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# Junos<sup>®</sup> OS for EX Series Ethernet Switches

## User Interfaces on EX9200 Switches

Release  
14.2



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## Documentation and Release Notes

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

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

Juniper Networks Books publishes books by Juniper Networks engineers and subject matter experts. These books go beyond the technical documentation to explore the nuances of network architecture, deployment, and administration. The current list can be viewed at <http://www.juniper.net/books>.

## Supported Platforms

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

- EX Series

## Using the Examples in This Manual

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

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

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

## Merging a Full Example

To merge a full example, follow these steps:

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

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

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

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

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

## Merging a Snippet

To merge a snippet, follow these steps:

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

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

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

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

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

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

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

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

## Documentation Conventions

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

Table 1: Notice Icons

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

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

Table 2: Text and Syntax Conventions

Convention	Description	Examples
<b>Bold text like this</b>	Represents text that you type.	To enter configuration mode, type the <b>configure</b> command:  user@host> <b>configure</b>

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

Convention	Description	Examples
Fixed-width text like this	Represents output that appears on the terminal screen.	<code>user@host&gt; show chassis alarms</code> <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 guide names.</li> <li>Identifies RFC and Internet draft titles.</li> </ul>	<ul style="list-style-type: none"> <li>A policy <i>term</i> is a named structure that defines match conditions and actions.</li> <li><i>Junos OS CLI User Guide</i></li> <li>RFC 1997, <i>BGP Communities Attribute</i></li> </ul>
<i>Italic text like this</i>	Represents variables (options for which you substitute a value) in commands or configuration statements.	Configure the machine's domain name:  [edit] 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 protocols ospf area area-id] hierarchy level.</li> <li>The console port is labeled <b>CONSOLE</b>.</li> </ul>
< > (angle brackets)	Encloses optional keywords or variables.	<b>stub &lt;default-metric metric&gt;;</b>
(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>  <b>(string1   string2   string3)</b>
# (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)	Encloses a variable for which you can substitute one or more values.	<b>community name members [</b> <i>community-ids</i> <b>]</b>
Indentation and braces ( { } )	Identifies a level in the configuration hierarchy.	[edit] routing-options { static { route default { nexthop <i>address</i> ; retain; } } }
;(semicolon)	Identifies a leaf statement at a configuration hierarchy level.	
<b>GUI Conventions</b>		
<b>Bold text like this</b>	Represents graphical user interface (GUI) items you click or select.	<ul style="list-style-type: none"> <li>In the Logical Interfaces box, select <b>All Interfaces</b>.</li> <li>To cancel the configuration, click <b>Cancel</b>.</li> </ul>

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

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

## Documentation Feedback

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

- Online feedback rating system—On any page at the Juniper Networks Technical Documentation site at <http://www.juniper.net/techpubs/index.html>, simply click the stars to rate the content, and use the pop-up form to provide us with information about your experience. Alternately, you can use the online feedback form at <https://www.juniper.net/cgi-bin/docbugreport/>.
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## Requesting Technical Support

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

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

## Self-Help Online Tools and Resources

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

- Find CSC offerings: <http://www.juniper.net/customers/support/>
- Search for known bugs: <http://www2.juniper.net/kb/>
- Find product documentation: <http://www.juniper.net/techpubs/>
- Find solutions and answer questions using our Knowledge Base: <http://kb.juniper.net/>

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

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

## Opening a Case with JTAC

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

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

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

## PART 1

# Configuration

- [Statement Hierarchies on page 3](#)





## CHAPTER 1

# Statement Hierarchies

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## [\[edit accounting-options\] Hierarchy Level](#)

```
accounting-options {
  class-usage-profile profile-name {
    destination-classes {
      destination-class-name;
    }
    file filename;
    interval minutes;
    source-classes {
      source-class-name;
    }
  }
  file filename {
    archive-sites {
      site-name;
    }
    files number;
    nonpersistent;
    size bytes;
    start-time time;
    transfer-interval minutes;
  }
  filter-profile profile-name {
    counters {
      counter-name;
    }
    file filename;
    interval minutes;
  }
  interface-profile profile-name {
    fields {
      input-bytes;
      input-errors;
      input-multicast;
      input-packets;
      input-unicast;
      output-bytes;
      output-errors;
      output-multicast;
      output-packets;
      output-unicast;
      rpf-check-bytes;
      rpf-check-packets;
      rpf-check6-bytes;
      rpf-check6-packets;
      unsupported-protocol;
    }
    file filename;
    interval minutes;
```

```
}
mib-profile profile-name {
  file filename;
  interval minutes;
  object-names {
    mib-object-name;
  }
  operation (get | get-next | walk);
}
policy-decision-statistics-profile profile-name {
  application-aware-access-list-fields {
    address;
    application;
    application-group;
    input-bytes;
    input-interface;
    input-packets;
    mask;
    output-bytes;
    output-packets;
    subscriber-name;
    timestamp;
    vrf-name;
  }
  file filename;
}
routing-engine-profile profile-name {
  fields {
    field-name;
  }
  file filename;
  interval minutes;
}
}
```

**Related Documentation** • *Notational Conventions Used in Junos OS Configuration Hierarchies*

---

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

```
chassis {
  aggregated-devices {
    ethernet {
      device-count number;
      lacp {
        link-protection {
          non-revertive;
        }
        system-priority;
      }
    }
  }
  sonet {
    device-count number;
  }
  maximum-links maximum-links-limit;
}
```

```

}
alarm {
  ds1 {
    ais (ignore | red | yellow);
    ylw (ignore | red | yellow);
  }
  ethernet {
    link-down (ignore | red | yellow);
  }
  integrated-services {
    failure (ignore | red | yellow);
  }
  management-ethernet {
    link-down (ignore | red | yellow);
  }
}
relay
  input {
    port port-number {
      mode (close | open);
      trigger (ignore | red | yellow);
    }
  }
  output {
    port port-number {
      input-relay input-relay;
      mode (close | open);
      temperature;
    }
  }
}
serial {
  cts-absent (ignore | red | yellow);
  dcd-absent (ignore | red | yellow);
  dsr-absent (ignore | red | yellow);
  loss-of-rx-clock (ignore | red | yellow);
  loss-of-tx-clock (ignore | red | yellow);
  tm-absent (ignore | red | yellow);
}
services {
  hw-down (ignore | red | yellow);
  linkdown (ignore | red | yellow);
  pic-hold-reset (ignore | red | yellow);
  pic-reset (ignore | red | yellow);
  rx-errors (ignore | red | yellow);
  sw-down (ignore | red | yellow);
  tx-errors (ignore | red | yellow);
}
sonet {
  (ais-l | ais-p | ber-sd | ber-sf | locd | lol | lop-p | los | pll | plm-p | rfi-l | rfl-p | uneq-p)
  (ignore | red | yellow);
}
t3 {
  (ais | exz | ferf | idle | lcv | lof | los | pll | ylw) (ignore | red | yellow);
}
}
cluster {
  control-link-recovery;
}

```

```

        control-ports {
            fpc slot-number port port-number;
        }
        heartbeat-interval milliseconds;
        heartbeat-threshold number;
        redundancy-group {
            ... the redundancy-group subhierarchy appears at the end of the [edit chassis cluster]
               hierarchy ...
        }
        reth-count number;
        traceoptions {
            file <filename > <files number> <match regular-expression> <size maximum-file-size>
              <world-readable | no-world-readable>;
            flag flag;
            level severity;
            no-remote-trace;
        }
        redundancy-group group-number {
            gratuitous-arp-count number;
            hold-down-interval seconds;
            interface-monitor {
                interface-name weight number;
            }
            ip-monitoring {
                family {
                    inet {
                        ipv4-address {
                            interface rethindex.logical-unit-number secondary-ip-address ipv4-address;
                            weight number;
                        }
                    }
                }
                global-threshold number;
                global-weight number;
                retry-count count;
                retry-interval interval;
            }
            node node-number priority priority-number;
            preempt;
        }
        config-button {
            no-clear;
            no-rescue;
        }
        container-devices {
            device-count number;
        }
        craft-lockout;
        disable-power-management;
        disk-partition partition-name (/config | /var) {
            level (full | high) {
                free-space threshold-value (mb | percent);
            }
        }
        enhanced-policer;
        extended-statistics;

```

```

fabric {
    degraded {
        action-fpc-restart-disable;
        degraded-fabric-detection-enable
        degraded-fpc-bad-plane-threshold number-bad-planes;
    }
    redundancy-mode (increased-bandwidth | redundant);
}
filter;
fpc slot-number {
    ... the fpc subhierarchy appears after the main [edit chassis] hierarchy ...
}
fpc-feb-connectivity {
    fpc slot-number feb (slot-number | none);
}
fpc-resync;
fru-poweron-sequence sequence;
lcc index {
    ... the lcc subhierarchy appears after the main [edit chassis] hierarchy ...
}
maximum-ecmp value;
memory-enhanced {
    filter;
    route;
    vpn-label;
}
network-services (ethernet | enhanced-ethernet | ip | enhanced-ip);
(packet-scheduling | no-packet-scheduling);
pem {
    minimum number;
}
policer-drop-probability-low;
ppp-subscriber-services (disable | enable);
redundancy {
    cfeb slot (always | preferred);
    failover {
        on-disk-failure;
        on-loss-of-keepalives;
    }
    feb {
        redundancy-group group-name {
            description description;
            feb slot-number <backup | primary>;
            no-auto-failover;
        }
    }
    graceful-switchover;
    keepalive-time seconds;
    routing-engine slot-number (backup | disabled | master);
    sfm slot-number (always | preferred);
    ssb slot-number (always | preferred);
}
route-localization {
    inet (chassis);
    inet6;
}

```

```

routing-engine {
    bios {
        no-auto-upgrade;
    }
    on-disk-failure disk-failure-action (halt | reboot);
}
sfm slot-number {
    power off;
}
sib {
    minimum number;
}
(source-route | no-source-route);
state [
    cb-upgrade [on | off];
]
synchronization { # for M Series and T Series routers
    primary (external-a | external-b);
    secondary (external-a | external-b);
    signal-type (e1 | t1);
    switching-mode (non-revertive | revertive);
    transmitter-enable;
    validation-interval seconds;
    y-cable-line-termination;
}
synchronization { # for MX80 and MX240 routers
    clock-mode (auto-select | free-run);
    esmc-transmit {
        interfaces (all | interface-name);
    }
    hold-interval {
        configuration-change seconds;
        restart seconds;
        switchover seconds;
    }
    network-option (option-1 | option-2);
    quality-mode-enable;
    selection-mode (configured-quality|received-quality);
    source {
        (external-a | external-b) {
            priority number;
            quality-level (prc | prs |sec | smc | ssu-a | ssu-b | st2 | st3 | st3e | st4 | stu | tnc);
            request (force-switch | lockout);
        }
        interfaces interface-name {
            priority number;
            quality-level (prc | prs |sec | smc | ssu-a | ssu-b | st2 | st3 | st3e | st4 | stu | tnc);
            request (force-switch | lockout);
            wait-to-restore minutes;
        }
    }
    switchover-mode (revertive | non-revertive);
}
synchronization { # for ACX Series routers
    clock-mode (auto-select | free-run);
    esmc-transmit {

```



```

    interfaces (all | interface-name);
  }
  hold-interval {
    configuration-change seconds;
    restart seconds;
    switchover seconds;
  }
  network-option (option-1 | option-2);
  quality-mode-enable;
  selection-mode (configured-quality | received-quality);
  source {
    (bits | gps) {
      priority number;
      quality-level (prc | prs | sec | smc | ssu-a | ssu-b | st2 | st3 | st3e | st4 | stu | tnc);
      request (force-switch | lockout);
    }
    interfaces interface-name {
      priority number;
      quality-level (prc | prs | sec | smc | ssu-a | ssu-b | st2 | st3 | st3e | st4 | stu | tnc);
      request (force-switch | lockout);
      wait-to-restore minutes;
    }
  }
  switchover-mode(non-revertive | revertive);
}
system-domains {
  protected-system-domains psdnumerical-index {
    control-plane-bandwidth-percent percent;
    control-slot-numbers [ slot-numbers ];
    control-system-id control-system-id;
    description description;
    fpcs [ slot-numbers ];
  }
  root-domain-id root-domain-id;
}
vrf-mtu-check;
}

chassis {
  fpc slot-number {
    number-of-ports active-ports;
    offline;
    pic slot-number {
      ... the pic subhierarchy appears after the main [edit chassis fpc slot-number] hierarchy
      ...
    }
    port-mirror-instance port-mirror-instance-name;
    power (off | on);
    sampling-instance instance-name;
  }

  fpc slot-number {
    pic slot-number {
      adaptive-services {
        service-package (layer-2 | layer-3 | ...the following extension-provider subhierarchy
          ...);
      }
    }
  }
}

```

```
extension-provider {
  control-cores number;
  data-cores number;
  data-flow-affinity {
    hash-key (layer-3 | layer-4);
  }
  channelization;
  forwarding-db-size megabytes;
  object-cache-size megabytes;
  package package-name;
  policy-db-size megabytes;
  syslog {
    facility {
      severity;
      destination (pic-console | routing-engine);
    }
  }
  wired-process-mem-size megabytes;
}
}
aggregated-devices {
  ima {
    device-count number;
  }
}
aggregate-ports;
atm-cell-relay-accumulation;
atm-l2circuit-mode (aal5 | cell | trunk trunk);
cel {
  e1 port-number {
    channel-group group-number timeslots slot-number;
  }
}
ct3 {
  port port-number {
    t1 link-number {
      channel-group group-number timeslots slot-number;
    }
  }
}
}
ethernet {
  pic-mode (enhanced-switching | routing | switching);
}
fibre-channel {
  port port-number;
  port-range port-range-low port-range-high
}
egress-policer-overhead bytes;
forwarding-mode {
  sa-multicast;
  vlan-steering {
    vlan-rule (high-low | odd-even);
  }
}
}
framing (e1 | e3 | sdh | sonet | t1 | t3);
idle-cell-format {
```

```

        itu-t;
        payload-pattern payload-pattern-byte;
    }
    ingress-policer-overhead bytes;
    inline-services {
        bandwidth (1g | 10g);
    }
    linerate-mode;
    max-queues-per-interface (4 | 8);
    mlfr-uni-nni-bundles number;
    no-concatenate;
    no-multi-rate;
    port port-number {
        framing (e1 | e3 | sdh | sonet | t1 | t3);
        forwarding-mode {
            sa-multicast;
        }
        speed ( oc3-stm1 | oc12-stm4 | oc48-stm16);
    }
    port-mirror-instance port-mirror-instance-name;
    q-pic-large-buffer {
        (large-scale | small-scale);
    }
    red-buffer-occupancy {
        weighted-averaged <instant-usage-weight-exponent weight-value>;
    }
    shdsl {
        pic-mode (1-port-atm | 2-port-atm);
    }
    sparse-dlcis;
    traffic-manager {
        egress-shaping-overhead number;
        ingress-shaping-overhead number;
        mode {
            egress-only;
            ingress-and-egress;
            session-shaping;
        }
    }
    tunnel-queuing;
    tunnel-services {
        bandwidth (1g | 10g | 20g | 40g);
        tunnel-only;
    }
    vtmapping (itu-t | klm);
}
}

chassis {
    lcc index {
        fpc slot-number {
            ... the fpc subhierarchy appears after the main [edit chassis lcc index] hierarchy ...
        }
        offline;
        online-expected;
    }
}

```

```

    }
  }

lcc index {
  fpc slot-number {
    pic slot-number {
      ... the pic subhierarchy appears after the main [edit chassis lcc index fpc slot-number]
      hierarchy ...
    }
    power (off | on);
    sampling-instance instance-name;
  }

  fpc slot-number {
    pic slot-number {
      aggregate-ports;
      atm-cell-relay-accumulation;
      atm-l2circuit-mode (aal5 | cell | trunk trunk);
      framing (e1 | e3 | sdh | sonet | t1 | t3);
      idle-cell-format {
        itu-t;
        payload-pattern payload-pattern-byte;
      }
      linerate-mode;
      max-queues-per-interface (4 | 8);
      no-concatenate;
      no-mcast-replication;
      no-pre-classifier;
      port port-number {
        framing (e1 | e3 | sdh | sonet | t1 | t3);
      }
      q-pic-large-buffer {
        (large-scale | small-scale);
      }
      red-buffer-occupancy {
        weighted-averaged <instant-usage-weight-exponent weight-value>;
      }
      shdsl {
        pic-mode (1-port-atm | 2-port-atm);
      }
      traffic-manager {
        egress-shaping-overhead bytes;
        ingress-shaping-overhead bytes;
        mode {
          egress-only;
          ingress-and-egress;
        }
      }
    }
  }
}

