• <i>Configuring a Maintenance Endpoint</i></li> <li>• <i>Example: Configuring Connectivity Fault Management for a PBB Network on MX Series Routers</i></li> <li>• <i>Configuring Ethernet 802.1ag OAM on PTX Series Packet Transport Routers</i></li> </ul>  |

## maintenance-domain

**Syntax** `maintenance-domain domain-name {`  
     `bridge-domain name <vlan-id [ vlan-ids ]>;`  
     `instance vpls-instance-name;`  
     `level number;`  
     `maintenance-association ma-name {`  
         `protect-maintenance-association protect-ma-name;`  
         `remote-maintenance-association remote-ma-name;`  
         `short-name-format (character-string | vlan | 2octet | rfc-2685-vpn-id);`  
         `continuity-check {`  
             `hold-interval minutes;`  
             `interval (10m | 10s | 1m | 1s | 100ms);`  
             `loss-threshold number`  
         `}`  
         `mep mep-id {`  
             `auto-discovery;`  
             `direction (up | down);`  
             `interface interface-name (protect | working);`  
             `lowest-priority-defect (all-defects | err-xcon | mac-rem-err-xcon | no-defect |`  
                 `rem-err-xcon | xcon );`  
             `priority number;`  
             `remote-mep mep-id {`  
                 `action-profile profile-name;`  
                 `sla-iterator-profile profile-name {`  
                     `data-tlv-size size;`  
                     `iteration-count count-value;`  
                     `priority priority-value;`  
                 `}`  
             `}`  
         `}`  
         `mip-half-function (none | default | explicit);`  
         `name-format (character-string | none | dns | mac+2oct);`  
     `}`  
     `virtual-switch name {`  
         `bridge-domain name <vlan-id [ vlan-ids ]>;`  
     `}`  
`}`

**Hierarchy Level** [edit protocols `oam ethernet connectivity-fault-management`]

**Release Information** Statement introduced in Junos OS Release 8.4.  
 Statement introduced in Junos OS Release 12.1X48 for PTX Series Packet Transport Routers.

**Description** Configure the name of the maintenance domain in IEEE-compliant format.

**Options** *domain-name*—Name of the maintenance domain.

The remaining statements are explained separately.

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

- Related Documentation**
- *Creating the Maintenance Domain*
  - *Configuring a Maintenance Endpoint*
  - *Example: Configuring Connectivity Fault Management for a PBB Network on MX Series Routers*
  - *Configuring Ethernet 802.1ag OAM on PTX Series Packet Transport Routers*

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## master-only

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | master-only;  |
| <b>Hierarchy Level</b>          | [edit groups rex interfaces (fxp0   em0) unit <i>logical-unit-number</i> family <i>family</i> address],<br>[edit groups rex logical-systems <i>logical-system-name</i> interfaces fxp0 unit <i>logical-unit-number</i> family <i>family</i> address],<br>[edit interfaces (fxp0   em0) unit <i>logical-unit-number</i> family <i>family</i> address],<br>[edit logical-systems <i>logical-system-name</i> interfaces fxp0 unit <i>logical-unit-number</i> family <i>family</i> address] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 11.1 for the QFX Series.  |
| <b>Description</b>              | Configure the IP address to be used when the Routing Engine is the current master.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring a Consistent Management IP Address</i></li><li>• <i>CLI User Guide</i></li></ul>   |

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## maximum

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | maximum <i>number</i> ;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> services-options <a href="#">session-limit</a> ]                                 |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.6.   |
| <b>Description</b>              | Specify the maximum number of sessions allowed simultaneously.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |

## maximum-contexts

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>maximum-contexts <i>number</i> &lt;force&gt;;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">compression</a> rtp],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">compression</a> rtp]                                |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 7.5.   |
| <b>Description</b>              | Specify the maximum number of RTP contexts to accept during negotiation.  |
| <b>Options</b>                  | <p><b><i>number</i></b>—Maximum number of contexts.</p> <p><b><i>force</i></b>—(Optional) Requires the PIC to use the value specified for maximum RTP contexts, regardless of the negotiated value. This option allows the software to interoperate with Junos OS Releases that base the RTP context value on link speed.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>   |

## maximum-requests

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>maximum-requests <i>times</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit protocols dot1x authenticator interface <i>interface-id</i> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.3.  |
| <b>Description</b>              | Specify the maximum number of retransmission times of an EAPOL Request packet to the client before it times out the authentication session.  |
| <b>Options</b>                  | <p><b><i>times</i></b>—Specify the maximum number of retransmission times.</p> <p><b>Range:</b> 1 through 10 times</p> <p><b>Default:</b> 2 times</p>  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>IEEE 802.1x Port-Based Network Access Control Overview</i></li> <li>• <a href="#">authenticator on page 349</a></li> <li>• <a href="#">dot1x on page 434</a></li> <li>• <a href="#">interface (IEEE 802.1x) on page 530</a></li> </ul> |

## maximum-vcs

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>maximum-vcs <i>maximum-vcs</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces at- <i>fpc/pic/port</i> <b>atm-options</b> <b>vpi</b> <i>vpi-identifier</i> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | <p>For ATM1 interfaces, configure the maximum number of virtual circuits (VCs) allowed on a virtual path (VP). When configuring ATM1 interfaces on the router, you must include this statement.</p> <p>For a configured virtual path identifier (VPI), valid virtual channel identifier (VCI) numbers are from 0 through (<i>maximum-vcs</i> value – 1). VCI numbers 0 through 31 are reserved by the ATM Forum. It is recommended that you use a VCI number higher than 31 when connecting to an ATM switch.</p> |
| <b>Options</b>                  | <p><i>maximum-vcs</i>—Maximum number of VCs on the VP.</p> <p><b>Range:</b> 1 through 4090</p>  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring the Maximum Number of ATM1 VCs on a VP</i></li><li>• <a href="#">multipoint-destination on page 624</a></li><li>• <a href="#">promiscuous-mode on page 704</a></li><li>• <a href="#">vci on page 845</a></li></ul>   |

## mc-ae

**Syntax**

```
mc-ae {
  chassis-id chassis-id;
  events {
    iccp-peer-down {
      force-icl-down;
      prefer-status-control-active;
    }
  }
  mc-ae-id mc-ae-id;
  mode (active-active | active-standby);
  redundancy-group group-id;
  status-control (active | standby);
}
```

**Hierarchy Level** [edit interfaces aeX aggregated-ether-options]

**Release Information** Statement introduced in Junos OS Release 9.6.  
**events** statement introduced in Junos OS Release 11.4R4.

**Description** Enable multichassis link aggregation (MC-LA), which allows one device to form a logical LAG interface with two or more other devices.

**Options** **chassis-id**—Specify the chassis ID for Link Aggregation Control Protocol (LACP) to calculate the port number of MC-LAG physical member links.

**Values:** 0 | 1

**events**—Specify an action if a specific MC-LAG event occurs.

**iccp-peer-down**—Specify an action if the peer of this node goes down.

**force-icl-down**—If the node's peer goes down, bring down the interchassis-link logical interface.

**prefer-status-control-active**—If the node's peer goes down, prefer that the node configured as **status-control active** become the active node.



**NOTE:** The **prefer-status-control-active** statement can be configured with the **status-control standby** configuration to prevent the LACP MC-LAG system ID from reverting to the default LACP system ID on ICCP failure. Use this configuration only if you can ensure that ICCP does not go down unless the router is down. You must also configure the **hold-time down** value (at the [edit interfaces *interface-name*] hierarchy level) for the interchassis link with the **status-control standby** configuration to be higher than the ICCP BFD timeout. This configuration prevents traffic loss by ensuring that when the router with the **status-control active** configuration goes down, the router with the **status-control standby** configuration does not go into standby mode.

To make the **prefer-status-control-active** configuration work with the **status-control standby** configuration when an interchassis-link logical interface is configured, you must either configure the **lACP periodic *interval*** statement at the **[edit interface *interface-name* aggregated-ether-options]** hierarchy level as **slow** or configure the **detection-time threshold** statement at the **[edit protocols iccp liveness-detection]** hierarchy level as **less than 3 seconds**.

---

**mc-ae-id**—Specify the identification number of the MC-LAG device. The two MC-LAG network devices that manage a given MC-LAG must have the same identification number.

**Range:** 1 through 65,535

**mode (active-active | active-standby)**—Specify whether the MC-LAG is in active-active or active-standby mode.

**redundancy-group**—Specify the redundancy group identification number. The Inter-Chassis Control Protocol (ICCP) uses the redundancy group ID to associate multiple chassis that perform similar redundancy functions.

**Range:** 1 through 4,294,967,294

**status-control (active | standby)**—Specify whether the chassis becomes active or remains in standby when an interchassis link failure occurs.

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

|                              |  |
|------------------------------|--|
| <b>Related Documentation</b> | <ul style="list-style-type: none"><li>• <i>Configuring Multichassis Link Aggregation</i></li></ul> |
|------------------------------|--|



## measurement-type

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | measurement-type (loss   statistical-loss-measurement   two-way-delay);  |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam</a> <a href="#">ethernet</a> <a href="#">connectivity-fault-management</a> <a href="#">performance-monitoring</a> <a href="#">sla-iterator-profiles</a> <i>profile-name</i> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.1.<br>The <b>statistical-loss-measurement</b> option introduced in Junos OS Release 11.2.  |
| <b>Description</b>              | Configure the measurement type for the service level agreement (SLA) frames. An SLA frame is a type of packet used to measure frame loss in Ethernet connections.  |
| <b>Options</b>                  | <b>loss</b> —Use Y.1731-compliant line module (LM) frames to measure frame loss.<br><br><b>statistical-loss-measurement</b> — Use Y.1731-compliant two-way data module (DM) frames to statistically measure frame loss.<br><br><b>two-way-delay</b> —Use Y.1731-compliant two-way DM frames to measure frame loss. |
| <b>Required Privilege Level</b> | Configure—To enter configuration mode.<br>Control—To modify any configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring an Iterator Profile</i></li> </ul>   |

## member-interface-speed

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | member-interface-speed <i>speed</i> ;   |
| <b>Hierarchy Level</b>          | [edit interfaces container-options <a href="#">member-interface-type</a> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.2.   |
| <b>Description</b>              | Specify container-interface member-interface speed options.   |
| <b>Options</b>                  | <b>speed</b> —Set interface speed to OC3, OC12, OC48, OC192, OC768, or mixed.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Displaying APS Using a Container Interface with ATM Encapsulation</i></li> <li>• <i>Configuring Container Interfaces for APS on SONET Links</i></li> <li>• <a href="#">container-options on page 395</a></li> </ul> |

## member-interface-type

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>member-interface-type sonet {<br/>    <a href="#">member-interface-speed</a> [ <i>speed</i> ];<br/>}</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <a href="#">container-options</a> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.2.   |
| <b>Description</b>              | Specify container-interface member-interface type as sonet and speed options.   |
| <b>Options</b>                  | <b>sonet</b> —Protocol type of the container interface, specify sonet.<br><br><b>speed</b> —Set interface speed to OC3, OC12, OC48, OC192, OC768, or mixed.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Displaying APS Using a Container Interface with ATM Encapsulation</i></li><li>• <i>Configuring Container Interfaces for APS on SONET Links</i></li><li>• <a href="#">container-options on page 395</a></li></ul> |

## mep

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre> mep mep-id {   auto-discovery;   direction (up   down);   interface interface-name (protect   working);   priority number;   remote-mep mep-id {     action-profile profile-name;     sla-iterator-profile profile-name {       data-tlv-size size;       iteration-count count-value;       priority priority-value;     }   } } </pre> |
| <b>Hierarchy Level</b>          | [edit protocols <b>oam ethernet connectivity-fault-management maintenance-domain</b> <i>md-name maintenance-association</i> <i>ma-name</i> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.  |
| <b>Description</b>              | The numeric identifier of the maintenance association end point (MEP) within the maintenance association.  |
| <b>Options</b>                  | <p><b>mep-id</b>—Specify the numeric identifier of the MEP.</p> <p><b>Range:</b> 1 through 8191</p> <p>The remaining statements are explained separately.</p>  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><i>Configuring a Maintenance Endpoint</i></li> <li><i>Example: Configuring Connectivity Fault Management for a PBB Network on MX Series Routers</i></li> </ul>  |

## minimum-links

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>minimum-links <i>number</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces aex <a href="#">aggregated-ether-options</a> ],<br>[edit interfaces aex <a href="#">aggregated-sonet-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">mlfr-uni-nni-bundle-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">unit logical-unit-number</a> ],<br>[edit interfaces interface-range <i>range</i> <a href="#">aggregated-ether-options</a> ],<br>[edit interfaces interface-range <i>range</i> <a href="#">aggregated-sonet-options</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit logical-unit-number</a> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.   |
| <b>Description</b>              | For aggregated Ethernet, SONET/SDH, multilink, link services, and voice services interfaces only, set the minimum number of links that must be up for the bundle to be labeled up.  |
| <b>Options</b>                  | <b><i>number</i></b> —Number of links.<br><b>Range:</b> On M120, M320, MX Series, T Series, and TX Matrix routers with Ethernet interfaces, the valid range for minimum-links number is 1 through 64. When the maximum value (16) is specified, all configured links of a bundle must be up for the bundle to be labeled up. On all other routers and on EX Series switches, other than EX8200 switches, the range of valid values for minimum-links number is 1 through 8. When the maximum value (8) is specified, all configured links of a bundle must be up for the bundle to be labeled up. On EX8200 switches, the range of valid values for minimum-links number is 1 through 12. When the maximum value (12) is specified, all configured links of a bundle must be up for the bundle to be labeled up.<br><b>Default:</b> 1 |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Aggregated Ethernet Minimum Links</i></li><li>• <i>Configuring Aggregated SONET/SDH Minimum Links</i></li><li>• <i>Configuring Aggregated Ethernet Links (CLI Procedure)</i></li><li>• <i>Example: Configuring Aggregated Ethernet High-Speed Uplinks Between an EX4200 Virtual Chassis Access Switch and an EX4200 Virtual Chassis Distribution Switch</i></li><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>  |

## mip-half-function

|                            |   |
|----------------------------|---|
| <b>Syntax</b>              | mip-half-function (none   default   explicit);  |
| <b>Hierarchy Level</b>     | [edit protocols <a href="#">oam ethernet connectivity-fault-management</a> <i>md-name</i> ],<br>[edit protocols <a href="#">oam ethernet connectivity-fault-management</a> <i>ma-name</i> ] |
| <b>Release Information</b> | Statement introduced in Junos OS Release 9.6.   |
| <b>Description</b>         | Specify the OAM Ethernet CFM maintenance domain MIP half functions.   |



**NOTE:** Whenever a MIP is configured and a bridge domain is mapped to multiple maintenance domains or maintenance associations, it is essential that the `mip-half-function` value for all maintenance domains and maintenance associations are the same.

|                                 |  |
|---------------------------------|--|
| <b>Options</b>                  | <p><b>none</b>—Specify to not use the mip-half-function.</p> <p><b>default</b>—Specify to use the default mip-half-function.</p> <p><b>explicit</b>—Specify an explicit mip-half-function.</p>   |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Creating the Maintenance Domain</i></li> <li>• <i>Example: Configuring Connectivity Fault Management for a PBB Network on MX Series Routers</i></li> <li>• <a href="#">maintenance-domain on page 601</a></li> </ul> |

## mlfr-uni-nni-bundle-options

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>mlfr-uni-nni-bundle-options {<br/>  acknowledge-retries <i>number</i>;<br/>  acknowledge-timer <i>milliseconds</i>;<br/>  action-red-differential-delay (disable-tx   remove-link);<br/>  drop-timeout <i>milliseconds</i>;<br/>  fragment-threshold <i>bytes</i>;<br/>  hello-timer <i>milliseconds</i>;<br/>  link-layer-overhead <i>percent</i>;<br/>  lmi-type (ansi   itu   c-lmi);<br/>  minimum-links <i>number</i>;<br/>  mrru <i>bytes</i>;<br/>  n391 <i>number</i>;<br/>  n392 <i>number</i>;<br/>  n393 <i>number</i>;<br/>  red-differential-delay <i>milliseconds</i>;<br/>  t391 <i>seconds</i>;<br/>  t392 <i>number</i>;<br/>  yellow-differential-delay <i>milliseconds</i>;<br/>}</pre> |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | <p>Configure link services and voice services interface management properties.</p> <p>The statements are explained separately.</p>  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Frame Relay Keepalives</i></li><li>• <a href="#">lmi (Frame Relay) on page 574</a></li><li>• <a href="#">lmi-type on page 577</a></li><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>  |

## mode (Interfaces)

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | mode loose;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family (inet   inet6) rpf-check],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family (inet   inet6) rpf-check]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | Check whether the packet has a source address with a corresponding prefix in the routing table. If a corresponding prefix is not found, unicast reverse path forwarding (RPF) loose mode does not accept the packet. Unlike strict mode, loose mode does not check whether the interface expects to receive a packet with a specific source address prefix. |
| <b>Default</b>                  | If you do not include this statement, unicast RPF is in strict mode.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Unicast RPF Strict Mode on page 236</a></li> </ul>   |

## monitor-session

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | monitor-session ( <i>interface-name</i>   all);  |
| <b>Hierarchy Level</b>          | [edit protocols ppp]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 7.5.  |
| <b>Description</b>              | Monitor PPP packet exchanges. When monitoring is enabled, packets exchanged during a session are logged to the default log of <code>/var/log/pppd</code> . |
| <b>Default</b>                  | If you do not include this statement, no PPPD-specific monitoring operations are performed.  |
| <b>Options</b>                  | <p>all—Monitor PPP packet exchanges on all sessions.</p> <p><i>interface-name</i>—Logical interface name on which to enable session monitoring.</p>        |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Monitoring a PPP Session on page 143</a></li> </ul>   |

## mpls (Interfaces)

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>mpls {<br/>    pop-all-labels {<br/>        required-depth <i>number</i>;<br/>    }<br/>}</pre>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> atm-options],<br>[edit interfaces <i>interface-name</i> sonet-options],<br>[edit interfaces <i>interface-name</i> fastether-options],<br>[edit interfaces <i>interface-name</i> gigeether-options] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | <p>For passive monitoring on ATM and SONET/SDH interfaces and 10-Gigabit Ethernet interfaces in WAN PHY mode, process incoming IP packets that have MPLS labels.</p> <p>The remaining statements are explained separately.</p>            |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Removing MPLS Labels from Incoming Packets</i></li><li>• <i>Removing MPLS Labels from Incoming Packet</i></li><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>  |



## mrru

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>mrru bytes;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">mlfr-uni-nni-bundle-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">unit logical-unit-number</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit logical-unit-number</a> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For multilink, link services, voice services, and J Series Services Routers ISDN interfaces only, set the maximum received reconstructed unit (MRRU). The MRRU is similar to the MTU, but is specific to multilink interfaces.  |
| <b>Options</b>                  | <b>bytes</b> —MRRU size.<br><b>Range:</b> 1500 through 4500 bytes<br><b>Default:</b> 1500 bytes   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring ISDN Logical Interface Properties</i></li> <li>• <a href="#">mtu on page 616</a></li> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>  |

## mtu

|                            |  |
|----------------------------|--|
| <b>Syntax</b>              | <code>mtu bytes;</code>  |
| <b>Hierarchy Level</b>     | <p>[edit interfaces <i>interface-name</i>],</p> <p>[edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>family</i>],</p> <p>[edit interfaces <i>interface-range name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>family</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols l2circuit local-switching interface <i>interface-name</i> backup-neighbor <i>address</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols l2circuit neighbor <i>address</i> interface <i>interface-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols l2circuit neighbor <i>address</i> interface <i>interface-name</i> backup-neighbor <i>address</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols l2vpn interface <i>interface-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols vpls],</p> <p>[edit protocols l2circuit local-switching interface <i>interface-name</i> backup-neighbor <i>address</i>],</p> <p>[edit protocols l2circuit neighbor <i>address</i> interface <i>interface-name</i>],</p> <p>[edit protocols l2circuit neighbor <i>address</i> interface <i>interface-name</i> backup-neighbor <i>address</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols l2vpn interface <i>interface-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols vpls]</p> |
| <b>Release Information</b> | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Support for Layer 2 VPNs and VPLS introduced in Junos OS Release 10.4.</p> <p>Statement introduced in Junos OS Release 12.1X48 for PTX Series Packet Transport Routers.</p> <p>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.</p> <p>Support at the [set interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>ccc</i>] hierarchy level introduced in Junos OS Release 12.3R3 for MX Series routers.</p>  |
| <b>Description</b>         | <p>Specify the maximum transmission unit (MTU) size for the media or protocol. The default MTU size depends on the device type. Changing the media MTU or protocol MTU causes an interface to be deleted and added again.</p> <p>To route jumbo data packets on an integrated routing and bridging (irb) interface or routed VLAN interface (RVI) on EX Series switches, you must configure the jumbo MTU size on the member physical interfaces and also on the IRB interface or RVI itself (the <b>irb</b> or <b>vlan</b> interface, respectively).</p>  |



**CAUTION:** For EX Series switches, setting or deleting the jumbo MTU size on an IRB interface or RVI while the switch is transmitting packets might cause packets to be dropped.



**NOTE:** If a packet whose size is larger than the configured MTU size is received on the receiving interface, the packet is eventually dropped. The value considered for MRU (maximum receive unit) size is also the same as the MTU size configured on that interface.



**NOTE:** Not all devices allow you to set an MTU value, and some devices have restrictions on the range of allowable MTU values. You cannot configure an MTU for management Ethernet interfaces (fxp0, em0, or me0) or for loopback, multilink, and multicast tunnel devices.

For more information about configuring MTU for specific interfaces and router or switch combinations, see [“Configuring the Media MTU” on page 119](#).

**Options** *bytes*—MTU size.

**Range:** 256 through 9192 bytes, 256 through 9500 bytes (Junos OS 12.1X48R2 for PTX Series routers)

**Default:** 1500 bytes (INET, INET6, and ISO families), 1448 bytes (MPLS), 1514 bytes (EX Series switch interfaces)

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

**Related Documentation**

- [Configuring Gigabit Ethernet Interfaces \(CLI Procedure\)](#)
- [Configuring Gigabit Ethernet Interfaces \(CLI Procedure\)](#)
- [Configuring Routed VLAN Interfaces \(CLI Procedure\)](#)
- [Configuring Integrated Routing and Bridging Interfaces \(CLI Procedure\)](#)
- [Configuring the Media MTU on page 119](#)
- [Configuring the MTU for Layer 2 Interfaces](#)
- [Setting the Protocol MTU on page 218](#)

## multi-chassis-protection

---

**Syntax**    multi-chassis-protection {  
              peer *a.b.c.d* {  
                  interface *interface-name*;  
              }  
          }

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

**Release Information**    Statement introduced in Junos OS Release 11.1.

**Description**    For MX Series routers with multichassis aggregated Ethernet (MC-AE) interfaces, you can use this statement under the physical interface level to reduce the configuration at the logical interface level if the following assumption exists:

If there are  $n + 1$  logical interfaces under **ae0**, from **ae0.0** through **ae0.n**, there will be  $n + 1$  logical interfaces under **ge-0/0/0** as well, from **ge-0/0/0.0** through **ge-0/0/0.n**, and each **ge-0/0/0** logical interface will be a protection link for the **ae0** logical interface.



**NOTE:** A bridge domain cannot have MC-AE logical interfaces which belong to different redundancy groups.

If the Inter-Chassis Control Protocol (ICCP) connection is UP and the interchassis data link (ICL) comes UP, the router configured as standby will bring up the MC-AE interfaces shared with the peer.

The remaining statements are explained separately.

**Options**    interface *interface-name*—Specify the interface: **interface *interface-name*-fpc/pic/port**

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

**Related Documentation**

- *Configuring Multichassis Link Aggregation*
- *Configuring Active-Active Bridging and VRRP over IRB in Multichassis Link Aggregation on MX Series Routers*
- *Configuring Aggregated Ethernet Link Protection*
- *Example: Configuring Aggregated Ethernet Link Protection*
- [peer on page 671](#)


## multicast-dlci

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>multicast-dlci <i>dlci-identifier</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For point-to-multipoint Frame Relay, link services, and voice services interfaces only, enable multicast support on the interface. You can configure multicast support on the interface if the Frame Relay switch performs multicast replication.   |
| <b>Options</b>                  | <i>dlci-identifier</i> —DLCI identifier, a number from 16 through 1022 that defines the Frame Relay DLCI over which the switch expects to receive multicast packets for replication.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring a Multicast-Capable Frame Relay Connection</a></li> <li>• <a href="#">dlci on page 431</a></li> <li>• <a href="#">multipoint-destination on page 624</a></li> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul> |

## multicast-only

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>multicast-only;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>inet</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>inet</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Configure the unit and family so that it can transmit and receive multicast traffic only. You can configure this property on the IP family only.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring the Protocol Family on page 202</a></li> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> <li>• <a href="#">tunnel on page 827</a></li> </ul>                           |

## multicast-router-interface (IGMP Snooping)

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | multicast-router-interface;   |
| <b>Hierarchy Level</b>          | <p>[edit bridge-domains <i>bridge-domain-name</i> protocols <b>igmp-snooping</b> interface <i>interface-name</i>],</p> <p>[edit bridge-domains <i>bridge-domain-name</i> protocols <b>igmp-snooping</b> vlan <i>vlan-id</i> interface <i>interface-name</i>],</p> <p>[edit protocols <b>igmp-snooping</b> vlan (all   <i>vlan-name</i>) interface (all   <i>interface-name</i>)]</p> <p>[edit routing-instances <i>routing-instance-name</i> bridge-domains <i>bridge-domain-name</i> protocols <b>igmp-snooping</b> interface <i>interface-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> bridge-domains <i>bridge-domain-name</i> protocols vlan <i>vlan-id</i> <b>igmp-snooping</b> interface <i>interface-name</i>]</p> |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 8.5.</p> <p>Statement introduced in Junos OS Release 9.1 for EX Series switches.</p>  |
| <b>Description</b>              | <p>Statically configure the interface as an IGMP snooping multicast-router interface—that is, an interface that faces toward a multicast router or other IGMP querier.</p>  |
|                                 | <div>  <p><b>NOTE:</b> If the specified interface is a trunk port, the interface becomes a multicast-routing device interface for all VLANs configured on the trunk port. In addition, all unregistered multicast packets, whether they are IPv4 or IPv6 packets, are forwarded to the multicast routing device interface, even if the interface is configured as a multicast routing device interface only for IGMP snooping.</p> <p>Configure an interface as a bridge interface toward other multicast routing devices.</p> </div>  |
| <b>Default</b>                  | The interface can either be a host-side or multicast-routing device interface.  |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Example: Configuring IGMP Snooping on EX Series Switches</i></li> <li>• <i>Example: Configuring IGMP Snooping</i></li> <li>• <i>Configuring IGMP Snooping (CLI Procedure)</i></li> <li>• <i>IGMP Snooping in MC-LAG Active-Active on MX Series Routers Overview</i></li> <li>• <i>host-only-interface</i></li> <li>• <i>show igmp-snooping membership</i></li> </ul>  |

## multicast-statistics

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | multicast-statistics;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 10.2.  |
| <b>Description</b>              | For Ethernet, SONET, aggregated Ethernet, and aggregated SONET interfaces in T Series or TX Matrix routers, specify support for multicast statistics on a physical interface to enable multicast accounting for all the logical interfaces below the physical interface.  |
| <b>Default</b>                  | not enabled—must be configured to enable  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Multicast Statistics Collection on Aggregated Ethernet Interfaces</i></li><li>• <i>Configuring Multicast Statistics Collection on Aggregated SONET Interfaces</i></li><li>• <i>Configuring Multicast Statistics Collection on Ethernet Interfaces</i></li><li>• <i>Configuring Multicast Statistics Collection on SONET Interfaces</i></li></ul> |

## multicast-vci

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>multicast-vci vpi-identifier.vci-identifier;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> ]              |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For ATM encapsulation only, and for point-to-multipoint ATM logical interfaces only, enable the support of multicast on the interface. You can configure multicast support on the interface if the ATM switch performs multicast replication. |
| <b>Options</b>                  | <p><i>vci-identifier</i>—ATM virtual circuit identifier.<br/><b>Range:</b> 0 through 16,384</p> <p><i>vpi-identifier</i>—ATM virtual path identifier.<br/><b>Range:</b> 0 through 255<br/><b>Default:</b> 0</p>                               |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring a Multicast-Capable ATM1 or ATM2 IQ Connection</i></li><li>• <a href="#">multipoint-destination on page 624</a></li><li>• <a href="#">vci on page 845</a></li></ul>                    |



## multilink-max-classes

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>multilink-max-classes <i>number</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For Adaptive Services (AS) PIC link services IQ interfaces ( <b>lsq</b> ) only, configure the number of multilink classes to be negotiated when a link joins the bundle.                                       |
| <b>Options</b>                  | <b><i>number</i></b> —The number of multilink classes to be negotiated when a link joins the bundle.<br><b>Range:</b> 1 through 8<br><b>Default:</b> None  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> <li>• <a href="#">multipoint on page 623</a></li> </ul>  |

## multipoint

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>multipoint;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Configure the interface unit as a multipoint connection.   |
| <b>Default</b>                  | If you omit this statement, the interface unit is configured as a point-to-point connection.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring a Multipoint Connection on page 187</a></li> <li>• <a href="#">point-to-point on page 678</a></li> </ul>                                      |

## multipoint-destination

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre> multipoint-destination address dlcidlcid-identifier; multipoint-destination address {     epd-threshold cells;     inverse-arp;     oam-liveness {         down-count cells;         up-count cells;     }     oam-period (disable   seconds);     shaping {         (cbr rate   rtvbr peak rate sustained rate burst length   vbr peak rate sustained rate burst         length);         queue-length number;     }     vci vpi-identifier.vci-identifier; } </pre>  |
| <b>Hierarchy Level</b>          | <p>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> address <i>address</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> address <i>address</i>]</p>  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For point-to-multipoint Frame Relay or ATM interfaces only, enable the support of multicast on the interface. You can configure multicast support on the interface if the Frame Relay or ATM switch performs multicast replication.  |
| <b>Options</b>                  | <p><b>address</b>—Address of the remote side of the point-to-multipoint connection.</p> <p><b>dlci-identifier</b>—For Frame Relay interfaces, the data-link connection identifier.<br/> <b>Range:</b> 0 through 0xFFFFFFF (24 bits)</p> <p><b>vci-identifier</b>—For ATM interfaces, the virtual circuit identifier.<br/> <b>Range:</b> 0 through 16,384</p> <p><b>vpi-identifier</b>—For ATM interfaces, the virtual path identifier.<br/> <b>Range:</b> 0 through 255<br/> <b>Default:</b> 0</p> <p>The remaining statements are explained separately.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring a Point-to-Point ATM1 or ATM2 IQ Connection</a></li> <li>• <a href="#">Configuring a Point-to-Multipoint Frame Relay Connection</a></li> <li>• <a href="#">dlci on page 431</a></li> <li>• <a href="#">encapsulation (Logical Interface) on page 450</a></li> </ul>   |

## multiservice-options

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>multiservice-options {<br/>  (syslog   no-syslog);<br/>  (core-dump   no-core-dump);<br/>  (dump-on-flow-control);<br/>  flow-control-options {<br/>    down-on-flow-control;<br/>    dump-on-flow-control;<br/>    reset-on-flow-control;<br/>  }<br/>}</pre>       |
| <b>Hierarchy Level</b>          | [edit interfaces mo- <i>fpc/pic/port</i> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | <p>For monitoring services interfaces only, configure multiservice-specific interface properties.</p> <p>The statements are explained separately.</p>   |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Multiservice Physical Interface Properties on page 168</a></li><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li><li>• <a href="#">passive-monitor-mode on page 665</a></li></ul> |

## n391

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|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | n391 <i>number</i> ;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> mlfr-uni-nni-bundle-options]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For link services and voice services interfaces only, set the Frame Relay full status polling interval.  |
| <b>Options</b>                  | <i>number</i> —Polling interval.<br><b>Range:</b> 1 through 255<br><b>Default:</b> 6   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li><li>• <a href="#">n392 on page 627</a></li><li>• <a href="#">n393 on page 628</a></li><li>• <a href="#">timeslots on page 803</a></li><li>• <a href="#">t392 on page 795</a></li></ul> |

## n392

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|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | n392 <i>number</i> ;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> mlfr-uni-nni-bundle-options]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For link services and voices interfaces only, set the Frame Relay error threshold, in number of errors.  |
| <b>Options</b>                  | <i>number</i> —Error threshold.<br><b>Range:</b> 1 through 10<br><b>Default:</b> 3   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li><li>• <a href="#">n391 on page 626</a></li><li>• <a href="#">n393 on page 628</a></li><li>• <a href="#">timeslots on page 803</a></li><li>• <a href="#">t392 on page 795</a></li></ul> |

## n393

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|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | n393 <i>number</i> ;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> mlfr-uni-nni-bundle-options]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For link services and voices interfaces only, set the Frame Relay monitored event count.   |
| <b>Options</b>                  | <i>number</i> —Number of event count.<br><b>Range:</b> 1 through 10<br><b>Default:</b> 4   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li><li>• <a href="#">n391 on page 626</a></li><li>• <a href="#">n392 on page 627</a></li><li>• <a href="#">timeslots on page 803</a></li><li>• <a href="#">t392 on page 795</a></li></ul> |

## name-format

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|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | name-format (character-string   none   dns   mac+2oct);  |
| <b>Hierarchy Level</b>          | [edit protocols oam ethernet connectivity-fault-management <b>maintenance-domain</b> domain-name]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.<br>Statement introduced in Junos OS Release 12.1X48 for PTX Series Packet Transport Routers.   |
| <b>Description</b>              | Specify the format of the maintenance domain name.   |
| <b>Options</b>                  | <p><b>character-string</b>—The name is an ASCII character string.</p> <p><b>none</b>—The maintenance domain name is not used.</p> <p><b>dns</b>—The name is in domain name service (DNS) format. For example: www.juniper.net.</p> <p><b>mac+2oct</b>—Name is the MAC address plus a two-octet maintenance association identifier. For example: 08:00:22:33:44:55.100.</p> <p><b>Default:</b> character-string</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Creating a Maintenance Association</i></li> <li>• <i>Configuring Ethernet 802.1ag OAM on PTX Series Packet Transport Routers</i></li> </ul>  |

## native-vlan-id

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|                            |  |
|----------------------------|--|
| <b>Syntax</b>              | <code>native-vlan-id <i>number</i>;</code>   |
| <b>Hierarchy Level</b>     | [edit interfaces <i>ge-fpc/pic/port</i> ],<br>[edit interfaces <i>interface-name</i> ]   |
| <b>Release Information</b> | Statement introduced in Junos OS Release 8.3.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.<br>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.   |
| <b>Description</b>         | For 1-, 4-, and 8-port Gigabit Ethernet IQ2 and IQ2-E PICs, for 1-port 10-Gigabit Ethernet IQ2 and IQ2-E PICs configured for 802.1Q flexible VLAN tagging, for all Ethernet interfaces on MX Series routers, and for aggregated Ethernet interfaces on IQ2 and IQ2-E PICs or MX Series DPCs, and for 100-Gigabit Ethernet Type 5 PIC with CFP, configure mixed tagging support for untagged packets on a port. When the <b>native-vlan-id</b> statement is included with the <b>flexible-vlan-tagging</b> statement, untagged packets are accepted on the same mixed VLAN-tagged port. |



**NOTE:** Mixed VLAN tagging is not supported on EX Series switches.

The logical interface on which untagged packets are received must be configured with the same VLAN ID as the native VLAN ID configured on the physical interface. To configure the logical interface, include the **vlan-id** statement (matching the **native-vlan-id** statement on the physical interface) at the [edit interfaces *interface-name* unit *logical-unit-number*] hierarchy level.