```

#### Related Documentation

- [Notational Conventions Used in Junos OS Configuration Hierarchies](#)

## [edit class-of-service] Hierarchy Level

```

class-of-service {
  adaptive-shapers {
    adaptive-shaper-name {
      trigger type shaping-rate (bps | percent percentage);
    }
  }
  classifiers {
    type classifier-name {
      forwarding-class class-name {
        loss-priority (high | low | medium-high | medium-low) code-points [ aliases bits ];
      }
      import (classifier-name | default);
    }
  }
  code-point-aliases {
    (dscp | dscp-ipv6 | exp | ieee-802.1 | inet-precedence) {
      alias-name bits;
    }
  }
  copy-plp-all;
  drop-profiles {
    profile-name {
      fill-level percentage drop-probability percentage;
      interpolate {
        drop-probability value;
        fill-level value;
      }
    }
  }
  fabric {
    scheduler-map {
      priority (high | low) scheduler scheduler-name;
    }
  }
  forwarding-class-map {
    map-name {
      class class-name queue-num queue-number <restricted-queue queue-number>;
    }
  }
  forwarding-classes {
    class class-name queue-num queue-number priority (high | low);
    queue queue-number class-name priority (high | low);
  }
  forwarding-policy {
    class class-name {
      classification-override {
        forwarding-class class-name;
      }
    }
  }
  next-hop-map map-name {
    forwarding-class class-name {
      discard;
    }
  }
}

```

```

        lsp-next-hop [ lsp-regular-expressions ];
        next-hop [ next-hop-names ];
        non-lsp-next-hop;
    }
}
fragmentation-maps {
    map-name {
        forwarding-class class-name {
            drop-timeout milliseconds;
            fragment-threshold bytes;
            multilink-class number;
            no-fragmentation;
        }
    }
}
host-outbound-traffic {
    dscp-code-point value;
    forwarding-class class-name;
    ieee-802.1 {
        default value;
        rewrite-rules;
    }
    translation-table to-802.1p-from-dscp table-name;
}
interfaces {
    ... the interfaces subhierarchy appears after the main [edit class-of-service] hierarchy
    ...
}
loss-priority-maps {
    frame-relay-de name {
        loss-priority level code-points [alias | bits ];
    }
}
loss-priority-rewrites {
    frame-relay-de name {
        loss-priority level code-point (alias | bits );
    }
}
restricted-queues {
    forwarding-class class-name queue queue-number;
}
rewrite-rules {
    (dscp | dscp-ipv6 | exp | frame-relay-de | ieee-802.1 | inet-precedence) rewrite-rule {
        forwarding-class class-name {
            loss-priority level code-point (alias | bits );
        }
        import (rewrite-rule | default);
    }
}
routing-instances routing-instance-name {
    classifiers {
        dscp (classifier-name | default);
        dscp-ipv6 (classifier-name | default);
        exp (classifier-name | default);
    }
}

```

```

    ieee-208.1 (classifier-name | default | encapsulated | vlan-tag);
  }
}
scheduler-maps {
  map-name {
    forwarding-class class-name scheduler scheduler-name;
  }
}
schedulers {
  scheduler-name {
    buffer-size (exact | percent percentage | remainder | temporal microseconds);
    drop-profile-map loss-priority (any | high | low | medium-high | medium-low)
      protocol (any | non-tcp | tcp) drop-profile profile-name;
    excess-priority (high | low | medium-high | medium-low);
    excess-rate percent percentage;
    priority (high | low | medium-high | medium-low | strict-high);
    shaping-rate (bps | percent percentage);
    transmit-rate (bps | percent percentage | remainder) <exact | rate-limit>;
  }
}
traceoptions {
  file <filename> <files number> <match regular-expression> <size maximum-file-size>
    <world-readable | no-world-readable>;
  flag flag;
  no-remote-trace;
}
traffic-control-profiles {
  profile-name {
    delay-buffer-rate (bps | percent percentage);
    excess-rate (percent percentage | proportion value);
    guaranteed-rate (bps | percent percentage) <burst-size bytes>;
    overhead-accounting (frame-mode | cell-mode) <bytes byte-value>;
    scheduler-map map-name;
    shaping-rate (bps | percent percentage) <burst-size bytes>;
  }
}
translation-table {
  to-802.1p-from-dscp table-name {
    to-code-point 3-bit-pattern from-code-points [ 6-bit-patterns ];
  }
  to-dscp-from-dscp table-name {
    to-code-point 6-bit-pattern from-code-points [ 6-bit-patterns ];
  }
  to-dscp-ipv6-from-dscp-ipv6 table-name {
    to-code-point 6-bit-pattern from-code-points [ 6-bit-patterns ];
  }
  to-exp-from-exp table-name {
    to-code-point 3-bit-pattern from-code-points [ 3-bit-patterns ];
  }
  to-inet-precedence-from-inet-precedence table-name {
    to-code-point 3-bit-pattern from-code-points [ 3-bit-patterns ];
  }
}
tri-color;
}

```

```

class-of-service {
  interfaces {
    interface-name {
      excess-bandwidth-share (equal | proportional value);
      input-excess-bandwidth-share (equal | proportional value);
      input-scheduler-map map-name;
      input-shaping-rate bps;
      input-traffic-control-profile profile-name;
      input-traffic-control-profile-remaining profile-name;
      output-forwarding-class-map map-name;
      output-traffic-control-profile profile-name;
      output-traffic-control-profile-remaining profile-name;
      scheduler-map map-name;
      scheduler-map-chassis map-name;
      shaping-rate bps;
    }
    unit logical-unit-number {
      adaptive-shaper adaptive-shaper-name;
      classifiers {
        dscp (classifier-name | default) {
          family [ inet mpls ];
        }
        dscp-ipv6 (classifier-name | default) {
          family [ inet mpls ];
        }
        exp (classifier-name | default);
        ieee-208.1 (classifier-name | default) <vlan-tag (inner | outer)>;
        ieee-208.1ad (classifier-name | default);
        inet-precedence (classifier-name | default);
      }
      forwarding-class class-name;
      fragmentation-map map-name;
      input-scheduler-map map-name;
      input-shaping-rate bps;
      input-traffic-control-profile profile-name shared-instance instance-name;
      loss-priority-maps {
        (map-name | default);
      }
      loss-priority-rewrites {
        (map-name | default);
      }
      output-forwarding-class-map map-name;
      output-traffic-control-profile profile-name shared-instance instance-name;
      per-session-scheduler;
      rewrite-rules {
        dscp (rule-name | default) <protocol mpls>;
        dscp-ipv6 (rule-name | default);
        exp (rule-name | default) <protocol [ mpls-any | mpls-inet-both |
          mpls-inet-both-non-vpn ]>;
        exp-push-push-push default;
        exp-swap-push-push default;
        frame-relay-de (rewrite-name | default);
        ieee-802.1 (rewrite-name | default) <vlan-tag (outer | outer-and-inner)>;
        ieee-802.1ad (rewrite-name | default) <vlan-tag (outer | outer-and-inner)>;
        inet-precedence (rewrite-name | default) <protocol mpls>;
      }
      scheduler-map map-name;
    }
  }
}

```



```

        shaping-rate bps;
        translation-table (to-dscp-from-dscp | to-dscp-ipv6-from-dscp-ipv6 |
            to-exp-from-exp | to-inet-precedence-from-inet-precedence) table-name;
    }
}
interface-set interface-set-name {
    excess-bandwidth-share (equal | proportional value);
    input-excess-bandwidth-share (equal | proportional value);
    input-traffic-control-profile profile-name;
    input-traffic-control-profile-remaining profile-name;
    internal-node;
    output-traffic-control-profile profile-name;
    output-traffic-control-profile-remaining profile-name;
}
}
}

```

**Related Documentation** • [Notational Conventions Used in Junos OS Configuration Hierarchies](#)

## [\[edit dynamic-profiles\] Hierarchy Level](#)

```

dynamic-profiles {
  profile-name {
    class-of-service
    ... statements from those in [edit class-of-service] Hierarchy Level.
    firewall
    ... statements from those in [edit firewall] Hierarchy Level.
    interfaces
    ... statements from those in [edit interfaces] Hierarchy Level.
    policy-options
    ... statements from those in [edit policy-options] Hierarchy Level.
    predefined-variable-defaults variable-name default-value
    profile-variable-set variable-set-name dynamic-variable-name substitute-variable-name
    protocols
    ... statements from those in [edit protocols] Hierarchy Level.
    routing-instances
    ... statements from those in [edit routing-instances] Hierarchy Level.
    routing-options
    ... statements from those in [edit routing-options] Hierarchy Level.
    services
    ... statements from those in [edit services] Hierarchy Level.
    variables {
      variable-name {
        default-value default-value;
        equals expression;
        mandatory;
      }
      uid;
      uid-reference;
    }
  }
}

```

- Related Documentation**
- *Notational Conventions Used in Junos OS Configuration Hierarchies*
  - *[edit dynamic-profiles routing-instances] Hierarchy Level*
  - *[edit dynamic-profiles routing-options] Hierarchy Level*
  - *[edit dynamic-profiles variables] Hierarchy Level*

---

## [edit event-options] Hierarchy Level

```
event-options {
  destinations {
    destination-name {
      archive-sites {
        url <password password>;
      }
      transfer-delay seconds;
    }
  }
  event-script {
    dampen {
      dampen-options {
        cpu-factor cpu-factor;
        line-interval line-interval;
        time-interval microseconds;
      }
    }
    file filename {
      checksum (md5 | sha-256 | sha1) hash;
      refresh;
      refresh-from url;
      remote-execution {
        remote-hostname {
          passphrase user-password;
          username user-login;
        }
      }
      source url;
    }
    max-datasize
    refresh;
    refresh-from url;
    traceoptions {
      file <filename> <files number> <size maximum-file-size> <world-readable |
        no-world-readable>;
      flag flag;
      no-remote-trace;
    }
  }
  generate-event event-name {
    time-interval seconds;
    time-of-day hh:mm:ss;
  }
  max-policies policies;
  policy policy-name {
```

```

... the policy subhierarchy appears after the main [edit event-options] hierarchy ...
}
traceoptions {
  file <filename> <files number> <match regular-expression> <size maximum-file-size>
    <world-readable | no-world-readable>;
  flag flag;
  no-remote-trace;
}
}

event-options {
  policy policy-name {
    attributes-match {
      event1.attribute-name equals event2.attribute-name;
      event.attribute-name matches regular-expression;
      event1.attribute-name starts-with event2.attribute-name;
    }
    events [ events ];
    then {
      change-configuration {
        commands {
          "command";
        }
        commit-options {
          check <synchronize>;
          force;
          log "comment-string";
          synchronize;
        }
        retry count number interval seconds;
        user-name username;
      }
      event-script filename {
        arguments {
          argument-name argument-value;
        }
        destination destination-name {
          retry-count number retry-interval seconds;
          transfer-delay seconds;
        }
        output-filename filename;
        output-format (text | xml);
        user-name username;
      }
      execute-commands {
        commands {
          "command";
        }
        destination destination-name {
          retry-count number retry-interval seconds;
          transfer-delay seconds;
        }
        output-filename filename;
        output-format (text | xml);
        user-name username;
      }
    }
  }
}

```

```
ignore;
priority-override {
    facility facility-type;
    severity severity-level;
}
raise-trap;
upload filename (filename | committed) destination destination-name {
    retry-count number retry-interval seconds;
    transfer-delay seconds;
    user-name username;
}
}
within seconds {
    events [ events ];
    not events [ events ];
    trigger (after number | on number | until number);
}
}
}
```

#### Related Documentation

- [Notational Conventions Used in Junos OS Configuration Hierarchies](#)

---

## [edit firewall] Hierarchy Level

Several statements in the **[edit firewall]** hierarchy are valid at numerous locations within the hierarchy.

- [Common Firewall Actions on page 22](#)
- [Common IPv6 Firewall Actions on page 23](#)
- [Common IPv4 Firewall Actions on page 23](#)
- [Common IPv6 Firewall Match Conditions on page 24](#)
- [Common IPv4 Firewall Match Conditions on page 25](#)
- [Common Layer 2 Firewall Match Conditions on page 26](#)
- [Complete \[edit firewall\] Hierarchy on page 27](#)

## Common Firewall Actions

This section lists statements that are valid at the following hierarchy levels, and is referenced at those levels in “[Complete \[edit firewall\] Hierarchy on page 27](#)” instead of the statements being repeated.

- **[edit firewall family (any | bridge | ccc | inet | inet6 | mpls | vpls) filter *filter-name* term *term-name* then]**
- **[edit firewall filter *filter-name* term *term-name* then]**

The common firewall actions are as follows:

```
count counter-name;
forwarding-class class-name;
loss-priority (high | low | medium-high | medium-low);
```

```

next term;
policer policer-name;
three-color-policer policer-name {
    (single-rate single-rate-policer-name | two-rate two-rate-policer-name);
}

```

## Common IPv6 Firewall Actions

This section lists statements that are valid at the following hierarchy levels, and is referenced at those levels in [“Complete \[edit firewall\] Hierarchy” on page 27](#) instead of the statements being repeated.

- [edit firewall family inet filter *filter-name* term *term-name* then]
- [edit firewall family inet6 filter *filter-name* term *term-name* then]
- [edit firewall filter *filter-name* term *term-name* then]

The common IP firewall actions are as follows:

```

log;
logical-system logical-system-name <routing-instance routing-instance-name>
    <topology topology-name>;
port-mirror;
port-mirror-instance instance-name;
routing-instance <routing-instance-name> <topology topology-name>;
sample;
service-filter-hit;
syslog;
topology topology-name;

```

## Common IPv4 Firewall Actions

This section lists statements that are valid at the following hierarchy levels, and is referenced at those levels in [“Complete \[edit firewall\] Hierarchy” on page 27](#) instead of the statements being repeated.

- [edit firewall family inet filter *filter-name* term *term-name* then]
- [edit firewall filter *filter-name* term *term-name* then]

The common IP version 4 (IPv4) firewall actions are as follows:

```

(accept | discard <accounting collector-name> | reject <administratively-prohibited |
    bad-host-tos | bad-network-tos | fragmentation-needed | host-prohibited |
    host-unknown | host-unreachable | network-prohibited | network-unknown |
    network-unreachable | port-unreachable | precedence-cutoff | precedence-violation |
    protocol-unreachable | source-host-isolated | source-route-failed | tcp-reset>);
ipsec-sa sa-name;
load-balance sa-name;
prefix-action action-name;

```

## Common IPv6 Firewall Match Conditions

This section lists statements that are valid at the following hierarchy levels, and is referenced at those levels in “[Complete \[edit firewall\] Hierarchy](#)” on page 27 instead of the statements being repeated.

- `[edit firewall family inet dialer-filter filter-name term term-name from]` (with the exceptions noted at this level in “[Complete \[edit firewall\] Hierarchy](#)” on page 27)
- `[edit firewall family inet filter filter-name term term-name from]`
- `[edit firewall family inet6 dialer-filter filter-name term term-name from]` (with the exceptions noted at this level in “[Complete \[edit firewall\] Hierarchy](#)” on page 27)
- `[edit firewall family inet6 filter filter-name term term-name from]`
- `[edit firewall filter filter-name term term-name from]`

The common IP firewall match conditions are as follows:



**NOTE:** You cannot specify the address and destination-address match conditions in the same term. Also, you cannot specify the address and source-address match conditions in the same term.



**NOTE:** For IPv4 addresses, the filter description syntax supports either a mask value that can be noncontiguous, such as 10.0.0.10/255.0.0.255, or prefix notation such as 10.0.0.0/8. Simple filters do not support noncontiguous mask values.

```
address {
    ip-prefix</prefix-length | /ipv4-noncontiguous-mask> <except>;
}
destination-address {
    ip-prefix</prefix-length | /ipv4-noncontiguous-mask> <except>;
}
destination-class [ class-names ] | destination-class-except [ class-names ];
(destination-port [ port-names ] | destination-port-except [ port-names ]);
destination-prefix-list {
    list-name <except>;
}
(forwarding-class [ class-names ] | forwarding-class-except [ class-names ]);
icmp-code [ codes ] | icmp-code-except [ codes ];
icmp-type [ types ] | icmp-type-except [ types ];
interface interface-name;
interface-group [ group-names ] | interface-group-except [ group-names ];
interface-set set-name;
(loss-priority [ priorities ] | loss-priority-except [ priorities ]);
(packet-length [ values ] | packet-length-except [ values ]);
(port [ port-names ] | port-except [ port-names ]);
prefix-list {
    list-name <except>;
}
```

```

service-filter-hit;
source-address {
    ip-prefix </prefix-length | /ipv4-noncontiguous-mask> <except>;
}
(source-class [ class-names ] | source-class-except [ class-names ]);
(source-port [ port-names ] | source-port-except [ port-names ]);
source-prefix-list {
    list-name <except>;
}
tcp-established;
tcp-flags flag;
tcp-initial;

```

## Common IPv4 Firewall Match Conditions

This section lists statements that are valid at the following hierarchy levels, and is referenced at those levels in “[Complete \[edit firewall\] Hierarchy](#)” on page 27 instead of the statements being repeated.

- **[edit firewall family inet dialer-filter *filter-name* term *term-name* from]** (with the exceptions noted at this level in “[Complete \[edit firewall\] Hierarchy](#)” on page 27)
- **[edit firewall family inet filter *filter-name* term *term-name* from]**
- **[edit firewall filter *filter-name* term *term-name* from]**

The common IPv4 firewall match conditions are as follows:

```

(ah-spi [ values ] | ah-spi-except [ values ]);
(dscp [ code-point-values ] | dscp-except [ code-point-values ]);
(esp-spi [ values ] | esp-spi-except [ values ]);
first-fragment;
fragment-flags flag;
(fragment-offset [ offsets ] | fragment-offset-except [ offsets ]);
(ip-options [ option-names ] | ip-options-except [ option-names ]);
is-fragment;
(precedence [ precedence-names ] | precedence-except [ precedence-names ]);
(protocol [ protocol-names ] | protocol-except [ protocol-names ]);
(ttl [ ttl-values ] | ttl-except [ ttl-values ]);

```



**NOTE:** On M Series and T Series routers, firewall filters cannot count ip-options packets on a per option type and per interface basis. A limited workaround is to use the `show pfe statistics ip options` command to see ip-options statistics on a per Packet Forwarding Engine basis. See `show pfe statistics ip` for sample output.

## Common Layer 2 Firewall Match Conditions

This section lists statements that are valid at the following hierarchy levels, and is referenced at those levels in [“Complete \[edit firewall\] Hierarchy” on page 27](#) instead of the statements being repeated.

- `[edit firewall family bridge filter filter-name term term-name from]`
- `[edit firewall family vpls filter filter-name term term-name from]`

The common Layer 2 firewall match conditions are as follows:

```
destination-mac-address {
  mac-address <except>;
}
(destination-port [ port-names ] | destination-port-except [ port-names ]);
(dscp [ code-point-values ] | dscp-except [ code-point-values ]);
(ether-type [ protocol-types ] | ether-type-except [ protocol-types ]);
(forwarding-class [ class-names ] | forwarding-class-except [ class-names ]);
 icmp-code [ codes ] | icmp-code-except [ codes ];
 icmp-type [ types ] | icmp-type-except [ types ];
(interface-group [ group-names ] | interface-group-except [ group-names ]);
ip-address {
  ip-prefix</prefix-length> <except>;
}
ip-destination-address {
  ip-prefix</prefix-length> <except>;
}
(ip-precedence [ precedence-names ] | ip-precedence-except [ precedence-names ]);
(ip-protocol [ protocol-names ] | ip-protocol-except [ protocol-names ]);
ip-source-address ip-prefix</prefix-length>;
(learn-vlan-lp-priority [ priorities ] | learn-vlan-lp-priority [ priorities ]);
(learn-vlan-id [ vlan-ids ] | learn-vlan-id-except [ vlan-ids ]);
(loss-priority [ priorities ] | loss-priority-except [ priorities ]);
(port [ port-names ] | port-except [ port-names ]);
source-mac-address {
  mac-address <except>;
}
(source-port [ port-names ] | source-port-except [ port-names ]);
tcp-flags flag;
(traffic-type [ broadcast known-unicast multicast unknown-unicast ] |
 traffic-type-except [ broadcast known-unicast multicast unknown-unicast ]);
(user-vlan-lp-priority [ priorities ] | user-vlan-lp-priority [ priorities ]);
(user-vlan-id [ vlan-ids ] | user-vlan-id-except [ vlan-ids ]);
(vlan-ether-type [ protocol-types ] | vlan-ether-type-except [ protocol-types ]);
```



## Complete [edit firewall] Hierarchy

```

firewall {
  family (any | bridge | ccc | inet | inet6 | mpls | vpls) {
    ... the family subhierarchies appear after the main [edit firewall] hierarchy ...
  }
  filter filter-name {
    accounting-profile [ profile-names ];
    enhanced-mode;
    interface-specific;
    physical-interface-policer;
    term term-name {
      filter filter-name;
      from {
        ... statements in Common IPv6 Firewall Match Conditions on page 24 AND
        ... statements in Common IPv4 Firewall Match Conditions on page 25 ...
      }
      then {
        ... statements in Common Firewall Actions on page 22 AND
        ... statements in Common IPv6 Firewall Actions on page 23 AND
        ... statements in Common IPv4 Firewall Actions on page 23 ...
      }
    }
  }
}
hierarchical-policer policer-name {
  aggregate {
    if-exceeding {
      bandwidth-limit bps;
      burst-size-limit bytes;
    }
    then {
      discard;
      forwarding-class class-name;
      loss-priority (high | low | medium-high | medium-low);
    }
  }
  premium {
    if-exceeding {
      bandwidth-limit bps;
      burst-size-limit bytes;
    }
    then {
      discard;
    }
  }
}
interface-set interface-set-name {
  interface-name;
}
load-balance-group group-name {
  next-hop-group [ group-names ];
}
policer policer-name {
  filter-specific;
  if-exceeding {

```

```

        (bandwidth-limit bps | bandwidth-percent percentage);
        burst-size-limit bytes;
    }
    logical-bandwidth-policer;
    logical-interface-policer;
    physical-interface-policer;
    then {
        discard;
        forwarding-class class-name;
        loss-priority (high | low | medium-high | medium-low);
    }
}
three-color-policer policer-name {
    action {
        loss-priority high then discard;
    }
    logical-interface-policer;
    single-rate {
        (color-aware | color-blind);
        committed-burst-size bytes;
        committed-information-rate bps;
        excess-burst-size bytes;
    }
    two-rate {
        (color-aware | color-blind);
        committed-burst-size bytes;
        committed-information-rate bps;
        peak-burst-size bytes;
        peak-information-rate bps;
    }
}
}

firewall {
    family any {
        filter filter-name {
            term term-name {
                from {
                    (forwarding-class [ class-names ] | forwarding-class-except [ class-names ]);
                    interface interface-name;
                    interface-set set-name;
                    (loss-priority [ priorities ] | loss-priority-except [ priorities ]);
                    (packet-length [ values ] | packet-length-except [ values ]);
                }
                then {
                    ... statements in Common Firewall Actions on page 22 PLUS ...
                    (accept | discard);
                }
            }
        }
    }
}

firewall {
    family bridge {
        filter filter-name {

```

```

    accounting-profile [ profile-names ];
    interface-specific;
    term term-name {
        filter filter-name;
        from {
            ... statements in Common Layer 2 Firewall Match Conditions on page 26 ...
        }
        then {
            ... statements in Common Firewall Actions on page 22 PLUS ...
            (accept | discard);
            port-mirror;
            port-mirror-instance instance-name;
        }
    }
}
}
}

firewall {
    family ccc {
        filter filter-name {
            accounting-profile [ profile-names ];
            interface-specific;
            term term-name {
                filter filter-name;
                from {
                    (forwarding-class [ class-names ] | forwarding-class-except [ class-names ]);
                    (interface-group [ group-names ] | interface-group-except [ group-names ]);
                    (learn-vlan-1p-priority [ priorities ] | learn-vlan-1p-priority [ priorities ]);
                    (loss-priority [ priorities ] | loss-priority-except [ priorities ]);
                    (user-vlan-1p-priority [ priorities ] | user-vlan-1p-priority [ priorities ]);
                }
                then {
                    ... statements in Common Firewall Actions on page 22 PLUS ...
                    (accept | discard);
                    port-mirror-instance instance-name;
                }
            }
        }
    }
}

firewall {
    family inet {
        dialer-filter filter-name {
            accounting-profile [ profile-names ];
            term term-name {
                from {
                    ... statements in Common IPv6 Firewall Match Conditions on page 24 AND
                     statements in Common IPv4 Firewall Match Conditions on page 25 EXCEPT
                     FOR ...
                    (ah-spi [ values ] | ah-spi-except [ values ]); # NOT valid at this level
                    (destination-class [ class-names ] | destination-class-except [ class-names ]); #
                     NOT valid at this level
                    interface interface-name; # NOT valid at this level
                }
            }
        }
    }
}

```

```

        (loss-priority [ priorities ] | loss-priority-except [ priorities ]); # NOT valid at this
        level
        service-filter-hit; # NOT valid at this level
        (source-class [ class-names ] | source-class-except [ class-names ]); # NOT
        valid at this level
    }
    then {
        (ignore | note);
        log;
        sample;
        syslog;
    }
}
}
filter filter-name {
    accounting-profile [ profile-names ];
    enhanced-mode;
    interface-shared;
    interface-specific;
    physical-interface-filter;
    term term-name {
        filter filter-name;
        from {
            ... statements in Common IPv6 Firewall Match Conditions on page 24 AND
            statements in Common IPv4 Firewall Match Conditions on page 25 ...
        }
        then {
            ... statements in Common Firewall Actions on page 22 AND
            statements in Common IPv6 Firewall Actions on page 23 AND
            statements in Common IPv4 Firewall Actions on page 23 ...
        }
    }
}
}
prefix-action name {
    count;
    destination-prefix-length prefix-length;
    filter-specific;
    policer policer-name;
    source-prefix-length prefix-length;
    subnet-prefix-length prefix-length;
}
}
service-filter filter-name {
    term term-name {
        from {
            address {
                ip-prefix</prefix-length>;
            }
            (ah-spi [ values ] | ah-spi-except [ values ]);
            destination-address {
                ip-prefix</prefix-length>;
            }
            (destination-port [ port-names ] | destination-port-except [ port-names ]);
            destination-prefix-list {
                list-name;
            }
            (esp-spi [ values ] | esp-spi-except [ values ]);

```

```

first-fragment;
fragment-flags flag;
(fragment-offset [ offsets ] | fragment-offset-except [ offsets ]);
(interface-group [ group-names ] | interface-group-except [ group-names ]);
(ip-options [ option-names ] | ip-options-except [ option-names ]);
is-fragment;
(loss-priority [ priorities ] | loss-priority-except [ priorities ]);
(port [ port-names ] | port-except [ port-names ]);
prefix-list {
    list-name;
}
(protocol [ protocol-names ] | protocol-except [ protocol-names ]);
source-address {
    ip-prefix</prefix-length>;
}
(source-port [ port-names ] | source-port-except [ port-names ]);
source-prefix-list {
    list-name;
}
tcp-flags flag-name;
}
then {
    count counter-name;
    log;
    port-mirror;
    sample;
    (service | skip);
}
}
}
simple-filter filter-name {
    term term-name {
        from {
            destination-address ip-prefix</prefix-length>;
            destination-port port-name;
            forwarding-class [ class-names ];
            protocol protocol-name;
            source-address ip-prefix</prefix-length>;
            source-port port-name;
        }
        then {
            forwarding-class class-name;
            loss-priority (high | low | medium-high | medium-low);
            policer policer-name;
        }
    }
}
}
}
}
firewall {
    family inet6 {
        dialer-filter filter-name {
            accounting-profile [ profile-names ];
            term term-name {
                from {

```

```

... statements in Common IPv6 Firewall Match Conditions on page 24 PLUS ...
(next-header [ protocol-types ] | next-header-except [ protocol-types ]);
... BUT NOT ...
(destination-class [ class-names ] |
 destination-class-except [ class-names ]); # NOT valid at this level
(forwarding-class [ class-names ] |
 forwarding-class-except [ class-names ]); # NOT valid at this level
interface interface-name; # NOT valid at this level
(interface-group [ group-names ] | interface-group-except [ group-names ]); #
 NOT valid at this level
(loss-priority [ priorities ] | loss-priority-except [ priorities ]); # NOT valid at
 this level
service-filter-hit; # NOT valid at this level
(source-class [ class-names ] | source-class-except [ class-names ]); # NOT
 valid at this level
tcp-established; # NOT valid at this level
tcp-flags flag; # NOT valid at this level
tcp-initial; # NOT valid at this level
}
then {
(ignore | note);
log;
sample;
syslog;
}
}
}
filter filter-name {
accounting-profile [ profile-names ];
interface-specific;
term term-name {
filter filter-name;
from {
... statements in Common IPv6 Firewall Match Conditions on page 24 PLUS ...
(next-header [ protocol-types ] | next-header-except [ protocol-types ]);
(traffic-class [ code-point-values ] | traffic-class-except [ code-point-values ]);
}
then {
... statements in Common Firewall Actions on page 22 AND
statements in Common IPv6 Firewall Actions on page 23 PLUS ...
next-hop-group group-name;
(accept | discard | reject <address-unreachable | administratively-prohibited |
beyond-scope | fragmentation-needed | no-route | port-unreachable |
tcp-reset>);
}
}
}
service-filter filter-name {
term term-name {
from {
address {
ip-prefix </prefix-length>;
}
}
(ah-spi [ values ] | ah-spi-except [ values ]);
destination-address {
ip-prefix </prefix-length>;
}
}
}

```

```

    }
    (destination-port [ port-names ] | destination-port-except [ port-names ]);
    destination-prefix-list {
        list-name;
    }
    (esp-spi [ values ] | esp-spi-except [ values ]);
    (interface-group [ group-names ] | interface-group-except [ group-names ]);
    (next-header [ protocol-types ] | next-header-except [ protocol-types ]);
    (port [ port-names ] | port-except [ port-names ]);
    prefix-list {
        list-name;
    }
    source-address {
        ip-prefix</prefix-length>;
    }
    (source-port [ port-names ] | source-port-except [ port-names ]);
    source-prefix-list {
        list-name;
    }
    tcp-flags flag-name;
}
then {
    count counter-name;
    log;
    port-mirror;
    sample;
    (service | skip);
}
}
}
}
}

firewall {
    family mpls {
        dialer-filter filter-name {
            accounting-profile [ profile-names ];
            term term-name {
                from {
                    (exp [ exp-bits ] | exp-except [ exp-bits ]);
                }
                then {
                    (ignore | note);
                    log;
                    sample;
                    syslog;
                }
            }
        }
    }
    filter filter-name {
        accounting-profile [ profile-names ];
        interface-specific;
        term term-name {
            filter filter-name;
            from {
                (exp [ exp-bits ] | exp-except [ exp-bits ]);
            }
        }
    }
}

```

```

        (forwarding-class [ class-names ] | forwarding-class-except [ class-names ] );
        interface interface-name;
        interface-set set-name;
        (loss-priority [ priorities ] | loss-priority-except [ priorities ] );
    }
    then {
        ... statements in Common Firewall Actions on page 22 PLUS ...
        (accept | discard);
        sample;
    }
}
}
}
}

firewall {
    family vpls {
        filter filter-name {
            accounting-profile [ profile-names ];
            interface-specific;
            term term-name {
                filter filter-name;
                from {
                    ... statements in Common Layer 2 Firewall Match Conditions on page 26 ...
                }
                then {
                    ... statements in Common Firewall Actions on page 22 PLUS ...
                    (accept | discard);
                    port-mirror;
                    port-mirror-instance instance-name;
                }
            }
        }
    }
}
}
}

```

#### Related Documentation

- *Notational Conventions Used in Junos OS Configuration Hierarchies*
- *family*
- *Firewall Filter Match Conditions Based on Address Fields*
- *Firewall Filter Match Conditions for IPv4 Traffic*
- *Firewall Filter Match Conditions for IPv6 Traffic*
- *Firewall Filter Match Conditions for MPLS-Tagged IPv4 or IPv6 Traffic*
- *Guidelines for Configuring Simple Filters*



## [edit forwarding-options] Hierarchy Level

Each of the following topics lists the statements at a subhierarchy of the **[edit forwarding-options]** hierarchy.