When the **native-vlan-id** statement is included with the **interface-mode** statement, untagged packets are accepted and forwarded within the bridge domain or VLAN that is configured with the matching VLAN ID.

|                                 |  |
|---------------------------------|--|
| <b>Options</b>                  | <b><i>number</i></b> —VLAN ID number.<br><b>Range:</b> (ACX Series routers and EX Series switches) 0 through 4094.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Mixed Tagging Support for Untagged Packets</i></li><li>• <i>Configuring a Logical Interface for Access Mode</i></li><li>• <i>Configuring the Native VLAN Identifier (CLI Procedure)</i></li><li>• <i>Understanding Bridging and VLANs on EX Series Switches</i></li><li>• <a href="#">flexible-vlan-tagging on page 481</a></li></ul> |



## ncp-max-conf-req


|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>ncp-max-conf-req <i>number</i></code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>so-fpc/pic/port unit number</i> <a href="#">ppp-options</a> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.6.  |
| <b>Description</b>              | Set the maximum number of NCP Configure-Requests to be sent, after which the router goes to NCP down state.  |
| <b>Options</b>                  | <p><i>number</i>—Ranges from 0 to 65535, where 0 means send infinite NCP Configure-Requests and any other value specifies the maximum number NCP Configure-Requests to send and then stop sending.</p> <p><b>Default</b>—254</p> <p><b>Range:</b> 0 through 65,535</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring the NCP Configure-Request Maximum Sent on page 192</a></li> <li>• <a href="#">ppp-options on page 692</a></li> </ul>  |

## ncp-restart-timer

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>ncp-restart-timer <i>milliseconds</i>;</code>   |
| <b>Hierarchy Level</b>          | <p>[edit interfaces <i>interface-name unit logical-unit-number</i> <a href="#">ppp-options</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name unit logical-unit-number</i> <a href="#">ppp-options</a>]</p> |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.1.   |
| <b>Description</b>              | For interfaces with PPP and PPP TCC encapsulations and on multilink PPP bundle interfaces, configure a restart timer for the Network Control Protocol (NCP) component of a PPP session.   |
| <b>Options</b>                  | <p><i>milliseconds</i>—The time in milliseconds between successive NCP configuration requests.</p> <p><b>Range:</b> 500 through 10,000 milliseconds</p> <p><b>Default:</b> 3 seconds</p>  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring the PPP Restart Timers on page 192</a></li> </ul>  |

## nd6-stale-time

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>nd6-stale-time seconds;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet6]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.1.<br>Statement introduced in Junos OS Release 11.1 for EX Series switches.   |
| <b>Description</b>              | Set the stale timer for IPv6 neighbor reachability confirmation. Reachability of the IPv6 neighbors is confirmed only after the stale timer has expired. For example, by setting the stale timer to 180 seconds, users can specify that IPv6 neighbor reachability be confirmed every 180 seconds.  |
|                                 | <div><p><b>NOTE:</b> When the Routing Engine sends a control packet to an IPv6 neighbor, the stale timer is the maximum interval in which neighbor reachability is confirmed. In such cases, IPv6 neighbor reachability is confirmed before the stale timer expires.</p></div> |
| <b>Default</b>                  | Default is 20 minutes (1200 seconds)  |
| <b>Options</b>                  | <b>seconds</b> —Duration in seconds.<br><b>Range:</b> 1 to 1200   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>IPv6 Neighbor Discovery Overview</i></li><li>• <i>show ipv6 neighbors</i></li></ul>  |

## negotiate-address

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | negotiate-address;   |
| <b>Hierarchy Level</b>          | [edit <a href="#">interfaces</a> <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> inet],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> inet] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For interfaces with PPP encapsulation, enable the interface to be assigned an IP address by the remote end.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring IPCP Options on page 210</a></li> <li>• <a href="#">address on page 329</a></li> <li>• <a href="#">unnumbered-address (PPP) on page 839</a></li> <li>• <i>Junos OS Administration Library for Routing Devices</i></li> </ul>          |

## negotiation-options

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | negotiation-options {<br><a href="#">allow-remote-loopback</a> ;<br><a href="#">no-allow-link-events</a> ;<br>}   |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam</a> <a href="#">link-fault-management</a> <a href="#">interface</a> <i>interface-name</i> ]                                       |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.   |
| <b>Description</b>              | Enable and disable IEEE 802.3ah Operation, Administration, and Management (OAM) features for Ethernet interfaces.<br><br>The statements are explained separately. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>IEEE 802.3ah OAM Link-Fault Management Overview</i></li> </ul>  |

## neighbor (Automatic Protection Switching for SONET/SDH)

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|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>neighbor address;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> sonet-options <a href="#">aps</a> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | <p>If you are configuring one router to be the working router and a second to be the protect router, configure the address of the remote interface. You configure this on one or both of the interfaces.</p> <p>The address you specify for the neighbor must never be routed through the interface on which APS is configured, or instability will result. We strongly recommend that you directly connect the working and protect routers and that you configure the interface address of this shared network as the neighbor address.</p> |
| <b>Options</b>                  | <i>address</i> —Neighbor's address.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Basic Automatic Protect Switching</i></li></ul>   |

## no-allow-link-events

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>no-allow-link-events;</code>   |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam</a> <a href="#">ethernet</a> <a href="#">link-fault-management</a> <a href="#">interface</a> <i>interface-name</i> <a href="#">negotiation-options</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.  |
| <b>Description</b>              | Disable the sending of link event TLVs.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Disabling the Sending of Link Event TLVs</i></li></ul>  |

## no-auto-mdix

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | no-auto-mdix;  |
| <b>Hierarchy Level</b>          | [edit interface <i>ge-fpc/port/pic</i> <i>gigether-options</i> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.5.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.  |
| <b>Description</b>              | Disable the Auto MDI/MDIX feature.<br><br>MX Series routers with Gigabit Ethernet interfaces automatically detect MDI and MDIX port connections. Use this statement to override the default setting. Remove this statement to return to the default setting. |
| <b>Default</b>                  | Auto MDI/MDIX is enabled by default.   |
| <b>Options</b>                  | There are no options for this statement.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Ethernet Interfaces Overview</i></li> <li>• <a href="#">gigether-options on page 496</a>.</li> </ul>   |

## no-gratuitous-arp-request

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | no-gratuitous-arp-request;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.6 for EX Series switches.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers. |
| <b>Description</b>              | For Ethernet interfaces and pseudowire logical interfaces, do not respond to gratuitous ARP requests.  |
| <b>Default</b>                  | Gratuitous ARP responses are enabled on all Ethernet interfaces.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Gratuitous ARP</i></li> <li>• <a href="#">gratuitous-arp-reply on page 497</a></li> </ul>              |

## no-keepalives

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | no-keepalives;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ],<br>[edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | <p>Disable the sending of keepalives on a physical interface configured with PPP, Frame Relay, or Cisco HDLC encapsulation. The default keepalive interval is 10 seconds.</p> <p>For ATM2 IQ interfaces only, you can disable keepalives on a logical interface unit if the logical interface is configured with one of the following PPP over ATM encapsulation types:</p> <ul style="list-style-type: none"><li>• <b>atm-ppp-llc</b>—PPP over AAL5 LLC encapsulation.</li><li>• <b>atm-ppp-vc-mux</b>—PPP over AAL5 multiplex encapsulation.</li></ul> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Keepalives on page 152</a></li><li>• <i>Disabling the Sending of PPPoE Keepalive Messages</i></li><li>• <i>Configuring Frame Relay Keepalives</i></li></ul>  |

## no-partition


|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | no-partition <b>interface-type</b> (e1   (cau4   so)   (ct3   t3)   so   t3);  |
| <b>Hierarchy Level</b>          | <pre>[edit interfaces ce1-fpc/pic/port], [edit interfaces coc1-fpc/pic/port:channel], [edit interfaces coc12-fpc/pic/port], [edit interfaces cstm1-fpc/pic/port], [edit interfaces ct3-fpc/pic/port]</pre>   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | <p>For Channelized E1 IQ PICs only, configure the channelized E1 interface as an unpartitioned, clear channel.</p> <p>For Channelized OC12 PIC only, convert the channelized OC1 IQ interface into a channelized T3 interface or a T3 interface. You perform this configuration task for C-bit parity and M13-mapped configurations.</p> <p>For Channelized OC12 IQ PICs only, configure the channelized OC12 interface as an unpartitioned, clear channel.</p> <p>For Channelized STM1 PIC only, convert the channelized STM1 IQ interface into a channelized Administrative Unit 4 (AU-4) interface or a SONET/SDH STM1 interface.</p> <p>For Channelized DS3 PIC only, configure the channelized T3 interface as an unpartitioned, clear channel.</p> |
| <b>Default</b>                  | If you do not include either this statement or the <b>partition</b> statement, the Channelized IQ PIC is not partitioned, and no data channels are configured.   |
| <b>Options</b>                  | <p>The option used must correspond to the physical interface type:</p> <p><b>e1</b>—E1 interface type.</p> <p><b>coc12 so</b>—Channelized OC12 interface type, in SONET mode.</p> <p><b>cau4</b>—Channelized AU-4 interface type.</p> <p><b>cstm1</b>—SONET/SDH STM1 interface type, in SDH mode.</p> <p><b>ct3</b>—Channelized T3 interface type.</p> <p><b>t3</b>—T3 interface type.</p>   |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Channelized E1 IQ and IQE Interfaces Overview</i></li> <li>• <i>Channelized OC12/STM4 IQ and IQE Interfaces Overview</i></li> <li>• <i>Configuring an OC12/STM4 Interface</i></li> </ul>   |

- *Configuring Channelized STM1 IQ and IQE Interfaces*
- *Configuring T3 IQ Interfaces*
- [partition on page 662](#)
- *no-partition*

---

## no-pre-classifier

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | no-pre-classifier;  |
| <b>Hierarchy Level</b>          | [edit chassis fpc <i>n</i> pic <i>n</i> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.4.  |
| <b>Description</b>              | Specify disabling the control queue for all ports on the 10-Gigabit Ethernet LAN/WAN PIC. Deleting this configuration re-enables the control queue feature on all ports of the 10-Gigabit Ethernet LAN/WAN PIC.   |
|                                 | <div><p><b>NOTE:</b> For the 10-Gigabit Ethernet LAN/WAN PIC with SFP+ (model number PD-5-10XGE-SFPP), the control queue has a rate limiter to limit the control traffic to 2 Mbps (fixed, not user-configurable) per port. If the transit control traffic crosses this limit, then it can cause drops on locally terminating control traffic, causing flap of protocols such as BGP and OSPF. To avoid the control traffic being dropped, configure the no-pre-classifier statement to disable the control queue.</p></div> |
| <b>Default</b>                  | The no-pre-classifier statement is not configured and the control queue is operational.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>10-port 10-Gigabit Ethernet LAN/WAN PIC Overview</i></li><li>• <i>Configuring Control Queue Disable on a 10-port 10-Gigabit Ethernet LAN/WAN PIC</i></li></ul>   |



## no-redirects

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | no-redirects;  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>family</i> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.  |
| <b>Description</b>              | Do not send protocol redirect messages on the interface.<br><br>To disable the sending of protocol redirect messages for the entire router or switch, include the <b>no-redirects</b> statement at the <b>[edit system]</b> hierarchy level. |
| <b>Default</b>                  | Interfaces send protocol redirect messages.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Disabling the Transmission of Redirect Messages on an Interface on page 219</a></li> <li>• <i>Junos OS Administration Library for Routing Devices</i></li> </ul>                        |

## no-termination-request

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | no-termination-request;  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ppp-options],<br>[edit interfaces <i>lsq-fpc/pic/port</i> lsq-failure-options]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 7.4.<br>Support at the <b>[edit interfaces <i>interface-name</i> ppp-options]</b> hierarchy level added in Junos OS Release 8.3.  |
| <b>Description</b>              | For LSQ PICs or link PICs in redundant LSQ configurations, you can inhibit the router from sending PPP termination-request messages to the remote host if the PIC fails.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Link PIC Failover on Channelized OC3 IQ and IQE Interfaces</i></li> <li>• <i>Configuring Link PIC Failover on Channelized OC12/STM4 IQ and IQE Interfaces</i></li> <li>• <i>Configuring Link PIC Failover on Channelized STM1 Interfaces</i></li> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul> |

## node-id

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>node-id mac-address;</code>   |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">protection-group ethernet-ring ring-name</a> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.4.   |
| <b>Description</b>              | <p>For EX Series switches, node-id is not configurable.</p> <p>For MX Series routers, optionally specify the MAC address of a node in the protection group. If this statement is not included, the router assigns the node's MAC address.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Ethernet Ring Protection Switching Overview</i></li></ul>  |

## non-revertive (Interfaces)

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>non-revertive;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces aeX aggregated-ether-options lacp link-protection]  |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 9.3.</p> <p>Statement introduced in Junos OS Release 11.4 for EX Series switches.</p>  |
| <b>Description</b>              | Disable the ability to switch to a better priority link (if one is available) once a link is established as active and collection distribution is enabled.   |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">link-protection on page 568</a></li><li>• <i>Configuring Aggregated Ethernet Link Protection</i></li><li>• <i>Configuring LACP Link Protection of Aggregated Ethernet Interfaces (CLI Procedure)</i></li></ul> |

## oam

```

Syntax  oam {
        ethernet {
            connectivity-fault-management {
                action-profile profile-name {
                    default-actions {
                        interface-down;
                    }
                }
            }
            performance-monitoring {
                delegate-server-processing;
                hardware-assisted-timestamping;
                sla-iterator-profiles {
                    profile-name {
                        disable;
                        calculation-weight {
                            delay delay-weight;
                            delay-variation delay-variation-weight;
                        }
                        cycle-time milliseconds;
                        iteration-period connections;
                        measurement-type (loss | statistical-frame-loss | two-way-delay);
                    }
                }
            }
            linktrace {
                age (30m | 10m | 1m | 30s | 10s);
                path-database-size path-database-size;
            }
            maintenance-domain domain-name {
                level number;
                name-format (character-string | none | dns | mac+2octet);
                maintenance-association ma-name {
                    short-name-format (character-string | vlan | 2octet | rfc-2685-vpn-id);
                    protect-maintenance-association protect-ma-name;
                    remote-maintenance-association remote-ma-name;
                    continuity-check {
                        convey-loss-threshold;
                        hold-interval minutes;
                        interface-status-tlv;
                        interval (10m | 10s | 1m | 1s | 100ms);
                        loss-threshold number;
                        port-status-tlv;
                    }
                }
                mep mep-id {
                    auto-discovery;
                    direction (up | down);
                    interface interface-name (protect | working);
                    lowest-priority-defect (all-defects | err-xcon | mac-rem-err-xcon | no-defect |
                        rem-err-xcon | xcon );
                    priority number;
                    remote-mep mep-id {
                        action-profile profile-name;
                    }
                }
            }
        }
    }

```

```

        sla-iterator-profile profile-name {
            data-tlv-size size;
            iteration-count count-value;
            priority priority-value;
        }
    }
}
}
}
link-fault-management {
    action-profile profile-name {
        action {
            link-down;
            send-critical-event;
            syslog;
        }
        event {
            link-adjacency-loss;
            link-event-rate {
                frame-error count;
                frame-period count;
                frame-period-summary count;
                symbol-period count;
            }
            protocol-down;
        }
    }
}
interface interface-name {
    apply-action-profile
    link-discovery (active | passive);
    pdu-interval interval;
    pdu-threshold threshold-value;
    remote-loopback;
    event-thresholds {
        frame-error count;
        frame-period count;
        frame-period-summary count;
        symbol-period count;
    }
    negotiation-options {
        allow-remote-loopback;
        no-allow-link-events;
    }
}
}
}
}

```

**Hierarchy Level** [edit protocols]

**Release Information** Statement introduced in Junos OS Release 8.2.  
Statement introduced in Junos OS Release 12.1X48 for PTX Series Packet Transport Routers.

**Description** For Ethernet interfaces on M320, M120, MX Series, and T Series routers and PTX Series Packet Transport Routers, provide IEEE 802.3ah Operation, Administration, and Maintenance (OAM) support.

The remaining statements are explained separately.

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

**Related Documentation**

- *IEEE 802.3ah OAM Link-Fault Management Overview*
- *Configuring Ethernet 802.1ag OAM on PTX Series Packet Transport Routers*

## oam-liveness

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>oam-liveness {<br/>    down-count cells;<br/>    up-count cells;<br/>}</pre>  |
| <b>Hierarchy Level</b>          | <pre>[edit interfaces <i>interface-name</i> atm-options vpi <i>vpi-identifier</i>],<br/>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i>],<br/>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> address <i>address</i><br/>    multipoint-destination <i>address</i>],<br/>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i>],<br/>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i><br/>    family <i>family</i> address <i>address</i> multipoint-destination <i>address</i>]</pre> |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 11.1 for the QFX Series.   |
| <b>Description</b>              | <p>For ATM encapsulation only, configure Operation, Administration, and Maintenance (OAM) F5 loopback cell count thresholds. Not supported on ATM-over-SHDSL interfaces.</p> <p>For ATM2 IQ PICs only, configure OAM F4 loopback cell count thresholds at the <b>[edit interfaces <i>interface-name</i> atm-options vpi <i>vpi-identifier</i>]</b> hierarchy level.</p>  |
| <b>Options</b>                  | <p><b>down-count cells</b>—Minimum number of consecutive OAM F4 or F5 loopback cells lost before a VC is declared down.<br/><b>Range:</b> 1 through 255<br/><b>Default:</b> 5 cells</p> <p><b>up-count cells</b>—Minimum number of consecutive OAM F4 or F5 loopback cells received before a VC is declared up.<br/><b>Range:</b> 1 through 255<br/><b>Default:</b> 5 cells</p>  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>Configuring the ATM OAM F5 Loopback Cell Threshold</li></ul>   |

## oam-period

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>oam-period (disable   seconds);</code>   |
| <b>Hierarchy Level</b>          | <p>[edit interfaces <i>interface-name</i> atm-options vpi <i>vpi-identifier</i>],<br/>         [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i>],<br/>         [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> address <i>address</i> multipoint-destination <i>address</i>],<br/>         [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i>],<br/>         [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> address <i>address</i> multipoint-destination <i>address</i>]</p> |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 11.1 for the QFX Series.</p>  |
| <b>Description</b>              | <p>For ATM encapsulation only, configure the OAM F5 loopback cell period. Not supported on ATM-over-SHDSL interfaces.</p> <p>For ATM2 IQ PICs only, configure the OAM F4 loopback cell period at the [edit interfaces <i>interface-name</i> atm-options vpi <i>vpi-identifier</i>] hierarchy level.</p>  |
| <b>Default</b>                  | If you omit this statement, OAM F5 loopback cells are not initiated, but the interface still responds if it receives OAM F5 loopback cells.  |
| <b>Options</b>                  | <p><b>disable</b>—Disable the OAM loopback cell transmit feature.</p> <p><b>seconds</b>—OAM loopback cell period.</p> <p><b>Range:</b> 1 through 900 seconds</p>   |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>Defining the ATM OAM F5 Loopback Cell Period</li> </ul>   |

## oc-slice

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>oc-slice <i>oc-slice-range</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>partition</b> <i>partition-number</i> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For channelized OC12 IQ interfaces only, configure the range of SONET/SDH slices.  |
| <b>Default</b>                  | If you do not include either this statement or the <b>no-partition</b> statement, the Channelized OC12 IQ PICs not partitioned, and no data channels are configured.   |
| <b>Options</b>                  | <p><b>oc-slice-range</b>—Range of SONET/SDH slices. OC3 interfaces must occupy three consecutive OC slices per interface, in the form 1–3, 4–6, 7–9, or 10–12. The T3, T1, and DS0 interface types each occupy one OC slice per interface.</p> <p><b>Range:</b> For OC3 interfaces, 1–3, 4–6, 7–9, or 10–12; for SONET/SDH and T3 interfaces, 1–12</p> <p>The remaining statement is explained separately.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Channelized OC12/STM4 IQ and IQE Interfaces Overview</i></li></ul>  |

## open-timeout

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>open-timeout <i>seconds</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit <b>interfaces</b> <i>interface-name</i> <b>services-options</b> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | Configure timeout period for Transmission Control Protocol (TCP) session establishment.                                       |
| <b>Options</b>                  | <p><b>seconds</b>—Timeout period in seconds.</p> <p><b>Range:</b> 4 through 224 seconds</p> <p><b>Default:</b> 30 seconds</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>             |



## operating-mode


|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>operating-mode <i>mode</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces at- <i>fpc/pic/port</i> <a href="#">dsl-options</a> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For J Series Services Routers only, modify the operating mode of the digital subscriber line for an ATM interface.  |
| <b>Options</b>                  | <p><b><i>mode</i></b>—Operating mode for ATM-over-ADSL interfaces. The mode can be one of the following:</p> <ul style="list-style-type: none"> <li>• <b><i>adsl2plus</i></b>—Set the ADSL line to train in the ITU G.992.5 mode.</li> <li>• <b><i>ansi-dmt</i></b>—Set the ADSL line to train in the ANSI T1.413 Issue 2 mode.</li> <li>• <b><i>auto</i></b>—Set the ADSL line to autonegotiate the setting to match the setting of the DSL access multiplexer (DSLAM) located at the central office. The ADSL line trains in the ANSI T1.413 Issue 2 (<b><i>ansi-dmt</i></b>) or ITU G.992.1 (<b><i>itu-dmt</i></b>) mode.</li> <li>• <b><i>etsi</i></b>—Set the ADSL line to train in the ETSI TS 101 388 V1.3.1 mode.</li> <li>• <b><i>itu-annexb-ur2</i></b>—Set the ADSL line to train in the ITU G.992.1 UR-2 mode.</li> <li>• <b><i>itu-annexb-non-ur2</i></b>—Set the ADSL line to train in the ITU G.992.1 non-UR-2 mode.</li> <li>• <b><i>itu-dmt</i></b>—Set the ADSL line to train in the ITU G.992.1 mode.</li> <li>• <b><i>itu-dmt-bis</i></b>—Set the ADSL line to train in the ITU G.992.3 mode.</li> </ul> <p><b>Default:</b> <code>auto</code></p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>ATM-over-ADSL Overview</i></li> <li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li> </ul>   |

## optics-options

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>optics-options {<br/>  alarm low-light-alarm {<br/>    (link-down   syslog);<br/>  }<br/>  tx-power dbm;<br/>  warning low-light-warning {<br/>    (link-down   syslog);<br/>  }<br/>  wavelength nm;<br/>}</pre>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ]   |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p><b>alarm</b> option and <b>warning</b> options introduced in Junos OS Release 10.0.</p> <p>Statement introduced in Junos OS Release 12.1 for EX Series switches.</p> <p>Statement and <b>tx-power</b> option introduced in Junos OS Release 13.2 for PTX Series routers.</p> |
| <b>Description</b>              | For 10-Gigabit Ethernet or 100-Gigabit Ethernet dense wavelength-division multiplexing (DWDM) interfaces only, configure full C-band International Telecommunication Union (ITU)-Grid tunable optics.  |
| <b>Options</b>                  | The remaining statements are explained separately.   |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Ethernet DWDM Interface Wavelength Overview</i></li><li>• <i>100-Gigabit Ethernet OTN Options Configuration Overview</i></li></ul>  |

## option-82

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>option-82 &lt;circuit-id&gt; &lt;remote-id&gt;;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> auto-configure <a href="#">vlan-ranges authentication username-include</a> ],<br>[edit interfaces <i>interface-name</i> auto-configure <a href="#">stacked-vlan-ranges authentication username-include</a> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.<br>Options <b>circuit-id</b> and <b>remote-id</b> introduced in Junos OS Release 11.4.   |
| <b>Description</b>              | <p>Specify that the option 82 information from the client PDU is concatenated with the username during the subscriber authentication process.</p> <p>For autosense VLANs, you can additionally specify Option 82 suboption information that is concatenated with the username. You can specify either both or neither of the Agent Circuit ID (suboption 1) and Agent Remote ID (suboption 1). If you specify both, the Agent Circuit ID is supplied first, followed by a delimiter, and then the Agent Remote ID. If you specify that neither suboption is supplied, the raw payload of Option 82 from the PDU is concatenated to the username.</p> <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;">  <p><b>NOTE:</b> The option 82 value used in creating the username is based on the option 82 value that is encoded in the incoming DHCP discover packet. The use of suboptions is supported for DHCPv4 only.</p> </div> |
| <b>Options</b>                  | <p><b>none</b>—Use the raw payload of Option 82 from the PDU.</p> <p><b>circuit-id</b>—(Optional) Use the Agent Circuit ID suboption (suboption 1).</p> <p><b>remote-id</b>—(Optional) Use the Agent Remote ID suboption (suboption 2).</p>   |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><i>Configuring VLAN Interface Username Information for AAA Authentication</i></li> <li><i>Option 82 Suboptions in Authentication Usernames for Autosense VLANs</i></li> </ul>  |

## otn-options

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre> otn-options {   bytes transmit-payload-type <i>value</i>;   fec (efec   gfec   gfec-sdfec   none);   (is-ma   no-is-ma);   (laser-enable   no-laser-enable);   (line-loopback   no-line-loopback);   (local-loopback   no-local-loopback);   (odu-ttim-action-enable   no-odu-ttim-action-enable);   (otu-ttim-action-enable   no-otu-ttim-action-enable);   odu-delay-management {     (bypass   no-bypass);     (monitor-end-point   no-monitor-end-point);     (number-of-frames   no-number-of-frames);     (start-measurement   no-start-measurement);   }   (prbs   no-prbs);   preemptive-fast-reroute {     (backward-frr-enable   no-backward-frr-enable);     (signal-degrade-monitor-enable   no-signal-degrade-monitor-enable);   }   rate {     (fixed-stuff-bytes   no-fixed-stuff-bytes);     otu4;     (pass-through   no-pass-through);   }   signal-degrade {     ber-threshold-clear <i>value</i>;     ber-threshold-signal-degrade <i>value</i>;     interval <i>value</i>;   }   trigger <i>trigger-identifier</i>;   tti <i>tti-identifier</i>; } </pre> |
| <b>Hierarchy Level</b>          | [edit interfaces <i>ge-fpc/pic/port</i> ]  |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 9.4.</p> <p><b>bytes</b>, <b>is-ma</b>, <b>local-loopback</b>, <b>no-is-ma</b>, <b>no-local-loopback</b>, <b>no-odu-ttim-action-enable</b>, <b>no-otu-ttim-action-enable</b>, <b>no-prbs</b>, <b>odu-delay-management</b>, <b>odu-ttim-action-enable</b>, <b>otu-ttim-action-enable</b>, <b>prbs</b>, <b>preemptive-fast-reroute</b>, and <b>signal-degrade</b> statements introduced in Junos OS Release 13.2 for PTX Series routers.</p>   |
| <b>Description</b>              | Specify the Ethernet Optical Transport Network (OTN) interface and options.  |
| <b>Options</b>                  | The remaining statements are explained separately.   |
| <b>Required Privilege Level</b> | <p>interfaces—To view this statement in the configuration.</p> <p>interfaces-control—To add this statement to the configuration.</p>   |

- Related Documentation**
- *10-Gigabit Ethernet OTN Options Configuration Overview*
  - *100-Gigabit Ethernet OTN Options Configuration Overview*
  - *Configuring OTN Optics*

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## output

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>output {<br/>  <b>service-set</b> <i>service-set-name</i> &lt;<b>service-filter</b> <i>filter-name</i>&gt;;<br/>}</pre>  |
| <b>Hierarchy Level</b>          | [edit <b>interfaces</b> <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> inet service],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> inet service] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | Define one or more output service sets and filters to be applied to traffic.  |
| <b>Options</b>                  | The remaining statements are explained separately.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>   |

## output-list

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>output-list [ <i>filter-names</i> ];</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> <i>family</i> <a href="#">filter</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> <i>family</i> <a href="#">filter</a> ]                          |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 7.6.   |
| <b>Description</b>              | Apply a group of filters to evaluate when packets are transmitted on an interface.  |
| <b>Options</b>                  | [ <i>filter-names</i> ]—Name of a filter to evaluate when packets are transmitted on the interface. Up to 16 filters can be included in a filter input list.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Applying a Filter to an Interface on page 230</a></li><li>• <a href="#">input-list on page 525</a></li><li>• <i>Routing Policy Feature Guide for Routing Devices</i></li><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li><li>• <i>Junos OS Administration Library for Routing Devices</i></li></ul> |

## output-priority-map

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre> output-priority-map {   classifier {     premium {       forwarding-class <i>class-name</i> {         loss-priority (high   low);       }     }   } } </pre>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> together-options <a href="#">ethernet-switch-profile</a> <a href="#">ethernet-policer-profile</a> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | <p>For Gigabit Ethernet IQ and 10-Gigabit Ethernet interfaces only, define the output policer priority map to be applied to outgoing frames on this interface.</p> <p>The statements are explained separately.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Specifying an Output Priority Map</a></li> <li>• <a href="#">input-priority-map on page 525</a></li> </ul>  |

## output-three-color

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|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>output-three-color <i>policer-name</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">layer2-policer</a> ]<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">layer2-policer</a> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.2.<br>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.   |
| <b>Description</b>              | Apply a single-rate or two-rate three-color policer to the Layer 2 output traffic at the logical interface. The <b>output-three-color</b> and <b>output-policer</b> statements are mutually exclusive.   |
| <b>Options</b>                  | <i>policer-name</i> —Name of the single-rate or two-rate three-color policer.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Two-Color and Three-Color Policers at Layer 2</i></li><li>• <i>Applying Layer 2 Policers to Gigabit Ethernet Interfaces</i></li><li>• <i>Configuring a Gigabit Ethernet Policer</i></li><li>• <a href="#">input-three-color on page 526</a></li><li>• <i>input-policer</i></li><li>• <a href="#">layer2-policer on page 555</a></li><li>• <a href="#">logical-interface-policer on page 583</a></li><li>• <i>output-policer</i></li></ul> |



## output-vlan-map

See the following sections:

- [output-vlan-map \(Aggregated Ethernet\) on page 655](#)
- [output-vlan-map \(Gigabit Ethernet IQ, 10-Gigabit Ethernet with SFPP, 10-Gigabit Ethernet SFP, and 100-Gigabit Ethernet Type 5 PIC with CFP\) on page 656](#)

### output-vlan-map (Aggregated Ethernet)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>output-vlan-map {   (pop   push   swap);   tag-protocol-id <i>tpid</i>;   vlan-id <i>number</i>; }</pre>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.2.  |
| <b>Description</b>              | <p>For aggregated Ethernet interfaces using Gigabit Ethernet IQ, 10-Gigabit Ethernet IQ2 and IQ2-E interfaces, and 100-Gigabit Ethernet Type 5 PIC with CFP only, define the rewrite profile to be applied to outgoing frames on this logical interface.</p> <p>The statements are explained separately.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Stacking and Rewriting Gigabit Ethernet VLAN Tags</a></li> <li>• <a href="#">input-vlan-map (Aggregated Ethernet) on page 527</a></li> </ul>  |

**output-vlan-map (Gigabit Ethernet IQ, 10-Gigabit Ethernet with SFPP, 10-Gigabit Ethernet SFP, and 100-Gigabit Ethernet Type 5 PIC with CFP)**

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>output-vlan-map {<br/>  (pop   pop-pop   pop-swap   push   push-push   swap   swap-push   swap-swap);<br/>  inner-tag-protocol-id <i>tpid</i>;<br/>  inner-vlan-id <i>number</i>;<br/>  tag-protocol-id <i>tpid</i>;<br/>  vlan-id <i>number</i>;<br/>}</pre>                                    |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br><b>pop-pop</b> , <b>pop-swap</b> , <b>push-push</b> , <b>swap-push</b> , and <b>swap-swap</b> statements added in Junos OS Release 8.1.<br>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.                               |
| <b>Description</b>              | For Gigabit Ethernet IQ, 10-Port 10-Gigabit Ethernet SFPP interfaces, 10-Gigabit Ethernet SFP interfaces, and 100-Gigabit Ethernet Type 5 PIC with CFP only, define the rewrite operation to be applied to outgoing frames on this logical interface.<br><br>The statements are explained separately. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Stacking and Rewriting Gigabit Ethernet VLAN Tags</i></li><li>• <a href="#">input-vlan-map (Gigabit Ethernet IQ, 10-Gigabit Ethernet SFPP, 10-Gigabit Ethernet SFP, and 100-Gigabit Ethernet Type 5 PIC with CFP) on page 528</a></li></ul>                |

## overflow

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See the following sections:

- [overflow \(Receive Bucket\) on page 657](#)
- [overflow \(Transmit Bucket\) on page 657](#)

### overflow (Receive Bucket)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | overflow (discard   tag);  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> receive-bucket]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Specify how to handle packets that exceed the threshold for the receive leaky bucket.  |
| <b>Options</b>                  | <p><b>tag</b>—Tag, count, and process received packets that exceed the threshold.</p> <p><b>discard</b>—Discard received packets that exceed the threshold. No counting is done.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Receive and Transmit Leaky Bucket Properties on page 158</a></li> </ul>   |

### overflow (Transmit Bucket)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | overflow discard;  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> transmit-bucket]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Discard packets that exceed the threshold for the transmit leaky bucket.   |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Receive and Transmit Leaky Bucket Properties on page 158</a></li> </ul> |

## override

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>override tag <i>vlan-tag</i> dynamic-profile <i>profile name</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">auto-configure vlan-ranges</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">auto-configure stacked-vlan-ranges</a> ]     |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.2.  |
| <b>Description</b>              | Override dynamic profile assignment to individual VLANs that are already part of a previously defined VLAN range and dynamic profile.   |
| <b>Options</b>                  | <b><i>vlan-tag</i></b> —VLAN tag that you want to override.<br><br><b><i>profile-name</i></b> —Name of the dynamic profile that you want to use when overriding the specified VLAN tag. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring VLAN Dynamic Profile Override</i></li><li>• <i>Configuring VLAN Ranges for Use with Dynamic Profiles</i></li></ul>               |

## pado-advertise

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|                            |   |
|----------------------------|---|
| <b>Syntax</b>              | <code>pado-advertise;</code>  |
| <b>Hierarchy Level</b>     | [edit protocols pppoe]  |
| <b>Release Information</b> | Statement introduced in Junos OS Release 10.2.  |
| <b>Description</b>         | Enable named services configured in PPPoE service name tables to be advertised in PPPoE Active Discovery Offer (PADO) control packets. By default, advertisement of named services in PADO packets is disabled. |



**NOTE:** If you enable advertisement of named services in PADO packets, make sure the number and length of all advertised service entries does not exceed the maximum transmission unit (MTU) size of the PPPoE underlying interface.

|                                 |  |
|---------------------------------|--|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring PPPoE Service Name Tables</i></li><li>• <i>Enabling Advertisement of Named Services in PADO Control Packets</i></li></ul> |


## paired-group

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>paired-group <i>group-name</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> sonet-options <a href="#">aps</a> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | Configure load sharing between two working protect circuit pairs.   |
| <b>Options</b>                  | <i>group-name</i> —Circuit's group name, as configured with the <b>protect-circuit</b> or <b>working-circuit</b> statement.                 |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring APS Load Sharing</i></li><li>• <a href="#">working-circuit on page 874</a></li></ul> |

## pap

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|                          |   |
|--------------------------|---|
| Syntax                   | <pre>pap {<br/>  access-profile <i>name</i>;<br/>  default-pap-password <i>password</i>;<br/>  local-name <i>name</i>;<br/>  local-password <i>password</i>;<br/>  passive;<br/>}</pre>   |
| Hierarchy Level          | <pre>[edit interfaces <i>interface-name</i> <b>ppp-options</b>],<br/>[edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>ppp-options</b>],<br/>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>ppp-options</b>]</pre>  |
| Release Information      | Statement introduced in Junos OS Release 8.3.   |
| Description              | <p>Configure the Password Authentication Protocol (PAP). Use PAP authentication as a means to provide a simple method for the peer to establish its identity using a two-way handshake. This is done only upon initial link establishment.</p> <p>After the link is established, an ID and password pair is repeatedly sent by the peer to the authenticator until authentication is acknowledged or the connection is terminated.</p>  |
|                          | <div><p><b>BEST PRACTICE:</b> On inline service (si) interfaces for L2TP, only the <b>pap</b> statement itself is typically used for subscriber management. We recommend that you leave the subordinate statements at their default values.</p></div>  |
|                          | <p>The remaining statements are explained separately.</p>   |
| Required Privilege Level | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| Related Documentation    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the PPP Challenge Handshake Authentication Protocol on page 136</a></li><li>• <a href="#">Configuring PPP PAP Authentication on page 194</a></li><li>• <a href="#">Tracing Operations of the pppd Process on page 143</a></li><li>• <a href="#">traceoptions (PPP Process) on page 813</a></li><li>• <i>Junos OS Administration Library for Routing Devices</i></li><li>• <i>Applying PPP Attributes to L2TP LNS Subscribers Per Inline Service Interface</i></li></ul> |

## pap-password

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|                            |   |
|----------------------------|---|
| <b>Syntax</b>              | <code>pap-password password;</code>   |
| <b>Hierarchy Level</b>     | [edit access profile <i>profile-name</i> client <i>client-name</i> ]  |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches. |
| <b>Description</b>         | Configure the Password Authentication Protocol (PAP) password.  |



**NOTE:** This statement is not supported for L2TP LNS on MX Series routers.

|                                 |   |
|---------------------------------|---|
| <b>Options</b>                  | <code>password</code> —PAP password.  |
| <b>Required Privilege Level</b> | admin—To view this statement in the configuration.<br>admin-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring the PAP Password for an L2TP Profile</i></li> </ul>     |

## partition

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>partition <i>partition-number</i> <b>oc-slice</b> <i>oc-slice-range</i> <b>interface-type</b> <i>type</i> <b>timeslots</b> <i>time-slot-range</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For IQ interfaces and J Series interfaces on the Dual-Port Channelized E1 and T1PIM, configure the channelized interface partition. The partition number is correlated with the channel number. Partition and channel numbering on IQ interfaces begins with :1, not :0.   |
| <b>Default</b>                  | If you omit this statement, the channelized PIC or PIM is not partitioned, and no data channels are configured.  |
| <b>Options</b>                  | <p><b><i>partition-number</i></b>—Sublevel interface partition index.</p> <p><b>Range:</b></p> <ul style="list-style-type: none"><li>• 1 through 4 for an OC3 interface on a channelized OC12 IQ interface.</li><li>• 1 through 12 for a T3 interface on a channelized OC12 IQ interface.</li><li>• 1 through 4 for a T3 interface on a channelized T3 IQ interface.</li><li>• 1 through 28 for a T1 IQ interface on a channelized OC12 IQ or channelized T3 IQ interface.</li><li>• 1 through 10 for an E1 interface on a channelized E1 IQ interface.</li><li>• 1 through 30 on a channelized E1 interface.</li><li>• 1 through 23 on a channelized T1 interface.</li><li>• 1 through 24 for NxDS0 interfaces on either channelized OC12 IQ or channelized DS3 IQ interfaces.</li><li>• 0 through 31 (with 0 reserved for framing) for NxDS0 interfaces on channelized E1 IQ interfaces.</li></ul> <p>The remaining statements are explained separately.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Channelized E1 IQ and IQE Interfaces Overview</i></li><li>• <i>Channelized OC12/STM4 IQ and IQE Interfaces Overview</i></li><li>• <i>Configuring Channelized T3 IQ Interfaces</i></li><li>• <a href="#">no-partition on page 637</a></li></ul>  |



## passive

See the following sections:

- [passive \(CHAP\) on page 663](#)
- [passive \(PAP\) on page 664](#)

### passive (CHAP)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | passive;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ppp-options chap],<br>[edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ppp-options chap],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ppp-options chap]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Do not challenge the peer, but respond if challenged. If you omit this statement from the configuration, the interface always challenges its peer.<br><br>For ATM2 IQ interfaces only, you can configure CHAP on the logical interface unit if the logical interface is configured with one of the following PPP over ATM encapsulation types: <ul style="list-style-type: none"> <li>• <b>atm-ppp-llc</b>—PPP over AAL5 LLC encapsulation.</li> <li>• <b>atm-ppp-vc-mux</b>—PPP over AAL5 multiplex encapsulation.</li> </ul> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Passive Mode on page 138</a></li> <li>• <i>Junos OS Administration Library for Routing Devices</i></li> </ul>   |

## passive (PAP)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | passive;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>ppp-options pap</b> ],<br>[edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>ppp-options pap</b> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>ppp-options pap</b> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.3.  |
| <b>Description</b>              | Initiate an authentication request when the PAP option is received from a peer. If you omit this statement from the configuration, the interface requires the peer to initiate an authentication request.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Passive Mode on page 141</a></li><li>• <i>Junos OS Administration Library for Routing Devices</i></li></ul>  |

## passive-monitor-mode

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>passive-monitor-mode;</code>   |
| <b>Hierarchy Level</b>          | <code>[edit interfaces <i>interface-name</i>],</code><br><code>[edit interfaces <i>interface-name</i> <i>unit</i> <i>logical-unit-number</i>],</code><br><code>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <i>unit</i> <i>logical-unit-number</i>]</code>  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | <p>Monitor packet flows from another router. If you include this statement in the configuration, the interface does not send keepalives or alarms, and does not participate actively on the network.</p> <p>This statement is supported on ATM, Ethernet, and SONET/SDH interfaces. For more information, see <i>ATM Interfaces Feature Guide for Routing Devices</i>.</p> <p>For ATM and Ethernet interfaces, you can include this statement on the physical interface only.</p> <p>For SONET/SDH interfaces, you can include this statement on the logical interface only.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Enabling Passive Monitoring on ATM Interfaces</i></li> <li>• <i>Passive Monitoring on Ethernet Interfaces Overview</i></li> <li>• <i>Enabling Passive Monitoring on SONET/SDH Interfaces</i></li> <li>• <a href="#">multiservice-options on page 625</a></li> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>   |

## password (Interfaces)

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>password password-string;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> auto-configure <a href="#">vlan-ranges authentication</a> ],<br>[edit interfaces <i>interface-name</i> auto-configure <a href="#">stacked-vlan-ranges authentication</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.  |
| <b>Description</b>              | Configure the password that is sent to the external AAA authentication server for subscriber VLAN or stacked VLAN interface authentication.   |
| <b>Options</b>                  | <i>password-string</i> —Authentication password.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring an Authentication Password for VLAN or Stacked VLAN Ranges</a></li></ul>  |

## path-database-size

---


|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>path-database-size path-database-size;</code>   |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet connectivity-fault-management linktrace</a> ]                                  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.   |
| <b>Description</b>              | Number of linktrace reply entries to be stored per linktrace request.   |
| <b>Options</b>                  | <i>path-database-size</i> —Database size.<br><b>Range:</b> 1 through 255<br><b>Default:</b> 64                          |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Linktrace Protocol in CFM</a></li></ul>                 |