- [\[edit forwarding-options accounting\] Hierarchy Level on page 35](#)
- [\[edit forwarding-options dhcp-relay\] Hierarchy Level on page 36](#)
- [\[edit forwarding-options enhanced-hash-key\] Hierarchy Level on page 39](#)
- [\[edit forwarding-options family\] Hierarchy Level on page 41](#)
- [\[edit forwarding-options fast-reroute-priority\] Hierarchy Level on page 41](#)
- [\[edit forwarding-options hash-key\] Hierarchy Level on page 42](#)
- [\[edit forwarding-options helpers\] Hierarchy Level on page 43](#)
- [\[edit forwarding-options load-balance\] Hierarchy Level on page 45](#)
- [\[edit forwarding-options next-hop-group\] Hierarchy Level on page 45](#)
- [\[edit forwarding-options port-mirroring\] Hierarchy Level](#)
- [\[edit forwarding-options rpf-loose-mode-discard\] Hierarchy Level on page 46](#)
- [\[edit forwarding-options sampling\] Hierarchy Level on page 46](#)

### Related Documentation

- [Notational Conventions Used in Junos OS Configuration Hierarchies](#)

## [edit forwarding-options accounting] Hierarchy Level

```
forwarding-options {
  accounting group-name {
    output {
      aggregate-export-interval seconds;
      cflowd hostname {
        aggregation {
          autonomous-system;
          destination-prefix;
          protocol-port;
          source-destination-prefix {
            caida-compliant;
          }
          source-prefix;
        }
        autonomous-system-type (origin | peer);
        port port-number;
        version format;
      }
      flow-active-timeout seconds;
      flow-inactive-timeout seconds;
      interface interface-name {
        engine-id number;
      }
    }
  }
}
```

```
        engine-type number;  
        source-address address;  
    }  
}  
}
```

- Related Documentation**
- *Notational Conventions Used in Junos OS Configuration Hierarchies*
  - [\[edit forwarding-options\] Hierarchy Level on page 35](#)

---

## [\[edit forwarding-options dhcp-relay\] Hierarchy Level](#)

```
forwarding-options {  
  dhcp-relay {  
    active-server-group server-group-name;  
  }  
  arp-inspection;  
  authentication {  
    password password-string;  
    username-include {  
      circuit-type;  
      delimiter delimiter-character;  
      domain-name domain-name-string;  
      interface-name;  
      logical-system-name;  
      mac-address;  
      option-60;  
      option-82 <circuit-id> <remote-id>;  
      routing-instance-name;  
      user-prefix user-prefix-string;  
    }  
  }  
  dhcpv6 {  
    active-server-group group-name;  
  }  
  authentication {  
    password password-string;  
  }  
  username-include {  
    circuit-type;  
    client-id;  
    delimiter delimiter-character;  
    domain-name domain-name-string;  
    interface-name;  
    logical-system-name;  
    relay-agent-interface-id;  
    relay-agent-remote-id;  
    relay-agent-subscriber-id;  
    routing-instance-name;  
    user-prefix user-prefix-string;  
  }  
  dynamic-profile profile-name {  
    aggregate-clients (merge |replace);  
    use-primary profile-name;  
  }  
}
```

```

}
group group-name {
  ... the group subhierarchy appears after the main [edit forwarding-options
    dhcp-relay] hierarchy ...
}
liveness-detecton {
  ... the liveness-detection subhierarchy appears after the main [edit
    forwarding-options dhcp-relay] hierarchy ...
}
overrides {
  ... the overrides subhierarchy appears after the main [edit forwarding-options
    dhcp-relay] hierarchy ...
}
relay-agent-interface-id {
  prefix;
  user-interface-description;
}
relay-option {
  default-action;
  equals;
  option-number;
  starts-with;
}
server-group;
service-profile;
)
dynamic-profile profile-name {
  aggregate-clients (merge |replace);
  use-primary profile-name;
}
forward-snooped-clients (all-interfaces | configured-interfaces |
  non-configured-interfaces);
group group-name {
  active-server-group server-group-name;
  authentication {
    password password-string;
    username-include {
      circuit-type;
      delimiter delimiter-character;
      domain-name domain-name-string;
      logical-system-name;
      mac-address;
      option-60;
      option-82 <circuit-id> <remote-id>;
      routing-instance-name;
      user-prefix user-prefix-string;
    }
  }
  dynamic-profile profile-name{
    aggregate-clients (merge |replace);
    use-primary profile-name;
  }
  interface;
  liveness-detection;
  overrides;
  relay-option;
  relay-option-82 ;
  service-profile;
}

```

```
    }
  }
  liveness-detection {
    failure-action (clear-binding |clear-binding-if-interface-up |log-only);
  }
  method {
    bfd {
      detection-time {
        threshold milliseconds;
      }
      holddown-interval;
      minimum--interval;
      minimum-receive-interval;
      multiplier;
      no-adaptation;
      session-mode;
    }
    transmit-interval {
      minimum-interval milliseconds;
      threshold milliseconds;
    }
    version;
  }
  overrides {
    (allow-snooped-clients | no-allow-snooped-clients);
    always-write-giaddr;
    always-write-option-82;
    client-discover-match <option60-and-option82>;
    disable-relay;
    interface-client-limit number;
    layer2-unicast-replies;
    no-allow-snooped-clients;
    no-bind-on-request;
    no-unicast-replies;
    proxy-mode;
    replace-ip-source-with giaddr;
    send-release-on-delete;
    trust-option-82;
  }
  relay-option {
    default-action {
      drop;
      forward-only;
      local-server-group group-name;
      relay-server-group group-name;
    }
    equals {
      ascii string;
      hexadecimal string;
    }
  }
  }
  option-number (60 | 77);
}
starts-with {
  ascii string;
  hexadecimal string;
```

```

    }
    relay-option-82 {
        circuit-id (value | ... the following prefix statement ...) {
            prefix {
                host-name;
                logical-system-name;
                routing-instance-name;
            }
            use-interface-description (device | logical);
        }
    }
    server-group {
        server-group-name {
            ip-address;
        }
    }
    service-profile name:
}
}

```

**Related  
Documentation**

- *Notational Conventions Used in Junos OS Configuration Hierarchies*
- [\[edit forwarding-options\] Hierarchy Level on page 35](#)

## [\[edit forwarding-options enhanced-hash-key\] Hierarchy Level](#)

```

enhanced-hash-key {
    family [
        inet
            gtp-tunnel-endpoint-identifier;
            incoming-interface-index;
            no-destination-port;
            no-source-port;
            type-of-service;
        ]
        inet6 {
            gtp-tunnel-endpoint-identifier;
            incoming-interface-index;
            no-destination-port;
            no-source-port;
            traffic-class;
        }
        mpls {
            incoming-interface-index;
            label-1-exp;
            no-payload;
        }
        multiservice {
            incoming-interface-index;
            no-mac-addresses;
            no-payload;
        }
    ]
}
services-loadbalancing {

```

```
family {
  inet layer-3-services {
    destination-address;
    incoming-interface-index;
    source-address;
  }
}
inet6 {
  destination-address;
  incoming-interface-index;
  source-address;
}
}
symmetric {
  family {
    inet {
      gtp-tunnel-endpoint-identifier;
      incoming-interface-index;
      no-destination-port;
      no-source-port;
      type-of-service;
    }
    inet6 {
      gtp-tunnel-endpoint-identifier;
      incoming-interface-index;
      no-destination-port;
      no-source-port;
      traffic-class;
    }
  }
}
mpls {
  incoming-interface-index;
  label-1-exp;
  no-payload;
}
multiservice {
  incoming-interface-index;
  no-mac-addresses;
  no-payload;
}
services-loadbalancing {
  family {
    inet layer-3-services {
      destination-address;
      incoming-interface-index;
      source-address;
    }
  }
  inet6 {
    destination-address;
    incoming-interface-index;
    source-address;
  }
}
```

- Related Documentation**
- *Notational Conventions Used in Junos OS Configuration Hierarchies*
  - [\[edit forwarding-options\] Hierarchy Level on page 35](#)

## [\[edit forwarding-options family\] Hierarchy Level](#)

```
forwarding-options {
  family inet {
    filter {
      input filter-name;
      output filter-name;
    }
  }
  family inet6 {
    filter {
      input filter-name;
      output filter-name;
      route-accounting;
      source-checking;
    }
  }
  family mpls {
    filter {
      input filter-name;
      output filter-name;
    }
  }
  family vpls {
    filter {
      input filter-name;
    }
    flood {
      input filter-name;
    }
  }
}
```

- Related Documentation**
- *Notational Conventions Used in Junos OS Configuration Hierarchies*
  - [\[edit forwarding-options\] Hierarchy Level on page 35](#)

## [\[edit forwarding-options fast-reroute-priority\] Hierarchy Level](#)

```
forwarding-options {
  fast-reroute-priority (low | medium | high);
}
```

- Related Documentation**
- *Notational Conventions Used in Junos OS Configuration Hierarchies*
  - [\[edit forwarding-options\] Hierarchy Level on page 35](#)

## [edit forwarding-options hash-key] Hierarchy Level

```

forwarding-options {
  hash-key {
    family inet {
      layer-3;
      layer-4;
      symmetric-hash {
        complement;
      }
    }
    family mpls {
      label-1;
      label-2;
      label-3;
      no-labels;
      payload {
        ether-pseudowire;
        ip {
          layer-3-only;
          port-data {
            destination-lsb;
            destination-msb;
            source-lsb;
            source-msb;
          }
        }
      }
    }
  }
  family multiservice {
    destination-mac;
    payload {
      ip {
        layer-3 {
          (destination-ip-only | source-ip-only);
        }
        layer-4;
      }
    }
    source-mac;
    symmetric-hash {
      complement;
    }
  }
}

```

### Related Documentation

- *Notational Conventions Used in Junos OS Configuration Hierarchies*
- [\[edit forwarding-options\] Hierarchy Level on page 35](#)



## [edit forwarding-options helpers] Hierarchy Level

```

forwarding-options {
  helpers {
    bootp {
      client-response-ttl number;
      description text-description;
      dhcp-option82 {
        disable;
        circuit-id {
          prefix hostname;
          use-interface-description;
          use-vlan-id;
        }
        remote-id {
          prefix (hostname | mac | none);
          use-interface-description;
          use-string text-string;
        }
        vendor-id {
          text-string;
        }
      }
    }
    interface interface-name-or-wildcard {
      broadcast;
      client-response-ttl number;
      description text-description;
      dhcp-option82 {
        ... same statements as at the [edit forwarding-options helpers bootp] hierarchy
        level ...
      }
      maximum-hop-count number;
      minimum-wait-time seconds;
      no-listen;
      server address {
        logical-system logical-system-name <routing-instance [ <default>
          routing-instance-names ]>;
        routing-instance [ <default> routing-instance-names ];
      }
    }
    maximum-hop-count number;
    minimum-wait-time seconds;
    relay-agent-option;
    server address {
      logical-system logical-system-name <routing-instance [ <default>
        routing-instance-names ]>;
      routing-instance [ <default> routing-instance-names ];
    }
  }
}

helpers {
  domain {
    description text-description;
  }
}

```

```
interface {
  interface-name {
    broadcast;
    description text-description;
    no-listen;
    server <address> <logical-system logical-system-name>
      <routing-instance (default | routing-instance-name)>;
  }
}
server <address> <logical-system logical-system-name>
  <routing-instance (default | routing-instance-name)>;
}

helpers {
  port port-number {
    description text-description;
    interface {
      interface-name {
        broadcast;
        description text-description;
        no-listen;
        server <address> <logical-system logical-system-name>
          <routing-instance (default | routing-instance-name)>;
      }
    }
    server <address> <logical-system logical-system-name>
      <routing-instance (default | routing-instance-name)>;
  }
}

helpers {
  rtsdb-client-traceoptions {
    if-rtsdb
      flag (all |init |map |routing-socket);
  }
}

helpers {
  tftp {
    description text-description;
    interface {
      interface-name {
        broadcast;
        description text-description;
        no-listen;
        server <address> <logical-system logical-system-name>
          <routing-instance (default | routing-instance-name)>;
      }
    }
    server <address> <logical-system logical-system-name>
      <routing-instance (default | routing-instance-name)>;
  }
}

helpers {
```

```

traceoptions {
  file <filename> <files number> <match regular-expression> <size maximum-file-size>
    <world-readable | no-world-readable>;
  flag flag;
  level severity;
  no-remote-trace;
}
}
}

```

- Related Documentation**
- *Notational Conventions Used in Junos OS Configuration Hierarchies*
  - [\[edit forwarding-options\] Hierarchy Level on page 35](#)

## [\[edit forwarding-options load-balance\] Hierarchy Level](#)

You can configure load balancing under the **[edit forwarding options]** hierarchy.

```

forwarding-options {
  load-balance {
    indexed-next-hop;
    per-flow {
      hash-seed;
    }
    per-prefix {
      hash-seed number;
    }
  }
}
}

```

- Related Documentation**
- *Notational Conventions Used in Junos OS Configuration Hierarchies*
  - [\[edit forwarding-options\] Hierarchy Level on page 35](#)

## [\[edit forwarding-options next-hop-group\] Hierarchy Level](#)

```

forwarding-options {
  next-hop-group group-name {
    group-type {
      layer-2 {
        interface interface-name {
          next-hop address;
        }
      }
      next-hop-subgroup subgroup-name ;
    }
    interface interface-name {
      next-hop address;
    }
    next-hop-subgroup subgroup-name ;
  }
}
}

```

- Related Documentation**
- *Notational Conventions Used in Junos OS Configuration Hierarchies*
  - [\[edit forwarding-options\] Hierarchy Level on page 35](#)

## [edit forwarding-options rpf-loose-mode-discard] Hierarchy Level

---

```
rpf-loose-mode-discard {  
  family {  
    inet;  
    inet6;  
  }  
}
```

- Related Documentation**
- *Notational Conventions Used in Junos OS Configuration Hierarchies*
  - [\[edit forwarding-options\] Hierarchy Level on page 35](#)

## [edit forwarding-options sampling] Hierarchy Level

---

```
forwarding-options {  
  sampling {  
    disable;  
  }  
  family {  
    inet {  
      disable;  
    }  
    output {  
      aggregate-export-interval seconds;  
      extension-service service-name;  
      file {  
        disable;  
        filename filename;  
        files number;  
        size bytes;  
        (stamp | no-stamp);  
        (world-readable | no-world-readable);  
      }  
      flow-active-timeout seconds;  
      flow-inactive-timeout seconds;  
    }  
    flow-server hostname {  
      aggregation {  
        autonomous-system-type (origin | peer);  
        (local-dump | no-local-dump);  
        port port-number;  
        source-address address;  
        version format;  
        version9 {  
          template template-name;  
        }  
      }  
    }  
  }  
  interface interface-name {  
    engine-id number;  
    engine-type number;  
    source-address address;  
  }  
}
```

```

    }
  }
}
inet6 {
  disable:
}
output {
  aggregate-export-interval seconds;
  extension-service service-name;
  flow-active-timeout seconds;
  flow-inactive-timeout seconds;
}
flow-server hostname {
  aggregation {
    autonomous-system-type (origin | peer);
    (local-dump | no-local-dump);
    port port-number;
    source-address address;
    version9 {
      template template-name;
    }
  }
}
interface {
  ... same statements as at the [edit forwarding-options sampling family inet]
    hierarchy level ...
}
}
mpls {
  disable:
}
output {
  aggregate-export-interval seconds;
  flow-active-timeout seconds;
  flow-inactive-timeout seconds;
}
flow-server hostname {
  aggregation {
    autonomous-system-type (origin | peer);
    (local-dump | no-local-dump);
    port port-number;
    source-address address;
    version9 {
      template template-name;
    }
  }
}
interface {
  ... same statements as at the [edit forwarding-options sampling family
    inet] hierarchy level ...
}
}
}
input {
  rate number;
  run-length number;
}

```

```
        max-packets-per-second number;  
        maximum-packet-length bytes;  
    }  
    instance instance-name {  
        disable;  
        input {  
            rate number;  
            run-length number;  
            max-packets-per-second number;  
            maximum-packet-length bytes;  
        }  
    }  
    sample-once;  
    traceoptions {  
        no-remote-trace;  
        file filename <files number> <size bytes> <match expression> <world-readable |  
        no-world-readable>;  
    }  
}
```

- Related Documentation**
- *Notational Conventions Used in Junos OS Configuration Hierarchies*
  - [\[edit forwarding-options\] Hierarchy Level on page 35](#)

---

## [edit groups] Hierarchy Level

```
groups {  
    group-name {  
        ... statements from any subhierarchy at the [edit] hierarchy level ...  
    }  
}
```

- Related Documentation**
- *Notational Conventions Used in Junos OS Configuration Hierarchies*

---

## [edit interfaces] Hierarchy Level

The following statement hierarchy can also be included at the **[edit logical-systems *logical-system-name*]** hierarchy level.

```
interfaces {  
    interface-name {  
        ... the "interface-name" subhierarchy appears after the main [edit interfaces] hierarchy level ...  
    }  
    interface-set interface-set-name {  
        interface interface-name {  
            (unit unit-number | vlan-tags-outer vlan-tag);  
        }  
    }  
    irb {  
        accounting-profile name;  
        description text;
```

```

(gratuitous-arp-reply | no-gratuitous-arp-reply);
hold-time up milliseconds down milliseconds;
mtu bytes;
no-gratuitous-arp-request;

traceoptions {
    flag flag;
}
(traps | no-traps);
unit logical-unit-number {
    accounting-profile name;
    bandwidth rate;
    description text;
    disable;
    encapsulation type;
    family inet {
        accounting {
            destination-class-usage;
            source-class-usage {
                input;
                output;
            }
        }
    }
    address ipv4-address {
        arp ip-address (mac | multicast-mac) mac-address <publish>;
        broadcast address;
        preferred;
        primary;
        vrrp-group group-id {
            (accept-data | no-accept-data);
            advertise-interval seconds;
            advertisements-threshold number;
            authentication-key key;
            authentication-type authentication;
            fast-interval milliseconds;
            (preempt | no-preempt) {
                hold-time seconds;
            }
            priority number;
            track {
                interface interface-name {
                    bandwidth-threshold bits-per-second priority-cost priority;
                    priority-cost priority;
                }
                priority-hold-time seconds;
                route prefix/prefix-length routing-instance instance-name priority-cost priority;
            }
            virtual-address [ addresses ];
            vrrp-inherit-from vrrp-group;
        }
    }
    filter {
        input filter-name;
        output filter-name;
    }
}

```

```

mtu bytes;
no-neighbor-learn;
no-redirects;
primary;
rpf-check {
    fail-filter filter-name;
    mode {
        loose;
    }
}
targeted-broadcast {
    forward-and-send-to-re;
    forward-only;
}
}
family inet6 {
    accounting {
        destination-class-usage;
        source-class-usage {
            input;
            output;
        }
    }
}
address address {
    eui-64;
    ndp ip-address (mac | multicast-mac) mac-address <publish>;
    preferred;
    primary;
    vrrp-inet6-group group-id {
        accept-data | no-accept-data;
        advertisements-threshold number;
        authentication-key key;
        authentication-type authentication;
        fast-interval milliseconds;
        inet6-advertise-interval milliseconds;
        preempt | no-preempt {
            hold-time seconds;
        }
        priority number;
        track {
            interface interface-name {
                bandwidth-threshold bandwidth priority-cost number;
                priority-cost number;
            }
            priority-hold-time seconds;
            route ip-address/mask routing-instance instance-name priority-cost cost;
        }
        virtual-inet6-address [addresses];
        virtual-link-local-address ipv6-address;
        vrrp-inherit-from {
            active-group group-number;
            active-interface interface-name;
        }
    }
}
}
(dad-disable | no-dad-disable);

```



```

    filter {
        input filter-name;
        output filter-name;
    }
    mtu bytes;
    nd6-stale-time seconds;
    no-neighbor-learn;
    no-redirects;
    policer {
        input policer-name;
        output policer-name;
    }
    rpf-check {
        fail-filter filter-name;
        mode {
            loose;
        }
    }
}
family iso {
    address interface-address;
    mtu bytes;
}
family mpls {
    filter {
        input filter-name;
        output filter-name;
    }
    mtu bytes;
    policer {
        input policer-name;
        output policer-name;
    }
}
native-inner-vlan-id vlan-id;
proxy-arp (restricted | unrestricted);
(traps | no-traps);
vlan-id-list [vlan-id's];
vlan-id-range [vlan-id-range];
}
}
traceoptions {
    file <filename> <files number> <match regular-expression> <size maximum-file-size>
        <world-readable | no-world-readable>;
    flag flag <disable>;
    no-remote-trace;
}
}
interfaces {
    interface-name {
        disable;
        accounting-profile name;
        aggregated-ether-options {
            ethernet-switch-profile {
                tag-protocol-id [ hexadecimal-identifiers ];
            }
        }
    }
}

```

```

}
(flow-control | no-flow-control);
lACP {
    (active | passive);
    admin-key key;
    fast-failover;
    link-protection {
        disable;
        (revertive | non-revertive);
    }
    periodic (fast | slow);
    system-id mac-address;
    system-priority priority;
}
(link-protection | no-link-protection);
link-speed (100m | 1g | 8g | 10g | 40g | 50g | 80g | 100g | oc192);
logical-interface-fpc-redundancy;
(loopback | no-loopback);
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);
}
minimum-links number;
rebalance-periodic {
    start-time time;
    interval number;
}
source-address-filter {
    mac-address;
}
(source-filtering | no-source-filtering);
}
auto-configure {
    remove-when-no-subscribers;
    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-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);
    ranges (any | low-tag-high-tag), (any | low-tag-high-tag);
  }
}
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;
      radius-realm radius-realm-string;
      user-prefix user-prefix-string;
    }
  }
  dynamic-profile profile-name {
    accept (any | dhcp-v4 | dhcp-v6 | inet | inet6);
    ranges (any | low-tag)—(any | high-tag);
  }
}
override tag vlan-tag dynamic-profile profile name;
}
encapsulation (ethernet-bridge | ethernet-vpls | extended-vlan-bridge |
  extended-vlan-vpls | flexible-ethernet-services | vlan-vpls);
ether-options {
  802.3ad {
    aex;
    (backup | primary);
    lacp {
      force-up;
      port-priority
    }
  }
}
asynchronous-notification;
(auto-negotiation | no-auto-negotiation);
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;
}
(mac-learn-enable | no-mac-learn-enable);
}
(flow-control | no-flow-control);
ignore-l3-incompletes;
link-mode (automatic | full-duplex | half-duplex);
(loopback | no-loopback);
keepalives <interval seconds> <down-count number> <up-count number>;
speed (1g | 10m | 100m | 10m-100m | auto-negotiation);
source-address-filter {
    mac-address;
}
source-filtering | no-source-filtering;
}
flexible-vlan-tagging;
(gratuitous-arp-reply | no-gratuitous-arp-reply);
hold-time (up milliseconds | down milliseconds);
interface-transmit-statistics;
(keepalives <down-count number> <interval seconds> <up-count number> |
no-keepalives);
layer2-policer {
    apply-groups [ group-names ];
    apply-groups-except [ group-names ];
}
link-mode (automatic | full-duplex);
mac mac-address;
mtu bytes;
multi-chassis-protection peer-ip-address {
    interface interface-name;
}
native-vlan-id number;
no-gratuitous-arp-request;
optics-options {
    alarm low-light-alarm {
        (link-down | syslog);
    }
    warning low-light-warning {
        (link-down | syslog);
    }
}
wavelength nm;
}
passive-monitor-mode;
per-unit-scheduler;
speed (10m | 100m | 1g | auto | oc3 | oc12 | oc48);
stacked-vlan-tagging;

```

```

traceoptions {
    flag flag;
}
transmit-bucket {
    overflow discard;
    rate percentage;
    threshold bytes;
}
(traps | no-traps);
unidirectional;
vlan-tagging;
}

interface-name {
    unit logical-unit-number {
        disable;
        accept-source-mac {
            mac-address mac-address {
                policer {
                    input policer-name;
                    output policer-name;
                }
            }
        }
    }
    accounting-profile name;
    advisory-options {
        downstream-rate rate;
        upstream-rate rate;
    }
    arp-resp (restricted|unrestricted);
    bandwidth rate;
    clear-dont-fragment-bit;
    copy-tos-to-outer-ip-header;
    demux-destination family;
    encapsulation (vlan-bridge | vlan-vpls);
    epd-threshold cells plp1 cells;
    filter filter-name;
    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;
    }
    interface-shared-with psdnumerical-index;
    layer2-policer {
        input-hierarchical-policer policer-name;
        input-policer policer-name;
        input-three-color policer-name;
        output-policer policer-name;
        output-three-color policer-name;
    }
    multi-chassis-protection peer-ip-address {
        interface interface-name;

```

```

}
native-inner-vlan-id number;
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;
}
peer-interface interface-name;
peer-unit unit-number;
plp-to-clp;
proxy-arp <restricted | unrestricted>;
rpm {
    (client | server);
    twamp-server;
}
swap-by-poppush;
vlan-id number;
vlan-id-list [ vlan-id vlan-id-vlan-id ];
vlan-id-range number-number;
vlan-tags (inner <tpid.>vlan-id | inner-list [ vlan-id vlan-id-vlan-id ] |
    inner-range <tpid.>vlan-id-vlan-id) outer <tpid.>vlan-id;
}

unit logical-unit-number {
    family ethernet-switching {
        filter {
            group filter-group-number;
            (input filter-name | input-list [ filter-names ]);
            (output filter-name | output-list [ filter-names ]);
            (inner-vlan-id-list [ vlan-ids ] | vlan-id number | vlan-id-list [ number
                number-number ]);
            interface-mode (access | trunk);
            policer {
                input policer-name;
                output policer-name;
            }
            vlan-rewrite {
                translate old-vlan-id new-vlan-id;
            }
            vlan {
                members [ all vlan-identifiers ];
            }
        }
    }
    family inet {
        filter {
            group filter-group-number;
            (input filter-name | input-list [ filter-names ]);
            (output filter-name | output-list [ filter-names ]);
        }
        input-hierarchical-policer policer-name;
        mac-validate (loose | strict);
        mtu bytes;
        no-neighbor-learn;
        no-redirects;
    }
}

```

```

    policer {
        arp policer-template-name;
        input policer-name;
        output policer-name;
    }
    primary;
    receive-options-packets;
    receive-ttl-exceeded;
    rpf-check {
        fail-filter filter-name;
        mode loose;
    }
    sampling {
        (input | output | input output);
    }
    simple-filter {
        input filter-name;
    }
    targeted-broadcast {
        forward-and-send-to-re;
        forward-only;
    }
    unnumbered-address interface-name <destination address>
        <destination-profile profile-name> <preferred-source-address address>;
}

family inet6 {
    address ipv6-address {
        destination destination-address;
        eui-64;
        ndp ipv6-address <l2-interface interface-name> <(mac mac-address |
            multicast-mac multicast-mac-address) <publish>>;
        preferred;
        primary;
        vrrp-inet6-group group-number {
            (accept-data | no-accept-data);
            fast-interval milliseconds;
            inet6-advertise-interval seconds;
            (no-preempt; | ... the following preempt statement ...)
            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 ip-address-prefix/prefix-length routing-instance instance-name
                    priority-cost priority;
            }
        }
        virtual-inet6-address [ addresses ];
        virtual-link-local-address ipv6-address;
        vrrp-inherit-from {

```

```

        active-group group-number;
        active-interface interface-name;
    }
}
(dad-disable | no-dad-disable);
filter {
    group filter-group-number;
    (input filter-name | input-list [ filter-names ]);
    (output filter-name | output-list [ filter-names ]);
}
input-hierarchical-policer policer-name;
mtu bytes;
nd6-stale-time seconds;
no-neighbor-learn;
policer {
    input policer-name;
    output policer-name;
}
rpf-check {
    fail-filter filter-name;
    mode loose;
}
sampling {
    (input | output | input output);
}
unnumbered-address interface-name preferred-source-address address;
}

family iso {
    address iso-address;
    mtu bytes;
}

family mlfrr-end-to-end {
    bundle logical-interface-name;
}

family mpls {
    filter {
        group filter-group-number;
        (input filter-name | input-list [ filter-names ]);
        (output filter-name | output-list [ filter-names ]);
    }
    input-hierarchical-policer policer-name;
    maximum-labels maximum-labels;
    mtu bytes;
    policer {
        input policer-name;
        output policer-name;
    }
}
}

```



```

family vpls {
  core-facing;
  filter {
    group filter-group-number;
    (input filter-name | input-list [ filter-names ]);
    (output filter-name | output-list [ filter-names ]);
  }
  policer {
    input policer-name;
    output policer-name;
  }
}
}
}

```

Related Documentation • [Notational Conventions Used in Junos OS Configuration Hierarchies](#)

## [\[edit logical-systems\] Hierarchy Level](#)

As indicated in the following hierarchy, you can include at this hierarchy level several of the hierarchies that can be included at the **[edit]** hierarchy level. However, some statements in a subhierarchy are not valid for logical systems. To learn which statements can be included under **[edit logical-systems *logical-system-name*]** on your device, issue the **set ?** command at the hierarchy level of interest.

```

logical-systems {
  logical-system-name {
    routing-options {
      nonstop-routing;
    }
    access {
      address-assignment {
        ... same statements as in the address-assignment subhierarchy in [edit access]
        Hierarchy Level ...
      }
    }
    access-profile profile-name;
    bridge-domains {
      ... (MX Series only) same statements as in [edit bridge-domains] Hierarchy Level ...
    }
    bridge-domains {
      ... (MX Series only) same statements as in [edit bridge-domains] Hierarchy Level ...
    }
    firewall {
      ... same statements as in several subhierarchies in [edit firewall] Hierarchy Level on
      page 22 ...
    }
    forwarding-options {
      ... same statements as in [edit forwarding-options dhcp-relay] Hierarchy Level ...
    }
  }
}

```

```

interfaces {
  interface-name {
    unit logical-unit-number {
      ... some of the statements in the unit subhierarchy in [edit interfaces] Hierarchy
      Level ...
    }
  }
}
policy-options {
  ... same statements as in [edit policy-options] Hierarchy Level on page 61 ...
}
protocols {
  ... same statements as in [edit protocols] Hierarchy Level ...
}
routing-instances {
  ... most statements in [edit routing-instances] Hierarchy Level ...
}
routing-options {
  ... most statements in [edit routing-options] Hierarchy Level ...
}
switch-options {
  ... (MX Series only) same statements as in [edit switch-options] Hierarchy Level ...
}
system {
  services {
    dhcp-local-server {
      ... same statements as in the services dhcp-local-server subhierarchy in [edit
      system] Hierarchy Level ...
    }
  }
  syslog {
    ... most statements in syslog subhierarchy in [edit system] Hierarchy Level...
  }
}
}
}

```

**Related Documentation** • *Notational Conventions Used in Junos OS Configuration Hierarchies*

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

```

multi-chassis {
  multi-chassis-protection ipv4-address {
    interface interface-name;
  }
}

```

**Related Documentation** • *Notational Conventions Used in Junos OS Configuration Hierarchies*

## multicast-snooping-options

<b>Syntax</b>	<pre> multicast-snooping-options {   flood-groups [ <i>ip-addresses</i> ];   forwarding-cache {     threshold suppress <i>value</i> &lt;reuse <i>value</i>&gt;;   }   graceful-restart &lt;restart-duration <i>seconds</i>&gt;;   multichassis-lag-replicate-state;   nexthop-hold-time <i>milliseconds</i>;   options {     syslog (level <i>level</i>   mark   upto <i>level</i>) ;   }   traceoptions {     file <i>filename</i> &lt;files <i>number</i>&gt; &lt;size <i>size</i>&gt; &lt;world-readable   no-world-readable&gt;;     flag <i>flag</i> &lt;<i>flag-modifier</i>&gt; &lt;disable&gt;;   } } </pre>
<b>Hierarchy Level</b>	[edit ]
<b>Release Information</b>	Statement introduced in Junos OS Release 12.3R2 for EX Series switches.
<b>Description</b>	Establish multicast snooping option values.
<b>Options</b>	The statements are explained separately.
<b>Required Privilege Level</b>	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">Multicast Overview</a></li> </ul>

## [edit policy-options] Hierarchy Level

Several statements in the **[edit policy-options]** hierarchy are valid at numerous locations within the hierarchy. To make the complete hierarchy easier to read, the repeated statements are listed in the following sections, which are referenced at the appropriate locations in “[Complete \[edit policy-options\] Hierarchy](#)” on page 65.