## path-trace

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>path-trace <i>trace-string</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">sonet-options</a> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | <p>For SONET/SDH interfaces and 10-Gigabit Ethernet interfaces in WAN PHY mode, configure a path trace identifier, which is a text string that identifies the circuit.</p> <p>On SONET/SDH OC48 interfaces that are configured for channelized (multiplexed) mode (by including the <b>no-concatenate</b> statement at the [edit chassis fpc slot-number pic pic-number] hierarchy level), the <b>bytes e1-quiet</b> and <b>bytes f1</b> options have no effect. The <b>bytes f2</b>, <b>bytes z3</b>, <b>bytes z4</b>, and <b>path-trace</b> options work correctly on channel 0 and work in the transmit direction only on channels 1, 2, and 3.</p> <p>For DS3 channels on a channelized OC12 interface, you can configure a unique path trace for each of the 12 channels. Each path trace can be up to 16 bytes. For channels on a channelized OC12 IQ interface, each path trace can be up to 64 bytes.</p> |
| <b>Options</b>                  | <p><b>trace-string</b>—Text string that identifies the circuit. If the string contains spaces, enclose it in quotation marks. A common convention is to use the circuit identifier as the path trace identifier. If you do not configure an identifier, the Junos OS uses the system and interface names to construct the default <b>trace-string</b>. For all nonchannelized SONET/SDH interfaces, the default <b>trace-string</b> is <b>system-name interface-name</b>. For channelized SONET/SDH interfaces and 10-Gigabit Ethernet WAN-PHY interfaces, the default <b>trace-string</b> is <b>interface-name</b>.</p>  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring the SONET/SDH Path Trace Identifier</i></li> <li>• <a href="#">sonet-options on page 765</a></li> </ul>   |

## payload-scrambler

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | (payload-scrambler   no-payload-scrambler);   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">e3-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">sonet-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">t3-options</a> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | <p>Enable or disable HDLC scrambling on an E3, a SONET/SDH, or a T3 interface. This type of scrambling provides better link stability. Both sides of a connection must either use or not use scrambling.</p> <p>If you commit a T3 interface configuration that has HDLC payload scrambling enabled, the interface must also be configured to be compatible with the channel service unit (CSU) at the remote end of the line.</p> <p>Disable payload scrambling on an E3 interface if Digital Link compatibility mode is used.</p> <p>On a channelized OC12 interface, the <b>sonet payload-scrambler</b> statement is ignored. To configure scrambling on the DS3 channels on the interface, you can include the <b>t3-options payload-scrambler</b> statement in the configuration for each DS3 channel.</p> |
|                                 | <div> <b>NOTE:</b> The <b>payload-scrambler</b> statement at the [edit interfaces <i>interface-name</i> <a href="#">e3-options</a>] hierarchy level is not valid for IQE PICs.</div>   |
| <b>Default</b>                  | Payload scrambling is disabled on all E3 and T3 interfaces; it is enabled by default on E3/T3 over ATM interfaces and on SONET/SDH interfaces.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring E3 and T3 Parameters on ATM Interfaces</i></li><li>• <i>Configuring E3 HDLC Payload Scrambling</i></li><li>• <i>Configuring SONET/SDH HDLC Payload Scrambling</i></li><li>• <i>Configuring T3 HDLC Payload Scrambling</i></li><li>• <i>Examples: Configuring T3 Interfaces</i></li><li>• <a href="#">compatibility-mode on page 388</a></li></ul>  |

## payload-size

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>payload-size bytes ;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> satop-options]  |
| <b>Release Information</b>      | Option introduced in Junos OS Release 9.3.   |
| <b>Description</b>              | Specify the <b>satop-options</b> payload-size in integer number of bytes.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>ATM Support on Circuit Emulation PICs Overview</i></li> <li>• <a href="#">satop-options on page 741</a></li> </ul> |

## pdu-interval

---

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

## pdu-threshold

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>pdu-threshold <i>threshold-value</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam</a> <a href="#">ethernet</a> <a href="#">link-fault-management</a> <a href="#">interface</a> <i>interface-name</i> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.2.   |
| <b>Description</b>              | For Ethernet interfaces on EX Series switches and M320, M120, MX Series, and T Series routers, specify the number of OAM PDUs to miss before an error is logged. Used for IEEE 802.3ah Operation, Administration, and Management (OAM) support. |
| <b>Options</b>                  | <b><i>threshold-value</i></b> —The number of PDUs missed before declaring the peer lost.<br><b>Range:</b> 3 through 10 PDUs<br><b>Default:</b> 3 PDUs   |
| <b>Required Privilege Level</b> | <code>interface</code> —To view this statement in the configuration.<br><code>interface-control</code> —To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring the OAM PDU Threshold</i></li></ul>  |



## peer

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>peer a.b.c.d {<br/>    interface <i>interface-name</i>;<br/>}</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>multi-chassis-protection</b> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.1.  |
| <b>Description</b>              | For MX Series routers with multichassis aggregated Ethernet (MC-AE) interfaces, use the <b>multi-chassis-protection</b> statement under the physical interface level to reduce the configuration at the logical interface level. If the interchassis control protocol connection (ICCP) is UP and the interchassis data link (ICL) comes UP, the router configured as standby will bring up the MC-AE interfaces shared with the peer active-active node specified by the <b>peer</b> statement. You must also specify the peer's physical interface. |
| <b>Options</b>                  | <p><b>a.b.c.d</b>—Specify the IP address of the peer.</p> <p><b>interface <i>interface-name</i></b>—Specify the peer's physical interface: interface <i>interface-name-fpc/pic/port</i></p>   |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Multichassis Link Aggregation</i></li> <li>• <i>Configuring Active-Active Bridging and VRRP over IRB in Multichassis Link Aggregation on MX Series Routers</i></li> <li>• <i>Configuring Aggregated Ethernet Link Protection</i></li> <li>• <i>Example: Configuring Aggregated Ethernet Link Protection</i></li> <li>• <a href="#">multi-chassis-protection on page 618</a></li> </ul>  |

## peer-unit

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>peer-unit <i>unit-number</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Configure a peer relationship between two logical systems.   |
| <b>Options</b>                  | <b><i>unit-number</i></b> —Peering logical system unit number.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>  |

## per-unit-scheduler

|                            |  |
|----------------------------|--|
| <b>Syntax</b>              | <code>per-unit-scheduler;</code>   |
| <b>Hierarchy Level</b>     | <code>[edit interfaces <i>interface-name</i>]</code>   |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 13.2 on 16x10GE MPC and MPC3E line cards.<br>Statement introduced in Junos OS Release 13.2 on PTX Series Packet Transport Routers.   |
| <b>Description</b>         | For Channelized OC3 IQ, Channelized OC12 IQ, Channelized STM1 IQ, Channelized T3 IQ, Channelized E1 IQ, E3 IQ, link services IQ interfaces (lsq-), link services (ls-) on J Series routers, Gigabit Ethernet IQ, Gigabit Ethernet IQ2 and IQ2-E, and 10-, 40-, and 100-Gigabit Ethernet interfaces (including the 16x10GE MPC), enable the association of scheduler map names with logical interfaces. |



**NOTE:** Per-unit scheduling is not supported on T1 interfaces configured on the Channelized OC12 IQ PIC.



**NOTE:** On Gigabit Ethernet IQ2 and IQ2-E PICs without the `per-unit-scheduler` statement, the entire PIC supports 4071 VLANs and the user can configure all the VLANs on the same port.

On Gigabit Ethernet IQ2 and IQ2-E PICs with the `per-unit-scheduler` statement, the entire PIC supports  $1024 - 2 * \text{number of ports}$  (1024 minus two times the number of ports), because each port is allocated two default schedulers.

When including the `per-unit-scheduler` statement, you must also include the `vlan-tagging` statement or the `flexible-vlan-tagging` statement (to apply scheduling to VLANs) or the `encapsulation frame-relay` statement (to apply scheduling to DLCIs) at the `[edit interfaces interface-name]` hierarchy level.

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

|                              |   |
|------------------------------|---|
| <b>Related Documentation</b> | <ul style="list-style-type: none"> <li>• <a href="#">Applying Scheduler Maps and Shaping Rate to DLCIs and VLANs</a></li> <li>• <a href="#">Applying Scheduling and Shaping to VLANs</a></li> <li>• <a href="#">Configuring Virtual LAN Queuing and Shaping on PTX Series Packet Transport Routers</a></li> <li>• <a href="#">Scaling of Per-VLAN Queuing on Non-Queuing MPCs</a></li> <li>• <a href="#">flexible-vlan-tagging on page 481</a></li> <li>• <a href="#">vlan-tagging on page 858</a></li> </ul> |
|------------------------------|---|

## performance-monitoring

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**Syntax**    performance-monitoring {  
              delegate-server-processing;  
              hardware-assisted-timestamping;  
              sla-iterator-profiles {  
                  profile-name {  
                      disable;  
                      calculation-weight {  
                          delay delay-weight;  
                          delay-variation delay-variation-weight;  
                      }  
                      cycle-time milliseconds;  
                      iteration-period connections;  
                      measurement-type (loss | statistical-frame-loss | two-way-delay);  
                  }  
              }  
          }

**Hierarchy Level**    [edit protocols oam ethernet connectivity-fault-management]

**Release Information**    Statement introduced in Junos OS Release 9.5.

**Description**    Specify performance monitoring support for Ethernet frame delay measurement.  
  
                  The remaining statements are explained separately.

**Required Privilege Level**    Configure—To enter configuration mode.  
                                  Control—To modify any configuration.

**Related Documentation**

- *Ethernet Frame Delay Measurements Overview*
- *Guidelines for Configuring Routers to Support an ETH-DM Session*
- *Enabling the Hardware-Assisted Timestamping Option*

## periodic

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

## pfc

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>pfc;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">ppp-options compression</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">unit logical-unit-number ppp-options compression</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit logical-unit-number ppp-options compression</a> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For interfaces with PPP encapsulation, configure the router to compress the protocol field to one byte.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><a href="#">Configuring the PPP Protocol Field Compression on page 147</a></li> </ul>  |

## pic-type

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>pic-type (atm1   atm2);</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces at- <i>fpc/pic/port</i> <a href="#">atm-options</a> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For ATM interfaces, configure the type of ATM PIC installed in your router.   |
| <b>Options</b>                  | <code>atm1</code> —ATM1 PIC.<br><code>atm2</code> —ATM2 IQ PIC.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring the ATM PIC Type</i></li></ul>                                   |

## plp-to-clp

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>plp-to-clp;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces at- <i>fpc/pic/port</i> <a href="#">atm-options</a> ],<br>[edit interfaces at- <i>fpc/pic/port</i> <a href="#">unit</a> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces at- <i>--fpc/pic/port</i> <a href="#">unit</a> <i>logical-unit-number</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For ATM2 IQ interfaces only, enable the PLP setting to be copied to the cell-loss priority (CLP) bit.   |
| <b>Default</b>                  | If you omit this statement, the Junos OS does not copy the PLP setting to the CLP bit.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Enabling the PLP Setting to Be Copied to the CLP Bit</i></li><li>• <i>Copying the PLP Setting to the CLP Bit on ATM Interfaces</i></li></ul>   |

## plp1

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>plp1 cells;</code>   |
| <b>Hierarchy Level</b>          | <p>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i>],</p> <p>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> address <i>address</i> family <i>family</i> multipoint-destination <i>address</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> address <i>address</i> family <i>family</i> multipoint-destination <i>address</i>]</p> |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 11.1 for QFX Series switches.</p>   |
| <b>Description</b>              | For ATM2 IQ interfaces only, define the EPD threshold on a VC. The EPD threshold is a limit on the number of transmit packets that can be queued. Packets that exceed the limit are discarded. This threshold applies to packets that have a PLP of 1.   |
| <b>Default</b>                  | EPD threshold is unregulated.  |
| <b>Options</b>                  | <p><b>cells</b>—Maximum number of cells.</p> <p><b>Range:</b> For 1-port and 2-port OC12 interfaces, 1 through 425,984 cellsFor 1-port OC48 interfaces, 1 through 425,984 cellsFor 2-port OC3, DS3, and E3 interfaces, 1 through 212,992 cellsFor 4-port DS3 and E3 interfaces, 1 through 106,496 cells</p>  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Two EPD Thresholds per Queue</i></li> <li>• <i>Configuring an ATM Scheduler Map</i></li> <li>• <a href="#">linear-red-profile on page 560</a></li> </ul>   |

## point-to-point

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|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | point-to-point;  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For all interfaces except aggregated Ethernet, Fast Ethernet, and Gigabit Ethernet, configure the interface unit as a point-to-point connection. This is the default connection type.                          |
| <b>Default</b>                  | If you omit this statement, the interface unit is configured as a point-to-point connection.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring a Point-to-Point Connection on page 187</a></li><li>• <a href="#">multipoint on page 623</a></li></ul>   |



## policer

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See the following sections:

- [policer \(CFM Firewall\) on page 679](#)
- [policer \(CFM Global\) on page 680](#)
- [policer \(CFM Session\) on page 681](#)
- [policer \(CoS\) on page 682](#)
- [policer \(Interface\) on page 683](#)
- [policer \(MAC\) on page 684](#)

### policer (CFM Firewall)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre> policer <i>cfm-policer</i> {     if-exceeding {         bandwidth-limit 8k;         burst-size-limit 2k;     }     then discard; } </pre>  |
| <b>Hierarchy Level</b>          | [edit firewall]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.   |
| <b>Description</b>              | Attach an explicit policer to CFM sessions.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Rate Limiting of Ethernet OAM Messages</i></li> <li>• <a href="#">policer (CFM Global) on page 680</a></li> <li>• <a href="#">policer (CFM Session) on page 681</a></li> </ul> |

## policer (CFM Global)

|                          |  |
|--------------------------|--|
| Syntax                   | <pre>policer {<br/>  all <i>cfm-policer-name</i>;<br/>  continuity-check <i>cfm-policer-name</i>;<br/>  other <i>cfm-policer-name</i>;<br/>}</pre>   |
| Hierarchy Level          | [edit protocols oam ethernet connectivity-fault-management]  |
| Release Information      | Statement introduced in Junos OS Release 10.0.   |
| Description              | Specify a policer at the global level to police the CFM traffic belonging to all sessions.   |
| Options                  | <p><b>continuity-check <i>cfm-policer-name</i></b>—Police all continuity check packets with the policer specified.</p> <p><b>other <i>cfm-policer-name</i></b>—Police all non-continuity check packets with the policer specified.</p> <p><b>all <i>cfm-policer-name</i></b>—Police all CFM packets with policer specified. If the <b>all</b> option is used, then you cannot specify above two options.</p> |
| Required Privilege Level | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| Related Documentation    | <ul style="list-style-type: none"><li>• <i>Configuring Rate Limiting of Ethernet OAM Messages</i></li><li>• <a href="#">policer (CFM Session) on page 681</a></li></ul>  |

## policer (CFM Session)

|                          |  |
|--------------------------|--|
| Syntax                   | <pre>policer {<br/>  all <i>cfm-policer-name</i>;<br/>  continuity-check <i>cfm-policer-name</i>;<br/>  other <i>cfm-policer-name</i>;<br/>}</pre>   |
| Hierarchy Level          | [edit protocols oam ethernet connectivity-fault-management maintenance-domain <i>name</i><br>level <i>number</i> maintenance-association <i>name</i> ]   |
| Release Information      | Statement introduced in Junos OS Release 10.0.   |
| Description              | Specify a separate policer to rate-limit packets specific to that session.   |
| Options                  | <ul style="list-style-type: none"><li>• <b>continuity-check <i>cfm-policer-name</i></b>—Police continuity check packets belonging to this session.</li><li>• <b>other <i>cfm-policer-name</i></b>—Police all non-continuity check packets belonging to this session.</li><li>• <b>all <i>cfm-policer-name</i></b>—Police all CFM packets belonging to this session. If the <b>all</b> option is used, then you cannot specify the above two options.</li></ul> |
| Required Privilege Level | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| Related Documentation    | <ul style="list-style-type: none"><li>• <i>Configuring Rate Limiting of Ethernet OAM Messages</i></li><li>• <a href="#">policer (CFM Global) on page 680</a></li></ul>   |


## policer (CoS)

|                          |   |
|--------------------------|---|
| Syntax                   | <pre>policer <i>cos-policer-name</i> {<br/>  aggregate {<br/>    bandwidth-limit <i>bps</i>;<br/>    burst-size-limit <i>bytes</i>;<br/>  }<br/>  premium {<br/>    bandwidth-limit <i>bps</i>;<br/>    burst-size-limit <i>bytes</i>;<br/>  }<br/>}</pre>  |
| Hierarchy Level          | [edit interfaces <i>interface-name</i> <i>gigether-options</i> <a href="#">ethernet-switch-profile</a> <a href="#">ethernet-policer-profile</a> ]   |
| Release Information      | Statement introduced before Junos OS Release 7.4.   |
| Description              | For Gigabit Ethernet IQ , Gigabit Ethernet PICs with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router), and 100-Gigabit Ethernet Type 5 PIC with CFP, define a CoS policer template to specify the premium bandwidth and burst-size limits, and the aggregate bandwidth and burst-size limits. The premium policer is not supported on MX Series routers or for Gigabit Ethernet interfaces with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router). |
| Options                  | <p><b><i>cos-policer-name</i></b>—Name of one policer to specify the premium bandwidth and burst-size limits, and the aggregate bandwidth and burst-size limits.</p> <p>The remaining statements are explained separately.</p>  |
| Required Privilege Level | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| Related Documentation    | <ul style="list-style-type: none"><li>• <i>Configuring Gigabit Ethernet Policers</i></li></ul>  |

## policer (Interface)

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre> policer {   arp <i>policer-template-name</i>;   input <i>policer-template-name</i>;   output <i>policer-template-name</i>; } </pre>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>family</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>family</i> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | Apply a policer to an interface.  |
| <b>Options</b>                  | <p><b>arp <i>policer-template-name</i></b>—For <b>inet</b> family only, name of one policer to evaluate when ARP packets are received on the interface.</p> <p><b>input <i>policer-template-name</i></b>—Name of one policer to evaluate when packets are received on the interface.</p> <p><b>output <i>policer-template-name</i></b>—Name of one policer to evaluate when packets are transmitted on the interface.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Applying Policers on page 222</a></li> <li>• <i>Configuring Firewall Filters and Policers for VPLS</i></li> <li>• <i>Routing Policy Feature Guide for Routing Devices</i></li> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>  |

## policer (MAC)

|  |  |
|--|--|
| <b>Syntax</b>  | <pre>policer {<br/>  input <i>cos-policer-name</i>;<br/>  output <i>cos-policer-name</i>;<br/>}</pre>  |
| <b>Hierarchy Level</b>   | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>accept-source-mac</b> <i>mac-address</i> <i>mac-address</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>accept-source-mac</b> <i>mac-address</i> <i>mac-address</i> ] |
| <b>Release Information</b>   | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.   |
| <b>Description</b>   | For Gigabit Ethernet IQ and Gigabit Ethernet PICs with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router), and 100-Gigabit Ethernet Type 5 PIC with CFP, configure MAC policing.  |
| <div> <b>NOTE:</b><br/>On MX Series routers with Gigabit Ethernet or Fast Ethernet PICs, the following considerations apply:</div> <ul style="list-style-type: none"><li>• Interface counters do not count the 7-byte preamble and 1-byte frame delimiter in Ethernet frames.</li><li>• In MAC statistics, the frame size includes MAC header and CRC before any VLAN rewrite/imposition rules are applied.</li><li>• In traffic statistics, the frame size encompasses the L2 header without CRC after any VLAN rewrite/imposition rule.</li></ul> |  |
| <b>Options</b>   | <b>input <i>cos-policer-name</i></b> —Name of one policer to specify the premium bandwidth and aggregate bandwidth.<br><br><b>output <i>cos-policer-name</i></b> —Name of one policer to specify the premium bandwidth and aggregate bandwidth.  |
| <b>Required Privilege Level</b>  | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>   | <ul style="list-style-type: none"><li>• <i>Configuring MAC Address Filtering</i></li></ul>   |

## pool

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>pool <i>pool-name</i> &lt;priority <i>priority</i>&gt;;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>br-pim/0/port</i> <b>dialer-options</b> ],<br>[edit interfaces <i>umd0</i> <b>dialer-options</b> ],<br>[edit interfaces <i>dlm unit logical-unit-number</i> <b>dialer-options</b> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>dlm unit logical-unit-number</i> <b>dialer-options</b> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | On J Series Services Routers, for logical and physical ISDN interfaces, specify the dial pool. The dial pool allows logical (dialer) and physical ( <b>br-pim/0/port</b> ) interfaces to be bound together dynamically on a per-call basis. On a dialer interface, <b>pool</b> directs the dialer interface which dial pool to use. On <b>br-pim/0/port</b> interface, <b>pool</b> defines the pool to which the interface belongs. |
| <b>Options</b>                  | <b>pool-name</b> —Pool identifier.<br><br><b>priority <i>priority</i></b> —(Physical <b>br-pim/0/port</b> interfaces only) Specify a priority value of 0 (lowest) to 255 (highest) for the interface within the pool.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring ISDN Physical Interface Properties</i></li> <li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li> </ul>   |

## pop

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|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | pop;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>input-vlan-map</b> ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>output-vlan-map</b> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>input-vlan-map</b> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>output-vlan-map</b> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.   |
| <b>Description</b>              | For Gigabit Ethernet IQ, 10-Gigabit Ethernet IQ2 and IQ2-E interfaces, 10-Gigabit Ethernet LAN/WAN PIC, aggregated Ethernet interfaces using Gigabit Ethernet IQ interfaces, 10-Gigabit Ethernet SFP interfaces, and 100-Gigabit Ethernet Type 5 PIC with CFP, specify the VLAN rewrite operation to remove a VLAN tag from the top of the VLAN tag stack. The outer VLAN tag of the frame is removed.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Removing a VLAN Tag</i></li></ul>   |



## pop-all-labels

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | pop-all-labels {<br>required-depth <i>number</i> ;<br>}  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> atm-options mpls],<br>[edit interfaces <i>interface-name</i> sonet-options mpls],<br>[edit interfaces <i>interface-name</i> fastether-options mpls],<br>[edit interfaces <i>interface-name</i> gigether-options mpls]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.  |
| <b>Description</b>              | <p>For passive monitoring on ATM, SONET/SDH, Fast Ethernet, and Gigabit Ethernet interfaces only, removes up to two MPLS labels from incoming IP packets. For passive monitoring on T Series devices, removes up to five MPLS labels from incoming IP packets.</p> <p>This statement has no effect on IP packets with more than two MPLS labels, or IP packets with more than five MPLS labels on T Series devices. Packets with MPLS labels cannot be processed by the Monitoring Services PIC; if packets with MPLS labels are forwarded to the Monitoring Services PIC, they are discarded.</p> <p>The remaining statement is explained separately.</p> |
| <b>Default</b>                  | If you omit this statement, the MPLS labels are not removed, and the packet is not processed by the Monitoring Services PIC.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Removing MPLS Labels from Incoming Packets</i></li> <li>• <i>Removing MPLS Labels from Incoming Packet</i></li> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>   |

## pop-pop

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | pop-pop;  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">input-vlan-map</a> ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">output-vlan-map</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">input-vlan-map</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">output-vlan-map</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.1.<br>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.  |
| <b>Description</b>              | For Gigabit Ethernet IQ, IQ2 and IQ2-E interfaces, 10-Gigabit Ethernet LAN/WAN PIC, for aggregated Ethernet interfaces using Gigabit Ethernet IQ2 and IQ2-E or 10-Gigabit Ethernet PICs on MX Series routers, and 100-Gigabit Ethernet Type 5 PIC with CFP, and for 10-Gigabit Ethernet SFP interfaces on EX Series switches, specify the VLAN rewrite operation to remove both the outer and inner VLAN tags of the frame.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Removing the Outer and Inner VLAN Tags</i></li></ul>   |

## pop-swap

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | pop-swap;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">input-vlan-map</a> ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">output-vlan-map</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">input-vlan-map</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">output-vlan-map</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.1.<br>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.  |
| <b>Description</b>              | Specify the VLAN rewrite operation to remove the outer VLAN tag of the frame, and replace the inner VLAN tag of the frame with a user-specified VLAN tag value. The inner tag becomes the outer tag in the final frame.<br><br>You can use this statement on Gigabit Ethernet IQ, IQ2, IQ2-E interfaces, 10-Gigabit Ethernet LAN/WAN PIC, on aggregated Ethernet interfaces using Gigabit Ethernet IQ2 and IQ2-E or 10-Gigabit Ethernet PICs on MX Series routers, and 100-Gigabit Ethernet Type 5 PIC with CFP.                    |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Removing the Outer VLAN Tag and Rewriting the Inner VLAN Tag</i></li> </ul>   |

## port

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>port {<br/>    minimum <i>port-number</i>;<br/>    maximum <i>port-number</i>;<br/>}</pre>   |
| <b>Hierarchy Level</b>          | [edit interfaces vsp- <i>fpc</i> / <i>pic</i> / <i>port</i> <b>unit</b> <i>logical-unit-number</i> <b>compression</b> <i>rtp</i> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For voice services interfaces only, assign User Datagram Protocol (UDP) destination port numbers reserved for Real-Time Transport Protocol (RTP) traffic.   |
| <b>Options</b>                  | <p><b>minimum <i>port-number</i></b>—Specify minimum port number.<br/><b>Range:</b> 0 through 65,535</p> <p><b>maximum <i>port-number</i></b>—Specify maximum port number.<br/><b>Range:</b> 0 through 65,535</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>   |

## port-priority

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|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>port-priority <i>priority</i>;</pre>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>gigether-options</b> <b>802.3ad</b> <i>lacp</i> ]<br>[edit interfaces <i>interface-name</i> <b>ether-options</b> <b>802.3ad</b> <i>lacp</i> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.3.<br>Statement introduced in Junos OS Release 11.4 for EX Series switches.   |
| <b>Description</b>              | Define LACP port priority at the interface level.  |
| <b>Options</b>                  | <p><b><i>priority</i></b>—Priority for being elected to be the active port and both collect and distribute traffic. A smaller value indicates a higher priority for being elected.<br/><b>Range:</b> 1 through 255<br/><b>Default:</b> 127</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring LACP Link Protection of Aggregated Ethernet Interfaces (CLI Procedure)</i></li></ul>  |

## port-status-tlv

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | port-status-tlv blocked;   |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet</a> connectivity-fault-management <a href="#">action-profile</a> <i>tlv-action</i> event]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.6.  |
| <b>Description</b>              | Define an <b>action-profile</b> consisting of various events and the action. Based on values of <b>port-status-tlv</b> in the received CCM packets, specific action such as <i>interface-down</i> can be taken using <a href="#">action-profile</a> options. |
| <b>Options</b>                  | <b>blocked</b> —When the incoming CCM packet contains port status TLV with value blocked, the action will be triggered for this action-profile.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring a Connectivity Fault Management Action Profile</i></li> <li>• <i>Configuring Remote MEP Action Profile Support</i></li> </ul>  |

## post-service-filter

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | post-service-filter <i>filter-name</i> ;   |
| <b>Hierarchy Level</b>          | [edit <a href="#">interfaces</a> <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> inet <a href="#">service</a> <a href="#">input</a> ],<br>[edit logical-systems <i>logical-system-name</i> <a href="#">interfaces</a> <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> inet <a href="#">service</a> <a href="#">input</a> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Define the filter to be applied to traffic after service processing. The filter is applied only if a service set is configured and selected.   |
| <b>Options</b>                  | <b><i>filter-name</i></b> —Identifier for postservice filter.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>  |

## ppp-options

|                        |  |
|------------------------|--|
| <b>Syntax</b>          | <pre> ppp-options {   authentication [ <i>authentication-protocols</i> ];   chap {     access-profile <i>name</i>;     challenge-length minimum <i>minimum-length</i> maximum <i>maximum-length</i>;     default-chap-secret <i>name</i>;     local-name <i>name</i>;     passive;   }   compression {     acfc;     pfc;   }   dynamic-profile <i>profile-name</i>;   lcp-max-conf-req <i>number</i>   lcp-restart-timer <i>milliseconds</i>;   loopback-clear-timer <i>seconds</i>;   ncp-max-conf-req <i>number</i>   ncp-restart-timer <i>milliseconds</i>;   on-demand-ip-address   pap {     access-profile <i>name</i>;     default-pap-password <i>password</i>;     local-name <i>name</i>;     local-password <i>password</i>;     passive;   } } </pre> |
| <b>Hierarchy Level</b> | <pre> [edit interfaces <i>interface-name</i>], [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>] </pre>  |

**Release Information** Statement introduced before Junos OS Release 7.4.

**Description** On interfaces with PPP encapsulation, configure PPP-specific interface properties.

For ATM2 IQ interfaces only, you can configure CHAP on the logical interface unit if the logical interface is configured with one of the following PPP over ATM encapsulation types:

- **atm-ppp-llc**—PPP over AAL5 LLC encapsulation.
- **atm-ppp-vc-mux**—PPP over AAL5 multiplex encapsulation.



**BEST PRACTICE:** On inline service (si) interfaces for L2TP, only the **chap** and **pap** statements are typically used for subscriber management. We recommend that you leave the other statements subordinate to **ppp-options**—including those subordinate to **chap** and **pap**—at their default values.

The remaining statements are explained separately.

|                                 |  |
|---------------------------------|--|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring the PPP Challenge Handshake Authentication Protocol on page 136</a></li> <li>• <i>Applying PPP Attributes to L2TP LNS Subscribers Per Inline Service Interface</i></li> </ul> |

## pppoe-options

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>pppoe-options {   access-concentrator name;   auto-reconnect seconds;   (client   server);   service-name name;   underlying-interface interface-name; }</pre>  |
| <b>Hierarchy Level</b>          | <pre>[edit interfaces pp0 unit logical-unit-number], [edit logical-systems logical-system-name interfaces pp0 unit logical-unit-number]</pre>  |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p><b>client</b> Statement introduced in Junos OS Release 8.5.</p> <p><b>server</b> Statement introduced in Junos OS Release 8.5.</p>   |
| <b>Description</b>              | <p>For J Series Services Routers, M120 Multiservice Edge Routers, M320 Multiservice Edge Service Routers, and MX Series Universal Edge Routers with PPP over Ethernet interfaces, configure PPP over Ethernet-specific interface properties.</p> <p>The remaining statements are explained separately.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring a PPPoE Interface</i></li> </ul>   |

## pppoe-underlying-options (Static and Dynamic Subscribers)


---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>pppoe-underlying-options {<br/>    access-concentrator <i>name</i>;<br/>    dynamic-profile <i>profile-name</i>;<br/>    duplicate-protection;<br/>    max-sessions <i>number</i>;<br/>    max-sessions-vs-a-ignore;<br/>    service-name-table <i>table-name</i>;<br/>    short-cycle-protection &lt;lockout-time-min <i>minimum-seconds</i> lockout-time-max<br/>        <i>maximum-seconds</i>&gt;;<br/>}</pre> |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.  |
| <b>Description</b>              | <p>Configure PPPoE-specific interface properties for the underlying interface on which the router creates a static or dynamic PPPoE logical interface. The underlying interface must be configured with PPPoE (<b>ppp-over-ether</b>) encapsulation.</p> <p>The remaining statements are explained separately.</p>  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring PPPoE</i> (for static interfaces)</li><li>• <i>Configuring an Underlying Interface for Dynamic PPPoE Subscriber Interfaces</i></li><li>• <i>Assigning a Service Name Table to a PPPoE Underlying Interface</i></li></ul>   |



## preferred

---

|  |  |
|--|--|
| <b>Syntax</b>  | preferred;   |
| <b>Hierarchy Level</b>   | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> address <i>address</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> address <i>address</i> ] |
| <b>Release Information</b>   | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 11.1 for the QFX Series.   |
| <b>Description</b>   | Configure this address to be the preferred address on the interface. If you configure more than one address on the same subnet, the preferred source address is chosen by default as the source address when you initiate frame transfers to destinations on the subnet.                 |
| <div>  <p><b>NOTE:</b> The edit logical-systems hierarchy is not available on QFabric systems.</p> </div> |  |
| <b>Default</b>   | The lowest-numbered address on the subnet is the preferred address.  |
| <b>Required Privilege Level</b>  | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>   | <ul style="list-style-type: none"> <li>• <a href="#">Configuring the Interface Address on page 204</a></li> </ul>  |

## preferred-source-address

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>preferred-source-address address;</code>  |
| <b>Hierarchy Level</b>          | <code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> <i>family</i> <i>unnumbered-address</i> <i>interface-name</i>],</code><br><code>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> <i>family</i> <i>unnumbered-address</i> <i>interface-name</i>]</code>  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.0.   |
| <b>Description</b>              | <p>For unnumbered Ethernet interfaces configured with a loopback interface as the donor interface, specify one of the loopback interface's secondary addresses as the preferred source address for the unnumbered Ethernet interface. Configuring the preferred source address enables you to use an IP address other than the primary IP address on some of the unnumbered Ethernet interfaces in your network.</p> <p>Configuration of a preferred source address for unnumbered Ethernet interfaces is supported for the IPv4 and IPv6 address families.</p> |
| <b>Options</b>                  | <b>address</b> —Secondary IP address of the donor loopback interface.   |
| <b>Required Privilege Level</b> | <b>interface</b> —To view this statement in the configuration.<br><b>interface-control</b> —To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring a Preferred Source Address for Unnumbered Ethernet or Demux Interfaces on page 215</a></li><li>• <a href="#">address on page 329</a></li><li>• <i>Junos OS Administration Library for Routing Devices</i></li></ul>   |

## premium

See the following sections:

- [premium \(Hierarchical Policer\) on page 697](#)
- [premium \(Output Priority Map\) on page 698](#)
- [premium \(Policer\) on page 698](#)

### premium (Hierarchical Policer)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre> premium {   if-exceeding {     bandwidth-limit <i>bandwidth</i>;     burst-size-limit <i>burst</i>;   }   then {     discard;   } } </pre>   |
| <b>Hierarchy Level</b>          | [edit dynamic-profiles <i>profile-name</i> firewall hierarchical-policer],<br>[edit firewall hierarchical-policer]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.5.<br>Support at the [edit dynamic-profiles ... <b>hierarchical-policer <i>name</i></b> ] hierarchy level introduced in Junos OS Release 11.4.  |
| <b>Description</b>              | On M40e, M120, and M320 edge routers with FPC input as FFPC and FPC output as SFPC, and on MX Series, T320, T640, and T1600 edge routers with Enhanced Intelligent Queuing (IQE) PICs, T4000 routers with Type 5 FPC and Enhanced Scaling Type 4 FPC, specify a premium level for a hierarchical policer.  |
| <b>Options</b>                  | Options are described separately.  |
| <b>Required Privilege Level</b> | firewall—To view this statement in the configuration.<br>firewall-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Applying Policers on page 222</a></li> <li>• <i>Junos OS Class of Service Library for Routing Devices</i></li> <li>• <i>Hierarchical Policer Configuration Overview</i></li> <li>• <i>Hierarchical Policers</i></li> <li>• <i>aggregate (Hierarchical Policer)</i></li> <li>• <a href="#">bandwidth-limit (Hierarchical Policer) on page 357</a></li> <li>• <a href="#">burst-size-limit (Hierarchical Policer) on page 370</a></li> <li>• <i>hierarchical-policer</i></li> <li>• <i>if-exceeding (Hierarchical Policer)</i></li> </ul> |

## premium (Output Priority Map)

|                          |  |
|--------------------------|--|
| Syntax                   | <pre>premium {<br/>  forwarding-class class-name {<br/>    loss-priority (high   low);<br/>  }<br/>}</pre>   |
| Hierarchy Level          | [edit interfaces <i>interface-name</i> gigether-options <a href="#">ethernet-switch-profile</a> <a href="#">ethernet-policer-profile</a> output-priority-map classifier] |
| Release Information      | Statement introduced before Junos OS Release 7.4.  |
| Description              | For Gigabit Ethernet IQ interfaces only, define the classifier for egress premium traffic.<br><br>The statements are explained separately.                               |
| Required Privilege Level | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| Related Documentation    | <ul style="list-style-type: none"><li>• <i>Specifying an Output Priority Map</i></li><li>• <a href="#">input-priority-map on page 525</a></li></ul>                      |

## premium (Policer)

|                          |  |
|--------------------------|--|
| Syntax                   | <pre>premium {<br/>  bandwidth-limit bps;<br/>  burst-size-limit bytes;<br/>}</pre>  |
| Hierarchy Level          | [edit interfaces <i>interface-name</i> gigether-options <a href="#">ethernet-switch-profile</a> <a href="#">ethernet-policer-profile</a> <a href="#">policer</a> cos-policer-name]   |
| Release Information      | Statement introduced before Junos OS Release 7.4.  |
| Description              | Define a policer to apply to nonpremium traffic.<br><br>The statements are explained separately.   |
| Required Privilege Level | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| Related Documentation    | <ul style="list-style-type: none"><li>• <i>Configuring Gigabit Ethernet Policers</i></li><li>• <a href="#">aggregate (Gigabit Ethernet CoS Policer) on page 334</a></li><li>• <a href="#">ieee802.1p on page 510</a></li></ul> |

## preserve-interface

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|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | preserve-interface;  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> sonet-options <a href="#">aps</a> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 7.6.  |
| <b>Description</b>              | <p>Provide link PIC replication, providing MLPPP link redundancy at the port level. This feature is supported with SONET APS and the following link PICs:</p> <ul style="list-style-type: none"> <li>• Channelized OC3 IQ PIC</li> <li>• Channelized OC12 IQ PIC</li> <li>• Channelized STM1 IQ PIC</li> </ul> <p>Link PIC replication provides the ability to add two sets of links, one from the active SONET PIC and the other from the standby SONET PIC, to the same bundle. If the active SONET PIC fails, links from the standby PIC are used without triggering link renegotiation. All the negotiated state is replicated from the active links to the standby links to prevent link renegotiation.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Link PIC Redundancy</i></li> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>  |


## primary

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See the following sections:

- [primary \(Address on Interface\) on page 700](#)
- [primary \(AS PIC or Multiservices PIC Interfaces\) on page 701](#)

### primary (Address on Interface)

|   |   |
|---|---|
| <b>Syntax</b>   | primary;  |
| <b>Hierarchy Level</b>  | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> address <i>address</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i><br>family <i>family</i> address <i>address</i> ]                 |
| <b>Release Information</b>  | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 11.1 for the QFX Series.  |
| <b>Description</b>  | Configure this address to be the primary address of the protocol on the interface. If the logical unit has more than one address, the primary address is used by default as the source address when packet transfer originates from the interface and the destination address does not indicate the subnet. |
| <div> <b>NOTE:</b> The edit logical-systems hierarchy is not available on QFabric systems.</div> |   |
| <b>Default</b>  | For unicast traffic, the primary address is the lowest non-127 (in other words, non-loopback) preferred address on the unit.  |
| <b>Required Privilege Level</b>   | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>  | • <a href="#">Configuring the Interface Address on page 204</a>   |

## primary (AS PIC or Multiservices PIC Interfaces)

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>primary <i>interface-name</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit <a href="#">interfaces</a> (rsp0   rsp1) <a href="#">redundancy-options</a> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | Specify the primary AS PIC or MultiServices PIC interface.  |
| <b>Options</b>                  | <i>interface-name</i> —The identifier for the AS PIC interface or MultiServices PIC interface, which must be of the form <b>sp-fpc/pic/port</b> . |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>                                 |

## priority

See the following sections:

- [priority \(OAM Connectivity-Fault Management\) on page 702](#)
- [priority \(Schedulers\) on page 703](#)



**NOTE:** For information about the priority statement at the [edit interfaces *interface-name* unit *unit-number* family inet address *address* (vrrp-group | vrrp-inet6-group) *group-number*] or [edit logical-systems *logical-system-name* interfaces *interface-name* unit *unit-number* family (inet | inet6) address *address* (vrrp-group | vrrp-inet6-group) *group-number*] hierarchy level, see the *Junos OS High Availability Library for Routing Devices*.

### priority (OAM Connectivity-Fault Management)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>priority <i>number</i>;</code>   |
| <b>Hierarchy Level</b>          | <p>[edit protocols <a href="#">oam ethernet connectivity-fault-management maintenance-domain</a> <i>md-name</i> <a href="#">maintenance-association</a> <i>ma-name</i> <a href="#">mep</a> <i>mep-id</i>]</p> <p>For EX Series Switches:</p> <p>[edit protocols oam ethernet connectivity-fault-management maintenance-domain <i>domain-name</i> maintenance-association <i>ma-name</i> mep <i>mep-id</i>]</p> |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.  |
| <b>Description</b>              | IEEE 802.1p priority bits used by the continuity check messages.   |
| <b>Options</b>                  | <p><b><i>number</i></b>—Configure the IEEE 802.1p priority bits to be used in the VLAN header of the CFM packets.</p> <p><b>Range:</b> 0 through 7</p>   |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring a Maintenance Endpoint</a></li> </ul>   |



## priority (Schedulers)

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>priority (high   low);</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>at-fpc/pic/port</i> atm-options scheduler-maps <i>map-name</i> <a href="#">forwarding-class</a> <i>class-name</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For ATM2 IQ interfaces only, assign queuing priority to a forwarding class.   |
| <b>Options</b>                  | <p><b>low</b>—Forwarding class has low priority.</p> <p><b>high</b>—Forwarding class has high priority.</p>                             |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring ATM2 IQ VC Tunnel CoS Components</a></li> </ul>                        |

## priority (Protocols OAM)

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>priority <i>priority-value</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam</a> <a href="#">ethernet connectivity-fault-management maintenance-domain</a> <i>md-name</i> <a href="#">maintenance-association</a> <i>ma-name</i> <a href="#">mep</a> <i>mep-id</i> <a href="#">remote-mep</a> <i>remote-mep-id</i> <a href="#">sla-iterator-profile</a> <i>profile-name</i> <a href="#">sla-iterator-profile</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.1.  |
| <b>Description</b>              | Configure the priority of the iterator profile, which is the <b>vlan-pcp</b> value that is sent in the Y.1731 data frames.  |
| <b>Options</b>                  | <p><b><i>priority-value</i></b>—Priority value, which is the <b>vlan-pcp</b> value that is sent in the Y.1731 data frames.</p> <p><b>Range:</b> 0 through 7</p> <p><b>Default:</b> 0</p>  |
| <b>Required Privilege Level</b> | <p>Configure—To enter configuration mode.</p> <p>Control—To modify any configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">sla-iterator-profile on page 761</a></li> <li>• <a href="#">Configuring a Remote MEP with an Iterator Profile</a></li> </ul>   |

## promiscuous-mode

---

**Syntax**    promiscuous-mode {  
                  vpi *vpi-identifier*;  
                  }

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

**Release Information**    Statement introduced before Junos OS Release 7.4.  
Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.

**Description**    For ATM interfaces with **atm-ccc-cell-relay** encapsulation, map all incoming cells from either an interface port or a VP to a single label-switched path (LSP) without restricting the VCI number. Promiscuous mode allows you to map traffic from all 65,535 VCIs to a single LSP, or from all 256 VPIs to a single LSP.



.....  
**NOTE:** In ACX Series routers, the statement supports only Inverse Multiplexing for ATM (IMA).  
.....

**Options**    *vpi-identifier*—Open this VPI in promiscuous mode.  
**Range:** 0 through 255

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

**Related Documentation**    • *Configuring ATM Cell-Relay Promiscuous Mode*  
                                  • [vpi \(ATM CCC Cell-Relay Promiscuous Mode\) on page 865](#)

## protect-circuit

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>protect-circuit <i>group-name</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> sonet-options <a href="#">aps</a> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | Configure the protect router in an APS circuit pair. When the working interface fails, APS brings up the protection circuit and the traffic is moved to the protection circuit. |
| <b>Options</b>                  | <i>group-name</i> —Circuit's group name.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Basic Automatic Protect Switching</i></li><li>• <a href="#">working-circuit on page 874</a></li></ul>                    |

## protection-group

```
Syntax  protection-group {
        ethernet-ring ring-name {
            control-vlan (vlan-id | vlan-name);
            data-channel {
                vlan number
            }
            east-interface {
                control-channel channel-name {
                    vlan number;
                }
            }
            guard-interval number;
            node-id mac-address;
            restore-interval number;
            ring-protection-link-owner;
            west-interface {
                control-channel channel-name {
                    vlan number;
                }
            }
        }
        control-vlan (vlan-id | vlan-name);
        east-interface {
            node-id mac-address;
            control-channel channel-name {
                interface-none
                ring-protection-link-end;
            }
        }
        control-channel channel-name {
            vlan number;
        }
    }
    data-channel {
        vlan number
    }
    guard-interval number;
    node-id mac-address;
    restore-interval number;
    ring-protection-link-owner;
    west-interface {
        node-id mac-address;
        control-channel channel-name {
            interface-none
            ring-protection-link-end;
        }
        control-channel channel-name {
            vlan number;
        }
    }
    guard-interval number;
```

```

restore-interval number;
traceoptions {
    file filename <no-stamp> <world-readable | no-world-readable> <replace> <size size>;
    flag flag;
}

```

|                                 |  |
|---------------------------------|--|
| <b>Hierarchy Level</b>          | [edit protocols]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.4.<br>Statement introduced in Junos OS Release 12.1 for EX Series switches.   |
| <b>Description</b>              | Configure Ethernet ring protection switching.<br><br>The statements are explained separately. All statements apply to MX Series routers. EX Series switches do not assign <b>node-id</b> and use <b>control-vlan</b> instead of <b>control-channel</b> .   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Ethernet Ring Protection Switching Overview</i></li> <li>• <i>Ethernet Ring Protection Using Ring Instances for Load Balancing</i></li> <li>• <i>Example: Configuring Load Balancing Within Ethernet Ring Protection for MX Series Routers</i></li> <li>• <i>Example: Configuring Ethernet Ring Protection Switching on EX Series Switches</i></li> <li>• <i>Configuring Ethernet Ring Protection Switching (CLI Procedure)</i></li> </ul> |

## protocol-down

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | protocol-down;   |
| <b>Hierarchy Level</b>          | [edit protocols <b>oam ethernet link-fault-management action-profile event</b> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.  |
| <b>Description</b>              | Upper layer indication of protocol down event. When the <b>protocol-down</b> statement is included, the protocol down event triggers the action specified under the <b>action</b> statement. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring an OAM Action Profile</i></li> </ul>   |

## protocols

---


|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>protocols [inet iso mpls];</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> logical-unit-number <b>family</b> tcc]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.3.   |
| <b>Description</b>              | For Layer 2.5 VPNs on T Series, MX Series, M120, and M320 routers support, configure IS-IS (ISO traffic) or MPLS traffic to traverse a TCC interface. By default, IPv4 (inet) traffic runs on T Series, MX, Series, M120, and M320 routers and over TCC interfaces. You must configure the same traffic type on both ends of the Layer 2.5 VPN. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring IS-IS or MPLS Traffic for TCC Interfaces on page 259</a></li></ul>  |

## proxy

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>proxy inet-address <i>address</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> logical-unit-number <b>family</b> tcc],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> logical-unit-number <b>family</b> tcc]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For Layer 2.5 VPNs using an Ethernet interface as the TCC router, configure the IP address for which the TCC router is proxying. Ethernet TCC is supported on interfaces that carry IPv4 traffic only. Ethernet TCC encapsulation is supported on 1-port Gigabit Ethernet, 2-port Gigabit Ethernet, 4-port Gigabit Ethernet, and 4-port Fast Ethernet PICs only. Ethernet TCC is not supported on the T640 router. |
| <b>Options</b>                  | <b>inet-address</b> —Configure the IP address of the neighbor to the TCC router.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Ethernet TCC</a></li><li>• <a href="#">Example: Configuring an Ethernet TCC or Extended VLAN TCC</a></li><li>• <a href="#">remote on page 723</a></li><li>• <a href="#">Junos OS VPNs Library for Routing Devices</a></li></ul>  |

## proxy-arp

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>proxy-arp (restricted   unrestricted);</code>  |
| <b>Hierarchy Level</b>          | <code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i>],</code><br><code>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i>]</code>   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.6 for EX Series switches.<br><b>restricted</b> added in Junos OS Release 10.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.2 for the QFX Series.   |
| <b>Description</b>              | For Ethernet interfaces only, configure the router or switch to respond to any ARP request, as long as the router or switch has an active route to the ARP request's target address.   |
|                                 | <div>  <p><b>NOTE:</b> You must configure the IP address and the inet family for the interface when you enable proxy ARP.</p> </div>  |
| <b>Default</b>                  | Proxy ARP is not enabled. The router or switch responds to an ARP request only if the destination IP address is its own.   |
| <b>Options</b>                  | <ul style="list-style-type: none"> <li>• <b>none</b>—The router or switch responds to any ARP request for a local or remote address if the router or switch has a route to the target IP address.</li> <li>• <b>restricted</b>—(Optional) The router or switch responds to ARP requests in which the physical networks of the source and target are different and does not respond if the source and target IP addresses are in the same subnet. The router or switch must also have a route to the target IP address.</li> <li>• <b>unrestricted</b>—(Optional) The router or switch responds to any ARP request for a local or remote address if the router or switch has a route to the target IP address.</li> </ul> |
|                                 | <b>Default:</b> <b>unrestricted</b>  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Restricted and Unrestricted Proxy ARP</i></li> <li>• <i>Configuring Proxy ARP (CLI Procedure)</i></li> <li>• <i>Configuring Proxy ARP (CLI Procedure)</i></li> <li>• <i>Example: Configuring Proxy ARP on an EX Series Switch</i></li> <li>• <i>Configuring Gratuitous ARP</i></li> </ul>  |

## push

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>push;</code>   |
| <b>Hierarchy Level</b>          | <code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">input-vlan-map</a>],</code><br><code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">output-vlan-map</a>],</code><br><code>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i></code><br><code><a href="#">input-vlan-map</a>],</code><br><code>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i></code><br><code><a href="#">output-vlan-map</a>]</code>  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.   |
| <b>Description</b>              | <p>Specify the VLAN rewrite operation to add a new VLAN tag to the top of the VLAN stack. An outer VLAN tag is pushed in front of the existing VLAN tag.</p> <p>You can use this statement on Gigabit Ethernet IQ and 10-Gigabit Ethernet IQ2 and IQ2-E interfaces, 10-Gigabit Ethernet LAN/WAN PIC, aggregated Ethernet interfaces using Gigabit Ethernet IQ interfaces, and 100-Gigabit Ethernet Type 5 PIC with CFP.</p> <p>If you include the <b>push</b> statement in the configuration, you must also include the <a href="#">pop</a> statement at the <code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">output-vlan-map</a>]</code> hierarchy level.</p> |
| <b>Required Privilege Level</b> | <code>interface</code> —To view this statement in the configuration.<br><code>interface-control</code> —To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Stacking a VLAN Tag</i></li></ul>   |



## push-push

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | push-push;  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">input-vlan-map</a> ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">output-vlan-map</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">input-vlan-map</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">output-vlan-map</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.1.<br>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.  |
| <b>Description</b>              | Specify the VLAN rewrite operation to push two VLAN tags in front of the frame.<br><br>You can use this statement on Gigabit Ethernet IQ, IQ2 and IQ2-E interfaces, 10-Gigabit Ethernet LAN/WAN PIC, on aggregated Ethernet interfaces using Gigabit Ethernet IQ2 and IQ2-E or 10-Gigabit Ethernet PICs on MX Series routers, and 100-Gigabit Ethernet Type 5 PIC with CFP.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Stacking Two VLAN Tags</i></li> </ul>   |

## queue-depth

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>queue-depth <i>cells</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">atm-options</a> <a href="#">linear-red-profiles</a> <i>profile-name</i> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For ATM2 IQ interfaces only, define maximum queue depth in the CoS VC drop profile. Packets are always dropped beyond the defined maximum. This statement is mandatory; there is no default configuration.  |
| <b>Default</b>                  | Buffer usage is unregulated.  |
| <b>Options</b>                  | <b><i>cells</i></b> —Maximum number of cells the queue can contain.<br><b>Range:</b> 1 through 64,000 cells   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring ATM2 IQ VC Tunnel CoS Components</i></li><li>• <i>Configuring Linear RED Profiles on ATM Interfaces</i></li><li>• <a href="#">high-plp-threshold on page 503</a></li><li>• <a href="#">low-plp-threshold on page 593</a></li></ul> |

## queue-length

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>queue-length <i>number</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> address <i>address</i> family <i>family</i> multipoint-destination <i>address</i> shaping ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> shaping ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> address <i>address</i> family <i>family</i> multipoint-destination <i>address</i> shaping ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> shaping ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 11.1 for the QFX Series.  |
| <b>Description</b>              | For ATM1 interfaces only, define the maximum queue length in the traffic-shaping profile. For ATM1 PICs, each VC has its own independent shaping parameters.  |
| <b>Default</b>                  | Buffer usage is unregulated.  |
| <b>Options</b>                  | <i>number</i> —Maximum number of packets the queue can contain.<br><b>Range:</b> 1 through 16,383 packets<br><b>Default:</b> 16,383 packets   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring the ATM1 Queue Length</i></li> </ul>  |

## queues

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>queues [ <i>queue-numbers</i> ];</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>vsp-fpc/pic/port</i> unit <i>logical-unit-number</i> <b>compression rtp</b> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For voice services interfaces only, assign queue numbers for RTP traffic.  |
| <b>Options</b>                  | <b>queues <i>queue-numbers</i></b> —Assign one or more of the following queues: <b>q0</b> , <b>q1</b> , <b>q2</b> , <b>q3</b> . For VRRP services, specify the <b>q3</b> option instead of <b>q0</b> . |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>  |

## quiet-period

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>quiet-period seconds;</code>  |
| <b>Hierarchy Level</b>          | [edit protocols dot1x authenticator interface <i>interface-id</i> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.3.   |
| <b>Description</b>              | Specify the number of seconds the port remains in the wait state following a failed authentication exchange with the client, before reattempting authentication.  |
| <b>Options</b>                  | <b>seconds</b> —Specify the number of seconds the port remains in the wait state following a failed authentication exchange with the client, before reattempting authentication.<br><b>Range:</b> 0 through 65,535 seconds<br><b>Default:</b> 60 seconds                      |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>IEEE 802.1x Port-Based Network Access Control Overview</i></li><li>• <a href="#">authenticator on page 349</a></li><li>• <a href="#">dot1x on page 434</a></li><li>• <a href="#">interface (IEEE 802.1x) on page 530</a></li></ul> |

## radius-realm

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>radius-realm radius-realm-string;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> auto-configure <a href="#">vlan-ranges authentication username-include</a> ],<br>[edit interfaces <i>interface-name</i> auto-configure <a href="#">stacked-vlan-ranges authentication username-include</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.  |
| <b>Description</b>              | Specify that the user-defined RADIUS realm string is appended as a last piece to the username and used by RADIUS to direct the authentication request to a profile that does not allocates addresses.   |
| <b>Options</b>                  | <b>radius-realm-string</b> —A string to describe the RADIUS realm.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring VLAN Interface Username Information for AAA Authentication</i></li></ul>   |

## ranges

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See the following sections:

- [ranges \(Dynamic Stacked VLAN\) on page 715](#)
- [ranges \(Dynamic VLAN\) on page 716](#)

### ranges (Dynamic Stacked VLAN)

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>ranges (any   <i>low-tag-high-tag</i>),(any   <i>low-tag-high-tag</i>);</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> auto-configure stacked-vlan-ranges dynamic-profile <i>profile-name</i> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.5.   |
| <b>Description</b>              | Configure VLAN ranges for dynamic, auto-sensed stacked VLANs.   |
| <b>Options</b>                  | <p><b>any</b>—The entire VLAN range.</p> <p><b><i>low-tag</i></b>—The lower limit of the VLAN range.</p> <p><b><i>high-tag</i></b>—The upper limit of the VLAN range.</p> <p><b>Range:</b> 1 through 4094</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Stacked VLAN Ranges for Use with Stacked VLAN Dynamic Profiles</a></li></ul>  |

## ranges (Dynamic VLAN)

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>ranges (any   <i>low-tag</i>)-(any   <i>high-tag</i>);</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> auto-configure vlan-ranges <b>dynamic-profile</b> <i>profile-name</i> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.5.   |
| <b>Description</b>              | Configure VLAN ranges for dynamic, auto-sensed VLANs.   |
| <b>Options</b>                  | <b>any</b> —The entire VLAN range.<br><br><b><i>low-tag</i></b> —The lower limit of the VLAN range.<br><br><b><i>high-tag</i></b> —The upper limit of the VLAN range.<br><b>Range:</b> 1 through 4094 |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Single-Level VLAN Ranges for Use with VLAN Dynamic Profiles</a></li></ul>   |

---

## rate

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>rate <i>percentage</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>receive-bucket</b> ],<br>[edit interfaces <i>interface-name</i> <b>transmit-bucket</b> ]               |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Specify percentage of the interface line rate that is available to receive or transmit packets.  |
| <b>Options</b>                  | <b><i>percentage</i></b> —Percentage of the interface line rate that is available to receive or transmit packets.<br><b>Range:</b> 0 through 100 |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Receive and Transmit Leaky Bucket Properties on page 158</a></li></ul>           |

## rate

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>rate new-sessions-per-second;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> services-options <a href="#">session-limit</a> ]                                 |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.6.   |
| <b>Description</b>              | Specify the maximum number of new sessions allowed per second.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |

## reassemble-packets

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>reassemble-packets;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>gr-fpc/pic/port</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>gr-fpc/pic/port</i> unit <i>logical-unit-number</i> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.2.  |
| <b>Description</b>              | Enable reassembly of fragmented tunnel packets on generic routing encapsulation (GRE) tunnel interfaces.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> <li>• <i>Configuring Packet Reassembly</i></li> </ul>                                |

## reauthentication

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | reauthentication (disable   interval <i>seconds</i> );   |
| <b>Hierarchy Level</b>          | [edit protocols dot1x authenticator interface <i>interface-id</i> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.3.  |
| <b>Description</b>              | Set or disable the periodic reauthentication of the client.  |
| <b>Options</b>                  | <ul style="list-style-type: none"><li>• <b>disable</b>—Disable the periodic reauthentication of the client.</li><li>• <b>interval <i>seconds</i></b>—Specify the periodic reauthentication time interval.</li></ul> <p><b>Range:</b> 1 through 65,535 seconds<br/><b>Default:</b> 3600 seconds</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>IEEE 802.1x Port-Based Network Access Control Overview</i></li><li>• <a href="#">dot1x on page 434</a></li><li>• <a href="#">interface (IEEE 802.1x) on page 530</a></li><li>• <a href="#">quiet-period on page 714</a></li></ul>                       |

## rebalance-periodic (Aggregated Ethernet Subscriber Interfaces)

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|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | rebalance-periodic time <i>hour:minute</i> <interval <i>hours</i> >  |
| <b>Hierarchy Level</b>          | [edit interfaces ae <i>number</i> <a href="#">aggregated-ether-options</a> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.2.   |
| <b>Description</b>              | Configure periodic rebalancing of distribution of subscribers on an aggregated Ethernet bundle.  |
| <b>Options</b>                  | <p><b><i>hour:minute</i></b>—Time at which the rebalancing occurs, in military time.</p> <p><b><i>hours</i></b>—Interval at which the rebalancing occurs, in hours. Default: 24 hours.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Periodic Rebalancing of Subscribers in an Aggregated Ethernet Interface</i></li></ul>   |



## receive-bucket

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>receive-bucket {     <b>overflow</b> (discard   tag);     <b>rate</b> <i>percentage</i>;     <b>threshold</b> <i>bytes</i>; }</pre>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | <p>Set parameters for the receive leaky bucket, which specifies what percentage of the interface's total capacity can be used to receive packets.</p> <p>For each DS3 channel on a channelized OC12 interface, you can configure a unique receive bucket.</p> <p>The statements are explained separately.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Receive and Transmit Leaky Bucket Properties on page 158</a></li> <li>• <a href="#">transmit-bucket on page 820</a></li> </ul>   |

## receive-options-packets

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | receive-options-packets;   |
| <b>Hierarchy Level</b>          | <p>[edit <b>interfaces</b> <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> inet],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> inet]</p> |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For a Monitoring Services PIC and an ATM or SONET/SDH PIC installed in an M160, M40e, or T Series router, guarantee conformity with cflowd records structure. This statement is required when you enable passive monitoring.   |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Enabling Passive Monitoring on ATM Interfaces</i></li> <li>• <i>Enabling Passive Monitoring on SONET/SDH Interfaces</i></li> </ul>   |

## receive-ttl-exceeded

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | receive-ttl-exceeded;  |
| <b>Hierarchy Level</b>          | [edit <a href="#">interfaces</a> <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> inet],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> inet] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For Monitoring Services PIC and an ATM or SONET/SDH PIC installed in an M160, M40e, or T Series router, guarantee conformity with cflowd records structure. This statement is required when you enable passive monitoring.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Enabling Passive Monitoring on ATM Interfaces</a></li><li>• <a href="#">Enabling Passive Monitoring on SONET/SDH Interfaces</a></li></ul>  |

## red-differential-delay

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | red-differential-delay <i>milliseconds</i> ;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> mlfr-uni-nni-bundle-options]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For link services and voice services interfaces only, configure the red differential delay among bundle links to give warning when a link has a differential delay that exceeds the configured threshold.  |
| <b>Options</b>                  | <b>milliseconds</b> —Red differential delay threshold.<br><b>Range:</b> 1 through 2000 milliseconds<br><b>Default:</b> 10 milliseconds   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">action-red-differential-delay on page 327</a></li><li>• <a href="#">yellow-differential-delay on page 874</a></li><li>• <a href="#">Junos OS Services Interfaces Library for Routing Devices</a></li></ul> |

## redial-delay

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>redial-delay <i>time</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>dlr</i> unit <i>logical-unit-number</i> <b>dialer-options</b> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>dlr</i> unit <i>logical-unit-number</i> <b>dialer-options</b> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 7.5.  |
| <b>Description</b>              | <p>On J Series Services Routers with interfaces configured for ISDN with dialout, specify the delay (in seconds) between two successive calls made by the dialer. To configure callback mode, include the <b>callback</b> statement at the [edit interfaces <i>dlr</i> unit <i>logical-unit-number</i> <b>dialer-options</b>] hierarchy level.</p> <p>If the <b>callback</b> statement is configured, you cannot use the <b>caller <i>caller-id</i></b> statement at the [edit interfaces <i>dlr</i> unit <i>logical-unit-number</i> <b>dialer-options</b>] hierarchy level.</p> |
| <b>Options</b>                  | <p><b>time</b>—Delay (in seconds) between two successive calls.</p> <p><b>Range:</b> 2 through 255 seconds</p> <p><b>Default:</b> 3 seconds</p>  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>ISDN Interfaces Overview</i></li> <li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li> </ul>  |

## redundancy-options

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|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>redundancy-options {<br/>    primary <i>interface-name</i>;<br/>    secondary <i>interface-name</i>;<br/>}</pre>  |
| <b>Hierarchy Level</b>          | [edit <a href="#">interfaces</a> (rsp0   rsp1)],<br>[edit interfaces <i>rlsnumber</i> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Specify the primary and secondary (backup) AS PIC interfaces or MultiServices PIC interfaces.  |
| <b>Options</b>                  | <p><b>primary <i>interface-name</i></b>—The identifier for the primary LSQ AS or MultiServices PIC interface.</p> <p><b>secondary <i>interface-name</i></b>—The identifier for the secondary (backup) LSQ AS or MultiServices PIC interface.</p> <p><b>hot-standby</b>—For one-to-one AS or MultiServices PIC redundancy configurations, specify that the failure detection and recovery must take place in less than 5 seconds.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>  |

## remote

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | remote {<br>(inet-address <i>address</i>   mac-address <i>address</i> );<br>}  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> tcc],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> tcc]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For Layer 2.5 VPNs using an Ethernet interface as the TCC router, configure the location of the remote router. Ethernet TCC is supported on interfaces that carry IPv4 traffic only. Ethernet TCC encapsulation is supported on 1-port Gigabit Ethernet, 2-port Gigabit Ethernet, 4-port Gigabit Ethernet, and 4-port Fast Ethernet PICs only. |
| <b>Options</b>                  | <b>mac-address</b> —Configure the MAC address of the remote site.<br><br><b>inet-address</b> —Configure the IP address of the remote site.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Ethernet TCC</i></li> <li>• <i>Example: Configuring an Ethernet TCC or Extended VLAN TCC</i></li> <li>• <a href="#">proxy on page 708</a></li> <li>• <i>Junos OS VPNs Library for Routing Devices</i></li> </ul>   |

## remote-loopback

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | remote-loopback;  |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam</a> <a href="#">link-fault-management</a> <a href="#">interface</a> <i>interface-name</i> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.2.   |
| <b>Description</b>              | For Ethernet interfaces on EX Series switches and M320, M120, MX Series, and T Series routers, set the remote DTE into loopback mode. Remove the statement from the configuration to take the remote DTE out of loopback mode. Used for IEEE 802.3ah Operation, Administration, and Management (OAM) support. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Setting a Remote Interface into Loopback Mode</i></li> </ul>  |

## remote-loopback-respond

---

|                            |   |
|----------------------------|---|
| <b>Syntax</b>              | remote-loopback-respond;  |
| <b>Hierarchy Level</b>     | [edit interfaces <i>ct1-fpc/pic/port</i> ],<br>[edit interfaces <i>interface-name</i> <b>t1-options</b> ]   |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.               |
| <b>Description</b>         | For T1 interfaces only, configure the router to respond to remote loopback requests. Remote loopback requests can be from the facilities data link or inband. |



**NOTE:** When configuring CT1 interfaces on the 10-port Channelized E1/T1 IQE PIC, the remote-loopback-respond statement must be included at the [edit interfaces *ct1-fpc/pic/port*] hierarchy level.

|                                 |   |
|---------------------------------|---|
| <b>Default</b>                  | The router does not respond to remote loop requests.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring the T1 Remote Loopback Response</i></li><li>• <a href="#">feac-loop-respond on page 479</a></li><li>• <a href="#">loopback (ADSL, DS0, E1/E3, SONET/SDH, SHDSL, and T1/T3) on page 587</a></li></ul> |

## remote-mep

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>remote-mep mep-id {   action-profile profile-name;   sla-iterator-profile profile-name {     data-tlv-size size;     iteration-count count-value;     priority priority-value;   } }</pre> |
| <b>Hierarchy Level</b>          | [edit protocols <b>oam ethernet connectivity-fault-management maintenance-domain md-name maintenance-association ma-name mep mep-id</b> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.   |
| <b>Description</b>              | Configure the numeric identifier of the remote maintenance association end point (MEP) within the maintenance association.  |
| <b>Options</b>                  | <p><b>mep-id</b>—Numeric identifier of the MEP.</p> <p><b>Range:</b> 1 through 8191</p> <p>The remaining statements are explained separately.</p>   |
| <b>Required Privilege Level</b> | <p>Configure—To enter configuration mode.</p> <p>Control—To modify any configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><i>Configuring a Maintenance Endpoint</i></li> </ul>   |

## remove-when-no-subscribers

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | remove-when-no-subscribers;  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>auto-configure</b> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.4.   |
| <b>Description</b>              | Remove subscriber VLANs automatically when no client sessions (for example, DHCP or PPPoE) exist on the VLAN.                  |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p> |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><i>Automatically Removing VLANs with No Subscribers</i></li> </ul>                      |

## request

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>request (protect   working);</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> sonet-options <a href="#">aps</a> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | Perform a manual switch between the protect and working circuits. This statement is honored only if there are no higher-priority reasons to switch.                 |
| <b>Options</b>                  | <b>protect</b> —Request that the circuit become the protect circuit.<br><b>working</b> —Request that the circuit become the working circuit.                        |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Switching Between the Working and Protect Circuits</i></li><li>• <a href="#">force on page 483</a></li></ul> |



## required-depth

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>required-depth</code> <i>number</i> ;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>atm-options</b> <b>mpls pop-all-labels</b> ],<br>[edit interfaces <i>interface-name</i> <b>sonet-options</b> <b>mpls pop-all-labels</b> ],<br>[edit interfaces <i>interface-name</i> <b>fastether-options</b> <b>mpls pop-all-labels</b> ],<br>[edit interfaces <i>interface-name</i> <b>gigether-options</b> <b>mpls pop-all-labels</b> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.   |
| <b>Description</b>              | For passive monitoring on ATM and SONET/SDH interfaces only, specify the number of MPLS labels an incoming packet must have for the <b>pop-all-labels</b> statement to take effect.<br><br>If you include the <b>required-depth 1</b> statement, the <b>pop-all-labels</b> statement takes effect for incoming packets with one label only. If you include the <b>required-depth 2</b> statement, the <b>pop-all-labels</b> statement takes effect for incoming packets with two labels only. |
| <b>Options</b>                  | <b>number</b> —Number of MPLS labels on incoming IP packets.<br><b>Range:</b> 1 or 2 labels<br><b>Default:</b> If you omit this statement, the <b>pop-all-labels</b> statement takes effect for incoming packets with one or two labels. The default is equivalent to including the <b>required-depth [ 1 2 ]</b> statement.  |
| <b>Required Privilege Level</b> | <b>interface</b> —To view this statement in the configuration.<br><b>interface-control</b> —To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Removing MPLS Labels from Incoming Packets</i></li> <li>• <i>Removing MPLS Labels from Incoming Packets</i></li> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>   |

## restore-interval

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | restore-interval <i>number</i> ;  |
| <b>Hierarchy Level</b>          | [edit protocols <b>protection-group ethernet-ring</b> <i>ring-name</i> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.4.<br>Statement introduced in Junos OS Release 12.1 for EX Series switches.  |
| <b>Description</b>              | Configures the number of minutes that the node does not process any Ethernet ring protection (ERP) protocol data units (PDUs).. This configuration is a global configuration and applies to all Ethernet rings if the Ethernet ring does not have a more specific configuration for this value. If no parameter is configured at the protection group level, the global configuration of this parameter uses the default value. |
| <b>Options</b>                  | <i>number</i> —Specify the restore interval.<br><b>Range:</b> 5 through 12 minutes  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Ethernet Ring Protection Switching Overview</i></li><li>• <i>Example: Configuring Ethernet Ring Protection Switching on EX Series Switches</i></li><li>• <i>Configuring Ethernet Ring Protection Switching (CLI Procedure)</i></li></ul>   |

## retries

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>retries <i>integer</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit protocols dot1x authenticator interface <i>interface-id</i> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.3.   |
| <b>Description</b>              | Set a limit on the number of failed authentication attempts between a port and a client. When the limit is exceeded, the port waits to reattempt authentication for the number of seconds set by the <b>quiet-period</b> statement configured at the same hierarchy level.        |
| <b>Options</b>                  | <p><i>integer</i>—Specify the number of retries.</p> <p><b>Range:</b> 1 through 10</p> <p><b>Default:</b> 3 retries</p>   |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>IEEE 802.1x Port-Based Network Access Control Overview</i></li> <li>• <a href="#">dot1x on page 434</a></li> <li>• <a href="#">interface (IEEE 802.1x) on page 530</a></li> <li>• <a href="#">quiet-period on page 714</a></li> </ul> |

## revert-time (Interfaces)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>revert-time <i>seconds</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> sonet-options <a href="#">aps</a> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Configure APS revertive mode.  |
| <b>Default</b>                  | APS operates in nonrevertive mode.   |
| <b>Options</b>                  | <p><i>seconds</i>—Amount of time to wait after the working circuit has again become functional before making the working circuit active again.</p> <p><b>Range:</b> 1 through 65,535 seconds</p> <p><b>Default:</b> None (APS operates in nonrevertive mode)</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Revertive Mode</i></li> </ul>  |

## revertive

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|                            |  |
|----------------------------|--|
| <b>Syntax</b>              | revertive;   |
| <b>Hierarchy Level</b>     | [edit interfaces aeX aggregated-ether-options lacp link-protection]  |
| <b>Release Information</b> | Statement introduced in Junos OS Release 9.3.<br>Statement introduced in Junos OS Release 12.3 for EX Series switches. |
| <b>Description</b>         | Enable the ability to switch to a better priority link (if one is available).  |



**NOTE:** By default, LACP link protection is revertive. However, you can use this statement to define a specific aggregated Ethernet interface as revertive to override a global non-revertive statement specified at the [edit chassis] hierarchy level.

|                                 |  |
|---------------------------------|--|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>non-revertive (Chassis)</i></li><li>• <i>Configuring LACP Link Protection of Aggregated Ethernet Interfaces (CLI Procedure)</i></li></ul> |

## rfc-2615

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | rfc-2615;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> sonet-options]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | Include this statement to enable features described in RFC 2615, <i>PPP over SONET/SDH</i> .                            |
| <b>Default</b>                  | Settings required by RFC 1619, <i>PPP over SONET/SDH</i> .  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring SONET/SDH RFC 2615 Support</i></li></ul>                         |

## ring-protection-link-end

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | ring-protection-link-end;   |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">protection-group ethernet-ring</a> <i>ring-name</i> ( <a href="#">east-interface</a>   <a href="#">west-interface</a> )]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.4.<br>Statement introduced in Junos OS Release 12.1 for EX Series switches.  |
| <b>Description</b>              | Specify that the port is one side of a ring protection link (RPL) by setting the RPL end flag.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Ethernet Ring Protection Switching Overview</i></li> <li>• <i>Example: Configuring Ethernet Ring Protection Switching on EX Series Switches</i></li> <li>• <i>Configuring Ethernet Ring Protection Switching (CLI Procedure)</i></li> </ul> |

## ring-protection-link-owner

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | ring-protection-link-owner;  |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">protection-group ethernet-ring</a> <i>ring-name</i> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.4.<br>Statement introduced in Junos OS Release 12.1 for EX Series switches.   |
| <b>Description</b>              | Specify the ring protection link (RPL) owner flag in the Ethernet protection ring. Include this statement only once for each ring (only one node can function as the RPL owner). |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Ethernet Ring Protection Switching Overview</i></li> </ul>   |

## routing-instance

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>routing-instance {<br/>    destination <i>routing-instance-name</i>;<br/>}</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> tunnel],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> tunnel] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | To configure <b>interfaces</b> and <b>logical-systems</b> , specify the destination routing instance that points to the routing table containing the tunnel destination address.                                    |
| <b>Default</b>                  | The default Internet routing table is <b>inet.0</b> .   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>   |

## routing-instance (PPPoE Service Name Tables)

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>routing-instance <i>routing-instance-name</i>;</code>   |
| <b>Hierarchy Level</b>          | <code>[edit protocols pppoe service-name-tables <i>table-name</i> <i>service</i> <i>service-name</i>],</code><br><code>[edit protocols pppoe service-name-tables <i>table-name</i> service <i>service-name</i> <i>agent-specifier</i></code><br><code>aci <i>circuit-id-string</i> ari <i>remote-id-string</i>]</code>  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.2.  |
| <b>Description</b>              | <p>Use in conjunction with the <b>dynamic-profile</b> statement at the same hierarchy levels to specify the routing instance in which to instantiate a dynamic PPPoE interface. You can associate a routing instance with a named service entry, <b>empty</b> service entry, or <b>any</b> service entry configured in a PPPoE service name table, or with an agent circuit identifier/agent remote identifier (ACI/ARI) pair defined for these services.</p> <p>The routing instance associated with a service entry in a PPPoE service name table overrides the routing instance associated with the PPPoE underlying interface on which the dynamic PPPoE interface is created.</p> <p>If you include the <b>routing-instance</b> statement at the <code>[edit protocols pppoe service-name-tables <i>table-name</i> service <i>service-name</i> agent-specifier aci <i>circuit-id-string</i> ari <i>remote-id-string</i>]</code> hierarchy level, you cannot also include the <b>static-interface</b> statement at this level. The <b>routing-instance</b> and <b>static-interface</b> statements are mutually exclusive for ACI/ARI pair configurations.</p> |
| <b>Options</b>                  | <b><i>routing-instance-name</i></b> —Name of the routing instance in which the router instantiates the dynamic PPPoE interface.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><i>Configuring PPPoE Service Name Tables</i></li> <li><i>Assigning a Dynamic Profile and Routing Instance to a Service Name or ACI/ARI Pair for Dynamic PPPoE Interface Creation</i></li> </ul>  |

## rpf-check (interfaces)

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>rpf-check {<br/>    fail-filter <i>filter-name</i>;<br/>    mode loose;<br/>}</pre>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>family</b> <i>family</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>family</i> ]                 |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | <p>Check whether traffic is arriving on an expected path. You can include this statement with the <b>inet</b> or <b>inet6</b> protocol family only.</p> <p>The <b>mode</b> statement is explained separately.</p>   |
| <b>Options</b>                  | <b>fail-filter</b> —A filter to evaluate when packets are received on the interface. If the RPF check fails, this optional filter is evaluated. If the fail filter is not configured, the default action is to silently discard the packet.                                     |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Unicast RPF Strict Mode on page 236</a></li><li>• <a href="#">Configuring Unicast RPF Loose Mode on page 237</a></li><li>• <a href="#">Example: Configuring Unicast Reverse-Path-Forwarding Check</a></li></ul> |



## rpf-loose-mode-discard

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>rpf-loose-mode-discard {     family {         inet;         inet6;     } }</pre>  |
| <b>Hierarchy Level</b>          | [edit forwarding-options]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 12.1.<br>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.  |
| <b>Description</b>              | Configure unicast reverse path forwarding (unicast RPF) loose mode with the ability to discard packets with the source address pointing to the discard next hop. |
| <b>Options</b>                  | <b>inet</b> —IPv4 address family.<br><br><b>inet6</b> —IPv6 address family.  |
| <b>Required Privilege Level</b> | interface-control—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Unicast RPF on page 235</a></li> </ul>  |

## rtp

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>rtp {     f-max-period <i>number</i>;     queues [ <i>queue-numbers</i> ];     port {         minimum <i>port-number</i>;         maximum <i>port-number</i>;     } }</pre> |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>compression</b> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Configure the real-time transport protocol (RTP) properties for voice services traffic.<br><br>The remaining statements are described separately.                                |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>  |

## rts

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | rts (assert   de-assert   normal);  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options dce-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">serial-options dte-options</a> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For EIA-530 and V.35 interfaces only, configure the to-DCE signal, request to send (RTS).   |
| <b>Options</b>                  | <b>assert</b> —The to-DCE signal must be asserted.<br><br><b>de-assert</b> —The to-DCE signal must be deasserted.<br><br><b>normal</b> —Normal RTS signal handling, as defined by the TIA/EIA Standard 530.<br><b>Default:</b> normal |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the Serial Signal Handling on page 303</a></li></ul>  |

## rts-polarity

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | rts-polarity (negative   positive);  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Configure RTS signal polarity.   |
| <b>Options</b>                  | <b>negative</b> —Negative signal polarity.<br><br><b>positive</b> —Positive signal polarity.<br><b>Default:</b> positive |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Serial Signal Polarities on page 306</a></li></ul>       |

## rtvbr

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>rtvbr peak rate sustained rate burst length;</code>   |
| <b>Hierarchy Level</b>          | <p>[edit interfaces <i>interface-name</i> atm-options vpi <i>vpi-identifier</i> shaping ],</p> <p>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> address <i>address</i> family <i>family</i> multipoint-destination <i>address</i> shaping ],</p> <p>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> shaping ],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> shaping ],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> address <i>address</i> family <i>family</i> multipoint-destination <i>address</i> shaping ]</p>   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | <p>For ATM2 IQ PICs only, define the real-time variable bandwidth utilization in the traffic-shaping profile.</p> <p>When you configure the real-time bandwidth utilization, you must specify all three options (<b>burst</b>, <b>peak</b>, and <b>sustained</b>). You can specify the rate in bits per second either as a complete decimal number or as a decimal number followed by the abbreviation <b>k</b> (1000), <b>m</b> (1,000,000), or <b>g</b> (1,000,000,000). You can also specify the rate in cells per second by entering a decimal number followed by the abbreviation <b>c</b>; values expressed in cells per second are converted to bits per second using the formula 1 cps = 384 bps.</p>   |
| <b>Default</b>                  | If the <b>rtvbr</b> statement is not included, bandwidth utilization is unlimited.  |
| <b>Options</b>                  | <p><b>burst length</b>—Burst length, in cells. If you set the length to 1, the peak traffic rate is used.<br/><b>Range:</b> 1 through 4000 cells</p> <p><b>peak rate</b>—Peak rate, in bits per second or cells per second.<br/><b>Range:</b> For ATM2 IQ OC3 and OC12 interfaces, 33 Kbps through 542,526,792 bps. For ATM2 IQ OC48 interfaces, 33 Kbps through 2,170,107,168 bps. For ATM2 IQ DS3 and E3 interfaces, 33 Kbps through the maximum rate, which depends on the ATM encapsulation and framing you configure..</p> <p><b>sustained rate</b>—Sustained rate, in bps or cps.<br/><b>Range:</b> For ATM2 IQ OC3 and OC12 interfaces, 33 Kbps through 542,526,792 bps. For ATM2 IQ OC48 interfaces, 33 Kbps through 2,170,107,168 bps. For ATM2 IQ DS3 and E3 interfaces, from 33 Kbps through the maximum rate, which depends on the ATM encapsulation and framing you configure.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring ATM CBR</i></li> <li>• <i>Configuring ATM2 IQ Real-Time VBR</i></li> <li>• <i>Applying Scheduler Maps to Logical ATM Interfaces</i></li> </ul>  |

- [cbr on page 379](#)
- [vbr on page 843](#)

## sa-multicast (100-Gigabit Ethernet)

|                            |  |
|----------------------------|--|
| <b>Syntax</b>              | sa-multicast;  |
| <b>Hierarchy Level</b>     | [edit chassis fpc slot pic slot forwarding-mode]   |
| <b>Release Information</b> | Statement introduced in Junos OS Release 10.4.   |
| <b>Description</b>         | Configure the 100-Gigabit Ethernet PIC or MIC to interoperate with other Juniper Networks 100-Gigabit Ethernet PICs. |



**NOTE:** The default packet steering mode for PD-1CE-CFP-FPC4 is SA multicast bit mode. No SA multicast configuration is required to enable this mode.

sa-multicast supports interoperability between the following PICs and MICs:

- 100-Gigabit Ethernet Type 5 PIC with CFP (PF-1CGE-CFP) and the 100-Gigabit Ethernet Type 4 PIC with CFP (PD-1CE-CFP-FPC4) .
- 100-Gigabit Ethernet MICs and the 100-Gigabit Ethernet Type 4 PIC with CFP (PD-1CE-CFP-FPC4).