- [Common Policy Terms](#) on page 62
- [Common Policy Match Conditions](#) on page 63
- [Common Ingress Policy Match Conditions](#) on page 64
- [Complete \[edit policy-options\] Hierarchy](#) on page 65

## Common Policy Terms

This section lists statements that are valid at the following hierarchy levels, and is referenced at those levels in “[Common Ingress Policy Match Conditions](#)” on page 64 and “[Complete \[edit policy-options\] Hierarchy](#)” on page 65 instead of the statements being repeated.

- [edit policy-options policy-statement *policy-name* from prefix-list-filter *prefix-list-name* (exact | longer | orlonger)]
- [edit policy-options policy-statement *policy-name* from route-filter *ip-prefix*</*prefix-length*> (exact | longer | orlonger | through *ip-prefix*</*prefix-length*> | upto /*prefix-length*)]
- [edit policy-options policy-statement *policy-name* from source-address-filter *ip-prefix*</*prefix-length*> (exact | longer | orlonger | through *ip-prefix*</*prefix-length*> | upto /*prefix-length*)]
- [edit policy-options policy-statement *policy-name* term *term-name* from prefix-list-filter *prefix-list-name* (exact | longer | orlonger)]
- [edit policy-options policy-statement *policy-name* term *term-name* from route-filter *ip-prefix*</*prefix-length*> (exact | longer | orlonger | through *ip-prefix*</*prefix-length*> | upto /*prefix-length*)]
- [edit policy-options policy-statement *policy-name* term *term-name* from source-address-filter *ip-prefix*</*prefix-length*> (exact | longer | orlonger | through *ip-prefix*</*prefix-length*> | upto /*prefix-length*)]
- [edit policy-options policy-statement *policy-name* then]
- [edit policy-options policy-statement *policy-name* term *term-name* then]

The common policy terms are as follows:

```
(accept | reject);
aigp-originate distance;
as-path-expand (as-number | last-as) <count number>;
as-path-prepend as-number;
class class-name;
color (preference | add number | subtract number);
color2 (preference | add number | subtract number);
community (add | delete | set | + | - | =) community-name;
cos-next-hop-map map-name;
damping list-name;
default-action (accept | reject);
destination-class class-name;
external {
    nssa-only;
    type (1 | 2);
}
forwarding-class class-name;
install-nexthop <strict> (lsp [ lsp-names ] | lsp-regex [ regular-expressions ] |
    static-lsp [ lsp-names ] | static-lsp-regex [ regular-expressions ] )
```

```

    <except (lsp [ lsp-names ] | lsp-regex [ regular-expressions | static-lsp [ lsp-names ] |
    static-lsp-regex [ regular-expressions ]])>;
load-balance per-packet;
local-preference (preference | add number | subtract number);
metric (metric-value | add number | igp <metric-offset> | minimum-igp <metric-offset> |
    subtract number | ... the following complex expression ...);
expression {
    metric (multiplier number | offset number | multiplier number offset number);
    metric2 (multiplier number | offset number | multiplier number offset number);
}
metric2 (metric-value | add number | subtract number);
metric3 (metric-value | add number | subtract number);
metric4 (metric-value | add number | subtract number);
next (policy | term);
next-hop (ip-address | discard | next-table routing-table-name | peer-address | reject |
    self);
origin (egp | igp | incomplete);
preference (preference | add number | subtract number);
preference2 (preference | add number | subtract number);
priority (high | low | medium);
selected-mldp-egress
source-class class-name;
tag (tag-number | add number | subtract number);
tag2 (tag-number | add number | subtract number);
trace;
load-balance {
    per-packet;
    random;
}

```

## Common Policy Match Conditions

This section lists statements that are valid at the following hierarchy levels, and is referenced at those levels in “[Complete \[edit policy-options\] Hierarchy](#)” on page 65 instead of the statements being repeated.

- [edit policy-options policy-statement *policy-name* from]
- [edit policy-options policy-statement *policy-name* term *term-name* from]
- [edit policy-options policy-statement *policy-name* term *term-name* to]
- [edit policy-options policy-statement *policy-name* to]

The common policy match conditions are as follows:

```

area area-id;
as-path [ regular-expression-names ];
as-path-group [ as-path-group-names ];
color preference;
color2 preference;
community [ community-names ];
external {
    nssa-only;
    type (1 | 2);
}

```

```

family family-name;
instance instance-name;
interface [ interface-names ];
level isis-level;
local-preference value;
metric metric-value;
metric2 metric-value;
metric3 metric-value;
metric4 metric-value;
neighbor [ ip-addresses ];
next-hop [ ip-addresses ];
nlri-route-type route-type-number;
origin (egp | igp | incomplete);
policy [ policy-names ];
preference preference;
preference2 preference;
protocol [ protocol-names ];
rib routing-table-name;
tag [ tag-numbers ];
tag2 tag-number;

```

## Common Ingress Policy Match Conditions

This section lists statements that are valid at the following hierarchy levels, and is referenced at those levels in “[Complete \[edit policy-options\] Hierarchy](#)” on page 65 instead of the statements being repeated at each level.

- [edit policy-options policy-statement *policy-name* from]
- [edit policy-options policy-statement *policy-name* term *term-name* from]

The common ingress policy match conditions are as follows:

```

aggregate-contributor;
condition [ conditions ];
multicast-scope (scope-value | global | link-local | node-local | organization-local |
  site-local) <orhigher | orlower>;
next-hop-type merged;
prefix-list prefix-list-name;
prefix-list-filter prefix-list-name (exact | longer | orlonger) {
  ... statements in Common Policy Terms on page 62 ...;
}
route-filter ip-prefix</prefix-length> (exact | longer | orlonger |
  through ip-prefix</prefix-length> | upto /prefix-length) {
  ... statements in Common Policy Terms on page 62 ...;
}
route-type (external | internal);
rtf-prefix-list name route-targets
source-address-filter ip-prefix</prefix-length> (exact | longer | orlonger |
  through ip-prefix</prefix-length> | upto /prefix-length) {
  ... statements in Common Policy Terms on page 62 ...;
}
state (active | inactive);

```

## Complete [edit policy-options] Hierarchy

The statement hierarchy in this section can also be included at the [edit logical-systems *logical-system-name*] hierarchy level.

```

policy-options {
  as-path name regular-expression;
  as-path-group group-name {
    as-path name regular-expression;
  }
  community name {
    invert-match;
    members [ community-ids ];
  }
  condition condition-name {
    dynamic-db;
    if-route-exists{
      address;
      address-family {
        inet {
          address;
          table table-name;
        }
        ccc {
          interface-name;
          standby;
          peer-unit unit-number;
          table table-name;
        }
      }
      table table-name;
    }
  }
  damping name {
    disable;
    half-life minutes;
    max-suppress minutes;
    reuse number;
    suppress number;
  }
  policy-statement policy-name {
    from {
      ... statements in Common Policy Match Conditions on page 63 AND
      statements in Common Ingress Policy Match Conditions on page 64 ...
    }
    term term-name {
      from {
        ... statements in Common Policy Match Conditions on page 63 AND
        statements in Common Ingress Policy Match Conditions on page 64 ...
      }
      to {
        ... statements in Common Policy Match Conditions on page 63 ...
      }
      then {
        ... statements in Common Policy Terms on page 62 ...
      }
    }
  }
}

```

```
    }  
  }  
  to {  
    ...statements in Common Policy Match Conditions on page 63 ...  
  }  
  then {  
    ...statements in Common Policy Terms on page 62 ...  
  }  
}  
prefix-list list-name {  
  ip-prefix </prefix-length>;  
  apply-path path;  
}  
}
```

**Related  
Documentation**

- [Notational Conventions Used in Junos OS Configuration Hierarchies](#)

---

**[edit protocols] Hierarchy Level**

---

Each of the following topics lists the statements at a subhierarchy of the **[edit protocols]** hierarchy.

- [\[edit protocols bfd\] Hierarchy Level](#)
- [\[edit protocols bgp\] Hierarchy Level on page 69](#)
- [\[edit protocols dot1x\] Hierarchy Level](#)
- [\[edit protocols dvmrp\] Hierarchy Level](#)
- [\[edit protocols igmp\] Hierarchy Level](#)
- **igmp-snooping**
- [\[edit protocols isis\] Hierarchy Level on page 80](#)
- [\[edit protocols l2-learning\] Hierarchy Level on page 82](#)
- [\[edit protocols lacp\] Configuration Statement Hierarchy on EX Series Switches](#)
- [\[edit protocols layer2-control\] Hierarchy Level on page 83](#)
- [\[edit protocols ldap\] Hierarchy Level on page 84](#)
- [\[edit protocols lldp\] Hierarchy Level](#)
- [\[edit protocols mld\] Hierarchy Level](#)
- [\[edit protocols mpls\] Hierarchy Level on page 89](#)
- [\[edit protocols msdp\] Hierarchy Level](#)
- [\[edit protocols mstp\] Hierarchy Level](#)
- [\[edit protocols mvrp\] Hierarchy Level](#)
- [\[edit protocols neighbor-discovery\] Hierarchy Level](#)
- [\[edit protocols oam\] Hierarchy Level](#)



- [\[edit protocols ospf\] Hierarchy Level on page 93](#)
- [\[edit protocols ospf3\] Hierarchy Level on page 97](#)
- [\[edit protocols pim\] Hierarchy Level on page 101](#)
- [\[edit protocols protection-group\] Hierarchy Level on page 105](#)
- [\[edit protocols rip\] Hierarchy Level on page 106](#)
- [\[edit protocols ripng\] Hierarchy Level on page 107](#)
- [\[edit protocols router-advertisement\] Hierarchy Level on page 108](#)
- [\[edit protocols router-discovery\] Hierarchy Level on page 109](#)
- [\[edit protocols rstp\] Hierarchy Level on page 109](#)
- [\[edit protocols sap\] Hierarchy Level on page 110](#)
- [\[edit protocols vrrp\] Hierarchy Level on page 111](#)
- [\[edit protocols vstp\] Hierarchy Level on page 111](#)

**Related  
Documentation**

- *Notational Conventions Used in Junos OS Configuration Hierarchies*

## bfd

<b>Syntax</b>	<pre> bfd {   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> &lt;flag-modifier&gt; &lt;disable&gt;;   } } </pre>
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols],</p> <p>[edit protocols],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols]</p>
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4.
<b>Description</b>	Configure trace options for Bidirectional Forwarding Protocol (BFD) traffic.
<b>Default</b>	If you do not include this statement, no BFD tracing operations are performed.
<b>Options</b>	<p><b>disable</b>—(Optional) Disable the BFD 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>file <i>filename</i></b>—Name of the file to receive the output of the tracing operation. Enclose the name in quotation marks. All files are placed in the <b>/var/log</b> directory. We recommend that you place global routing protocol tracing output in the <b>routing-log</b> file.</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.</p> <p><b>Range:</b> 2 through 1000 files</p> <p><b>Default:</b> 2 files</p> <p><b>flag <i>flag</i></b>—Tracing operation to perform. To specify more than one tracing operation, include multiple <b>flag</b> statements. These are the BFD protocol tracing options:</p> <ul style="list-style-type: none"> <li>• <b>adjacency</b>—Trace adjacency messages.</li> <li>• <b>all</b>—Trace all options for BFD.</li> <li>• <b>error</b>—Trace all errors.</li> <li>• <b>event</b>—Trace all events.</li> <li>• <b>issu</b>—Trace in-service software upgrade (ISSU) packet activity.</li> </ul>

- **nsr-packet**—Trace non-stop-routing (NSR) packet activity.
- **nsr-synchronization**—Trace NSR synchronization events.
- **packet**—Trace all packets.
- **pipe**—Trace pipe messages.
- **pipe-detail**—Trace pipe messages in detail.
- **ppm-packet**—Trace packet activity by periodic packet management (PPM).
- **state**—Trace state transitions.
- **timer**—Trace timer processing.

**match *regular-expression***—(Optional) Regular expression for lines to be logged.

**no-world-readable**—(Optional) Prevent any user from reading the log file.

**size *size***—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named ***trace-file*** reaches this size, it is renamed ***trace-file.0***. When the trace file again reaches its maximum size, ***trace-file.0*** is renamed ***trace-file.1*** and ***trace-file*** is renamed ***trace-file.0***. This renaming scheme continues until the maximum number of trace files is reached. Then, the oldest trace file is overwritten.

If you specify a maximum file size, you also must specify a maximum number of trace files with the **files** option.

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

**Range:** 10 KB through the maximum file size supported on your system

**Default:** 128 KB

**world-readable**—(Optional) Allow any user to read the log file.

<b>Required Privilege Level</b>	routing and trace—To view this statement in the configuration. routing-control and trace-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <i>Example: Configuring BFD for Static Routes for Faster Network Failure Detection</i></li> </ul>

## [\[edit protocols bgp\] Hierarchy Level](#)

Several statements in the **[edit protocols mpls]** hierarchy are valid at numerous locations within it. To make the complete hierarchy easier to read, the repeated statements are listed in “[Common BGP Family Options](#)” on page 70 and that section is referenced at the appropriate locations in “[Complete \[edit protocols bgp\] Hierarchy](#)” on page 70.

- [Common BGP Family Options on page 70](#)
- [Complete \[edit protocols bgp\] Hierarchy on page 70](#)

## Common BGP Family Options

This section lists statements that are valid at the following hierarchy levels, and is referenced at those levels in “[Complete \[edit protocols bgp\] Hierarchy](#)” on page 70 instead of the statements being repeated.

- [edit protocols bgp family inet (any | flow | labeled-unicast | multicast | unicast)]
- [edit protocols bgp family inet6 (any | labeled-unicast | multicast | unicast)]
- [edit protocols bgp family (evpn | inet-mdt | inet-mvpn | inet6-mvpn | l2vpn) signaling]
- [edit protocols bgp family inet-vpn (any | flow | multicast | unicast)]
- [edit protocols bgp family inet6-vpn (any | multicast | unicast)]
- [edit protocols bgp family iso-vpn unicast]

The common BGP family options are as follows:

```
accepted-prefix-limit {
    maximum number;
    teardown <percentage> <idle-timeout (forever | minutes)>;
}
damping;
loops number;
prefix-limit {
    maximum number;
    teardown <percentage> <idle-timeout (forever | minutes)>;
}
rib-group group-name;
topology name {
    community {
        target identifier;
    }
}
```

## Complete [edit protocols bgp] Hierarchy

The statement hierarchy listed in this section can also be included at the [edit logical-systems *logical-system-name*] hierarchy level.

```
protocols {
    bgp {
        disable;
        accept-remote-nexthop;
        advertise-external <conditional>;
        advertise-from-main-vpn-tables;
        advertise-inactive;
        (advertise-peer-as | no-advertise-peer-as);
        authentication-algorithm (aes-128-cmac-96 | hmac-sha-1-96 | md5);
        authentication-key key;
        authentication-key-chain key-chain;
        bfd-liveness-detection {
            authentication {
```

```

    algorithm (keyed-md5 | keyed-sha-1 | meticulous-keyed-md5 |
        meticulous-keyed-sha-1 | simple-password);
    key-chain key-chain-name;
    loose-check;
}
detection-time {
    threshold milliseconds;
}
holddown-interval milliseconds;
minimum-interval milliseconds;
minimum-receive-interval milliseconds;
multiplier number;
no-adaptation;
session-mode (automatic | multihop | single-hop);
transmit-interval {
    minimum-interval milliseconds;
    threshold milliseconds;
}
version (1 | automatic);
}
bmp {
    monitor (disable | enable);
    route-monitoring {
        none;
        post-policy {
            exclude-non-eligible;
        }
        pre-policy {
            exclude-non-feasible;
        }
    }
}
cluster cluster-identifier;
damping;
description text-description;
export [ policy-names ];
family family-name {
    ... the family subhierarchies appear after the main [edit protocols bgp] hierarchy ...
}
unconfigured-peer-graceful-restart;
graceful-restart {
    disable;
    restart-time seconds;
    stale-routes-time seconds;
}
graceful-restart {
    long-lived {
        receiver {
            enable;
            disable;
        }
        advertise-to-non-llgr-neighbor {
            omit-no-export;
        }
    }
}
}