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

|                              |  |
|------------------------------|--|
| <b>Related Documentation</b> | <ul style="list-style-type: none"> <li>• <i>Interoperability Between the 100-Gigabit Ethernet PICs PD-1CE-CFP-FPC4 and PF-1CGE-CFP</i></li> <li>• <i>Configuring the Interoperability Between the 100-Gigabit Ethernet PICs PF-1CGE-CFP and PD-1CE-CFP-FPC4</i></li> <li>• <i>Configuring 100-Gigabit Ethernet MICs to Interoperate with Type 4 100-Gigabit Ethernet PICs (PD-1CE-CFP-FPC4)(Type 4 1X100GE PIC for STFPC4 FPC) Using SA Multicast Mode</i></li> <li>• <i>Interoperability Between MPC4E (MPC4E-3D-2CGE-8XGE) and 100-Gigabit Ethernet PICs on Type 4 FPC</i></li> <li>• <i>Configuring MPC4E (MPC4E-3D-2CGE-8XGE) to Interoperate with 100-Gigabit Ethernet PICs on Type 4 FPC Using SA Multicast Mode</i></li> <li>• <i>Interoperability Between the 100-Gigabit Ethernet PICs PD-1CE-CFP-FPC4 and P1-PTX-2-100GE-CFP</i></li> <li>• <i>Configuring the Interoperability Between the 100-Gigabit Ethernet PICs P1-PTX-2-100GE-CFP and PD-1CE-CFP-FPC4</i></li> <li>• <a href="#">forwarding-mode (100-Gigabit Ethernet) on page 487</a></li> <li>• <i>sa-multicast (PTX Series Packet Transport Routers)</i></li> </ul> |
|------------------------------|--|

- [vlan-steering \(100-Gigabit Ethernet Type 4 PIC with CFP\) on page 857](#)
- *Configuring VLAN Steering Mode for 100-Gigabit Ethernet Type 4 PIC with CFP*

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## sampling (Interfaces)

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>sampling <i>direction</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit <a href="#">interfaces</a> <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> inet],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> inet]                  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | Configure the direction of traffic to be sampled.   |
| <b>Options</b>                  | <p><i>direction</i> can be one of the following:</p> <p><b>input</b>—Configure at least one expected ingress point.</p> <p><b>output</b>—Configure at least one expected egress point.</p> <p><b>input output</b>—On a single interface, configure at least one expected ingress point and one expect egress point.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li><li>• <i>Configuring Flow Monitoring</i></li></ul>  |

## satop-options

|                            |  |
|----------------------------|--|
| <b>Syntax</b>              | <pre> satop-options {     excessive-packet-loss-rate {         apply-groups <i>group-name</i>         apply-groups-except <i>group-name</i>         groups <i>group-name</i>         sample-period <i>milliseconds</i>         threshold <i>percentile</i>     }     idle-pattern <i>pattern</i>     jitter-buffer-auto-adjust     jitter-buffer-latency <i>milliseconds</i>     jitter-buffer-packets <i>packets</i>     payload-size <i>bytes</i>; } </pre>  |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> ]   |
| <b>Release Information</b> | <p>Statement introduced in Junos OS Release 9.3.</p> <p>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.</p>   |
| <b>Description</b>         | <p>Set Structure-Agnostic TDM over Packet (SAToP) protocol options.</p> <p>On ACX Series routers, the following statements are not supported:</p> <pre>     apply-groups <i>group-name</i>     apply-groups-except <i>group-name</i>     groups <i>group-name</i>     jitter-buffer-auto-adjust </pre>   |
| <b>Options</b>             | <p><b>excessive-packet-loss-rate options</b>—Set packet loss options.</p> <ul style="list-style-type: none"> <li><b>apply-groups <i>group-name</i></b>—Groups from which to inherit configuration data.</li> <li><b>apply-groups-except <i>group-name</i></b>—Don't inherit configuration data from these groups.</li> <li><b>groups <i>group-name</i></b>—Specify groups.</li> <li><b>sample-period <i>milliseconds</i></b>—Number of milliseconds over which excessive packet loss rate is calculated.</li> <li><b>threshold <i>percentile</i></b>—Percentile designating the threshold of excessive packet loss rate (from 1 to 100).</li> </ul> <p><b>idle-pattern <i>pattern</i></b>—An 8-bit hexadecimal pattern to replace TDM data in a lost packet (from 0 to 255).</p> <p><b>jitter-buffer-auto-adjust</b>—Automatically adjust the jitter buffer.</p> |



**NOTE:** This option is not applicable on MX Series routers.

**jitter-buffer-latency** *milliseconds*—Number of milliseconds delay in jitter buffer (from 1 to 1000 milliseconds).

**jitter-buffer-packets** *packets*—Number of packets in jitter buffer (from 1 to 64).

**payload-size** *bytes*—Payload size in integer number of bytes.

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

**Related Documentation**

- *Configuring SAToP on 4-Port Channelized OC3/STM1 Circuit Emulation PICs*
- *Configuring SAToP Emulation on T1/E1 Interfaces on Circuit Emulation PICs*
- *Configuring SAToP on Channelized OC3/STM1 (Multi-Rate) Circuit Emulation MIC with SFP*
- *Configuring SAToP Encapsulation on T1/E1 Interfaces on Channelized OC3/STM1 (Multi-Rate) Circuit Emulation MIC with SFP*
- *Configuring SAToP on Channelized E1/T1 Circuit Emulation MIC*
- *ATM Support on Circuit Emulation PICs Overview*

---

## scheduler-maps

**Syntax** `scheduler-maps map-name {  
    forwarding-class (class-name | assured-forwarding | best-effort | expedited-forwarding  
        | network-control);  
    vc-cos-mode (alternate | strict);  
}`

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

**Release Information** Statement introduced before Junos OS Release 7.4.

**Description** For ATM2 IQ interfaces only, define CoS parameters assigned to forwarding classes.

**Options** *map-name*—Name of the scheduler map.

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 ATM2 IQ VC Tunnel CoS Components*
- [atm-scheduler-map on page 346](#)
- *Junos OS Class of Service Library for Routing Devices*



## schedulers

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>schedulers <i>number</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.2.   |
| <b>Description</b>              | Specify the number of schedulers for Ethernet IQ2 and IQ2-E PIC port interfaces.  |
| <b>Default</b>                  | If you omit this statement, the 1024 schedulers are distributed equally over all ports in multiples of 4.               |
| <b>Options</b>                  | <i>number</i> —Number of schedulers to configure on the port.<br><b>Range:</b> 1 through 1024                           |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Class of Service Library for Routing Devices</i></li> </ul>        |

## secondary

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>secondary <i>interface-name</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit <a href="#">interfaces</a> (rsp0   rsp1) <a href="#">redundancy-options</a> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | Specify the secondary (backup) AS PIC interface or MultiServices PIC interface.   |
| <b>Options</b>                  | <i>interface-name</i> —The identifier for the AS PIC interface or MultiServices PIC interface, which must be of the form <b>sp-fpc/pic/port</b> . |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>                               |

## send-critical-event

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | send-critical-event;   |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam</a> <a href="#">ethernet</a> <a href="#">link-fault-management</a> <a href="#">action-profile</a> <a href="#">action</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.  |
| <b>Description</b>              | Send OAM PDUs with the critical event bit set.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Specifying the Actions to Be Taken for Link-Fault Management Events</i></li></ul>                               |

## serial-options

```
Syntax  serial-options {
        clock-rate rate;
        clocking-mode (dce | 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 (dce-local | dce-remote | local | remote);
        rts-polarity (negative | positive);
        tm-polarity (negative | positive);
        transmit-clock invert;
    }
```

**Hierarchy Level** [edit interfaces *se-pim*/0/*port*]

**Release Information** Statement introduced prior to Junos OS Release 7.4.

**Description** Configure serial-specific interface properties.

The statements are explained separately.

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

- Related Documentation**
- [Serial Interfaces Overview on page 295](#)
  - *no-concatenate*

---

## server

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | server;  |
| <b>Hierarchy Level</b>          | [edit interfaces pp0 unit <i>logical-unit-number</i> <a href="#">pppoe-options</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces pp0 unit <i>logical-unit-number</i> <a href="#">pppoe-options</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.  |
| <b>Description</b>              | Configure the router to operate in the PPPoE server mode. Supported on M120 and M320 Multiservice Edge Routers and MX Series Universal Edge Routers operating as access concentrators.                                   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | • <i>Configuring the PPPoE Server Mode</i>   |

---

## server-timeout

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | server-timeout <i>seconds</i> ;  |
| <b>Hierarchy Level</b>          | [edit protocols dot1x authenticator interface <i>interface-id</i> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.3.  |
| <b>Description</b>              | Sets the number of seconds the port waits for a reply when relaying a response from the client to the authentication server before timing out and invoking the server-fail action.   |
| <b>Options</b>                  | <b>seconds</b> —The number of seconds the port waits for a response when relaying a request from the authentication server to the client before resending the request.<br><b>Range:</b> 1 through 60 seconds<br><b>Default:</b> 30 seconds |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | • <i>IEEE 802.1x Port-Based Network Access Control Overview</i><br>• <a href="#">authenticator on page 349</a><br>• <a href="#">dot1x on page 434</a><br>• <a href="#">interface (IEEE 802.1x) on page 530</a>                             |

## service

See the following sections:

- [service \(Logical Interfaces\) on page 747](#)
- [service \(PPPoE\) on page 748](#)

### service (Logical Interfaces)

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre> service {   input {     service-set service-set-name &lt;service-filter filter-name&gt;;     post-service-filter filter-name;   }   output {     service-set service-set-name &lt;service-filter filter-name&gt;;   } } </pre>  |
| <b>Hierarchy Level</b>          | <p>[edit <a href="#">interfaces</a> <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> inet],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> inet]</p> |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | Define one or more service sets and filters, and one postservice filter to be applied to an interface.  |
| <b>Options</b>                  | The remaining statements are explained separately.  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>   |

## service (PPPoE)

**Syntax**

```
service service-name {
  drop;
  delay seconds;
  terminate;
  dynamic-profile profile-name;
  routing-instance routing-instance-name;
  max-sessions number;
  agent-specifier {
    aci circuit-id-string ari remote-id-string {
      drop;
      delay seconds;
      terminate;
      dynamic-profile profile-name;
      routing-instance routing-instance-name;
      static-interface interface-name;
    }
  }
}
```

**Hierarchy Level** [edit protocols pppoe **service-name-tables** table-name]

**Release Information** Statement introduced in Junos OS Release 10.0.  
**any**, **dynamic-profile**, **routing-instance**, **max-sessions**, and **static-interface** options introduced in Junos OS Release 10.2.

**Description** Specify the action taken by the interface on receipt of a PPPoE Active Discovery Initiation (PADI) control packet for the specified named service, **empty** service, or **any** service in a PPPoE service name table. You can also specify the dynamic profile and routing instance that the router uses to instantiate a dynamic PPPoE interface, and the maximum number of active PPPoE sessions that the router can establish with the specified service.

**Default** The default action is terminate.

**Options** **service-name**—Service entry in the PPPoE service name table:

- **service-name**—Named service entry of up to 32 characters; for example, **premiumService**. You can configure a maximum of 512 named service entries across all PPPoE service name tables on the router.
- **empty**—Service entry of zero length that represents an unspecified service. Each PPPoE service name table includes one **empty** service entry by default.
- **any**—Default service for non-empty service entries that do not match the named or **empty** service entries configured in the PPPoE service name table. Each PPPoE service name table includes one **any** service entry by default.

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 PPPoE Service Name Tables*
  - *Assigning a Service to a Service Name Table and Configuring the Action Taken When the Client Request Includes a Non-zero Service Name Tag*
  - *Configuring the Action Taken When the Client Request Includes an Empty Service Name Tag*
  - *Configuring the Action Taken for the Any Service*

## service-domain

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | service-domain (inside   outside);   |
| <b>Hierarchy Level</b>          | [edit <b>interfaces</b> <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For adaptive services interfaces, specify a service interface domain. If you specify this interface using the <b>next-hop-service</b> statement at the [edit <b>services service-set service-set-name</b> ] hierarchy level, the interface domain must match that used with the <b>inside-service-interface</b> and <b>outside-service-interface</b> statements. |
| <b>Options</b>                  | <b>inside</b> —Interface used within the network.<br><br><b>outside</b> —Interface used outside the network.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | • <i>Junos OS Services Interfaces Library for Routing Devices</i>  |

## service-filter (Interfaces)

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>service-filter <i>filter-name</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit <code>interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet service (input   output) service-set <i>service-set-name</i></code> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet service (input   output) service-set <i>service-set-name</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | Define the filter to be applied to traffic before it is accepted for service processing. Configuration of a service filter is optional; if you include the <b>service-set</b> statement without a <b>service-filter</b> definition, Junos OS assumes the match condition is true and selects the service set for processing automatically.                      |
| <b>Options</b>                  | <i>filter-name</i> —Identifies the filter to be applied in service processing.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Applying Filters and Services to Interfaces</i></li><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>  |


## service-name

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>service-name <i>name</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces pp0 unit <i>logical-unit-number</i> <code>pppoe-options</code> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces pp0 unit <i>logical-unit-number</i> <code>pppoe-options</code> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For J Series Services Routers with PPP over Ethernet interfaces, configure the service to be requested from the PPP over Ethernet server; that is, the access concentrator. For example, you can use this statement to indicate an Internet service provider (ISP) name or a class of service. |
| <b>Options</b>                  | <i>name</i> —Service to be requested from the PPP over Ethernet server.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring the PPPoE Service Name</i></li><li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li></ul>   |



## service-name-table

|  |   |
|--|---|
| <b>Syntax</b>  | <code>service-name-table <i>table-name</i>;</code>  |
| <b>Hierarchy Level</b>   | <p>[edit dynamic-profiles <i>profile-name</i> interfaces demux0 unit <i>logical-unit-number</i> family pppoe],</p> <p>[edit dynamic-profiles <i>profile-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family pppoe],</p> <p>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family pppoe],</p> <p>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>pppoe-underlying-options</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family pppoe],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>pppoe-underlying-options</b>]</p> |
| <b>Release Information</b>   | <p>Statement introduced in Junos OS Release 10.0.</p> <p>Support at the [edit ... family pppoe] hierarchies introduced in Junos OS Release 11.2.</p>  |
| <b>Description</b>   | Specify the PPPoE service name table assigned to a PPPoE underlying interface. This underlying interface is configured with either the <b>encapsulation ppp-over-ether</b> statement or the <b>family pppoe</b> statement; the two statements are mutually exclusive.   |
| <div>  <p><b>NOTE:</b> The [edit ... family pppoe] hierarchies are supported only on MX Series routers with MPCs.</p> </div> |   |
| <b>Options</b>   | <b><i>table-name</i></b> —Name of the PPPoE service name table, a string of up to 32 alphanumeric characters.   |
| <b>Required Privilege Level</b>  | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>   | <ul style="list-style-type: none"> <li>• <i>Configuring PPPoE Service Name Tables</i></li> <li>• <i>Assigning a Service Name Table to a PPPoE Underlying Interface</i></li> <li>• <i>Configuring the PPPoE Family for an Underlying Interface</i></li> </ul>  |

## service-name-tables

---

|                          |   |
|--------------------------|---|
| Syntax                   | <pre>service-name-tables <i>table-name</i> {<br/>  service <i>service-name</i> {<br/>    drop;<br/>    delay <i>seconds</i>;<br/>    terminate;<br/>    dynamic-profile <i>profile-name</i>;<br/>    routing-instance <i>routing-instance-name</i>;<br/>    max-sessions <i>number</i>;<br/>    agent-specifier {<br/>      aci <i>circuit-id-string</i> ari <i>remote-id-string</i> {<br/>        drop;<br/>        delay <i>seconds</i>;<br/>        terminate;<br/>        dynamic-profile <i>profile-name</i>;<br/>        routing-instance <i>routing-instance-name</i>;<br/>        static-interface <i>interface-name</i>;<br/>      }<br/>    }<br/>  }<br/>}</pre> |
| Hierarchy Level          | [edit protocols pppoe]  |
| Release Information      | Statement introduced in Junos OS Release 10.0.<br><b>dynamic-profile</b> , <b>routing-instance</b> , <b>max-sessions</b> , and <b>static-interface</b> options introduced in Junos OS Release 10.2.   |
| Description              | Create and configure a PPPoE service name table. Specify the action taken for each service and remote access concentrator on receipt of a PPPoE Active Discovery Initiation (PADI) packet. You can also specify the dynamic profile and routing instance that the router uses to instantiate a dynamic PPPoE interface, and the maximum number of active PPPoE sessions that the router can establish with the specified service. A maximum of 32 PPPoE service name tables is supported per router.  |
| Options                  | <b>table-name</b> —Name of the PPPoE service name table, a string of up to 32 alphanumeric characters.<br><br>The remaining statements are explained separately.  |
| Required Privilege Level | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| Related Documentation    | <ul style="list-style-type: none"><li>Configuring PPPoE Service Name Tables</li><li>Creating a Service Name Table</li></ul>   |

## service-set

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>service-set service-set-name;</code>   |
| <b>Hierarchy Level</b>          | <p>[edit <b>interfaces</b> <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>inet</i> <b>service</b> (<b>input</b>   <b>output</b>) <b>service-set</b> <i>service-set-name</i>],</p> <p>[edit <b>logical-systems</b> <i>logical-system-name</i> <b>interfaces</b> <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>inet</i> <b>service</b> (<b>input</b>   <b>output</b>) <b>service-set</b> <i>service-set-name</i>]</p> |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Define one or more service sets to be applied to an interface. If you define multiple service sets, the Junos OS evaluates the filters in the order in which they appear in the configuration.   |
| <b>Options</b>                  | <b><i>service-set-name</i></b> —Identifies the service set.  |
| <b>Required Privilege Level</b> | <p><b>interface</b>—To view this statement in the configuration.</p> <p><b>interface-control</b>—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>  |

## services (Priority Level)

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>services priority-level;</code>  |
| <b>Hierarchy Level</b>          | [edit <a href="#">interfaces</a> <i>interface-name</i> <a href="#">services-options</a> <a href="#">sysloghost</a> <i>hostname</i> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Specify system logging priority level.   |
| <b>Options</b>                  | <p><i>priority-level</i>—Assigns a priority level to the facility. Valid entries are as follows:</p> <ul style="list-style-type: none"><li>• <b>alert</b>—Conditions that should be corrected immediately.</li><li>• <b>any</b>—Matches any level.</li><li>• <b>emergency</b>—Panic conditions.</li><li>• <b>critical</b>—Critical conditions.</li><li>• <b>error</b>—Error conditions.</li><li>• <b>info</b>—Informational messages.</li><li>• <b>notice</b>—Conditions that require special handling.</li><li>• <b>warning</b>—Warning messages.</li></ul> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>  |

## services-options

**Syntax**

```

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;
    }
  }
}

```

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

**Release Information** Statement introduced before Junos OS Release 7.4.

**Description** Define the service options to be applied on an interface.

**Options** 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**

- *Junos OS Services Interfaces Library for Routing Devices*

## session-limit

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>session-limit {<br/>    <b>maximum</b> <i>number</i>;<br/>    <b>rate</b> <i>new-sessions-per-second</i>;<br/>    cpu-load-threshold <i>percentage</i>;<br/>}</pre>    |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> services-options ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.6.   |
| <b>Description</b>              | Restrict the maximum number of sessions and the session rate on Multiservices PICs.   |
| <b>Options</b>                  | <p><b>session-limit</b>—Restricts the maximum number of sessions and the session rate for Multiservices PICs.</p> <p>The remaining statements are explained separately.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |

## shaping

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>shaping {   (cbr rate   rtvbr peak rate sustained rate burst length   vbr peak rate sustained rate burst   length);   queue-length number; }</pre>  |
| <b>Hierarchy Level</b>          | <pre>[edit interfaces interface-name atm-options vpi vpi-identifier], [edit interfaces interface-name unit logical-unit-number], [edit interfaces interface-name unit logical-unit-number address address family family multipoint-destination address], [edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number], [edit logical-systems logical-system-name interfaces interface-name unit logical-unit-number address address family family multipoint-destination address]</pre> |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | <p>For ATM encapsulation only, define the traffic-shaping profile.</p> <p>For Circuit Emulation PICs, specify traffic shaping in the ingress and egress directions.</p> <p>For ATM2 IQ interfaces, changing or deleting VP tunnel traffic shaping causes all logical interfaces on a VP to be deleted and then re-added.</p> <p>VP tunnels are not supported on multipoint interfaces.</p> <p>The statements are explained separately.</p>   |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Defining Virtual Path Tunnels</i></li> <li>• <i>Defining the ATM Traffic-Shaping Profile</i></li> <li>• <i>Configuring ATM QoS or Shaping</i></li> <li>• <i>Applying Scheduler Maps to Logical ATM Interfaces</i></li> </ul>   |

## shdsl-options

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>shdsl-options {<br/>  annex (annex-a   annex-b);<br/>  line-rate <i>line-rate</i>;<br/>  loopback (local   remote   payload);<br/>  snr-margin {<br/>    current <i>margin</i>;<br/>    snext <i>margin</i>;<br/>  }<br/>}</pre> |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 7.4.   |
| <b>Description</b>              | For J Series Services Routers only, configure symmetric DSL (SHDSL) options.<br><br>The statements are explained separately.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>ATM-over-SHDSL Overview</i></li></ul>  |



## short-name-format

|                            |  |
|----------------------------|--|
| <b>Syntax</b>              | short-name-format (character-string   vlan   2octet   rfc-2685-vpn-id);  |
| <b>Hierarchy Level</b>     | [edit protocols oam ethernet connectivity-fault-management maintenance-domain domain-name <b>maintenance-association</b> ma-name]  |
| <b>Release Information</b> | Statement introduced in Junos OS Release 8.4.<br>Statement introduced in Junos OS Release 12.1X48 for PTX Series Packet Transport Routers.   |
| <b>Description</b>         | Specify the name format of the maintenance association name.   |
| <b>Options</b>             | <p><b>character-string</b>—The name is an ASCII character string.</p> <p><b>vlan</b>—The primary VLAN identifier.</p> <p><b>2octet</b>—A number in the range 0 through 65,535.</p> <p><b>rfc-2685-vpn-id</b>—A VPN identifier that complies with RFC 2685.</p> <p><b>Default:</b> character-string</p> |



**NOTE:** The PTX Series Packet Transport Routers support the vlan and 2octet options only.

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

|                              |   |
|------------------------------|---|
| <b>Related Documentation</b> | <ul style="list-style-type: none"> <li>• <i>Creating a Maintenance Association</i></li> <li>• <i>Configuring Ethernet 802.1ag OAM on PTX Series Packet Transport Routers</i></li> </ul> |
|------------------------------|---|

## short-sequence

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | short-sequence;  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For multilink interfaces only, set the length of the packet sequence identification number to 12 bits.   |
| <b>Default</b>                  | If you omit this statement from the configuration, the length is set to 24 bits.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>  |

## sla-iterator-profile

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | sla-iterator-profile <i>profile-name</i> {<br>data-tlv-size <i>size</i> ;<br>iteration-count <i>count-value</i> ;<br>priority <i>priority-value</i> ;<br>}  |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet connectivity-fault-management maintenance-domain md-name maintenance-association ma-name mep mep-id remote-mep remote-mep-id</a> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.1.  |
| <b>Description</b>              | Configure a remote MEP with an iterator profile and specify the options.  |
| <b>Options</b>                  | <p><b>profile-name</b>—Name of the iterator profile configured for a remote MEP. For more information about configuring a remote MEP with an iterator profile, see <i>Configuring a Remote MEP with an Iterator Profile</i>.</p> <p>The remaining statements are explained separately.</p>  |
| <b>Required Privilege Level</b> | Configure—To enter configuration mode.<br>Control—To modify any configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring an Iterator Profile</i></li> <li>• <i>Configuring a Remote MEP with an Iterator Profile</i></li> <li>• <i>Verifying the Configuration of an Iterator Profile</i></li> <li>• <i>Managing Iterator Statistics</i></li> <li>• <a href="#">sla-iterator-profiles on page 762</a></li> </ul> |

## sla-iterator-profiles

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>sla-iterator-profiles {<br/>  profile-name {<br/>    calculation-weight {<br/>      delay delay-weight;<br/>      delay-variation delay-variation-weight;<br/>    }<br/>    cycle-time milliseconds;<br/>    iteration-period iteration-period-value;<br/>    measurement-type (loss   statistical-frame-loss   two-way-delay);<br/>  }<br/>}</pre> |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam</a> <a href="#">ethernet</a> <a href="#">connectivity-fault-management</a> <a href="#">performance-monitoring</a> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.1.   |
| <b>Description</b>              | Configure an iterator application and specify the iterator profile options.  |
| <b>Options</b>                  | <p><b>profile-name</b>—Name of the iterator profile. For more information about configuring the iterator profile, see <i>Configuring an Iterator Profile</i>.</p> <p>The remaining statements are explained separately.</p>  |
| <b>Required Privilege Level</b> | Configure—To enter configuration mode.<br>Control—To modify any configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring an Iterator Profile</i></li><li>• <i>Configuring a Remote MEP with an Iterator Profile</i></li><li>• <i>Verifying the Configuration of an Iterator Profile</i></li><li>• <i>Managing Iterator Statistics</i></li></ul>  |

## snext

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>snext margin;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>shdsl-options</b> <b>snr-margin</b> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>shdsl-options</b> <b>snr-margin</b> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 7.4.  |
| <b>Description</b>              | For J Series Services Routers only, configure self-near-end crosstalk (SNEXT) signal-to-noise ratio (SNR) margin for a SHDSL line. When configured, the line trains at higher than SNEXT threshold. The SNR margin is the difference between the desired SNR and the actual SNR. |
| <b>Options</b>                  | <b>margin</b> —Desired SNEXT margin. Possible values are disabled or a margin between –10dB and 10 dB.<br><b>Default:</b> disabled   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>ATM-over-SHDSL Overview</i></li> <li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li> </ul>   |

## snr-margin

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>snr-margin {<br/>    <b>current</b> margin;<br/>    <b>snext</b> margin;<br/>}</pre>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>shdsl-options</b> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>shdsl-options</b> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 7.4.   |
| <b>Description</b>              | <p>For J Series Services Routers only, configure the SHDSL signal-to-noise ratio (SNR) margin. The SNR margin is the difference between the desired SNR and the actual SNR. Configuring the SNR creates a more stable SHDSL connection by making the line train at a SNR margin higher than the threshold. If any external noise below the threshold is applied to the line, the line remains stable.</p> <p>The statements are explained separately.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>ATM-over-SHDSL Overview</i></li><li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li></ul>   |

## sonet-options

```
Syntax  sonet-options {
        aps {
            advertise-interval milliseconds;
            annex-b
            authentication-key key;
            (break-before-make | no-break-before-make);
            fast-aps-switch;
            force;
            hold-time milliseconds;
            lockout;
            neighbor address;
            paired-group group-name;
            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;
            defect hold-time up milliseconds down milliseconds;
        }
    }
    vtmapping (itu-t | klm);
    (z0-increment | no-z0-increment);
```

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

**Release Information** Statement introduced before Junos OS Release 7.4.

**Description** Configure SONET/SDH-specific interface properties.

On SONET/SDH OC48 interfaces that you configure for channelized (multiplexed) mode (by including the **no-concatenate** statement at the **[edit chassis fpc slot-number pic pic-number]** hierarchy level), the **bytes e1-quiet** and **bytes f1** options have no effect. The **bytes f2**, **bytes z3**, **bytes z4**, and **path-trace** options work correctly on channel 0 and work in the transmit direction only on channels 1, 2, and 3.

On a channelized OC12 interface, the **bytes e1-quiet**, **bytes f1**, **bytes f2**, **bytes z3**, and **bytes z4** options are not supported. The **fcs** and **payload-scrambler** statements are also not supported; you must configure these for each DS3 channel using the **t3-options fcs** and **t3-options payload-scrambler** statements. The **aps** and **loopback** statements are supported only on channel 0 and are ignored if included in the configurations for channels 1 through 11. You can configure loopbacks for each DS3 channel with the **t3-options loopback** statement. The **path-trace** statement can be included in the configuration for each DS3 channel, thereby configuring a unique path trace for each channel.

To configure loopback on channelized IQ and IQE PICs, SONET/SDH level, use the **loopback** statement **local** and **remote** options at the controller interface (coc48, cstm16, coc12, cstm4, coc3, and cstm1). It is ignored for path-level interfaces **so-fpc/pic/port** or **so-fpc/pic/port:channel**.

If you are running Intermediate System-to-Intermediate System (IS-IS) over SONET/SDH interfaces, use PPP if you are running Cisco IOS Release 12.0 or later. If you need to run HDLC, configure an ISO family MTU of 4469 on the router.

The statements are explained separately.

|                                 |   |
|---------------------------------|---|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring SONET/SDH Parameters on ATM Interfaces</i></li><li>• <i>Channelized OC12/STM4 IQ and IQE Interfaces Overview</i></li><li>• <i>Channelized STM1 Interfaces Overview</i></li><li>• <i>SONET/SDH Physical Interface Properties Overview</i></li><li>• <i>no-concatenate</i></li></ul> |



## source

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>source source-address;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>tunnel</b> <i>address</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>tunnel</b> <i>address</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | Specify the source address of the tunnel.   |
| <b>Default</b>                  | If you do not specify a source address, the tunnel uses the unit's primary address as the source address of the tunnel.   |
| <b>Options</b>                  | <b>source-address</b> —Address of the local side of the tunnel. This is the address that is placed in the outer IP header's source field.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">multicast-only on page 619</a></li> <li>• <a href="#">primary (Address on Interface) on page 700</a></li> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>                   |

## source-address-filter

---

|                          |  |
|--------------------------|--|
| Syntax                   | source-address-filter {<br><code>mac-address</code> ;<br>}   |
| Hierarchy Level          | [edit interfaces <i>interface-name</i> <a href="#">aggregated-ether-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">fastether-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">gigether-options</a> ]   |
| Release Information      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.1X48 for PTX Packet Transport Routers.  |
| Description              | For aggregated Ethernet, Fast Ethernet, Gigabit Ethernet, Gigabit Ethernet IQ interfaces, and Gigabit Ethernet PICs with SFPs (except the 10-port Gigabit Ethernet PIC and the built-in Gigabit Ethernet port on the M7i router), specify the MAC addresses from which the interface can receive packets. For this statement to have any effect, you must include the <b>source-filtering</b> statement in the configuration to enable source address filtering. This statement is not supported on the J Series Services Routers.   |
| Options                  | <p><b>mac-address</b>—MAC address filter. You can specify the MAC address as <i>nn:nn:nn:nn:nn:nn</i> or <i>nnnn.nnnn.nnnn</i>, where <i>n</i> is a decimal digit. To specify more than one address, include multiple <b>mac-address</b> options in the <b>source-address-filter</b> statement.</p> <p>If you enable the VRRP on a Fast Ethernet or Gigabit Ethernet interface, as described in <i>VRRP and VRRP for IPv6 Overview</i>, and if you enable MAC source address filtering on the interface, you must include the virtual MAC address in the list of source MAC addresses that you specify in the <b>source-address-filter</b> statement. MAC addresses ranging from <b>00:00:5e:00:01:00</b> through <b>00:00:5e:00:01:ff</b> are reserved for VRRP, as defined in RFC 3768, <i>Virtual Router Redundancy Protocol</i>. When you configure the VRRP group, the group number must be the decimal equivalent of the last hexadecimal byte of the virtual MAC address.</p> <p>On untagged Gigabit Ethernet interfaces, you should not configure the <b>source-address-filter</b> statement and the <b>accept-source-mac</b> statement simultaneously. On tagged Gigabit Ethernet interfaces, you should not configure the <b>source-address-filter</b> statement and the <b>accept-source-mac</b> statement with an identical MAC address specified in both filters.</p> |
| Required Privilege Level | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| Related Documentation    | <ul style="list-style-type: none"><li>• <i>Enabling Ethernet MAC Address Filtering</i></li><li>• <i>Configuring MAC Filtering on PTX Series Packet Transport Routers</i></li><li>• <a href="#">source-filtering on page 770</a></li></ul>  |

## source-class-usage

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | source-class-usage {<br><i>direction</i> ;<br>}   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>family</b> inet <b>accounting</b> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> inet <b>accounting</b> ],<br>[edit routing-instances <i>routing-instance-name</i> vrf-table-label]     |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Support for the <b>vrf-table-label</b> statement added in Junos OS Release 9.3.  |
| <b>Description</b>              | Enable packet counters on an interface that count packets that arrive from specific prefixes on the provider core router and are destined for specific prefixes on the customer edge router.  |
| <b>Options</b>                  | <i>direction</i> can be one of the following:<br><br><b>input</b> —Configure at least one expected ingress point.<br><br><b>output</b> —Configure at least one expected egress point.<br><br><b>input output</b> —On a single interface, configure at least one expected ingress point and one expect egress point.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Enabling Source Class and Destination Class Usage on page 241</a></li> <li>• <a href="#">accounting on page 319</a></li> <li>• <a href="#">destination-class-usage on page 423</a></li> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> <li>• <i>vrf-table-label</i></li> </ul> |

## source-filtering

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | (source-filtering   no-source-filtering);   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">aggregated-ether-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">fastether-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">gigether-options</a> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.1X48 for PTX Packet Transport Routers.   |
| <b>Description</b>              | <p>For aggregated Ethernet, Fast Ethernet, Gigabit Ethernet, and Gigabit Ethernet IQ interfaces only, enable the filtering of MAC source addresses, which blocks all incoming packets to that interface. To allow the interface to receive packets from specific MAC addresses, include the <b>source-address-filter</b> statement.</p> <p>If the remote Ethernet card is changed, the interface is no longer able to receive packets from the new card because it has a different MAC address.</p> |
| <b>Default</b>                  | Source address filtering is disabled.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Enabling Ethernet MAC Address Filtering</i></li><li>• <i>Configuring MAC Filtering on PTX Series Packet Transport Routers</i></li><li>• <a href="#">accept-source-mac on page 315</a></li><li>• <a href="#">source-address-filter on page 768</a></li></ul>  |

## speed

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See the following sections:

- [speed \(Ethernet\) on page 772](#)
- [speed \(MX Series DPC\) on page 773](#)
- [speed \(SONET/SDH\) on page 774](#)

## speed (Ethernet)

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>speed (10m   100m   1g   auto   auto-10m-100m);</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ],<br>[edit interfaces <i>ge-pim</i> /0/0 <i>switch-options switch-port port-number</i> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.<br>Statement introduced in Junos OS Release 13.2X50-D10 for EX Series switches.   |
| <b>Description</b>              | <p>Configure the interface speed. This statement applies to the management Ethernet interface (<b>fxp0</b> or <b>em0</b>), Fast Ethernet 12-port and 48-port PICs, the built-in Fast Ethernet port on the FIC (M7i router), the built-in Ethernet interfaces on J Series Services Routers, Combo Line Rate DPCs and Tri-Rate Ethernet Copper interfaces on MX Series routers, Gigabit Ethernet ports on J Series Services Routers with uPIMs installed and configured for access switching mode, and Gigabit Ethernet interfaces on EX Series switches.</p> <p>When you configure the Tri-Rate Ethernet copper interface to operate at 1 Gbps, autonegotiation must be enabled. When you configure 100BASE-FX SFP, you must set the port speed at 100 Mbps.</p>                 |
| <b>Options</b>                  | <p>You can specify the speed as either <b>10m</b> (10 Mbps), <b>100m</b> (100 Mbps), or on J Series routers with uPIMs installed and on MX Series routers, <b>1g</b> (1 Gbps). You can also specify the <b>auto</b> option on MX Series routers.</p> <p>For Gigabit Ethernet interfaces on EX Series switches, you can specify one of the following options:</p> <ul style="list-style-type: none"><li>• <b>10m</b>—10 Mbps</li><li>• <b>100m</b>—100 Mbps</li><li>• <b>1g</b>—1 Gbps</li><li>• <b>auto</b>—Automatically negotiate the speed (10 Mbps, 100 Mbps, or 1 Gbps) based on the speed of the other end of the link.</li><li>• <b>auto-10m-100m</b>—Automatically negotiate the speed (10 Mbps or 100 Mbps) based on the speed of the other end of the link.</li></ul> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the Interface Speed on page 148</a></li><li>• <i>Configuring the Interface Speed on Ethernet Interfaces</i></li><li>• <i>Configuring Gigabit Ethernet Autonegotiation</i></li><li>• <i>Configuring J Series Services Router Switching Interfaces</i></li><li>• <i>Configuring Gigabit Ethernet Interfaces (CLI Procedure)</i></li></ul>   |

## speed (MX Series DPC)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>speed (auto   1Gbps   100Mbps   10Mbps);</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>ge-fpc/pic/port</i> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.5.  |
| <b>Description</b>              | On MX Series routers with Combo Line Rate DPCs and Tri-Rate Copper SFPs you can set auto negotiation of speed. To specify the auto negotiation speed, use the <b>speed (auto   1Gbps   100Mbps   10Mbps)</b> statement under the [edit interface <i>ge-/fpc/pic/port</i> ] hierarchy level. The <b>auto</b> option will attempt to automatically match the rate of the connected interface. To set port speed negotiation to a specific rate, set the port speed to <b>1Gbps</b> , <b>100Mbps</b> , or <b>10Mbps</b> . |
|                                 | <div>  <p><b>NOTE:</b> If the negotiated speed and the interface speed do not match, the link will not be brought up. Half duplex mode is not supported.</p> </div>   |
| <b>Options</b>                  | You can specify the speed as either <b>auto</b> (autonegotiate), <b>10Mbps</b> (10 Mbps), <b>100Mbps</b> (100 Mbps), or <b>1Gbps</b> (1 Gbps).   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Gigabit Ethernet Autonegotiation</i></li> <li>• <a href="#">no-auto-mdix on page 635</a></li> </ul>  |

## speed (SONET/SDH)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>speed (oc3   oc12   oc48);</code>  |
| <b>Hierarchy Level</b>          | <code>[edit interfaces so-fpc/pic/port],</code><br><code>[edit interfaces so-fpc/pic/port:channel]</code>  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.3.  |
| <b>Description</b>              | Configure the interface speed. This statement applies to SONET/SDH interfaces on next-generation SONET/SDH Type 1 and Type 2 PICs with SFP. Available speeds depend on whether the PIC is in concatenated mode or nonconcatenated mode. Include the channel in the interface name when configuring nonconcatenated interfaces.     |
| <b>Options</b>                  | <b>oc3   oc12   oc48</b> —Speed when the PIC is in concatenated mode. For example, you can configure each port of a 4-port OC12 PIC to have a speed of <b>oc3</b> .<br><br>You can configure port 0 of a 4-port OC12 PIC to have a speed of <b>oc12</b> .<br><br><b>oc3   oc12</b> —Speed when the PIC is in nonconcatenated mode. |
| <b>Required Privilege Level</b> | <b>interface</b> —To view this statement in the configuration.<br><b>interface-control</b> —To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring SONET/SDH Interface Speed</i></li></ul>   |

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## spid1

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>spid1 spid1-string;</code>   |
| <b>Hierarchy Level</b>          | <code>[edit interfaces br-pim/O/port isdn-options]</code>  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Configure the Service Profile Identifier (SPID).   |
| <b>Options</b>                  | <b>spid1-string</b> —Numeric SPID.   |
| <b>Required Privilege Level</b> | <b>interface</b> —To view this statement in the configuration.<br><b>interface-control</b> —To add this statement to the configuration.                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring ISDN Physical Interface Properties</i></li><li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li></ul> |



## spid2

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>spid2 spid2-string;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces br-pim/0/port isdn-options]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | Configure an additional SPID.   |
| <b>Options</b>                  | <i>spid2-string</i> —Numeric SPID.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring ISDN Physical Interface Properties</i></li><li>• <i>J Series Services Router Configuration Guide</i></li></ul> |

## stacked-vlan-ranges

---

**Syntax**    stacked-vlan-ranges {  
              access-profile *profile-name*;  
              authentication {  
                  password *password-string*;  
                  username-include {  
                      circuit-type;  
                      delimiter *delimiter-character*;  
                      domain-name *domain-name-string*;  
                      interface-name;  
                      mac-address;  
                      option-18  
                      option-37  
                      option-82;  
                      radius-realm *radius-realm-string*;  
                      user-prefix *user-prefix-string*;  
                  }  
              }  
              dynamic-profile *profile-name* {  
                  accept (any | dhcp-v4 | inet);  
                  ranges (any | *low-tag-high-tag*), (any | *low-tag-high-tag*);  
              }  
              override;  
          }

**Hierarchy Level**    [edit interfaces *interface-name* auto-configure]

**Release Information**    Statement introduced in Junos OS Release 9.5.

**Description**    Configure multiple VLANs. Each VLAN is assigned a VLAN ID number from the range.  
  
                  The remaining statements are explained separately.

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

**Related Documentation**

- *Configuring Stacked VLAN Ranges for Use with Stacked VLAN Dynamic Profiles*
- *Configuring Dynamic Mixed VLAN Ranges*


## stacked-vlan-tagging

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | stacked-vlan-tagging;  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.  |
| <b>Description</b>              | <p>For Gigabit Ethernet IQ interfaces, Gigabit Ethernet, 10-Gigabit Ethernet LAN/WAN PIC, and 100-Gigabit Ethernet Type 5 PIC with CFP, enable stacked VLAN tagging for all logical interfaces on the physical interface.</p> <p>For pseudowire subscriber interfaces, enable stacked VLAN tagging for logical interfaces on the pseudowire service.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Stacking and Rewriting Gigabit Ethernet VLAN Tags Overview</i></li><li>• <a href="#">vlan-tags (Stacked VLAN Tags) on page 862</a></li></ul>  |

## start-end-flag

---

|  |   |
|--|---|
| <b>Syntax</b>  | start-end-flag (filler   shared);   |
| <b>Hierarchy Level</b>   | [edit interfaces e1- <i>fpc/pic/port</i> ],<br>[edit interfaces t1- <i>fpc/pic/port</i> ],<br>[edit interfaces <i>interface-name</i> ds0-options],<br>[edit interfaces <i>interface-name</i> e1-options],<br>[edit interfaces <i>interface-name</i> e3-options],<br>[edit interfaces <i>interface-name</i> t1-options],<br>[edit interfaces <i>interface-name</i> t3-options] |
| <b>Release Information</b>   | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.   |
| <b>Description</b>   | For DS0, E1, E3, T1, and T3 interfaces, configure the interface to share the transmission of start and end flags.   |
| <div> <b>NOTE:</b> When configuring E1 or T1 interfaces on the 10-port Channelized E1/T1 IQE PIC, the start-end-flag statement must be included at the [edit interfaces e1-<i>fpc/pic/port</i>] or [edit interfaces t1-<i>fpc/pic/port</i>] hierarchy level as appropriate.</div> |   |
| <b>Options</b>   | <b>filler</b> —Wait two idle cycles between the start and end flags.<br><br><b>shared</b> —Share the transmission of the start and end flags. This is the default.  |
| <b>Required Privilege Level</b>  | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>   | <ul style="list-style-type: none"><li>• <i>Configuring E1 Start and End Flags</i></li><li>• <i>Configuring the E3 Start and End Flags</i></li><li>• <i>Configuring T1 Start and End Flags</i></li><li>• <i>Configuring T3 Start and End Flags</i></li></ul>   |

## static-interface

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>static-interface <i>interface-name</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit protocols pppoe service-name-tables <i>table-name</i> service <i>service-name</i> <b>agent-specifier</b> <i>aci circuit-id-string</i> <i>ari remote-id-string</i> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.2.   |
| <b>Description</b>              | <p>Reserve the specified static PPPoE interface for use only by the PPPoE client with matching agent circuit identifier (ACI) and agent remote identifier (ARI) information. You can specify only one static interface per ACI/ARI pair configured for a named service entry, <b>empty</b> service entry, or <b>any</b> service entry in the PPPoE service name table.</p> <p>The static interface associated with an ACI/ARI pair takes precedence over the general pool of static interfaces associated with the PPPoE underlying interface.</p> <p>If you include the <b>static-interface</b> statement in the configuration, you cannot also include either the <b>dynamic-profile</b> statement or the <b>routing-instance</b> statement. The <b>dynamic-profile</b>, <b>routing-instance</b>, and <b>static-interface</b> statements are mutually exclusive for ACI/ARI pair configurations.</p> |
| <b>Options</b>                  | <b><i>interface-name</i></b> —Name of the static PPPoE interface reserved for use by the PPPoE client with matching ACI/ARI information. Specify the interface in the format <b>pp0.logical</b> , where <b>logical</b> is a logical unit number from 0 through 16385 for static interfaces.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring PPPoE Service Name Tables</i></li> <li>• <i>Reserving a Static PPPoE Interface for Exclusive Use by a PPPoE Client</i></li> </ul>  |

## static-tei-val

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|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>static-tei-val value;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>br-pim</i> /0/port <a href="#">isdn-options</a> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For J Series Services Routers only. Statically configure the Terminal Endpoint Identifier (TEI) value. The TEI value represents any ISDN-capable device attached to an ISDN network that is the terminal endpoint. TEIs are used to distinguish between several different devices using the same ISDN links. |
| <b>Options</b>                  | <b>value</b> —Value between 0 through 63.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring ISDN Physical Interface Properties</i></li><li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li></ul>   |

## supplicant

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>supplicant single;</code>   |
| <b>Hierarchy Level</b>          | [edit protocols dot1x authenticator interface <i>interface-id</i> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.3.   |
| <b>Description</b>              | <p>Specify the supplicant mode. Only single mode is supported.</p> <p>This option will authenticate only the first client that connects to a port. All other clients that connect later (802.1x compliant or non-compliant) will be allowed free access on that port without any further authentication. If the first authenticated client logs out, all other users are locked out until a client authenticates again.</p> |
| <b>Options</b>                  | <b>single</b> —Sets single mode.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>IEEE 802.1x Port-Based Network Access Control Overview</i></li><li>• <a href="#">authenticator on page 349</a></li><li>• <a href="#">dot1x on page 434</a></li><li>• <a href="#">interface (IEEE 802.1x) on page 530</a></li></ul>   |

## supplicant-timeout

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | supplicant-timeout <i>seconds</i> ;   |
| <b>Hierarchy Level</b>          | [edit protocols dot1x authenticator interface <i>interface-id</i> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.3.   |
| <b>Description</b>              | Specify the number of seconds the port waits for a response when relaying a request from the authentication server to the client before resending the request.  |
| <b>Options</b>                  | <b><i>seconds</i></b> —Specify the number of seconds the port waits for the supplicant timeout.<br><b>Range:</b> 1 through 60 seconds<br><b>Default:</b> 30 seconds   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>IEEE 802.1x Port-Based Network Access Control Overview</i></li><li>• <a href="#">authenticator on page 349</a></li><li>• <a href="#">dot1x on page 434</a></li><li>• <a href="#">interface (IEEE 802.1x) on page 530</a></li></ul> |

## swap

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | swap;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">input-vlan-map</a> ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">output-vlan-map</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">input-vlan-map</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">output-vlan-map</a> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.  |
| <b>Description</b>              | <p>Specify the VLAN rewrite operation to replace a VLAN tag. The outer VLAN tag of the frame is overwritten with the user-specified VLAN tag information.</p> <p>On MX Series routers, you can enter this statement on Gigabit Ethernet IQ and 10-Gigabit Ethernet IQ2 and IQ2-E interfaces, 10-Gigabit Ethernet LAN/WAN PIC, aggregated Ethernet using Gigabit Ethernet IQ interfaces, and 100-Gigabit Ethernet Type 5 PIC with CFP.</p>   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Rewriting the VLAN Tag on Tagged Frames</i></li></ul>  |



## swap-push

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | swap-push;  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>input-vlan-map</b> ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>output-vlan-map</b> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>input-vlan-map</b> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>output-vlan-map</b> ]                                 |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.1.<br>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.  |
| <b>Description</b>              | Specify the VLAN rewrite operation to replace the outer VLAN tag of the frame with 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.<br><br>You can use this statement on Gigabit Ethernet IQ, IQ2 and IQ2-E interfaces, 10-Gigabit Ethernet LAN/WAN PIC, and for aggregated Ethernet interfaces using Gigabit Ethernet IQ2 and IQ2-E or 10-Gigabit Ethernet PICs on MX Series routers, and 100-Gigabit Ethernet Type 5 PIC with CFP. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Rewriting a VLAN Tag and Adding a New Tag</i></li> </ul>  |

## swap-swap

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | swap-swap;  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">input-vlan-map</a> ],<br>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">output-vlan-map</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">input-vlan-map</a> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">output-vlan-map</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.1.<br>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.  |
| <b>Description</b>              | <p>Specify the VLAN rewrite operation to replace both the inner and the outer VLAN tags of the frame with a user-specified VLAN tag value.</p> <p>You can use this statement on Gigabit Ethernet IQ, IQ2 and IQ2-E interfaces, 10-Gigabit Ethernet LAN/WAN PIC, for aggregated Ethernet interfaces using Gigabit Ethernet IQ2 and IQ2-E or 10-Gigabit Ethernet PICs on MX Series routers, and for 100-Gigabit Ethernet Type 5 PIC with CFP.</p>   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Rewriting the Inner and Outer VLAN Tags</i></li></ul>  |

## switch-options

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>switch-options {   switch-port <i>port-number</i> {     (<i>auto-negotiation</i>   no-auto-negotiation);     <i>speed</i> (10m   100m   1g);     <i>link-mode</i> (full-duplex   half-duplex);   } }</pre>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>ge-pim</i> /0/0]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.   |
| <b>Description</b>              | On a J Series Services Router with multiport Gigabit Ethernet uPIMs installed and operating in access switching mode, only one physical interface is configured for the entire multiport Gigabit Ethernet uPIM. Configuration of the physical port characteristics is done under the single physical interface. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><i>Configuring J Series Services Router Switching Interfaces</i></li> </ul>  |

## switch-port

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|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>switch-port <i>port-number</i> {<br/>    (auto-negotiation   no-auto-negotiation);<br/>    speed (10m   100m   1g);<br/>    link-mode (full-duplex   half-duplex);<br/>}</pre>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>ge-pim</i> /0/0 <a href="#">switch-options</a> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.  |
| <b>Description</b>              | On a J Series Services Router with Ethernet uPIMs installed and operating in access switching mode, configuration of the physical port characteristics, done under the single physical interface.  |
| <b>Default</b>                  | Autonegotiation is enabled by default. If the link speed and duplex are also configured, the interfaces use the values configured as the desired values in the negotiation.  |
| <b>Options</b>                  | <p><b><i>port-number</i></b>—Ports are numbered 0 through 5 on the 6-port Gigabit Ethernet uPIM, 0 through 7 on the 8-port Gigabit Ethernet uPIM, and 0 through 15 on the 16-port Gigabit Ethernet uPIM.</p> <p>The remaining statements are explained separately.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li><i>Configuring J Series Services Router Switching Interfaces</i></li></ul>   |

## switch-type

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|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | switch-type (att5e   etsi   ni1   ntdms-100)   |
| <b>Hierarchy Level</b>          | [edit interfaces br-pim/0/port isdn-options]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For J Series Services Routers only. Configure the ISDN variant supported.  |
| <b>Options</b>                  | <p>att5e—AT&amp;T switch variant.</p> <p>etsi—European Telecommunications Standards Institute switch variant.</p> <p>ni1—National ISDN 1 switch variant.</p> <p>ntdms-100—Northern Telecom DMS-100.</p> <p>ntt—NTT Group switch for Japan.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>ISDN Interfaces Overview</i></li><li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li></ul>   |

## switching-mode

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>switching-mode (bidirectional   unidirectional);</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> sonet-options <a href="#">aps</a> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For unchannelized OC3, OC12, and OC48 SONET/SDH interfaces on T Series routers only, configure the interface to interoperate with SONET/SDH line-terminating equipment (LTE) that is provisioned for unidirectional linear APS in 1+1 architecture. |
| <b>Default</b>                  | If the <b>switching-mode</b> statement is not configured, the mode is bidirectional, and the interface does not interoperate with a unidirectional SONET/SDH LTE.   |
| <b>Options</b>                  | <b>bidirectional</b> —Support bidirectional mode only.<br><br><b>unidirectional</b> —Interoperate with a SONET/SDH LTE provisioned for unidirectional mode.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Switching Mode</i></li></ul>   |

## symbol-period

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>symbol-period count;</code>  |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet link-fault-management action-profile event</a> , <a href="#">link-event-rate</a> ],<br>[edit protocols <a href="#">oam link-fault-management interface</a> <i>interface-name</i> <a href="#">event-thresholds</a> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.  |
| <b>Description</b>              | <p>Configure the threshold for sending symbol period events or taking the action specified in the action profile.</p> <p>A symbol error is any symbol code error on the underlying physical layer. The symbol period threshold is reached when the number of symbol errors reaches the configured value within the period window. The default period window is the number of symbols that can be transmitted on the underlying physical layer in 1 second. The window is not configurable.</p> |
| <b>Options</b>                  | <p><b>count</b>—Threshold count for symbol period events.</p> <p><b>Range:</b> 1 through 100</p>   |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Threshold Values for Local Fault Events on an Interface</i></li> <li>• <i>Configuring Threshold Values for Fault Events in an Action Profile</i></li> </ul>  |

## syslog

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See the following sections:

- [syslog \(Interfaces\) on page 790](#)
- [syslog \(Monitoring\) on page 791](#)
- [syslog \(OAM Action\) on page 791](#)

### syslog (Interfaces)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>syslog {<br/>  host hostname {<br/>    facility-override facility-name;<br/>    log-prefix prefix-number;<br/>    services priority-level;<br/>  }<br/>}</pre>  |
| <b>Hierarchy Level</b>          | [edit <a href="#">interfaces interface-name services-options</a> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For adaptive services interfaces, configure generation of system log messages for the service set. System log information is passed to the kernel for logging in the <b>/var/log</b> directory. Any values configured in the service set definition override these values. |
| <b>Options</b>                  | The remaining statements are explained separately.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>  |



## syslog (Monitoring)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | (syslog   no-syslog);  |
| <b>Hierarchy Level</b>          | [edit <a href="#">interfaces mo-fpc/pic/port multiservice-options</a> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | <p>System logging is enabled by default. The system log information of the Monitoring Services PIC is passed to the kernel for logging in the <code>/var/log</code> directory.</p> <ul style="list-style-type: none"><li>• <b>syslog</b>—Enable PIC system logging.</li><li>• <b>no-syslog</b>—Disable PIC system logging.</li></ul> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Multiservice Physical Interface Properties on page 168</a></li><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>   |

## syslog (OAM Action)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | syslog;  |
| <b>Hierarchy Level</b>          | [edit protocols <a href="#">oam ethernet link-fault-management action-profile action</a> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.  |
| <b>Description</b>              | Generate a syslog message for the Ethernet Operation, Administration, and Management (OAM) event.                                  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p> |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Specifying the Actions to Be Taken for Link-Fault Management Events</i></li></ul>       |

## system-priority

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>system-priority <i>priority</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces aeX aggregated-ether-options lacp]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.3.<br>Statement introduced in Junos OS Release 11.4 for EX Series switches.  |
| <b>Description</b>              | <p>Define LACP system priority at the aggregated Ethernet interface level. This system priority value takes precedence over a system priority value configured at the global <b>[edit chassis]</b> hierarchy level.</p> <p>The device with the lower system priority value determines which links between LACP partner devices are active and which are in standby for each LACP group. The device on the controlling end of the link uses port priorities to determine which ports are bundled into the aggregated bundle and which ports are put in standby mode. Port priorities on the other device (the noncontrolling end of the link) are ignored. In priority comparisons, numerically lower values have higher priority. Therefore, the system with the numerically lower value (higher priority value) for LACP system priority becomes the controlling system. If both devices have the same LACP system priority (for example, they are both configured with the default setting of 127), the device MAC address determines which switch is in control.</p> |
| <b>Options</b>                  | <p><b>priority</b>—Priority for the aggregated Ethernet system. A smaller value indicates a higher priority.</p> <p><b>Range:</b> 0 through 65535</p> <p><b>Default:</b> 127</p>  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring LACP Link Protection of Aggregated Ethernet Interfaces (CLI Procedure)</i></li></ul>   |

## t1-options

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre> t1-options {   bert-algorithm <i>algorithm</i>;   bert-error-rate <i>rate</i>;   bert-period <i>seconds</i>;   buildout <i>value</i>;   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 <i>time-slot-range</i>; } </pre> |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ]  |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access Routers.</p>  |
| <b>Description</b>              | <p>Configure T1-specific physical interface properties.</p> <p>The statements are explained separately.</p>   |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>T1 Interfaces Overview</i></li> </ul>   |

## t310

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|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | t310-value <i>seconds</i> ;  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>br-pim</i> /0/ <i>port</i> <a href="#">isdn-options</a> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For ISDN interfaces, configure the Q.931-specific timer for T310, in seconds. The Q.931 protocol is involved in the setup and termination of connections.                    |
| <b>Options</b>                  | <b>seconds</b> —Timer value, in seconds.<br><b>Range:</b> 1 through 65,536 seconds<br><b>Default:</b> 10 seconds   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring ISDN Physical Interface Properties</i></li><li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li></ul> |

## t391

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | t391 <i>seconds</i> ;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> mlfr-uni-nni-bundle-options]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For link services and voices interfaces only, set Frame Relay link integrity polling interval.  |
| <b>Options</b>                  | <b>seconds</b> —Link integrity polling interval.<br><b>Range:</b> 5 through 30 seconds<br><b>Default:</b> 10 seconds  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">n391 on page 626</a></li><li>• <a href="#">n392 on page 627</a></li><li>• <a href="#">n393 on page 628</a></li><li>• <a href="#">t392 on page 795</a></li><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul> |

## t392

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | t392 <i>seconds</i> ;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> mlfr-uni-nni-bundle-options]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For link services and voices interfaces only, set Frame Relay polling verification interval.  |
| <b>Options</b>                  | <b><i>seconds</i></b> —Polling verification interval.<br><b>Range:</b> 5 through 30 seconds<br><b>Default:</b> 15 seconds   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">n391 on page 626</a></li><li>• <a href="#">n392 on page 627</a></li><li>• <a href="#">n393 on page 628</a></li><li>• <a href="#">t391 on page 794</a></li><li>• <a href="#">timeslots on page 803</a></li><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul> |

## t3-options

---

**Syntax**    t3-options {  
              atm-encapsulation (direct | plcp);  
              bert-algorithm *algorithm*;  
              bert-error-rate *rate*;  
              bert-period *seconds*;  
              (cbit-parity | no-cbit-parity);  
              compatibility-mode (digital-link | kentrox | larscom) <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);  
              start-end-flag *value*;  
              }

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

**Release Information**    Statement introduced before Junos OS Release 7.4.

**Description**    Configure T3-specific physical interface properties, including the properties of DS3 channels on a channelized OC12 interface. The **long-buildout** statement is not supported for DS3 channels on a channelized OC12 interface.

On T3 interfaces, the default encapsulation is PPP.

For ATM1 interfaces, you can configure a subset of E3 options statements.

The statements are explained separately.

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

**Related Documentation**    • *T3 Interfaces Overview*

## tag-protocol-id

See the following sections:

- [tag-protocol-id \(TPIDs Expected to Be Sent or Received\)](#) on page 797
- [tag-protocol-id \(TPID to Rewrite\)](#) on page 798

### tag-protocol-id (TPIDs Expected to Be Sent or Received)

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>tag-protocol-id [ <i>tpids</i> ];</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>gether-options</b> <a href="#">ethernet-switch-profile</a> ],<br>[edit interfaces <i>interface-name</i> <b>aggregated-ether-options</b> <a href="#">ethernet-switch-profile</a> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.   |
| <b>Description</b>              | For Gigabit Ethernet IQ and 10-Gigabit Ethernet IQ2 and IQ2-E interfaces, aggregated Ethernet with Gigabit Ethernet IQ interfaces, and Gigabit Ethernet PICs with SFPs (except the 10-port Gigabit Ethernet PIC, and the built-in Gigabit Ethernet port on the M7i router), define the TPIDs expected to be sent or received on a particular VLAN. For each Gigabit Ethernet port, you can configure up to eight TPIDs using the <b>tag-protocol-id</b> statement; but only the first four TPIDs are supported on IQ2 and IQ2-E interfaces.<br><br>For 10-Gigabit Ethernet LAN/WAN PIC interfaces on T Series routers only the default TPID value ( <b>0x8100</b> ) is supported. |
| <b>Options</b>                  | <i>tpids</i> —TPIDs to be accepted on the VLAN. Specify TPIDs in hexadecimal.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Frames with Particular TPIDs to Be Processed as Tagged Frames</i></li> </ul>  |

## tag-protocol-id (TPID to Rewrite)

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>tag-protocol-id <i>tpid</i>;</code>   |
| <b>Hierarchy Level</b>          | <code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">input-vlan-map</a>],</code><br><code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">output-vlan-map</a>],</code><br><code>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i></code><br><code><a href="#">input-vlan-map</a>],</code><br><code>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i></code><br><code><a href="#">output-vlan-map</a>]</code> |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.  |
| <b>Description</b>              | <p>For Gigabit Ethernet IQ and 10-Gigabit Ethernet IQ2 and IQ2-E interfaces only, configure the outer TPID value. All TPIDs you include in input and output VLAN maps must be among those you specify at the <code>[edit interfaces <i>interface-name</i> <b>gether-options ethernet-switch-profile tag-protocol-id [ <i>tpids</i> ]]</b></code> hierarchy level.</p> <p>For 10-Gigabit Ethernet LAN/WAN PIC interfaces on T Series routers the default TPID value (<b>0x8100</b>) is supported.</p>  |
| <b>Default</b>                  | If the <b>tag-protocol-id</b> statement is not configured, the TPID value is 0x8100.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Inner and Outer TPIDs and VLAN IDs</i></li></ul>   |



## targeted-broadcast

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | targeted-broadcast {<br>forward-and-send-to-re;<br>forward-only;<br>}  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family inet]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.2.   |
| <b>Description</b>              | Specify the IP packets destined for a Layer 3 broadcast address to be forwarded to both an egress interface and the Routing Engine, or to an egress interface only. The packets are broadcast only if the egress interface is a LAN interface.<br><br>The statements are explained separately. |
| <b>Default</b>                  | When this statement is not included, broadcast packets are sent to the Routing Engine only.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Targeted Broadcast on page 250</a></li> <li>• <a href="#">Understanding Targeted Broadcast on page 249</a></li> </ul>   |

## targeted-distribution (Static Interfaces over Aggregated Ethernet)

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | targeted-distribution;   |
| <b>Hierarchy Level</b>          | [edit interfaces <b>demux0 unit</b> <i>logical-unit-number</i> ],<br>[edit interfaces <b>pp0 unit</b> <i>logical-unit-number</i> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.2.   |
| <b>Description</b>              | Configure egress data for a logical interface to be sent across a single member link in an aggregated Ethernet bundle. A backup link is provisioned with CoS scheduling resources in the event that the primary assigned link goes down. The aggregated Ethernet interface must be configured without link protection.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>CoS for PPPoE Subscriber Interfaces Overview</i></li><li>• <i>Configuring the Distribution Type for PPPoE Subscribers on Aggregated Ethernet Interfaces</i></li><li>• <i>Verifying the Distribution of PPPoE Subscribers in an Aggregated Ethernet Interface</i></li><li>• <i>Targeted Traffic Distribution on Aggregated Ethernet Interfaces in a Virtual Chassis</i></li><li>• <i>Configuring Module Redundancy for a Virtual Chassis</i></li><li>• <i>Configuring Chassis Redundancy for a Virtual Chassis</i></li></ul> |

## tei-option

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | tei-option (first-call   power-up);  |
| <b>Hierarchy Level</b>          | [edit interfaces <b>br-pim/0/port</b> <b>isdn-options</b> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For ISDN interfaces, configure when the Terminal Endpoint Identifier (TEI) negotiates with the ISDN provider.  |
| <b>Options</b>                  | <b>first-call</b> —Activation does not occur until the call setup is sent.<br><b>power-up</b> —Activation occurs when the Services Router is powered on.<br><b>Default:</b> power-up |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring ISDN Physical Interface Properties</i></li><li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li></ul>         |

## terminate (PPPoE Service Name Tables)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | terminate;   |
| <b>Hierarchy Level</b>          | [edit protocols pppoe service-name-tables <i>table-name</i> <a href="#">service</a> <i>service-name</i> ],<br>[edit protocols pppoe service-name-tables <i>table-name</i> service <i>service-name</i> <a href="#">agent-specifier</a><br>aci <i>circuit-id-string</i> ari <i>remote-id-string</i> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.<br>Support at [edit protocols pppoe service-name-tables <i>table-name</i> service <i>service-name</i> <a href="#">agent-specifier</a> aci <i>circuit-id-string</i> ari <i>remote-id-string</i> ] hierarchy level introduced in Junos OS Release 10.2.   |
| <b>Description</b>              | Direct the router to immediately respond to a PPPoE Active Discovery Initiation (PADI) control packet received from a PPPoE client by sending the client a PPPoE Active Discovery Offer (PADO) packet. The PADO packet contains the name of the access concentrator (router) that can service the client request. The <b>terminate</b> action is the default action for a named service entry, <b>empty</b> service entry, <b>any</b> service entry, or agent circuit identifier/agent remote identifier (ACI/ARI) pair in a PPPoE service name table. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring PPPoE Service Name Tables</a></li> </ul>  |

## then

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | then {<br>discard;<br>}  |
| <b>Hierarchy Level</b>          | [edit firewall hierarchical-policer aggregate],<br>[edit firewall hierarchical-policer premium]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.5.  |
| <b>Description</b>              | On M40e, M120, and M320 (with FFPC and SFPC) edge routers and T320, T640, and T1600 core routers with Enhanced Intelligent Queuing (IQE) PICs, discard packets when a specified bandwidth or burst limits for an aggregate level of a hierarchical policer is reached. |
| <b>Options</b>                  | <b>discard</b> —Discard packets if condition is met.   |
| <b>Required Privilege Level</b> | firewall—To view this statement in the configuration.<br>firewall-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Applying Policers on page 222</a></li> <li>• <a href="#">Junos OS Class of Service Library for Routing Devices</a></li> </ul>   |

## threshold

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>threshold <i>bytes</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | <p>Specify the bucket threshold, which controls the burstiness of the leaky bucket mechanism. The larger the value, the more bursty the traffic, which means that over a very short amount of time, the interface can receive or transmit close to line rate, but the average over a longer time is at the configured bucket rate.</p>                                 |
| <b>Options</b>                  | <p><b><i>bytes</i></b>—Maximum size, in bytes, for traffic bursts. For ease of entry, you can enter <b><i>number</i></b> either as a complete decimal number or as a decimal number followed by the abbreviation <b>k</b> (1000). For example, the entry <b>threshold 2k</b> corresponds to a threshold of 2000 bytes.</p> <p><b>Range:</b> 0 through 65,535 bytes</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Receive and Transmit Leaky Bucket Properties on page 158</a></li></ul>   |

## timeslots

|                            |   |
|----------------------------|---|
| <b>Syntax</b>              | <code>timeslots <i>time-slot-range</i>;</code>  |
| <b>Hierarchy Level</b>     | <code>[edit interfaces e1-<i>fpc/pic/port</i>],</code><br><code>[edit interfaces t1-<i>fpc/pic/port</i>],</code><br><code>[edit interfaces <i>interface-name</i> e1-<b>options</b>],</code><br><code>[edit interfaces <i>interface-name</i> <b>partition</b> <i>partition-number</i>],</code><br><code>[edit interfaces <i>interface-name</i> t1-<b>options</b>]</code> |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>         | For E1 and T1 interfaces, allocate the specific time slots by number.   |



**NOTE:** When configuring E1 or T1 interfaces on the 10-port Channelized E1/T1 IQE PIC, the `timeslots` statement must be included at the `[edit interfaces e1-fpc/pic/port]` or `[edit interfaces t1-fpc/pic/port]` hierarchy level as appropriate.

|                |   |
|----------------|---|
| <b>Options</b> | <p><b><i>time-slot-range</i></b>—Actual time slot numbers allocated:</p> <p><b>Range:</b> Ranges vary by interface type and configuration option as follows:</p> <ul style="list-style-type: none"> <li>• 1 through 24 for T1 interfaces (0 is reserved)</li> <li>• 1 through 31 for 4-port E1 PICs (0 is reserved)</li> <li>• 1 through 31 for NxDS0 interfaces (0 is reserved)</li> <li>• 2 through 32 for 10-port Channelized E1 and 10-port Channelized E1 IQ PICs (1 is reserved)</li> <li>• 2 through 32 for the setting under <b>e1-<i>options</i></b> with IQE PICs (1 is reserved) (when creating fractional E1)</li> <li>• 1 through 31 for the setting under <b>partition</b> with IQE PICs (0 is reserved) (when creating NxDS0)</li> </ul> |
|----------------|---|



**NOTE:** When creating fractional E1 interfaces only, if you connect a 4-port E1 PIC interface to a device that uses time slot numbering from 2 through 32, you must subtract 1 from the configured number of time slots.

|                                 |  |
|---------------------------------|--|
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Fractional E1 IQ and IQE Interfaces</i></li> <li>• <i>Configuring Fractional T1 IQ and IQE Interfaces</i></li> </ul> |

- *Configuring Fractional E1 Time Slots*
- *Configuring Fractional T1 Time Slots*
- *Configuring a Channelized T1/E1 Interface to Drop and Insert Time Slots*

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## tm

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | tm (ignore   normal   require);   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options dce-options</a> ],<br>[edit interfaces <i>interface-name</i> <a href="#">serial-options dte-options</a> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For EIA-530 interfaces only, configure the from-DCE signal, test-mode (TM).   |
| <b>Options</b>                  | <b>ignore</b> —The from-DCE signal is ignored.<br><br><b>normal</b> —Normal TM signal handling as defined by the TIA/EIA Standard 530.<br><br><b>require</b> —The from-DCE signal must be asserted.<br><b>Default:</b> normal |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the Serial Signal Handling on page 303</a></li></ul>  |

---

## tm-polarity

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | tm-polarity (negative   positive);   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">serial-options</a> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Configure TM signal polarity.  |
| <b>Options</b>                  | <b>negative</b> —Negative signal polarity.<br><br><b>positive</b> —Positive signal polarity.<br><b>Default:</b> positive |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Serial Signal Polarities on page 306</a></li></ul>       |

## traceoptions

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See the following sections:

- [traceoptions \(ICCP\) on page 806](#)
- [traceoptions \(Individual Interfaces\) on page 807](#)
- [traceoptions \(Interface Process\) on page 809](#)
- [traceoptions \(LACP\) on page 811](#)
- [traceoptions \(PPP Process\) on page 813](#)
- [traceoptions \(PPPoE\) on page 816](#)



**NOTE:** For information about the `traceoptions` statement at the `[edit protocols vrrp]` hierarchy level, see the *Junos OS High Availability Library for Routing Devices*.

---

## traceoptions (ICCP)

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>traceoptions {<br/>  local-ip-address <i>ip address</i>;<br/>  session-establishment-hold-time <i>value</i>;<br/>  authentication-key <i>string</i>;<br/>  peer <i>ip-address</i> {<br/>    local-ip-address <i>ip address</i>;<br/>    session-establishment-hold-time <i>value</i>;<br/>    authentication-key <i>string</i>;<br/>    redundancy-group-id-list <i>redundancy-group-id-list</i>;<br/>    liveness-detection;<br/>  }<br/>}</pre>  |
| <b>Hierarchy Level</b>          | [edit protocols iccp]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.  |
| <b>Description</b>              | Define tracing operations for the ICCP protocol.  |
| <b>Default</b>                  | If you do not include this statement, no ICCP protocol tracing operations are performed.  |
| <b>Options</b>                  | <p><b>local-ip-address</b>—Specify the source address where the ICCP packet is routed.</p> <p><b>session-establishment-hold-time</b>—Specify if the chassis takes over as the master at the ICCP session.</p> <p><b>authentication-key</b> —Specify TCP Message Digest 5 (MD5) option for an ICCP TCP session.</p> <p><b>redundancy-group-id-list</b>—Specify the redundancy groups between two ICCP peers.</p> <p><b>liveness-detection</b>—Specify Bidirectional Forwarding Detection (BFD) protocol options.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring ICCP for MC-LAG on page 209</a></li></ul>   |



## traceoptions (Individual Interfaces)

|                            |   |
|----------------------------|---|
| <b>Syntax</b>              | <pre> traceoptions {   file <i>filename</i> &lt;files <i>name</i>&gt; &lt;size <i>size</i>&gt; &lt;world-readable   no-world-readable&gt;;   flag <i>flag</i>;   match; } </pre>  |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> ]  |
| <b>Release Information</b> | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.</p>  |
| <b>Description</b>         | <p>Define tracing operations for individual interfaces.</p> <p>To specify more than one tracing operation, include multiple <b>flag</b> statements.</p> <p>The interfaces <b>traceoptions</b> statement does not support a trace file. The logging is done by the kernel, so the tracing information is placed in the system <b>syslog</b> file in the directory <b>/var/log</b>.</p>   |
| <b>Default</b>             | If you do not include this statement, no interface-specific tracing operations are performed.   |
| <b>Options</b>             | <p><b>file name</b>—Name of the file to receive the output of the tracing operation. Enclose the name within quotation marks. All files are placed in the directory <b>/var/log</b>. By default, interface process tracing output is placed in the file <b>files number</b>—(Optional) Maximum number of trace files. When a trace file named <b>trace-file</b> reaches its maximum size, it is renamed <b>trace-file.0</b>, then <b>trace-file.1</b>, and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten.<b>dcd</b>.</p> <p><b>match</b>—(Optional) Regular expression for lines to be traced.</p> <p><b>no-world-readable</b>—(Optional) Prevent any user from reading the log file.</p> <p><b>world-readable</b>—(Optional) Allow any user to read the log file.</p> <p><b>size size</b>—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named <b>trace-file</b> reaches this size, it is renamed <b>trace-file.0</b>. When the <b>trace-file</b> again reaches its maximum size, <b>trace-file.0</b> is renamed <b>trace-file.1</b> and <b>trace-file</b> is renamed <b>trace-file.0</b>. This renaming scheme continues until the maximum number of trace files is reached. Then, the oldest trace file is overwritten.</p> <p><b>flag</b>—Tracing operation to perform. To specify more than one tracing operation, include multiple <b>flag</b> statements. The following are the interface-specific tracing options.</p> <ul style="list-style-type: none"> <li>• <b>all</b>—All interface tracing operations</li> <li>• <b>event</b>—Interface events</li> <li>• <b>ipc</b>—Interface interprocess communication (IPC) messages</li> </ul> |

- **media**—Interface media changes
- **q921**—Trace ISDN Q.921 frames
- **q931**—Trace ISDN Q.931 frames

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

**Related Documentation**    • [Tracing Operations of an Individual Router Interface on page 167](#)

## traceoptions (Interface Process)

|                            |  |
|----------------------------|--|
| <b>Syntax</b>              | <pre> traceoptions {   file &lt;filename&gt; &lt;files number&gt; &lt;match regular-expression&gt; &lt;size size&gt; &lt;world-readable       no-world-readable&gt;;   flag flag &lt;disable&gt;;   no-remote-trace; } </pre>  |
| <b>Hierarchy Level</b>     | [edit interfaces]  |
| <b>Release Information</b> | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p>   |
| <b>Description</b>         | Define tracing operations for the interface process (dcd).   |
| <b>Default</b>             | If you do not include this statement, no interface-specific tracing operations are performed.  |
| <b>Options</b>             | <p><b>disable</b>—(Optional) Disable the tracing operation. You can use this option to disable a single operation when you have defined a broad group of tracing operations, such as <b>all</b>.</p> <p><b>filename</b>—Name of the file to receive the output of the tracing operation. Enclose the name within quotation marks. All files are placed in the directory <b>/var/log</b>. By default, interface process tracing output is placed in the file <b>dcd</b>.</p> <p><b>files number</b>—(Optional) Maximum number of trace files. When a trace file named <b>trace-file</b> reaches its maximum size, it is renamed <b>trace-file.0</b>, then <b>trace-file.1</b>, and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten.</p> <p>If you specify a maximum number of files, you also must specify a maximum file size with the <b>size</b> option.</p> <p><b>Range:</b> 2 through 1000</p> <p><b>Default:</b> 3 files</p> <p><b>flag</b>—Tracing operation to perform. To specify more than one tracing operation, include multiple <b>flag</b> statements. You can include the following flags:</p> <ul style="list-style-type: none"> <li>• <b>all</b></li> <li>• <b>change-events</b>—Log changes that produce configuration events</li> <li>• <b>config-states</b>—Log the configuration state machine changes</li> <li>• <b>kernel</b>—Log configuration IPC messages to kernel</li> <li>• <b>kernel-detail</b>—Log details of configuration messages to kernel</li> </ul> <p><b>no-world-readable</b>—(Optional) Disallow any user to read the log file.</p> <p><b>size size</b>—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named <b>trace-file</b> reaches this size, it is renamed</p> |

***trace-file.0***. When the ***trace-file*** again reaches its maximum size, ***trace-file.0*** is renamed ***trace-file.1*** and ***trace-file*** is renamed ***trace-file.0***. This renaming scheme continues until the maximum number of trace files is reached. Then, the oldest trace file is overwritten.