```

```

graceful-restart {
  disable-notification-flag;
  disable-notification-extensions {
    omit-no-export;
  }
  forwarding-state-bit (from-fib | set); /* Configurable to be common for all address
    families */
  forwarding-state-bit (as-rr-client | from-fib); /* Configurable for each address family
    */
  long-lived {
    restarter {
      disable;
      stale-time interval;
    }
  }
}
group group-name {
  ... the group subhierarchy appears after the main [edit protocols bgp] hierarchy ...
}
hold-time seconds;
idle-after-switch-over (seconds | forever);
import [ policy-names ];
include-mp-next-hop;
ipsec-sa ipsec-sa;
keep (all | none);
local-address address;
local-as autonomous-system <loops number> <alias> <private>;
local-interface interface-name;
local-preference local-preference;
log-updown;
metric-out (metric | igp (delay-med-update | offset) | minimum-igp offset);
mtu-discovery;
multihop {
  no-nexthop-change;
  ttl tvl-value;
}
no-aggregator-id;
no-client-reflect;
out-delay seconds;
outbound-route-filter {
  bgp-orf-cisco-mode;
  prefix-based {
    accept {
      inet;
      inet6;
    }
  }
}
passive;
path-selection {
  always-compare-med;
  as-path-ignore;
  cisco-non-deterministic;
  external-router-id;
  med-plus-igp {
    igp-multiplier number;
  }
}

```

```

        med-multiplier number;
    }
}
peer-as autonomous-system;
preference preference;
remove-private;
tcp-mss segment-size;
traceoptions {
    file filename <files number> <size maximum-file-size> <world-readable |
        no-world-readable>;
    flag flag <flag-modifier> <disable>;
}
tcp-aggressive-transmission;
vpn-apply-export;
}

bgp {
    family inet {
        (any | multicast) {
            ... statements in Common BGP Family Options on page 70 ...
        }
        flow {
            ... statements in Common BGP Family Options on page 70 PLUS ...
            no-validate [ validation-procedure-names ];
        }
        labeled-unicast {
            ... statements in Common BGP Family Options on page 70 PLUS ...
            add-path {
                receive;
                send {
                    path-count number;
                    prefix-policy [ policy-names ];
                }
            }
            aggregate-label {
                community community-name;
            }
            aigp [disable];
            explicit-null connected-only;
            per-group-label;
            per-prefix-label;
            protection;
            resolve-vpn;
            rib (inet.3 | inet6.3);
            traffic-statistics {
                file filename <files number> <size maximum-file-size> <world-readable |
                    no-world-readable>;
                interval seconds;
            }
        }
    }
    unicast {
        ... statements in Common BGP Family Options on page 70 PLUS ...
        add-path {
            receive;
            send {
                path-count number;
            }
        }
    }
}

```

```

        prefix-policy [ policy-names ];
    }
}
topology name {
    community target identifier;
}
}
}
}

bgp {
    family inet6 {
        (any | multicast) {
            ... statements in Common BGP Family Options on page 70 ...
        }
        labeled-unicast {
            ... statements in Common BGP Family Options on page 70 PLUS ...
            add-path {
                receive;
                send {
                    path-count number;
                    prefix-policy [ policy-names ];
                }
            }
            aggregate-label {
                community community-name;
            }
            aigp [disable];
            explicit-null;
            per-group-label;
            protection;
            traffic-statistics {
                file filename <files number> <size maximum-file-size> <world-readable |
                    no-world-readable>;
                interval seconds;
            }
        }
    }
    unicast {
        ... statements in Common BGP Family Options on page 70 PLUS ...
        topology name {
            community target identifier;
        }
    }
}

bgp {
    family (evpn | inet-mdt | inet-mvpn | inet6-mvpn | l2vpn) {
        auto-discovery-only; # for l2vpn
        signaling {
            ... statements in Common BGP Family Options on page 70 ...
        }
    }
}

bgp {

```



```

family inet-vpn {
  (any | multicast | unicast) {
    ... statements in Common BGP Family Options on page 70 PLUS ...
    aggregate-label <community community-name>;
  }
  flow {
    ... statements in Common BGP Family Options on page 70 ...
  }
}

bgp {
  family inet6-vpn {
    (any | multicast | unicast) {
      ... statements in Common BGP Family Options on page 70 PLUS ...
      aggregate-label <community community-name>;
    }
  }
}

bgp {
  family iso-vpn {
    unicast {
      ... statements in Common BGP Family Options on page 70 PLUS ...
      aggregate-label <community community-name>;
    }
  }
}

bgp {
  family route-target {
    accepted-prefix-limit {
      maximum number;
      teardown <percentage> <idle-timeout (forever | minutes)>;
    }
    advertise-default;
    external-paths number;
    prefix-limit {
      maximum number;
      teardown <percentage> <idle-timeout (forever | minutes)>;
    }
    proxy-generate <route-target-policy route-target-policy-name>;
  }
}

bgp {
  group group-name {
    ... same statements as at the [edit protocols bgp] hierarchy level PLUS ...
    allow [ all ip-prefix</prefix-length> ];
    as-override;
    multipath <multiple-as>;
    neighbor address {
      ... the neighbor subhierarchy appears after the main [edit protocols bgp group
        group-name] hierarchy ...
    }
    type (external | internal);
  }
}

```

```
... BUT NOT ...
disable; # NOT valid at this level
group group-name { ... } # NOT valid at this level
path-selection { ... } # NOT valid at this level
}

group group-name {
  neighbor address {
    ... same statements as at the [edit protocols bgp] hierarchy level PLUS ...
    as-override;
    multipath <multiple-as>;
    ... BUT NOT ...
    disable; # NOT valid at this level
    group group-name { ... } # NOT valid at this level
    neighbor address { ... } # NOT valid at this level
    path-selection { ... } # NOT valid at this level
  }
}
}
```

**Related  
Documentation**

- *Notational Conventions Used in Junos OS Configuration Hierarchies*
- *[edit protocols] Hierarchy Level*

## dvmrp

<b>Syntax</b>	<pre> dvmrp {   disable;   export [ <i>policy-names</i> ];   import [ <i>policy-names</i> ];   interface <i>interface-name</i> {     disable;     hold-time <i>seconds</i>;     metric <i>metric</i>;     mode (forwarding   unicast-routing);   }   rib-group <i>group-name</i>;   traceoptions {     file <i>filename</i> &lt;files <i>number</i>&gt; &lt;size <i>size</i>&gt; &lt;world-readable   no-world-readable&gt;;     flag <i>flag</i> &lt;flag-modifier&gt; &lt;disable&gt;;   } } </pre>
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols], [edit protocols]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 12.3R2 for EX Series switches.
<b>Description</b>	Enable DVMRP on the router or switch.
<b>Default</b>	DVMRP is disabled on the router or switch.
<b>Options</b>	The statements are explained separately.
<b>Required Privilege Level</b>	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <i>Example: Configuring DVMRP</i></li> </ul>

## igmp

```
Syntax  igmp {
        accounting;
        interface interface-name {
            disable;
            (accounting | no-accounting);
            group-limit limit;
            group-policy [ policy-names ];
            group-threshold
            immediate-leave;
            log-interval
            oif-map map-name;
            passive;
            promiscuous-mode;
            ssm-map ssm-map-name;
            ssm-map-policy ssm-map-policy-name;
            static {
                group multicast-group-address {
                    exclude;
                    group-count number;
                    group-increment increment;
                    source ip-address {
                        source-count number;
                        source-increment increment;
                    }
                }
            }
            version version;
        }
        query-interval seconds;
        query-last-member-interval seconds;
        query-response-interval seconds;
        robust-count number;
        traceoptions {
            file filename <files number> <size size> <world-readable | no-world-readable>;
            flag flag <flag-modifier> <disable>;
        }
    }
```

**Hierarchy Level** [edit logical-systems *logical-system-name* protocols],  
[edit protocols]

**Release Information** Statement introduced before Junos OS Release 7.4.  
Statement introduced in Junos OS Release 12.1 for the QFX Series.  
Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.  
Statement introduced in Junos OS Release 12.3R2 for EX Series switches.

**Description** Enable IGMP on the router or switch. IGMP must be enabled for the router or switch to receive multicast packets.

The remaining statements are explained separately.

<b>Default</b>	IGMP is disabled on the router or switch. IGMP is automatically enabled on all broadcast interfaces when you configure Protocol Independent Multicast (PIM) or Distance Vector Multicast Routing Protocol (DVMRP).
<b>Required Privilege Level</b>	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <i>Enabling IGMP</i></li> </ul>

## igmp-snooping

<b>Syntax</b>	<pre> igmp-snooping {   vlan <i>vlan-id</i> {     immediate-leave;     interface <i>interface-name</i> {       group-limit <i>limit</i>;       host-only-interface;       immediate-leave;       multicast-router-interface;       static {         group <i>ip-address</i> {           source <i>ip-address</i>;         }       }     }   }   proxy {     source-address <i>ip-address</i>;   }   query-interval <i>seconds</i>;   query-last-member-interval <i>seconds</i>;   query-response-interval <i>seconds</i>;   robust-count <i>number</i>; } </pre>
<b>Hierarchy Level</b>	[edit protocols]
<b>Release Information</b>	Statement introduced in Junos OS Release 8.5.
<b>Description</b>	Enable IGMP snooping on the router or switch.
<b>Default</b>	IGMP snooping is disabled on the router or switch.
<b>Options</b>	The statements are explained separately.
<b>Required Privilege Level</b>	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <i>Understanding IGMP Snooping</i></li> <li>• <i>IGMP Snooping in MC-LAG Active-Active Mode on MX Series Routers Overview</i></li> </ul>

## [edit protocols isis] Hierarchy Level

The following statement hierarchy can also be included at the **[edit protocols isis]** hierarchy level.

```

protocols {
  isis {
    disable;
    clns-routing;
    clns-updown-compatibility
    context-identifier ip-address</prefix> {
      level (1 | 2) <disable>;
    }
    export [ policy-names ];
    graceful-restart {
      disable;
      helper-disable;
      restart-duration seconds;
    }
    ignore-attached-bit;
    interface interface-name {
      ... the interface subhierarchy appears after the main [edit protocols isis] hierarchy ...
    }
    label-switched-path name level level metric metric;
    level (1 | 2) {
      disable;
      authentication-key key;
      authentication-type authentication;
      external-preference preference;
      no-csnp-authentication;
      no-hello-authentication;
      no-psnp-authentication;
      preference preference;
      prefix-export-limit number;
      wide-metrics-only;
    }
    loose-authentication-check;
    lsp-lifetime seconds;
    max-areas number;
    no-adjacency-holddown;
    no-authentication-check;
    no-ipv4-routing;
    no-ipv6-routing;
    overload {
      advertise-high-metrics;
      timeout seconds;
    }
    reference-bandwidth reference-bandwidth;
    rib-group {
      inet group-name;
      inet6 group-name;
    }
    spf-options {
      delay milliseconds;

```

```

        holddown milliseconds;
        rapid-runs number;
    }
    topologies {
        ipv4-multicast;
        ipv6-multicast;
        ipv6-unicast;
    }
    traceoptions {
        file filename <files number> <size maximum-file-size> <world-readable |
            no-world-readable>;
        flag flag <flag-modifier> <disable>;
    }
    traffic-engineering {
        disable;
        family inet {
            shortcuts {
                multicast-rpf-routes:
            }
        }
        family inet6 {
            shortcuts;
        }
    }
    ignore-lsp-metrics;
}

isis {
    interface interface-name {
        disable;
        bfd-liveness-detection {
            authentication {
                algorithm (keyed-md5 | keyed-sha-1 | meticulous-keyed-md5 |
                    meticulous-keyed-sha-1 | simple-password);
                key-chain key-chain-name;
                loose-check;
            }
            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);
        }
        checksum;
        csnp-interval (seconds | disable);
        hello-padding (adaptive | loose | strict);
        ldp-synchronization {
            disable;
            hold-time seconds;
        }
    }
}

```

```
    }
    level (1 | 2) {
        disable;
        hello-authentication-key key;
        hello-authentication-type authentication;
        hello-interval seconds;
        hold-time seconds;
        ipv4-multicast-metric number;
        ipv6-multicast-metric number;
        ipv6-unicast-metric number;
        metric metric;
        passive;
        priority number;
        te-metric metric;
    }
    link-protection;
    lsp-interval milliseconds;
    mesh-group (value | blocked);
    no-adjacency-down-notification;
    no-eligible-backup;
    no-ipv4-multicast;
    no-ipv6-multicast;
    no-ipv6-unicast;
    no-unicast-topology;
    node-link-protection;
    passive;
    point-to-point;
}
}
```

- Related Documentation**
- [Notational Conventions Used in Junos OS Configuration Hierarchies](#)
  - [\[edit protocols\] Hierarchy Level](#)

---

## [\[edit protocols l2-learning\] Hierarchy Level](#)

```
protocols {
  l2-learning {
    global-mac-limit {
      limit;
      packet-action drop;
    }
    global-mac-statistics;
    global-mac-table-aging-time seconds;
    global-no-mac-learning;
  }
}
```

- Related Documentation**
- [Notational Conventions Used in Junos OS Configuration Hierarchies](#)
  - [\[edit protocols\] Hierarchy Level](#)



## [edit protocols lacp] Hierarchy Level

The following statement hierarchy can also be included at the [edit logical-systems *logical-system-name*] hierarchy level.

```
protocols {
  lacp {
    traceoptions {
      file <filename> <files number> <match regular-expression> <size maximum-file-size>
      <world-readable | no-world-readable>;
      flag <flag>;
      no-remote-trace;
    }
    ppm (centralized | distributed)
  }
}
```

### Related Documentation

- *Notational Conventions Used in Junos OS Configuration Hierarchies*
- *[edit protocols] Hierarchy Level*

## [edit protocols layer2-control] Hierarchy Level

The following statement hierarchy can also be included at the [edit logical-systems *logical-system-name*] hierarchy level.

```
protocols {
  layer2-control {
    bpdu-block {
      disable-timeout <seconds>;
      interface [ <interface-names> ];
    }
    mac-rewrite {
      interface <interface-name> {
        enable-all-ifl;
        protocol {
          cdp;
          stp;
          vtp;
          pvstp;
        }
      }
    }
  }
  nonstop-bridging;
  traceoptions {
    file <filename> <files number> <size maximum-file-size> <world-readable |
    no-world-readable>;
    flag <flag> <disable>;
  }
}
```

- Related Documentation**
- *layer2-control*
  - *Notational Conventions Used in Junos OS Configuration Hierarchies*
  - *[edit protocols] Hierarchy Level*

---

## [edit protocols ldp] Hierarchy Level

The following statement hierarchy can also be included at the **[edit logical-systems *logical-system-name*]** hierarchy level.

```
protocols {
  ldp {
    (deaggregate | no-deaggregate);
    dod-request-policy [ policy-names ];
    egress-policy [ policy-names ];
    explicit-null;
    export [ policy-names ];
    graceful-restart {
      disable;
      helper-disable;
      maximum-neighbor-reconnect-time seconds;
      maximum-neighbor-recovery-time seconds;
      reconnect-time seconds;
      recovery-time seconds;
    }
    igp-synchronization holddown-interval seconds;
    import [ policy-names ];
    interface interface-name {
      (allow-subnet-mismatch | no-allow-subnet-mismatch);
      disable;
      hello-interval seconds;
      hold-time seconds;
      transport-address (interface | router-id);
    }
    keepalive-interval seconds;
    keepalive-timeout seconds;
    l2-smart-policy;
    log-updown {
      trap disable;
    }
    next-hop {
      merged {
        policy [ policy-names ];
      }
    }
    no-forwarding;
    oam {
      ... the oam subhierarchy appears after the main [edit protocols ldp] hierarchy ...
    }
    p2mp {
      root-address root-address{
        lsp-id id;
      }
    }
  }
}
```

```

}
policing {
    fec class-address {
        ingress-traffic filter-name;
        transit-traffic filter-name;
    }
}
preference preference;
session destination-address {
    authentication-algorithm algorithm;
    authentication-key key;
    authentication-key-chain key-chain;
    downstream-on-demand;
}
session-protection <timeout seconds>;
strict-targeted-hellos;
targeted-hello {
    hello-interval seconds;
    hold-time seconds;
}
traceoptions {
    file filename <files number> <size maximum-file-size> <world-readable |
        no-world-readable>;
    flag flag <flag-modifier> <disable>;
}
track-igp-metric;
traffic-statistics {
    file filename <files number> <size maximum-file-size> <world-readable |
        no-world-readable>;
    interval seconds;
    no-penultimate-hop;
}
transport-address (address | interface | router-id);
}

oam {
    bfd-liveness-detection {
        detection-time {
            threshold milliseconds;
        }
    }
    ecmp;
    failure-action (remove-nexthop | remove-route);
    holddown-interval milliseconds;
    minimum-interval milliseconds;
    minimum-receive-interval milliseconds;
    multiplier number;
    no-adaptation;
    transmit-interval {
        minimum-interval milliseconds;
        threshold milliseconds;
    }
    version (1 | automatic);
}
fec class-address {
    bfd-liveness-detection {