If you specify a maximum file size, you also must specify a maximum number of trace files with the **files** option.

**Syntax:** **xk** to specify kilobytes, **xm** to specify megabytes, or **xg** to specify gigabytes

**Range:** 10 KB through the maximum file size supported on your router

**Default:** 1 MB

**world-readable**—(Optional) Allow any user to read the log file.

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

|                                 |   |
|---------------------------------|---|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.  |
|                                 | interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Tracing Operations of the Interface Process on page 272</a></li></ul> |

## traceoptions (LACP)

|                            |  |
|----------------------------|--|
| <b>Syntax</b>              | <pre>traceoptions {   file &lt;filename&gt; &lt;files number&gt; &lt;size size&gt; &lt;world-readable   no-world-readable&gt;;   flag flag;   no-remote-trace; }</pre>   |
| <b>Hierarchy Level</b>     | [edit protocols lacp]  |
| <b>Release Information</b> | Statement introduced in Junos OS Release 7.6.  |
| <b>Description</b>         | Define tracing operations for the LACP protocol.   |
| <b>Default</b>             | If you do not include this statement, no LACP protocol tracing operations are performed.   |
| <b>Options</b>             | <p><b>disable</b>—(Optional) Disable the tracing operation. You can use this option to disable a single operation when you have defined a broad group of tracing operations, such as <b>all</b>.</p> <p><b>filename</b>—Name of the file to receive the output of the tracing operation. Enclose the name within quotation marks. All files are placed in the directory <b>/var/log</b>. By default, interface process tracing output is placed in the file <b>lacpd</b>.</p> <p><b>files number</b>—(Optional) Maximum number of trace files. When a trace file named <b>trace-file</b> reaches its maximum size, it is renamed <b>trace-file.0</b>, then <b>trace-file.1</b>, and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten.</p> <p>If you specify a maximum number of files, you also must specify a maximum file size with the <b>size</b> option.</p> <p><b>Range:</b> 2 through 1000</p> <p><b>Default:</b> 3 files</p> <p><b>flag</b>—Tracing operation to perform. To specify more than one tracing operation, include multiple <b>flag</b> statements. You can include the following flags:</p> <ul style="list-style-type: none"> <li>• <b>all</b>—All LACP tracing operations</li> <li>• <b>configuration</b>—Configuration code</li> <li>• <b>packet</b>—Packets sent and received</li> <li>• <b>process</b>—LACP process events</li> <li>• <b>protocol</b>—LACP protocol state machine</li> <li>• <b>routing-socket</b>—Routing socket events</li> <li>• <b>startup</b>—Process startup events</li> </ul> <p><b>no-world-readable</b>—(Optional) Prevent any user from reading the log file.</p> |

**size size**—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named **trace-file** reaches this size, it is renamed **trace-file.0**. When the **trace-file** again reaches its maximum size, **trace-file.0** is renamed **trace-file.1** and **trace-file** is renamed **trace-file.0**. This renaming scheme continues until the maximum number of trace files is reached. Then the oldest trace file is overwritten.

If you specify a maximum file size, you also must specify a maximum number of trace files with the **files** option:

**Syntax:** **xk** to specify kilobytes, **xm** to specify megabytes, or **xg** to specify gigabytes

**Range:** 10 KB through the maximum file size supported on your router

**Default:** 1 MB

**world-readable**—(Optional) Allow any user to read the log file.

|                                 |  |
|---------------------------------|--|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.                           |
|                                 | interface-control—To add this statement to the configuration.                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Tracing LACP Operations</i></li></ul> |

## traceoptions (PPP Process)

|                            |  |
|----------------------------|--|
| <b>Syntax</b>              | <pre> traceoptions {     file <i>filename</i> &lt;files <i>number</i>&gt; &lt;match <i>regular-expression</i>&gt; &lt;size <i>size</i>&gt; &lt;world-readable           no-world-readable&gt;;     flag <i>flag</i>;     level <i>severity-level</i>;     no-remote-trace; } </pre>  |
| <b>Hierarchy Level</b>     | [edit protocols ppp]   |
| <b>Release Information</b> | Statement introduced in Junos OS Release 7.5.  |
| <b>Description</b>         | <p>Define tracing operations for the PPP process.</p> <p>To specify more than one tracing operation, include multiple <b>flag</b> statements.</p> <p>You cannot specify a separate trace tile. Tracing information is placed in the system <b>syslog</b> file in the directory <b>/var/log/pppd</b>.</p>   |
| <b>Default</b>             | If you do not include this statement, no PPPD-specific tracing operations are performed.   |
| <b>Options</b>             | <p><b>filename</b>—Name of the file to receive the output of the tracing operation. Enclose the name within quotation marks. All files are placed in the directory <b>/var/log</b>. By default, commit script process tracing output is placed in the file <b>ppd</b>. If you include the <b>file</b> statement, you must specify a filename. To retain the default, you can specify <b>eventd</b> as the filename.</p> <p><b>files <i>number</i></b>—(Optional) Maximum number of trace files. When a trace file named <b>trace-file</b> reaches its maximum size, it is renamed <b>trace-file.0</b>, then <b>trace-file.1</b>, and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten.</p> <p>If you specify a maximum number of files, you also must specify a maximum file size with the <b>size</b> option and a filename.</p> <p><b>Range:</b> 2 through 1000</p> <p><b>Default:</b> 3 files</p> <p><b>disable</b>—(Optional) Disable the tracing operation. You can use this option to disable a single operation when you have defined a broad group of tracing operations, such as <b>all</b>.</p> <p><b>flag</b>—Tracing operation to perform. To specify more than one tracing operation, include multiple <b>flag</b> statements. The following are the PPPD-specific tracing options.</p> <ul style="list-style-type: none"> <li>• <b>access</b>—Access code</li> <li>• <b>address-pool</b>—Address pool code</li> <li>• <b>all</b>—All areas of code</li> <li>• <b>auth</b>—Authentication code</li> </ul> |

- **chap**—Challenge Handshake Authentication Protocol (CHAP) code
- **config**—Configuration code
- **ifdb**—Interface database code
- **lcp**—LCP state machine code
- **memory**—Memory management code
- **message**—Message processing code
- **mlppp**—Trace MLPPP code
- **ncp**—NCP state machine code
- **pap**—Password Authentication Protocol (PAP) code
- **ppp**—PPP protocol processing code
- **radius**—RADIUS processing code
- **rtsock**—Routing socket code
- **session**—Session management code
- **signal**—Signal handling code
- **timer**—Timer code
- **ui**—User interface code

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

**size *size***—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named ***trace-file*** reaches this size, it is renamed ***trace-file.0***. When the ***trace-file*** again reaches its maximum size, ***trace-file.0*** is renamed ***trace-file.1*** and ***trace-file*** is renamed ***trace-file.0***. This renaming scheme continues until the maximum number of trace files is reached. Then the oldest trace file is overwritten.

If you specify a maximum file size, you also must specify a maximum number of trace files with the **files** option and filename.

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

**Range:** 10 KB through 1 GB

**Default:** 128 KB

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

**non-world-readable**—(Optional) By default, log files can be accessed only by the user who configures the tracing operation. Specify **non-world-readable** to reset the default.

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



**Related Documentation** • [Tracing Operations of the pppd Process on page 143](#)

## traceoptions (PPPoE)

**Syntax**    `traceoptions {  
          file <filename> <files number> <match regular-expression> <size maximum-file-size>  
          <world-readable | no-world-readable>;  
          filter {  
            aci regular-expression;  
            ari regular-expression;  
            service-name regular-expression;  
            underlying-interface interface-name;  
          }  
          flag flag;  
          level (all | error | info | notice | verbose | warning);  
          no-remote-trace;  
        }`

**Hierarchy Level**    [edit protocols pppoe]

**Release Information**    Statement introduced in Junos OS Release 9.6.  
Option **filter** introduced in Junos OS Release 12.3

**Description**    Define tracing operations for PPPoE processes.

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

**files number**—(Optional) Maximum number of trace files to create before overwriting the oldest one. If you specify a maximum number of files, you also must specify a maximum file size with the **size** option.

**Range:** 2 through 1000

**Default:** 3 files

**disable**—Disable this trace flag.

**filter**—Additional filter to refine the output to display particular subscribers. Filtering based on the following subscriber identifiers simplifies troubleshooting in a scaled environment.



**BEST PRACTICE:** Due to the complexity of agent circuit identifiers and agent remote identifiers, we recommend that you do not try an exact match when filtering on these options. For service names, searching on the exact name is appropriate, but you can also use a regular expression with that option.

- **aci regular-expression**—Regular expression to match the agent circuit identifier provided by PPPoE client.
- **ari regular-expression**—Regular expression to match the agent remote identifier provided by PPPoE client.
- **service regular-expression**—Regular expression to match the name of PPPoE service.

- **underlying-interface *interface-name***—Name of a PPPoE underlying interface. You cannot use a regular expression for this filter option.

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

- **all**—Trace all operations.
- **config**—Trace configuration events.
- **events**—Trace events.
- **gres**—Trace GRES events.
- **init**—Trace initialization events.
- **interface-db**—Trace interface database operations.
- **memory**—Trace memory processing events.
- **protocol**—Trace protocol events.
- **rtsock**—Trace routing socket events.
- **session-db**—Trace connection events and flow.
- **signal**—Trace signal operations.
- **state**—Trace state handling events.
- **timer**—Trace timer processing.
- **ui**—Trace user interface processing.

**level**—Level of tracing to perform. You can specify any of the following levels:

- **all**—Match all levels.
- **error**—Match error conditions.
- **info**—Match informational messages.
- **notice**—Match notice messages about conditions requiring special handling.
- **verbose**—Match verbose messages.
- **warning**—Match warning messages.

**match *regular-expression***—(Optional) Refine the output to include lines that contain the regular expression.

**no-remote-trace**—Disable remote tracing.

**no-world-readable**—(Optional) Disable unrestricted file access.

**size** *maximum-file-size*—(Optional) Maximum size of each trace file. By default, the number entered is treated as bytes. Alternatively, you can include a suffix to the number to indicate kilobytes (KB), megabytes (MB), or gigabytes (GB). If you specify a maximum file size, you also must specify a maximum number of trace files with the **files** option.

**Syntax:** *sizek* to specify KB, *sizem* to specify MB, or *sizeg* to specify GB

**Range:** 10240 through 1073741824

**Default:** 128 KB

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

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

**Related Documentation**

- *Configuring PPPoE Service Name Tables*
- *Tracing PPPoE Operations*

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## translate-discard-eligible

---

**Syntax** (translate-discard-eligible | no-translate-discard-eligible);

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

**Release Information** Statement introduced before Junos OS Release 7.4.

**Description** For interfaces with encapsulation type Frame Relay CCC, enable or disable translation of Frame Relay discard eligible (DE) control bits.

**Default** DE bit translation is disabled.

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

**Related Documentation**

- *Configuring Frame Relay Control Bit Translation*

## translate-fecn-and-becn

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | (translate-fecn-and-becn   no-translate-fecn-and-becn);  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>ccc</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>ccc</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For interfaces with encapsulation type Frame Relay CCC, enable or disable translation of Frame Relay forward explicit congestion notification (FECN) control bits and Frame Relay backward explicit congestion notification (BECN) control bits.                 |
| <b>Default</b>                  | FECN and BECN bit translation is disabled.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Frame Relay Control Bit Translation</i></li> </ul>   |

## translate-plp-control-word-de

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | translate-plp-control-word-de   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> <b>family</b> <i>ccc</i> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 11.1.  |
| <b>Description</b>              | For the interfaces with encapsulation type Frame Relay CCC, classify and rewrite the control word discard eligibility (DE) bit based on the packet loss priority (PLP). |
| <b>Default</b>                  | PLP bit translation is disabled.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Frame Relay Control Bit Translation</i></li> <li>• <i>frame-relay-de</i></li> </ul>                             |

## transmit-bucket

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre>transmit-bucket {<br/>    <b>overflow</b> discard;<br/>    <b>rate</b> <i>percentage</i>;<br/>    <b>threshold</b> <i>bytes</i>;<br/>}</pre>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | <p>Set parameters for the transmit leaky bucket, which specifies what percentage of the interface's total capacity can be used to transmit packets.</p> <p>For each DS3 channel in a channelized OC12 interface, you can configure a unique transmit bucket.</p> <p>The statements are explained separately.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Receive and Transmit Leaky Bucket Properties on page 158</a></li><li>• <a href="#">receive-bucket on page 719</a></li></ul>  |

## transmit-clock

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>transmit-clock invert;</pre>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>serial-options</b> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | Configure the transmit clock signal.  |
| <b>Options</b>                  | <b>invert</b> —Shift the clock phase 180 degrees.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring the Serial Clocking Mode on page 301</a></li></ul>      |

## transmit-period

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | transmit-period <i>seconds</i> ;  |
| <b>Hierarchy Level</b>          | [edit protocols dot1x authenticator interface <i>interface-id</i> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.3.   |
| <b>Description</b>              | Set the number of seconds the port waits before retransmitting the initial EAPOL PDUs to the client.  |
| <b>Options</b>                  | <p><b>seconds</b>—The number of seconds the port waits before retransmitting the initial EAPOL PDUs to the client.</p> <p><b>Range:</b> 1 through 65,535 seconds</p> <p><b>Default:</b> 30 seconds</p>  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>IEEE 802.1x Port-Based Network Access Control Overview</i></li><li>• <a href="#">authenticator on page 349</a></li><li>• <a href="#">dot1x on page 434</a></li><li>• <a href="#">interface (IEEE 802.1x) on page 530</a></li></ul> |

## transmit-weight

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See the following sections:

- [transmit-weight \(ATM2 IQ CoS Forwarding Class\) on page 822](#)
- [transmit-weight \(ATM2 IQ Virtual Circuit\) on page 823](#)

### transmit-weight (ATM2 IQ CoS Forwarding Class)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | transmit-weight (cells <i>number</i>   percent <i>number</i> );  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> atm-options scheduler-maps <i>map-name</i> forwarding-class <i>class-name</i> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For ATM2 IQ interfaces only, assign a transmission weight to a forwarding class.   |
| <b>Default</b>                  | 95 percent for queue 0, 5 percent for queue 3.   |
| <b>Options</b>                  | <b>percent <i>percent</i></b> —Transmission weight of the forwarding class as a percentage of the total bandwidth.<br><b>Range:</b> 5 through 100<br><br><b>cells <i>number</i></b> —Transmission weight of the forwarding class as a number of cells.<br><b>Range:</b> 0 through 32,000 |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring ATM2 IQ VC Tunnel CoS Components</i></li></ul>  |



## transmit-weight (ATM2 IQ Virtual Circuit)

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>transmit-weight <i>number</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For ATM2 IQ PICs only, configure the transmission weight.<br><br>Each VC is serviced in weighted round robin (WRR) mode. When VCs have data to send, they send the number of cells equal to their weight before passing control to the next active VC. This allows proportional bandwidth sharing between multiple VCs within a rate-shaped VP tunnel. VP tunnels are not supported on multipoint interfaces. |
| <b>Options</b>                  | <b>number</b> —Number of cells a VC sends before passing control to the next active VC within a VP tunnel.<br><b>Range:</b> 1 through 32,767  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring the ATM2 IQ Transmission Weight</a></li> </ul>   |

## traps

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>(traps   no-traps);</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ],<br>[edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit interfaces interface-range <i>name</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.  |
| <b>Description</b>              | Enable or disable the sending of Simple Network Management Protocol (SNMP) notifications when the state of the connection changes.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Enabling or Disabling SNMP Notifications on Physical Interfaces on page 169</a></li> <li>• <a href="#">Enabling or Disabling SNMP Notifications on Logical Interfaces on page 189</a></li> </ul>  |

## trigger

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <pre>trigger {<br/>    defect ignore;<br/>    defect <b>hold-time</b> up milliseconds down milliseconds;<br/>}</pre>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>sonet-options</b> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For ATM over SONET/SDH, SONET/SDH interfaces, and 10-Gigabit Ethernet interfaces in WAN PHY mode, configure SONET/SDH defect triggers to be ignored.  |
| <b>Default</b>                  | If you do not include this statement, all SONET/SDH defect triggers are honored.  |
| <b>Options</b>                  | <p><b>defect</b>—Defect to ignore or hold. It can be one of the following:</p> <ul style="list-style-type: none"><li>• <b>ais-l</b>—Line alarm indication signal</li><li>• <b>ais-p</b>—Path alarm indication signal</li><li>• <b>ber-sd</b>—Bit error rate signal degrade</li><li>• <b>ber-sf</b>—Bit error rate signal fault</li><li>• <b>locd</b> (ATM only)—Loss of cell delineation</li><li>• <b>lof</b>—Loss of frame</li><li>• <b>lol</b>—PHY loss of light</li><li>• <b>lop-p</b>—Path loss of pointer</li><li>• <b>los</b>—Loss of signal</li><li>• <b>pll</b>—PHY phase-locked loop out of lock</li><li>• <b>plm-p</b>—Path payload (signal) label mismatch</li><li>• <b>rfi-l</b>—Line remote failure indication</li><li>• <b>rfi-p</b>—Path remote failure indication</li><li>• <b>uneq-p</b>—Path unequipped</li></ul> <p>The remaining statements are explained separately.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring SONET/SDH Defect Triggers</i></li></ul>  |

## trigger-link-failure

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | [trigger-link-failure <i>interface-name</i> ];  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>lsq-fpc/pic/port</i> lsq-failure-options]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 7.4.   |
| <b>Description</b>              | List of SONET interfaces connected to the LSQ interface that can implement Automatic Protection Switching (APS) if the LSQ PIC fails. |
| <b>Options</b>                  | <i>interface-name</i> —Name of SONET interface.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> </ul>                   |

## trunk-bandwidth

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | trunk-bandwidth <i>rate</i> ;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | <p>For ATM2 IQ interfaces configured to use Layer 2 circuit trunk mode, configure a scheduler so that unused bandwidth from any inactive trunk is proportionally shared among the active trunks.</p> <p>During congestion, each trunk receives a proportional share of the leftover bandwidth, thus minimizing the latency on each trunk.</p>   |
| <b>Options</b>                  | <p><i>rate</i>—Peak rate, in bits per second (bps) or cells per second (cps). You can specify a value in bits per second either as a complete decimal number or as a decimal number followed by the abbreviation <b>k</b> (1000), <b>m</b> (1,000,000), or <b>g</b> (1,000,000,000). You can also specify a value in cells per second by entering a decimal number followed by the abbreviation <b>c</b>; values expressed in cells per second are converted to bits per second by means of the formula 1 cps = 384 bps.</p> <p><b>Range:</b> 1,000,000 through 542,526,792 bps</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Layer 2 Circuit Trunk Mode Scheduling</i></li> </ul>  |

## trunk-id

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>trunk-id number;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | <p>For ATM2 IQ interfaces with ATM CCC cell-relay encapsulation, configure the trunk identification number.</p> <p>When you associate a trunk ID number with a logical interface, you are in effect specifying the interfaces that are allowed to send ATM traffic over an LSP.</p> |
| <b>Options</b>                  | <p><b>number</b>—A valid trunk identifier.</p> <p><b>Range:</b> For UNI mode, 0 through 7. For NNI mode, 0 through 31.</p>  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Layer 2 Circuit Transport Mode</i></li></ul>   |

## ttl

---


|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>ttl value;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>number</i> <b>tunnel</b> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4  |
| <b>Description</b>              | Set the time-to-live value bit in the header of the outer IP packet.  |
| <b>Options</b>                  | <p><b>value</b>—Time-to-live value.</p> <p><b>Range:</b> 0 through 255</p> <p><b>Default:</b> 64</p>                    |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li></ul>       |

## tunnel

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <pre> tunnel {   backup-destination address;   destination address;   key number;   routing-instance {     destination routing-instance-name;   }   source source-address;   ttl number; } </pre>                          |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> <b>unit</b> <i>logical-unit-number</i> ]             |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | <p>Configure a tunnel. You can use the tunnel for unicast and multicast traffic or just for multicast traffic. You can also use tunnels for encrypted traffic or VPNs.</p> <p>The statements are explained separately.</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li> <li>• <i>Junos OS VPNs Library for Routing Devices</i></li> </ul>  |


## underlying-interface

|   |   |
|---|---|
| <b>Syntax</b>   | <code>underlying-interface <i>interface-name</i>;</code>  |
| <b>Hierarchy Level</b>  | <p>[edit interfaces pp0 unit <i>logical-unit-number</i> <a href="#">pppoe-options</a>],</p> <p>[edit interfaces demux0 unit <i>logical-unit-number</i> <a href="#">demux-options</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces demux0 unit <i>logical-unit-number</i> <a href="#">demux-options</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces pp0 unit <i>logical-unit-number</i> <a href="#">pppoe-options</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> interfaces demux0 unit <i>logical-unit-number</i> <a href="#">demux-options</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> interfaces pp0 unit <i>logical-unit-number</i> <a href="#">pppoe-options</a>]</p> |
| <b>Release Information</b>  | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Support for aggregated Ethernet added in Junos OS Release 9.4.</p>  |
| <b>Description</b>  | <p>For J Series Services Routers, M120 and M320 Multiservice Edge routers, and MX Series Universal Edge Routers with PPP over Ethernet interfaces, configure the interface on which PPP over Ethernet is running.</p> <p>For demux interfaces, configure the underlying interface on which the demultiplexing (demux) interface is running.</p>   |
| <b>Options</b>  | <p><b><i>interface-name</i></b>—Name of the interface on which PPP over Ethernet or demux is running. For example, <b>at-0/0/1.0</b> (ATM VC), <b>fe-1/0/1.0</b> (Fast Ethernet interface), <b>ge-2/0/0.0</b> (Gigabit Ethernet interface), <b>ae1.0</b> (for IP demux on an aggregated Ethernet interface), or <b>ae1</b> (for VLAN demux on an aggregated Ethernet interface).</p>  |
| <div>  <p><b>NOTE:</b> Demux interfaces are currently supported on Gigabit Ethernet, Fast Ethernet, 10-Gigabit Ethernet interfaces, or aggregated Ethernet devices.</p> </div> |   |
| <b>Required Privilege Level</b>   | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>  | <ul style="list-style-type: none"> <li>• <a href="#">Configuring an IP Demux Underlying Interface on page 281</a></li> <li>• <a href="#">Configuring a VLAN Demux Underlying Interface on page 283</a></li> <li>• <a href="#">Specifying the Demux Underlying Interface on page 283</a></li> <li>• <a href="#">Configuring the PPPoE Underlying Interface</a></li> <li>• <a href="#">Junos OS Interfaces and Routing Configuration Guide</a></li> </ul>   |

## unframed

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | (unframed   no-unframed);   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> <a href="#">e3-options</a> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For E3 IQ interfaces only, enable or disable unframed mode. In unframed mode, the E3 IQ interface do not detect yellow ( <b>ylw</b> ) or loss-of-frame ( <b>lof</b> ) alarms. |
| <b>Default</b>                  | Unframed mode is disabled.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring E3 IQ and IQE Unframed Mode</a></li> </ul>   |

## unidirectional

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | unidirectional;   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.<br>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.  |
| <b>Description</b>              | Create two new, unidirectional (transmit-only and receive-only) physical interfaces subordinate to the original parent interface. Unidirectional links are currently supported only on 10-Gigabit Ethernet interfaces on the following hardware:                |
|                                 | <div style="display: flex; align-items: flex-start;"> <div style="margin-right: 10px;">  </div> <div> <p><b>NOTE:</b> Which interfaces and pic for EX9200?</p> </div> </div> |
|                                 | <ul style="list-style-type: none"> <li>• 4-port 10-Gigabit Ethernet DPC on the MX960 router</li> <li>• 10-Gigabit Ethernet IQ2 PIC and 10-Gigabit Ethernet IQ2E PIC on the T Series router</li> </ul>   |
| <b>Default</b>                  | Disabled.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Understanding Unidirectional Traffic Flow on Physical Interfaces on page 170</a></li> <li>• <a href="#">Enabling Unidirectional Traffic Flow on Physical Interfaces</a></li> </ul>                         |

## 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;
  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 ...
}
bridge-domain-type (bvlan | svlan);
bundle interface-name;
core-facing;
demux-destination {
    destination-prefix;
}
demux-source {
    source-prefix;
}
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;
isid-list all-service-groups;
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 only. 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*
  - *Example: Configuring E-LINE and E-LAN Services for a PBB Network on MX Series Routers*
  - *Junos OS Services Interfaces Library for Routing Devices*

## unnumbered-address

See the following sections:

- [unnumbered-address \(Demux\) on page 837](#)
- [unnumbered-address \(Ethernet\) on page 838](#)
- [unnumbered-address \(PPP\) on page 839](#)

### unnumbered-address (Demux)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>unnumbered-address interface-name &lt;preferred-source-address address&gt;;</code>   |
| <b>Hierarchy Level</b>          | [edit <a href="#">interfaces</a> <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> inet],<br>[edit <a href="#">logical-systems</a> <i>logical-system-name</i> <a href="#">interfaces</a> <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> inet] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.2.<br><b>preferred-source-address</b> option introduced in Junos OS Release 9.0.<br>IP demultiplexing interfaces supported in Junos OS Release 9.2.   |
| <b>Description</b>              | For IP demultiplexing interfaces, enable the local address to be derived from the specified interface. Configuring an unnumbered interface enables IP processing on the interface without assigning an explicit IP address to the interface.   |
| <b>Options</b>                  | <i>interface-name</i> —Name of the interface from which the local address is derived. The specified interface must have a logical unit number and a configured IP address, and must not be an unnumbered interface.<br><br>The <b>preferred-source-address</b> statement is explained separately.                                      |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring an Unnumbered Interface on page 213</a></li> <li>• <a href="#">address on page 329</a></li> <li>• <i>Junos System Basics Configuration Guide</i></li> </ul>   |

## unnumbered-address (Ethernet)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>unnumbered-address interface-name &lt;preferred-source-address address&gt;;</code>   |
| <b>Hierarchy Level</b>          | [edit <a href="#">interfaces</a> <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> <i>family</i> ],<br>[edit <a href="#">logical-systems</a> <i>logical-system-name</i> <a href="#">interfaces</a> <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> <i>family</i> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.2.<br><b>preferred-source-address</b> option introduced in Junos OS Release 9.0.  |
| <b>Description</b>              | For Ethernet interfaces, enable the local address to be derived from the specified interface. Configuring an unnumbered Ethernet interface enables IP processing on the interface without assigning an explicit IP address to the interface.   |
| <b>Options</b>                  | <b>interface-name</b> —Name of the interface from which the local address is derived. The specified interface must have a logical unit number and a configured IP address, and must not be an unnumbered interface.<br><br>The <b>preferred-source-address</b> statement is explained separately.  |
| <b>Required Privilege Level</b> | <b>interface</b> —To view this statement in the configuration.<br><b>interface-control</b> —To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring an Unnumbered Interface on page 213</a></li><li>• <a href="#">address on page 329</a></li><li>• <i>Junos System Basics Configuration Guide</i></li></ul>   |



## unnumbered-address (PPP)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>unnumbered-address interface-name destination address destination-profile profile-name;</code>   |
| <b>Hierarchy Level</b>          | [edit <a href="#">interfaces</a> <i>interface-name</i> <a href="#">unit</a> <i>logical-unit-number</i> <a href="#">family</a> inet],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <a href="#">family</a> inet] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For interfaces with PPP encapsulation, enable the local address to be derived from the specified interface.  |
| <b>Options</b>                  | <i>interface-name</i> —Interface from which the local address is derived. The interface name must include a logical unit number and must have a configured address.<br><br>The remaining statements are explained separately.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring IPCP Options on page 210</a></li><li>• <a href="#">address on page 329</a></li><li>• <a href="#">negotiate-address on page 633</a></li><li>• <i>Junos OS Administration Library for Routing Devices</i></li></ul>      |

## up-count

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>up-count <i>cells</i>;</code>   |
| <b>Hierarchy Level</b>          | <code>[edit interfaces <i>interface-name</i> atm-options vpi <i>vpi-identifier</i> oam-liveness]</code> ,<br><code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> oam-liveness]</code> ,<br><code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> address <i>address</i> multipoint-destination <i>address</i> oam-liveness]</code> ,<br><code>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> oam-liveness]</code> ,<br><code>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family <i>family</i> address <i>address</i> multipoint-destination <i>address</i> oam-liveness]</code> |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | <p>For ATM encapsulation only, configure Operation, Administration, and Maintenance (OAM) F5 loopback cell count thresholds. Not supported on ATM-over-SHDSL interfaces.</p> <p>For ATM2 IQ PICs only, configure OAM F4 loopback cell count thresholds at the <code>[edit interfaces <i>interface-name</i> atm-options vpi <i>vpi-identifier</i>]</code> hierarchy level.</p>   |
| <b>Options</b>                  | <p><b>cells</b>—Minimum number of consecutive OAM F4 or F5 loopback cells received before a VC is declared up.</p> <p><b>Range:</b> 1 through 255</p> <p><b>Default:</b> 5 cells</p>  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring the ATM OAM F5 Loopback Cell Threshold</i></li></ul>   |

## user-prefix

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>user-prefix <i>user-prefix-string</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> auto-configure <a href="#">vlan-ranges authentication username-include</a> ],<br>[edit interfaces <i>interface-name</i> auto-configure <a href="#">stacked-vlan-ranges authentication username-include</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.  |
| <b>Description</b>              | Specify the user prefix that is concatenated with the username during the subscriber authentication process.  |
| <b>Options</b>                  | <i>user-prefix-string</i> —The user prefix string.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring VLAN Interface Username Information for AAA Authentication</i></li></ul>   |

## username-include

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|                          |  |
|--------------------------|--|
| Syntax                   | <pre>username-include {<br/>    circuit-type;<br/>    delimiter <i>delimiter-character</i>;<br/>    domain-name <i>domain-name-string</i>;<br/>    interface-name;<br/>    mac-address;<br/>    option-18;<br/>    option-37;<br/>    option-82 &lt;circuit-id&gt; &lt;remote-id&gt;;<br/>    radius-realm <i>radius-realm-string</i>;<br/>    user-prefix <i>user-prefix-string</i>;<br/>}</pre>  |
| Hierarchy Level          | [edit interfaces <i>interface-name</i> auto-configure <a href="#">vlan-ranges authentication</a> ],<br>[edit interfaces <i>interface-name</i> auto-configure <a href="#">stacked-vlan-ranges authentication</a> ]  |
| Release Information      | Statement introduced in Junos OS Release 10.0.   |
| Description              | <p>Configure the username that the router passes to the external AAA server. You must include at least one of the optional statements for the username to be valid. If you do not configure a username, the router accesses the local authentication service only and does not use external authentication services, such as RADIUS.</p> <p>The username takes the format <b><i>user-prefix mac-address circuit-type option-82 interface-name domain-name radius-realm</i></b> with each component separated by whatever delimiter you choose.</p> <p>The remaining statements are explained separately.</p> |
| Required Privilege Level | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| Related Documentation    | <ul style="list-style-type: none"><li>• <i>Configuring VLAN Interface Username Information for AAA Authentication</i></li><li>• <i>Option 82 Suboptions in Authentication Usernames for Autosense VLANs</i></li><li>• <i>Option 18 and Option 37 in Authentication Usernames for DHCPv6 Autosense VLANs</i></li></ul>  |

## vbr

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>vbr peak <i>rate</i> sustained <i>rate</i> burst <i>length</i>;</code>   |
| <b>Hierarchy Level</b>          | <p>[edit interfaces <i>interface-name</i> atm-options vpi <i>vpi-identifier</i> <b>shaping</b>],</p> <p>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> address <i>address</i> family <i>family</i> multipoint-destination <i>address</i> shaping ],</p> <p>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> shaping ],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> address <i>address</i> family <i>family</i> multipoint-destination <i>address</i> shaping ],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> shaping ]</p>  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | <p>For ATM encapsulation only, define the variable bandwidth utilization in the traffic-shaping profile.</p> <p>When you configure the variable bandwidth utilization, you must specify all three options (<b>burst</b>, <b>peak</b>, and <b>sustained</b>). You can specify the rate in bits per second either as a complete decimal number or as a decimal number followed by the abbreviation <b>k</b> (1000), <b>m</b> (1,000,000), or <b>g</b> (1,000,000,000). You can also specify the rate in cells per second by entering a decimal number followed by the abbreviation <b>c</b>; values expressed in cells per second are converted to bits per second by means of the formula 1 cps = 384 bps.</p>  |
| <b>Default</b>                  | If the <b>vbr</b> statement is not specified, bandwidth utilization is unlimited.  |
| <b>Options</b>                  | <p><b>burst <i>length</i></b>—Burst length, in cells. If you set the length to 1, the peak traffic rate is used.<br/> <b>Range:</b> 1 through 4000 cells</p> <p><b>peak <i>rate</i></b>—Peak rate, in bits per second or cells per second.<br/> <b>Range:</b> For ATM1 interfaces, 33 Kbps through 135.6 Mbps (ATM OC3); 33 Kbps through 276 Mbps (ATM OC12). For ATM2 IQ OC3 and OC12 interfaces, 33 Kbps through 542,526,792 bps. For ATM2 IQ OC48 interfaces, 33 Kbps through 2,170,107,168 bps. For ATM2 IQ DS3 and E3 interfaces, from 33 Kbps through the maximum rate, which depends on the ATM encapsulation and framing you configure.</p> <p><b>sustained <i>rate</i></b>—Sustained rate, in bits per second or cells per second.<br/> <b>Range:</b> For ATM1 interfaces, 33 Kbps through 135.6 Mbps (ATM OC3); 33 Kbps through 276 Mbps (ATM OC12). For ATM2 IQ OC3 and OC12 interfaces, 33 Kbps through 542,526,792 bps. For ATM2 IQ OC48 interfaces, 33 Kbps through 2,170,107,168 bps. For ATM2 IQ DS3 and E3 interfaces, from 33 Kbps through the maximum rate, which depends on the ATM encapsulation and framing you configure.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring ATM CBR</i></li> <li>• <i>Applying Scheduler Maps to Logical ATM Interfaces</i></li> </ul>   |

- [cbr on page 379](#)
- [rtvbr on page 737](#)
- [shaping on page 757](#)

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## vc-cos-mode

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | vc-cos-mode (alternate   strict);   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> atm-options scheduler-maps <i>map-name</i> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For ATM2 IQ interfaces only, specify packet-scheduling priority value for ATM2 IQ VC tunnels.   |
| <b>Options</b>                  | <p><b>alternate</b>—VC CoS queue has high priority. The scheduling of the queues alternates between the high-priority queue and the remaining queues, so every other scheduled packet is from the high-priority queue.</p> <p><b>strict</b>—VC CoS queue has strictly high priority. A queue with strict high priority is always scheduled before the remaining queues. The remaining queues are scheduled in round-robin fashion.</p> <p><b>Default:</b> alternate</p> |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring ATM2 IQ VC Tunnel CoS Components</i></li><li>• <i>Configuring Scheduler Maps on ATM Interfaces</i></li></ul>   |

## vci

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>vci vpi-identifier.vci-identifier;</code>  |
| <b>Hierarchy Level</b>          | <p>[edit interfaces at-<i>fpc/pic/port</i> unit <i>logical-unit-number</i>],</p> <p>[edit interfaces at-<i>fpc/pic/port</i> unit <i>logical-unit-number</i> family <i>family</i> address <i>address</i> multipoint-destination <i>address</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces at-<i>fpc/pic/port</i> unit <i>logical-unit-number</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> interfaces at-<i>fpc/pic/port</i> unit <i>logical-unit-number</i> family <i>family</i> address <i>address</i> multipoint-destination <i>address</i>]</p> |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 11.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access routers.</p>  |
| <b>Description</b>              | <p>For ATM point-to-point logical interfaces only, configure the virtual circuit identifier (VCI) and virtual path identifier (VPI).</p> <p>To configure a VPI for a point-to-multipoint interface, specify the VPI in the <a href="#">multipoint-destination</a> statement.</p> <p>VCIs 0 through 31 are reserved for specific ATM values designated by the ATM Forum.</p>  |
| <b>Options</b>                  | <p><b>vci-identifier</b>—ATM virtual circuit identifier. Unless you configure the interface to use promiscuous mode, this value cannot exceed the highest-numbered VC configured for the interface with the <b>maximum-vcs</b> option of the <b>vpi</b> statement.</p> <p><b>Range:</b> 0 through 4089 or 0 through 65,535 with promiscuous mode, with VCIs 0 through 31 reserved.</p> <p><b>vpi-identifier</b>—ATM virtual path identifier.</p> <p><b>Range:</b> 0 through 255</p> <p><b>Default:</b> 0</p>   |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring a Point-to-Point ATM1 or ATM2 IQ Connection</a></li> <li>• <a href="#">Applying Scheduler Maps to Logical ATM Interfaces</a></li> <li>• <a href="#">multipoint-destination on page 624</a></li> <li>• <a href="#">promiscuous-mode on page 704</a></li> <li>• <a href="#">vpi (ATM CCC Cell-Relay Promiscuous Mode) on page 865</a></li> </ul>  |

## vci-range

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|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>vci-range start <i>start-vci</i> end <i>end-vci</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces at- <i>fpc/pic/port</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces at- <i>fpc/pic/port</i> <b>unit</b> <i>logical-unit-number</i> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.0.   |
| <b>Description</b>              | Range of VCI values used in ATM-to-Ethernet interworking cross-connects. VCI 0 through 31 are reserved. VCI 0 through 31 should not be used.  |
| <b>Options</b>                  | <b><i>start-vci</i></b> —Lowest number VCI in the range.<br><br><b><i>end-vci</i></b> —Highest number VCI in the range.<br><b>Range:</b> 0 through 255  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring ATM-to-Ethernet Interworking on page 260</a></li></ul>  |

## virtual-switch

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|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>virtual-switch <i>name</i> bridge-domain <i>name</i> vlan-id [<i>vlan-ids</i> ];</code>  |
| <b>Hierarchy Level</b>          | [edit protocols oam ethernet connectivity-fault-management <b>maintenance-domain</b> <i>domain-name</i> default-x]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.6.  |
| <b>Description</b>              | Specify the routing-instance type as a virtual switch, under which bridge-domain MIPs must be enabled.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring MIP for Bridge Domains of a Virtual Switch</a></li><li>• <a href="#">Example: Configuring Connectivity Fault Management for a PBB Network on MX Series Routers</a></li></ul> |



## vlan-id

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See the following sections:

- [vlan-id \(Logical Port in Bridge Domain\) on page 847](#)
- [vlan-id \(Outer VLAN ID\) on page 848](#)
- [vlan-id \(VLAN ID to Be Bound to a Logical Interface\) on page 848](#)
- [vlan-id \(VLAN ID to Rewrite\) on page 849](#)

### vlan-id (Logical Port in Bridge Domain)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>vlan-id <i>number</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family bridge],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> family bridge] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.2.  |
| <b>Description</b>              | The VLAN ID configured on the logical port. Received packets with no VLAN tags are forwarded within the bridge domain with the matching VLAN ID.   |
| <b>Options</b>                  | <b>number</b> —The VLAN ID.<br><b>Range:</b> 1 through 4095  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring a Logical Interface for Access Mode</a></li></ul>  |

### vlan-id (Outer VLAN ID)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>vlan-id <i>outer-vlan-id</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.0.  |
| <b>Description</b>              | The outer VLAN ID to be used in ATM-to-Ethernet interworking cross-connects. Outer VLAN IDs are converted to the ATM VPI. The outer VLAN ID must match the VPI value configured. The allowable VPI range is 0 to 255. Do not configure the outer VLAN ID to be greater than 255. |
| <b>Options</b>                  | <b>outer-vlan-id</b> —Outer VLAN ID number.<br><b>Range:</b> 0 through 4094  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring ATM-to-Ethernet Interworking on page 260</a></li></ul>   |

### vlan-id (VLAN ID to Be Bound to a Logical Interface)

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>vlan-id <i>number</i>;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | For Fast Ethernet, Gigabit Ethernet, and Aggregated Ethernet interfaces only, bind a 802.1Q VLAN tag ID to a logical interface.   |
| <b>Options</b>                  | <b>number</b> —A valid VLAN identifier.<br><b>Range:</b> For aggregated Ethernet, 4-port, 8-port, and 12-port Fast Ethernet PICs, and for management and internal Ethernet interfaces, 1 through 1023.<br><br>For 48-port Fast Ethernet and Gigabit Ethernet PICs, 1 through 4094.<br><br>VLAN ID 0 is reserved for tagging the priority of frames. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Mixed Tagging</a></li></ul>   |

**vlan-id (VLAN ID to Rewrite)**

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>vlan-id <i>number</i>;</code>  |
| <b>Hierarchy Level</b>          | <p>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>input-vlan-map</b>],<br/> [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>output-vlan-map</b>],<br/> [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>input-vlan-map</b>],<br/> [edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>output-vlan-map</b>]</p>   |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.</p>  |
| <b>Description</b>              | <p>For Gigabit Ethernet IQ and 10-Gigabit Ethernet IQ2, 10-Gigabit Ethernet LAN/WAN PIC, and IQ2-E interfaces and aggregated Ethernet using Gigabit Ethernet IQ interfaces, specify the line VLAN identifiers to be rewritten at the input or output interface.</p> <p>You cannot include the <b>vlan-id</b> statement with the <b>swap</b> statement, <b>swap-push</b> statement, <b>push-push</b> statement, or <b>push-swap</b> statement at the [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> <b>output-vlan-map</b>] hierarchy level. If you include any of those statements in the output VLAN map, the VLAN ID in the outgoing frame is rewritten to the <b>vlan-id</b> statement that you include at the [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i>] hierarchy level.</p> |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Rewriting the VLAN Tag on Tagged Frames</i></li> <li>• <i>Binding VLAN IDs to Logical Interfaces</i></li> </ul>  |

## vlan-id-list

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See the following sections:

- [vlan-id-list \(Ethernet VLAN Circuit\) on page 851](#)
- [vlan-id-list \(Interface in Bridge Domain\) on page 852](#)

## vlan-id-list (Ethernet VLAN Circuit)

|                            |  |
|----------------------------|--|
| <b>Syntax</b>              | <code>vlan-id-list [ <i>vlan-id</i> <i>vlan-id</i>–<i>vlan-id</i> ];</code>  |
| <b>Hierarchy Level</b>     | <code>[edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i>],</code><br><code>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i>]</code> |
| <b>Release Information</b> | Statement introduced in Junos OS Release 9.5.  |
| <b>Description</b>         | (MX Series routers only) Binds a single-tag logical interface to a list of VLAN IDs. Configures a logical interface to receive and forward any tag frame whose VLAN ID tag matches the list of VLAN IDs you specify.     |



### NOTE:

When you create a circuit cross-connect (CCC) using VLAN-bundled single-tag logical interfaces on Layer 2 VPN routing instances, the circuit automatically uses ethernet encapsulation. For Layer 2 VPN, you need to include the `encapsulation-type` statement and specify the value `ethernet` at either of the following hierarchy levels:

- `[edit routing-instances routing-instance-name protocols l2vpn]`
- `[edit logical-systems logical-system-name routing-instances routing-instance-name protocols l2vpn]`

For more information about the `encapsulation-type` configuration statement and the Layer 2 encapsulation types `ethernet` and `ethernet-vlan`, see the *Junos OS VPNs Library for Routing Devices*.

**Options** `[vlan-id vlan-id–vlan-id]`—A list of valid VLAN ID numbers. Specify the VLAN IDs individually by using a space to separate each ID, as an inclusive list by separating the starting VLAN ID and ending VLAN ID with a hyphen, or as a combination of both.

**Range:** 1 through 4094. VLAN ID 0 is reserved for tagging the priority of frames.



**NOTE:** Configuring `vlan-id-list` with the entire `vlan-id` range is an unnecessary waste of system resources and is not best practice. It should be used only when a subset of VLAN IDs (not the entire range) needs to be associated with a logical interface. If you specify the entire range (1-4094), it has the same result as not specifying a range; however, it consumes PFE resources such as VLAN lookup tables entries, and so on.

The following examples illustrate this further:

```
[edit interfaces interface-name
vlan-tagging;
unit number {
    vlan-id-range 1-4094;
}
```

```
[edit interfaces interface-name]  
unit 0;
```

---

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

**Related Documentation**

- *Binding VLAN IDs to Logical Interfaces*
- [encapsulation \(Logical Interface\) on page 450](#)
- [encapsulation \(Physical Interface\) on page 454](#)
- encapsulation-type (Layer 2 VPN routing instance), see the *Junos OS VPNs Library for Routing Devices*
- [flexible-vlan-tagging on page 481](#)
- [vlan-tagging on page 858](#)
- [vlan-tags \(Dual-Tagged Logical Interface\) on page 860](#)

### vlan-id-list (Interface in Bridge Domain)

**Syntax** `vlan-id-list [ number number-number ];`

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

**Release Information** Statement introduced in Junos OS Release 9.2.

**Description** Configure a logical interface to forward packets and learn MAC addresses within each bridge domain configured with a VLAN ID that matches a VLAN ID specified in the list. VLAN IDs can be entered individually using a space to separate each ID, entered as an inclusive list separating the starting VLAN ID and ending VLAN ID with a hyphen, or a combination of both.

**Options** *number number*—Individual VLAN IDs separated by a space.  
*number-number*—Starting VLAN ID and ending VLAN ID in an inclusive range.  
**Range:** 1 through 4095

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

**Related Documentation**

- *Configuring a Logical Interface for Trunk Mode*
- *Configuring the VLAN ID List for a Trunk Interface*

## vlan-id-range

|                            |  |
|----------------------------|--|
| <b>Syntax</b>              | <code>vlan-id-range <i>vlan-id-vlan-id</i></code>  |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ] |
| <b>Release Information</b> | Statement introduced in Junos OS Release 8.4.  |
| <b>Description</b>         | Bind a range of VLAN IDs to a logical interface.   |
| <b>Options</b>             | <b>number</b> —The first number is the lowest VLAN ID in the range the second number is the highest VLAN ID in the range.<br><b>Range:</b> 1 through 4094  |



**NOTE:** Configuring `vlan-id-range` with the entire `vlan-id` range is an unnecessary waste of system resources and is not best practice. It should be used only when a subset of VLAN IDs (not the entire range) needs to be associated with a logical interface. If you specify the entire range (1-4094), it has the same result as not specifying a range; however, it consumes PFE resources such as VLAN lookup tables entries, and so on.

The following examples illustrate this further:

```
[edit interfaces interface-name]
vlan-tagging;
unit number {
    vlan-id-range 1-4094;
}

[edit interfaces interface-name]
unit 0;
```

VLAN ID 0 is reserved for tagging the priority of frames.

|                                 |   |
|---------------------------------|---|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Binding a Range of VLAN IDs to a Logical Interface</i></li> </ul>           |

## vlan-ranges

---

**Syntax**    `vlan-ranges {  
              access-profile profile-name;  
              authentication {  
                  password password-string;  
                  username-include {  
                      circuit-type;  
                      delimiter delimiter-character;  
                      domain-name domain-name-string;  
                      interface-name;  
                      mac-address;  
                      option-82 <circuit-id> <remote-id>;  
                      radius-realm radius-realm-string;  
                      user-prefix user-prefix-string;  
                  }  
              }  
              dynamic-profile profile-name {  
                  accept (any | dhcp-v4 | inet);  
                  ranges (any | low-tag)–(any | high-tag);  
              }  
              override;  
          }`

**Hierarchy Level**    [edit interfaces *interface-name* [auto-configure](#)]

**Release Information**    Statement introduced in Junos OS Release 9.5.

**Description**    Configure multiple VLANs. Each VLAN is assigned a VLAN ID number from the range.  
  
The remaining statements are explained separately.

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

**Related Documentation**

- [Configuring Single-Level VLAN Ranges for Use with VLAN Dynamic Profiles](#)
- [Configuring Dynamic Mixed VLAN Ranges](#)



## vlan-rewrite

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | vlan-rewrite translate (200 500   201 501)  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> unit <i>number</i> family bridge interface-mode trunk]<br>[edit interfaces <i>interface-name</i> unit <i>number</i> family ethernet-switching interface-mode trunk]                                |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.4.<br>Statement introduced in Junos OS Release 12.3R2 for EX Series switches.  |
| <b>Description</b>              | Translates an incoming VLAN to a bridge-domain VLAN, corresponding counter translation at egress. Supports translation of VLAN 200 to VLAN 500 and VLAN 201 to VLAN 501. Other valid VLANs pass through without translation.              |
| <b>Options</b>                  | <b>translate 200 500</b> —Translates incoming packets with VLAN 200 to 500.<br><b>translate 201 501</b> —Translates incoming packets with VLAN 201 to 501.<br><b>translate 202 502</b> —Translates incoming packets with VLAN 202 to 502. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Rewriting a VLAN Tag and Adding a New Tag</i></li> </ul>  |

## vlan-rule (100-Gigabit Ethernet Type 4 PIC with CFP)

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | vlan-rule (high-low   odd-even);   |
| <b>Hierarchy Level</b>          | [edit chassis fpc slot pic slot forwarding-mode <a href="#">vlan-steering</a> ]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.4.   |
| <b>Description</b>              | <p>Configure the interoperation mode of the 100-Gigabit Ethernet Type 4 PIC with CFP (PD-ICE-CFP-FPC4) when interoperating with 100 gigabit Ethernet interfaces from other vendors.</p> <p>If no VLAN rule is configured, all tagged packets are distributed to PFE0.</p>  |
| <b>Options</b>                  | <p><b>high-low</b>—VLAN IDs 1 through 2047 are distributed to PFE0 and VLAN IDs 2048 through 4096 are distributed to PFE1.</p> <p><b>odd-even</b>—Odd number VLAN IDs are distributed to PFE1 and even number VLAN IDs are distributed to PFE0.</p>  |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring VLAN Steering Mode for 100-Gigabit Ethernet Type 4 PIC with CFP</i></li><li>• <a href="#">forwarding-mode (100-Gigabit Ethernet) on page 487</a></li><li>• <a href="#">vlan-steering (100-Gigabit Ethernet Type 4 PIC with CFP) on page 857</a></li></ul> |

## vlan-steering (100-Gigabit Ethernet Type 4 PIC with CFP)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>vlan-steering {<br/>    <a href="#">vlan-rule</a> (high-low   odd-even);<br/>}</code>  |
| <b>Hierarchy Level</b>          | [edit chassis fpc slot pic slot forwarding-mode]   |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.4.  |
| <b>Description</b>              | <p>Configure the 100-Gigabit Ethernet Type 4 PIC with CFP (PD-ICE-CFP-FPC4) to interoperate with 100 gigabit Ethernet interfaces from other vendors.</p> <p>The other statement is explained separately.</p>   |
| <b>Required Privilege Level</b> | <p>interface—To view this statement in the configuration.</p> <p>interface-control—To add this statement to the configuration.</p>   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring VLAN Steering Mode for 100-Gigabit Ethernet Type 4 PIC with CFP</i></li><li>• <a href="#">forwarding-mode (100-Gigabit Ethernet) on page 487</a></li><li>• <a href="#">sa-multicast (100-Gigabit Ethernet) on page 739</a></li><li>• <a href="#">vlan-rule (100-Gigabit Ethernet Type 4 PIC with CFP) on page 856</a></li></ul> |

## vlan-tagging

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | vlan-tagging;  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.2 for ACX Series Universal Access Routers.<br>Statement introduced in Junos OS Release 13.2 for PTX Series Routers.   |
| <b>Description</b>              | For Fast Ethernet and Gigabit Ethernet interfaces, aggregated Ethernet interfaces configured for VPLS, and pseudowire subscriber interfaces, enable the reception and transmission of 802.1Q VLAN-tagged frames on the interface.  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Example: Configuring Layer 3 Subinterfaces for a Distribution Switch and an Access Switch</i></li><li>• <i>Example: Configuring BGP Autodiscovery for LDP VPLS</i></li><li>• <i>Configuring a Layer 3 Subinterface (CLI Procedure)</i></li><li>• <i>Configuring Tagged Aggregated Ethernet Interfaces</i></li><li>• <i>Configuring Interfaces for VPLS Routing</i></li><li>• <i>Enabling VLAN Tagging</i></li><li>• <i>802.1Q VLANs Overview</i></li><li>• <i>vlan-id</i></li></ul> |

## [vlan-tags](#)

---

See the following sections:

- [vlan-tags \(Dual-Tagged Logical Interface\) on page 860](#)
- [vlan-tags \(Stacked VLAN Tags\) on page 862](#)

## vlan-tags (Dual-Tagged Logical Interface)

|                            |   |
|----------------------------|---|
| <b>Syntax</b>              | <code>vlan-tags inner-list [vlan-id vlan-id–vlan-id ] outer &lt;tpid.&gt;vlan-id;</code>  |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ]                                |
| <b>Release Information</b> | Statement introduced in Junos OS Release 9.5.   |
| <b>Description</b>         | (MX Series routers only) Binds a dual-tag logical interface to a list of VLAN IDs. Configures the logical interface to receive and forward any dual-tag frame whose inner VLAN ID tag matches the list of VLAN IDs you specify. |



---

### NOTE:

To create a circuit cross-connect (CCC) using VLAN-bundled dual-tag logical interfaces on Layer 2 VPN routing instances, you must include the `encapsulation-type` statement and specify the value `ethernet-vlan` at the one of the following hierarchy levels:

- [edit routing-instances *routing-instance-name* protocols l2vpn]
- [edit logical-systems *logical-system-name* routing-instances *routing-instance-name* protocols l2vpn]

For more information about the `encapsulation-type` configuration statement and the Layer 2 encapsulation types `ethernet` and `ethernet-vlan`, see the *Junos OS VPNs Library for Routing Devices*.

---

**Options** `inner-list [vlan-id vlan-id vlan-id–vlan-id]`—A list of valid VLAN ID numbers. Specify the VLAN IDs individually by using a space to separate each ID, as an inclusive list by separating the starting VLAN ID and ending VLAN ID with a hyphen, or as a combination of both.

**Range:** 1 through 4094. VLAN ID 0 is reserved for tagging the priority of frames.

`outer <tpid.>vlan-id`—An optional Tag Protocol ID (TPID) and a valid VLAN ID.

**Range:** For TPID, specify a hexadecimal value in the format `0xnnnn`.

**Range:** For VLAN ID, 1 through 4094. VLAN ID 0 is reserved for tagging the priority of frames.



---

**NOTE:** Configuring `inner-list` with the entire `vlan-id` range is an unnecessary waste of system resources and is not best practice. It should be used only when a subset of VLAN IDs of inner tag (not the entire range) needs to be associated with a logical interface. If you specify the entire range (1 through 4094), it has the same result as not specifying a range; however, it consumes PFE resources such as VLAN lookup tables entries, and so on.

The following examples illustrate this further:

```
[edit interfaces interface-name]  
vlan-tagging;  
unit number {  
    vlan-tags outer vid inner-list 1-4094;  
}  
  
[edit interfaces interface-name]  
vlan-tagging;  
unit number {  
    vlan-id vid;  
}
```

---

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

**Related Documentation**

- *Binding VLAN IDs to Logical Interfaces*
- [encapsulation \(Logical Interface\) on page 450](#)
- [encapsulation \(Physical Interface\) on page 454](#)
- encapsulation-type (Layer 2 VPN routing instance), see the *Junos OS VPNs Library for Routing Devices*.
- [flexible-vlan-tagging on page 481](#)
- [vlan-id-list \(Ethernet VLAN Circuit\) on page 851](#)
- [vlan-tagging on page 858](#)

## vlan-tags (Stacked VLAN Tags)

|                            |  |
|----------------------------|--|
| <b>Syntax</b>              | <code>vlan-tags inner <i>tpid.vlan-id</i> inner-range <i>vid1—vid2</i> outer <i>tpid.vlan-id</i>;</code>   |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> unit <i>logical-unit-number</i> ] |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.1X48 for PTX Series Packet Transport Routers.   |
| <b>Description</b>         | For Gigabit Ethernet IQ and IQE interfaces only, bind TPIDs and 802.1Q VLAN tag IDs to a logical interface.  |



**NOTE:** The inner-range *vid1—vid2* option is supported on MX Series with IQE PICs only.

|                |   |
|----------------|---|
| <b>Options</b> | <p><b>inner <i>tpid.vlan-id</i></b>—A TPID and a valid VLAN identifier.</p> <p><b>Range:</b> (most routers) For VLAN ID, 1 through 4094. VLAN ID 0 is reserved for tagging the priority of frames.</p> <p><b>Range:</b> (PTX Series) For VLAN ID, 0 through 4094.</p> <p><b>inner-range <i>vid1—vid2</i></b>—For MX Series routers with Enhanced IQ (IQE) PICs only; specify a range of VLAN IDs where <i>vid1</i> is the start of the range and <i>vid2</i> is the end of the range.</p> <p><b>Range:</b> For VLAN ID, 1 through 4094. VLAN ID 0 is reserved for tagging the priority of frames.</p> <p><b>outer <i>tpid.vlan-id</i></b>—A TPID and a valid VLAN identifier.</p> <p><b>Range:</b> (most routers) For VLAN ID, 1 through 511 for normal interfaces, and 512 through 4094 for VLAN CCC interfaces. VLAN ID 0 is reserved for tagging the priority of frames.</p> <p><b>Range:</b> (PTX Series) For VLAN ID, 0 through 511 for normal interfaces, and 512 through 4094 for VLAN CCC interfaces.</p> |
|----------------|---|



**NOTE:** Configuring inner-range with the entire *vlan-id* range consumes system resources and is not a best practice. It should be used only when a subset of VLAN IDs of inner tag (not the entire range) needs to be associated with a logical interface. If you specify the entire range (1–4094), it has the same result as not specifying a range; however, it consumes Packet Forwarding Engine resources such as VLAN lookup table entries, and so on.

The following examples illustrate this further:

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



```

stacked-vlan-tagging;
unit number {
    vlan-tags outer vid inner-range 1-4094;
}

[edit interfaces interface-name]
vlan-tagging;
unit number {
    vlan-id vid;
}

```

---

|                                 |  |
|---------------------------------|--|
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring Dual VLAN Tags</i></li> <li>• <i>Configuring Flexible VLAN Tagging on PTX Series Packet Transport Routers</i></li> <li>• <a href="#">stacked-vlan-tagging on page 777</a></li> </ul> |

## vlan-tags-outer

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | vlan-tags-outer <i>vlan-tag</i> ;   |
| <b>Hierarchy Level</b>          | [edit interfaces <a href="#">interface-set</a> <i>interface-set-name</i> interface <i>interface-name</i> ]              |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.   |
| <b>Description</b>              | The S-VLAN outer tag that belongs to a set of interfaces used to configure hierarchical CoS schedulers.                 |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Junos OS Class of Service Library for Routing Devices</i></li> </ul>        |

## vlan-vci-tagging

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | vlan-vci-tagging;  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces <i>interface-name</i> ]             |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.0.  |
| <b>Description</b>              | Enable the ATM-to-Ethernet interworking cross-connect function on a Gigabit Ethernet, 10-Gigabit Ethernet, or aggregated Ethernet interface. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring ATM-to-Ethernet Interworking on page 260</a></li></ul>                       |

## vpi

---

See the following sections:

- [vpi \(ATM CCC Cell-Relay Promiscuous Mode\) on page 865](#)
- [vpi \(Define Virtual Path\) on page 866](#)
- [vpi \(Logical Interface and Interworking\) on page 867](#)

### vpi (ATM CCC Cell-Relay Promiscuous Mode)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>vpi vpi-identifier;</code>   |
| <b>Hierarchy Level</b>          | [edit interfaces at- <i>fpc/pic/port</i> <a href="#">atm-options promiscuous-mode</a> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Junos OS Release 12.2 for the ACX Series Universal Access routers.  |
| <b>Description</b>              | For ATM interfaces, allow all VCI in this VPI to open in ATM CCC cell-relay mode.<br><br>When you include <b>vpi</b> statements at the [edit interfaces <i>interface-name</i> <a href="#">atm-options promiscuous-mode</a> ] hierarchy level, the specified VPIs open in promiscuous mode. |
| <b>Options</b>                  | <b>vpi-identifier</b> —ATM virtual path identifier. This is one of the VPIs that you define in the <b>vci</b> statement. (For a list of hierarchy levels at which you can include the <b>vci</b> statement, see <a href="#">vci</a> .)<br><br><b>Range:</b> 0 through 255                  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring ATM Cell-Relay Promiscuous Mode</a></li> </ul>  |

## vpi (Define Virtual Path)

**Syntax**    `vpi vpi-identifier {  
                  maximum-vcs maximum-vcs;  
                  oam-liveness {  
                    up-count cells;  
                    down-count cells;  
                  }  
                  oam-period (disable | seconds);  
                  shaping {  
                    (cbr rate | rtvbr peak rate sustained rate burst length | vbr peak rate sustained rate burst  
                      length);  
                    queue-length number;  
                  }  
                }`

**Hierarchy Level**    [edit interfaces at-*fpc/pic/port* atm-options]

**Release Information**    Statement introduced before Junos OS Release 7.4.

**Description**    For ATM interfaces, configure the virtual path (VP).



---

**NOTE:** Certain options apply only to specific platforms.

---

**Options**    *vpi-identifier*—ATM virtual path identifier. This is one of the VPIs that you define in the *vci* statement. (For a list of hierarchy levels at which you can include the *vci* statement, see *vci*.)

**Range:** 0 through 255

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 the Maximum Number of ATM1 VCs on a VP*
- [multipoint-destination on page 624](#)
- [promiscuous-mode on page 704](#)
- [vci on page 845](#)

## vpi (Logical Interface and Interworking)

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>vpi virtual-path-identifier;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces at- <i>fpc/pic/port</i> <b>unit</b> <i>logical-unit-number</i> ],<br>[edit logical-systems <i>logical-system-name</i> interfaces at- <i>fpc/pic/port</i> <b>unit</b> <i>logical-unit-number</i> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.0.<br>Statement introduced in Junos OS Release 12.2 for the ACX Series Universal Access routers.  |
| <b>Description</b>              | VPI used in an ATM-to-Ethernet interworking cross-connect.   |
| <b>Options</b>                  | <b>virtual-path-identifier</b> —VPI to be used.<br><b>Range:</b> 0 through 255   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring ATM-to-Ethernet Interworking on page 260</a></li> <li>• <a href="#">Configuring ATM Cell-Relay Promiscuous Mode</a></li> </ul>                    |

## vtmapping

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>vtmapping (itu-t   klm);</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> sonet-options];<br>[edit chassis <i>fpc number</i> <i>pic number</i> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For the Channelized STM1 IQ PIC or Channelized STM1 PIC, configure virtual tributary mapping.<br><br>For the Channelized STM1 PIC, you configure virtual tributary mapping at the [edit chassis <i>fpc number</i> <i>pic number</i> ] hierarchy level.       |
| <b>Options</b>                  | <b>itu-t</b> —International Telephony Union standard.<br><br><b>klm</b> —KLM standard.<br><b>Default:</b> klm  |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Virtual Tributary Mapping of Channelized STM1 Interfaces</a></li> <li>• <a href="#">Configuring the Junos OS to Support Channelized STM1 Interface Virtual Tributary Mapping</a></li> </ul> |

## warning

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>warning low-light-warning {<br/>  (link-down   syslog);<br/>}</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> optics-options]  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.0.<br>Statement introduced in Junos OS Release 12.1 for EX Series switches.<br>Statement introduced in Junos OS Release 13.2 for PTX Series routers.  |
| <b>Description</b>              | Specifies the action to take if the receiving optics signal is below the optics low-light warning threshold.  |
| <b>Options</b>                  | <b>link-down</b> —Drop the 10-Gigabit Ethernet link and marks link as down.<br><b>syslog</b> —Write the optics information to the system log.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring 10-Gigabit Ethernet Link Down Notification for Optics Options Alarm or Warning</i></li><li>• <a href="#">optics-options on page 648</a></li><li>• <i>100-Gigabit Ethernet OTN Options Configuration Overview</i></li></ul> |

## watch-list

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | <code>watch-list {<br/>    [ <i>routes</i> ];<br/>}</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>dl</i> unit <i>logical-unit-number</i> <b>dialer-options</b> ]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | On J Series Services Routers with ISDN interfaces, configure an ISDN list of routes to watch. Used only for dialer watch.   |
| <b>Options</b>                  | <b>routes</b> —IP prefix of a route. Specify one or more. The primary interface is considered up if there is at least one valid route for any of the addresses in the watch list to an interface other than the backup interface. |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Dialer Watch</i></li><li>• <i>Junos OS Interfaces and Routing Configuration Guide</i></li></ul>  |

## wavelength

---

|                            |  |
|----------------------------|--|
| <b>Syntax</b>              | <code>wavelength <i>nm</i>;</code>   |
| <b>Hierarchy Level</b>     | [edit interfaces <i>interface-name</i> <b>optics-options</b> ]   |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.1 for EX Series switches.<br>Statement introduced in Junos OS Release 13.2 for PTX Series routers.  |
| <b>Description</b>         | For 10-Gigabit or 100-Gigabit Ethernet DWDM interfaces only, configure full C-band ITU-Grid tunable optics.  |
| <b>Options</b>             | <p><i>nm</i>—Wavelength value. It can be one of the following:</p> <ul style="list-style-type: none"><li>• <b>1528.77</b>—1528.77 nanometers (nm), corresponds to 50 GHz through 100 GHz</li><li>• <b>1529.16</b>—1529.16 nm, corresponds to 50 GHz</li><li>• <b>1529.55</b>—1529.55 nm, corresponds to 50 GHz through 100 GHz</li><li>• <b>1529.94</b>—1529.94 nm, corresponds to 50 GHz</li><li>• <b>1530.33</b>—1530.33 nm, corresponds to 50 GHz through 100 GHz</li><li>• <b>1530.72</b>—1530.72 nm, corresponds to 50 GHz</li><li>• <b>1531.12</b>—1531.12 nm, corresponds to 50 GHz through 100 GHz</li><li>• <b>1531.51</b>—1531.51 nm, corresponds to 50 GHz</li><li>• <b>1531.90</b>—1531.90 nm, corresponds to 50 GHz through 100 GHz</li><li>• <b>1532.29</b>—1532.29 nm, corresponds to 50 GHz</li><li>• <b>1532.68</b>—1532.68 nm, corresponds to 50 GHz through 100 GHz</li><li>• <b>1533.07</b>—1533.07 nm, corresponds to 50 GHz</li><li>• <b>1533.47</b>—1533.47 nm, corresponds to 50 GHz through 100 GHz</li><li>• <b>1533.86</b>—1533.86 nm, corresponds to 50 GHz</li><li>• <b>1534.25</b>—1534.25 nm, corresponds to 50 GHz through 100 GHz</li><li>• <b>1534.64</b>—1534.64 nm, corresponds to 50 GHz</li><li>• <b>1535.04</b>—1535.04 nm, corresponds to 50 GHz through 100 GHz</li><li>• <b>1535.43</b>—1535.43 nm, corresponds to 50 GHz</li><li>• <b>1535.82</b>—1535.82 nm, corresponds to 50 GHz through 100 GHz</li><li>• <b>1536.22</b>—1536.22 nm, corresponds to 50 GHz</li><li>• <b>1536.61</b>—1536.61 nm, corresponds to 50 GHz through 100 GHz</li><li>• <b>1537.00</b>—1537.00 nm, corresponds to 50 GHz</li><li>• <b>1537.40</b>—1537.40 nm, corresponds to 50 GHz through 100 GHz</li></ul> |



- **1537.79**—1537.79 nm, corresponds to 50 GHz
- **1538.19**—1538.19 nm, corresponds to 50 GHz through 100 GHz
- **1538.58**—1538.58 nm, corresponds to 50 GHz
- **1538.98**—1538.98 nm, corresponds to 50 GHz through 100 GHz
- **1539.37**—1539.37 nm, corresponds to 50 GHz
- **1539.77**—1539.77 nm, corresponds to 50 GHz through 100 GHz
- **1540.16**—1540.16 nm, corresponds to 50 GHz
- **1540.56**—1540.56 nm, corresponds to 50 GHz through 100 GHz
- **1540.95**—1540.95 nm, corresponds to 50 GHz
- **1541.35**—1541.35 nm, corresponds to 50 GHz through 100 GHz
- **1541.75**—1541.75 nm, corresponds to 50 GHz
- **1542.14**—1542.14 nm, corresponds to 50 GHz through 100 GHz
- **1542.54**—1542.54 nm, corresponds to 50 GHz
- **1542.94**—1542.94 nm, corresponds to 50 GHz through 100 GHz
- **1543.33**—1543.33 nm, corresponds to 50 GHz
- **1543.73**—1543.73 nm, corresponds to 50 GHz through 100 GHz
- **1544.13**—1544.13 nm, corresponds to 50 GHz
- **1544.53**—1544.53 nm, corresponds to 50 GHz through 100 GHz
- **1544.92**—1544.92 nm, corresponds to 50 GHz
- **1545.32**—1545.32 nm, corresponds to 50 GHz through 100 GHz
- **1545.72**—1545.72 nm, corresponds to 50 GHz
- **1546.12**—1546.12 nm, corresponds to 50 GHz through 100 GHz
- **1546.52**—1546.52 nm, corresponds to 50 GHz
- **1546.92**—1546.92 nm, corresponds to 50 GHz through 100 GHz
- **1547.32**—1547.32 nm, corresponds to 50 GHz
- **1547.72**—1547.72 nm, corresponds to 50 GHz through 100 GHz
- **1548.11**—1548.11 nm, corresponds to 50 GHz
- **1548.51**—1548.51 nm, corresponds to 50 GHz through 100 GHz
- **1548.91**—1548.91 nm, corresponds to 50 GHz
- **1549.32**—1549.32 nm, corresponds to 50 GHz through 100 GHz
- **1549.72**—1549.72 nm, corresponds to 50 GHz
- **1550.12**—1550.12 nm, corresponds to 50 GHz through 100 GHz
- **1550.52**—1550.52 nm, corresponds to 50 GHz

- **1550.92**—1550.92 nm, corresponds to 50 GHz through 100 GHz
- **1551.32**—1551.32 nm, corresponds to 50 GHz
- **1551.72**—1551.72 nm, corresponds to 50 GHz through 100 GHz
- **1552.12**—1552.12 nm, corresponds to 50 GHz
- **1552.52**—1552.52 nm, corresponds to 50 GHz through 100 GHz
- **1552.93**—1552.93 nm, corresponds to 50 GHz
- **1553.33**—1554.33 nm, corresponds to 50 GHz through 100 GHz
- **1553.73**—1554.73 nm, corresponds to 50 GHz
- **1554.13**—1554.13 nm, corresponds to 50 GHz through 100 GHz
- **1554.54**—1554.54 nm, corresponds to 50 GHz
- **1554.94**—1554.94 nm, corresponds to 50 GHz through 100 GHz
- **1555.34**—1555.34 nm, corresponds to 50 GHz
- **1555.75**—1555.75 nm, corresponds to 50 GHz through 100 GHz
- **1556.15**—1556.15 nm, corresponds to 50 GHz
- **1556.55**—1556.55 nm, corresponds to 50 GHz through 100 GHz
- **1556.96**—1556.96 nm, corresponds to 50 GHz
- **1557.36**—1557.36 nm, corresponds to 50 GHz through 100 GHz
- **1557.77**—1557.77 nm, corresponds to 50 GHz
- **1558.17**—1558.17 nm, corresponds to 50 GHz through 100 GHz
- **1558.58**—1558.58 nm, corresponds to 50 GHz
- **1558.98**—1558.98 nm, corresponds to 50 GHz through 100 GHz
- **1559.39**—1559.39 nm, corresponds to 50 GHz
- **1559.79**—1559.79 nm, corresponds to 50 GHz through 100 GHz
- **1560.20**—1560.20 nm, corresponds to 50 GHz
- **1560.61**—1560.61 nm, corresponds to 50 GHz through 100 GHz
- **1561.01**—1561.01 nm, corresponds to 50 GHz
- **1561.42**—1561.42 nm, corresponds to 50 GHz through 100 GHz
- **1561.83**—1561.83 nm, corresponds to 50 GHz
- **1562.23**—1562.23 nm, corresponds to 50 GHz through 100 GHz
- **1562.64**—1562.64 nm, corresponds to 50 GHz
- **1563.05**—1563.05 nm, corresponds to 50 GHz through 100 GHz
- **1563.45**—1563.45 nm, corresponds to 50 GHz

- **1563.86**—1563.86 nm, corresponds to 50 GHz through 100 GHz

**Default:** 1550.12—1550.12 nm, corresponds to 50 GHz through 100 GHz

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

**Related Documentation**

- *Ethernet DWDM Interface Wavelength Overview*

## west-interface

**Syntax**

```
west-interface {
  node-id mac-address;
  control-channel channel-name {
    interface-name
    ring-protection-link-end;
  }
}
```

**Hierarchy Level** [edit protocols **protection-group ethernet-ring ring-name**]

**Release Information** Statement introduced in Junos OS Release 9.5.  
Statement introduced in Junos OS Release 12.1 for EX Series switches.

**Description** Define one of the two interface ports for Ethernet ring protection, the other being defined by the **east-interface** statement at the same hierarchy level. The interface must use the control channel's logical interface name. The control channel is a dedicated VLAN channel for the ring port.



**NOTE:** Always configure this port second, after configuring the **east-interface** statement.

The statements are explained separately.

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

**Related Documentation**

- *Ethernet Ring Protection Switching Overview*
- *Ethernet Ring Protection Using Ring Instances for Load Balancing*
- [east-interface on page 448](#)
- [ethernet-ring on page 465](#)
- *Example: Configuring Ethernet Ring Protection Switching on EX Series Switches*
- *Configuring Ethernet Ring Protection Switching (CLI Procedure)*

## working-circuit

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>working-circuit <i>group-name</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> sonet-options <a href="#">aps</a> ]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | Configure the working router in an APS circuit pair.   |
| <b>Options</b>                  | <i>group-name</i> —Circuit's group name.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring Basic Automatic Protect Switching</i></li><li>• <a href="#">protect-circuit on page 705</a></li></ul> |

## yellow-differential-delay

---

|                                 |  |
|---------------------------------|--|
| <b>Syntax</b>                   | <code>yellow-differential-delay <i>milliseconds</i>;</code>  |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> mlfr-uni-nni-bundle-options]  |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.  |
| <b>Description</b>              | For link services and voices interfaces only, configure the yellow differential delay among bundle links to give warning when a link has a differential delay that exceeds the configured threshold.                               |
| <b>Options</b>                  | <i>milliseconds</i> —Yellow differential delay threshold.<br><b>Range:</b> 1 through 2000 milliseconds<br><b>Default:</b> 6 milliseconds   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Junos OS Services Interfaces Library for Routing Devices</i></li><li>• <a href="#">action-red-differential-delay on page 327</a></li><li>• <a href="#">remote on page 723</a></li></ul> |

## z0-increment

---

|                                 |   |
|---------------------------------|---|
| <b>Syntax</b>                   | (z0-increment   no-z0-increment);   |
| <b>Hierarchy Level</b>          | [edit interfaces <i>interface-name</i> sonet-options]   |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.   |
| <b>Description</b>              | Configure an incremental STM ID rather than a static one.   |
| <b>Required Privilege Level</b> | interface—To view this statement in the configuration.<br>interface-control—To add this statement to the configuration.                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring an Incrementing STM ID</i></li><li>• <a href="#">sonet-options on page 765</a></li></ul> |



## PART 6

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