```

```
... same statements as at the [edit protocols ldp oam bfd-liveness-detection]
  hierarchy level ...
}
no-bfd-liveness-detection;
periodic-traceroute {
  ... same statements as at the [edit protocols ldp oam periodic-traceroute]
    hierarchy level PLUS ...
  disable;
}
}
ingress-policy [ policy-names ];
periodic-traceroute {
  exp cos-value;
  fanout next-hops;
  frequency minutes;
  paths number;
  retries number;
  source address;
  ttl number;
  wait seconds;
}
}
}
```

- Related Documentation**
- [Notational Conventions Used in Junos OS Configuration Hierarchies](#)
  - [\[edit protocols\] Hierarchy Level](#)

## lldp

<b>Syntax</b>	<pre> lldp {   advertisement-interval <i>seconds</i>;   disable;   hold-multiplier <i>number</i>;   interface (all   <i>interface-name</i>) {     disable;   }   lldp-configuration-notification-interval <i>seconds</i>;   management-address <i>ip-management-address</i>;   port-description-type {     interface-alias;     interface-description;   }   port-id-subtype {     interface-name;     locally-assigned;   }   ptopo-configuration-maximum-hold-time <i>seconds</i>;   ptopo-configuration-trap-interval <i>seconds</i>;   traceoptions {     file <i>filename</i> &lt;files <i>number</i>&gt; &lt;size <i>maximum-file-size</i>&gt; &lt;world-readable         no-world-readable&gt;;     flag <i>flag</i> &lt;disable&gt;;   }   transmit-delay <i>seconds</i>; } </pre>
<b>Hierarchy Level</b>	[edit protocols], [edit routing-instances <i>routing-instance-name</i> protocols]
<b>Release Information</b>	Statement introduced in Junos OS Release 9.6.
<b>Description</b>	Specify LLDP configuration parameters.
<b>Options</b>	The statements are explained separately.
<b>Required Privilege Level</b>	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <i>Configuring LLDP</i></li> </ul>

## mld

<b>Syntax</b>	<pre> mld {   accounting;   interface <i>interface-name</i> {     (accounting   no-accounting);     disable;     group-limit <i>limit</i>;     group-policy [ <i>policy-names</i> ];     immediate-leave;     oif-map [ <i>map-names</i> ];     passive;     ssm-map <i>ssm-map-name</i>;     ssm-map-policy <i>ssm-map-policy-name</i>;     static (Protocols MLD) {       group <i>multicast-group-address</i> {         exclude;         group-count <i>number</i>;         group-increment <i>increment</i>;         source <i>ip-address</i> {           source-count <i>number</i>;           source-increment <i>increment</i>;         }       }     }     version <i>version</i>;   }   maximum-transmit-rate <i>packets-per-second</i>;   query-interval <i>seconds</i>;   query-last-member-interval <i>seconds</i>;   query-response-interval <i>seconds</i>;   robust-count <i>number</i>; } </pre>
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols], [edit protocols]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4.
<b>Description</b>	Enable MLD on the routing device. MLD must be enabled for the routing device to receive multicast packets.
<b>Default</b>	MLD is disabled on the routing device. MLD is automatically enabled on all broadcast interfaces when you configure Protocol Independent Multicast (PIM) or Distance Vector Multicast Routing Protocol (DVMRP).
<b>Options</b>	The statements are explained separately.
<b>Required Privilege Level</b>	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.

Related Documentation

- [Enabling MLD](#)

## [edit protocols mpls] Hierarchy Level

- [Complete \[edit protocols mpls\] Hierarchy on page 89](#)

### Complete [edit protocols mpls] Hierarchy

The statement hierarchy listed in this section can also be included at the **[edit logical-systems *logical-system-name*]** hierarchy level.

```
protocols {
  mpls {
    disable;
    interface (interface-name | all) {
      always-mark-connection-protection-tlv;
      disable;
      admin-group [ group-names ];
      srlg srlg-name;
      static {
        protection-revert-time seconds;
      }
      switch-away-lsps;
    }
    egress-protection {
      context-identifier context-id {
        primary | protector;
        metric igp-metric-value;
        advertise-mode (stub-alias | stub-proxy);
      }
    }
    ipv6-tunneling;
    priority setup-priority hold-priority;
    traceoptions {
      file filename <files number> <size maximum-file-size> <world-readable |
        no-world-readable>;
      flag flag;
    }
  }
}
```

Related Documentation

- [Notational Conventions Used in Junos OS Configuration Hierarchies](#)
- [\[edit protocols\] Hierarchy Level](#)

## neighbor-discovery

---

**Syntax**    neighbor-discovery {  
              no-dad-on-state-change ;  
              onlink-subnet-only;  
              secure {  
                  security-level {  
                      (default | secure-messages-only);  
                  }  
                  cryptographic-address {  
                      key-length *number*;  
                      key-pair *pathname*;  
                  }  
                  timestamp {  
                      clock-drift *number*;  
                      known-peer-window *number*;  
                      new-peer-window *number*;  
                  }  
                  traceoptions {  
                      file *filename* <files *number*> <match *regular-expression*> <size *size*> <world-readable |  
                          no-world-readable>;  
                      flag *flag*;  
                      no-remote-trace;  
                  }  
              }  
          }

**Hierarchy Level**    [edit protocols]

**Release Information**    Statement introduced in Junos OS Release 9.3.  
                              Statement introduced in Junos OS Release 12.3R2 for EX Series switches.

**Description**    Enable Secure Neighbor Discovery.  
  
                      The remaining statements are explained separately.

**Default**    Disabled

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

**Related Documentation**    • *Example: Configuring Secure IPv6 Neighbor Discovery*



## oam

```

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

```

```

    }
  }
  traceoptions {
    file filename <files number> <match regex> <size size> <world-readable |
      no-world-readable>;
    flag flag ;
    no-remote-trace;
  }
}
link-fault-management {
  action-profile profile-name;
  action {
    syslog;
    link-down;
    send-critical-event
  }
  event {
    link-adjacency-loss;
    link-event-rate {
      frame-error count;
      frame-period count;
      frame-period-summary count;
      symbol-period count;
    }
  }
}
interface interface-name {
  link-discovery (active | passive);
  pdu-interval interval;
  pdu-threshold threshold-value;
  remote-loopback;
  event-thresholds {
    frame-error count;
    frame-period count;
    frame-period-summary count;
    symbol-period count;
  }
  negotiation-options {
    allow-remote-loopback;
    no-allow-link-events;
  }
}
traceoptions {
  file filename <files number> <match regex> <size size> <world-readable |
    no-world-readable>;
  flag flag ;
  no-remote-trace;
}
}
}

```

Hierarchy Level [edit protocols]

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

<b>Description</b>	Provide IEEE 802.3ah Operation, Administration, and Maintenance (OAM) link fault management (LFM) support for Ethernet interfaces on EX Series switches or configure connectivity fault management (CFM) for IEEE 802.1ag Operation, Administration, and Management (OAM) support on the switches.
	The remaining statements are explained separately.
<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>Example: Configuring Ethernet OAM Link Fault Management on EX Series Switches</i></li> <li>• <i>Example: Configuring Ethernet OAM Connectivity Fault Management on EX Series Switches</i></li> <li>• <i>Configuring Ethernet OAM Link Fault Management (CLI Procedure)</i></li> <li>• <i>Configuring Ethernet OAM Connectivity Fault Management (CLI Procedure)</i></li> </ul>

## [\[edit protocols ospf\] Hierarchy Level](#)

The following statement hierarchy can also be included at the **[edit logical-systems *logical-system-name*]** hierarchy level.

```

protocols {
  ospf {
    disable;
    area area-id {
      ... the area subhierarchy appears after the main [edit protocols ospf] hierarchy ...
    }
    backup-spf-options {
      disable;
      downstream-paths-only;
      no-install;
      node-link-degradation;
      per-prefix-calculation {
        all;
        externals;
        stubs;
        summary;
      }
      remote-backup-calculation;
    }
    database-protection {
      ignore-count number;
      ignore-time seconds;
      maximum-lsa number;
      reset-time seconds;
      warning-only;
      warning-threshold percent;
    }
    export [ policy-names ];
    external-preference preference;
    graceful-restart {
      disable;

```

```

    helper-disable <both | restart-signaling | standard>;
    no-strict-lsa-checking;
    notify-duration seconds;
    restart-duration seconds;
}
import [ policy-names ];
lsa-refresh-interval;
no-nssa-abr;
no-rfc-1583;
overload <timeout seconds>;
preference preference;
prefix-export-limit number;
reference-bandwidth reference-bandwidth;
rib-group group-name;
spf-options {
    delay milliseconds;
    holddown milliseconds;
    rapid-runs number;
}
topology (default | ipv4-multicast | name) {
    backup-spf-options {
        disable;
        downstream-paths-only;
        no-install;
        remote-backup-calculation;
    }
    overload;
    prefix-export-limit number;
    spf-options {
        delay milliseconds;
        holddown milliseconds;
        rapid-runs number;
    }
    topology-id number;
}
traceoptions {
    file filename <files number> <size maximum-file-size> <world-readable |
        no-world-readable>;
    flag flag <flag-modifier> <disable>;
}
traffic-engineering {
    advertise-unnumbered-interfaces;
    credibility-protocol-preference;
    ignore-lsp-metrics;
    multicast-rpf-routes;
    no-topology;
    shortcuts <lsp-metric-into-summary>;
}
}

ospf {
    area area-id {
        area-range ip-prefix </prefix-length> <exact> <override-metric metric> <restrict>;
        context-identifier identifier
        interface interface-name {

```

```

... the interface subhierarchy appears after the main [edit ospf area area-id] hierarchy
level ...
}
label-switched-path name {
  disable;
  metric metric;
  topology (name | default | ipv4-multicast) {
    disable;
    metric metric;
  }
}
network-summary-export [ policy-names ];
network-summary-import [ policy-names ];
nssa {
  area-range ip-prefix </prefix-length> <exact> <override-metric metric> <restrict>;
  default-lsa {
    default-metric metric;
    metric-type type;
    type-7;
  }
  (summaries | no-summaries);
}
peer-interface interface-name {
  disable;
  authentication {
    md5 key-id key key-string <start-time YYYY-MM-DD.hh:mm>;
    simple-password key-string;
  }
  dead-interval seconds;
  demand-circuit;
  flood-reduction;
  hello-interval seconds;
  no-neighbor-down-notification;
  retransmit-interval seconds;
  transit-delay seconds;
}
stub <default-metric metric> <summaries | no-summaries>;
virtual-link neighbor-id router-id transit-area area-id {
  disable;
  authentication {
    md5 key-id key key-string <start-time YYYY-MM-DD.hh:mm>;
    simple-password key-string;
  }
  dead-interval seconds;
  demand-circuit;
  flood-reduction;
  hello-interval seconds;
  ipsec-sa sa-name;
  no-neighbor-down-notification;
  retransmit-interval seconds;
  topology (name | default | ipv4-multicast) {
    disable;
    metric metric;
  }
  transit-delay seconds;
}

```

```

}

area area-id {
  interface interface-name {
    disable;
    authentication {
      md5 key-id key key-string <start-time YYYY-MM-DD.hh:mm>;
      simple-password key-string;
    }
    bandwidth-based-metrics {
      bandwidth value metric number;
    }
    bfd-liveness-detection {
      authentication {
        algorithm (keyed-md5 | keyed-sha-1 | meticulous-keyed-md5 |
          meticulous-keyed-sha-1 | simple-password);
        key-chain key-chain-name;
        loose-check;
      }
      detection-time {
        threshold milliseconds;
      }
      full-neighbors-only;
      minimum-interval milliseconds;
      minimum-receive-interval milliseconds;
      multiplier number;
      no-adaptation;
      transmit-interval {
        minimum-interval milliseconds;
        threshold milliseconds;
      }
      version (1 | automatic);
    }
    dead-interval seconds;
    demand-circuit;
    dynamic-neighbors;
    flood-reduction;
    hello-interval seconds;
    interface-type (nbma | p2mp | p2p);
    ipsec-sa sa-name;
    ldp-synchronization {
      disable;
      hold-time seconds;
    }
    (link-protection | node-link-protection);
    metric metric;
    neighbor address <eligible>;
    no-eligible-backup;
    no-eligible-remote-backup;
    no-interface-state-traps;
    no-neighbor-down-notification;
    passive {
      traffic-engineering {
        remote-node-id address;
      }
    }
  }
}

```

```

    poll-interval seconds;
    priority number;
    retransmit-interval seconds;
    secondary;
    te-metric metric;
    topology (name | default | ipv4-multicast) {
        disable;
        bandwidth-based-metrics {
            bandwidth value;
            metric number;
        }
        metric metric;
    }
    transit-delay seconds;
}
}
}
}

```

**Related  
Documentation**

- *Notational Conventions Used in Junos OS Configuration Hierarchies*
- *[edit protocols] Hierarchy Level*

## [\[edit protocols ospf3\] Hierarchy Level](#)

The following statement hierarchy can also be included at the **[edit logical-systems *logical-system-name*]** hierarchy level.

```

protocols {
  ospf3 {
    disable;
    area area-id {
      ... the area subhierarchy appears after the main [edit protocols ospf3] hierarchy ...
    }
    backup-spf-options {
      disable;
      downstream-paths-only;
      no-install;
      node-link-degradation;
      per-prefix-calculation {
        all;
        externals;
        stubs;
        summary;
      }
      remote-backup-calculation;
    }
    database-protection {
      ignore-count number;
      ignore-time seconds;
      maximum-lsa number;
      reset-time seconds;
      warning-only;
      warning-threshold percent;
    }
  }
}

```

```

export [ policy-names ];
external-preference preference;
graceful-restart {
    disable;
    helper-disable;
    no-strict-lsa-checking;
    notify-duration seconds;
    restart-duration seconds;
}
import [ policy-names ];
lsa-refresh-interval;
no-nssa-abr;
no-rfc-1583;
overload <timeout seconds>;
preference preference;
prefix-export-limit number;
realm (ipv4-multicast | ipv4-unicast | ipv6-multicast | ipv6-unicast) {
    ... the realm subhierarchies appear after the main [edit protocols ospf3] hierarchy ...
}
reference-bandwidth reference-bandwidth;
rib-group group-name;
spf-options {
    delay milliseconds;
    holddown milliseconds;
    no-ignore-our-externals;
    rapid-runs number;
}
traceoptions {
    file filename <files number> <size maximum-file-size> <world-readable |
        no-world-readable>;
    flag flag <flag-modifier> <disable>;
}
traffic-engineering {
    ignore-lsp-metrics;
    shortcuts <lsp-metric-into-summary>;
}
}

ospf3 {
    area area-id {
        area-range ip-prefix </prefix-length> <exact> <override-metric metric> <restrict>;
        inter-area-prefix-export [ policy-names ];
        inter-area-prefix-import [ policy-names ];
        interface interface-name {
            ... the interface subhierarchy appears after the main [edit ospf3 area area-id]
                hierarchy level ...
        }
        nssa {
            area-range ip-prefix </prefix-length> <exact> <override-metric metric> <restrict>;
            default-lsa {
                default-metric metric;
                metric-type type;
                type-7;
            }
            (summaries | no-summaries);
        }
    }
}

```



```

stub <default-metric metric> <summaries | no-summaries>;
virtual-link neighbor-id router-id transit-area area-id {
    disable;
    dead-interval seconds;
    demand-circuit;
    flood-reduction;
    hello-interval seconds;
    ipsec-sa sa-name;
    retransmit-interval seconds;
    transit-delay seconds;
}
}

area area-id {
    interface interface-name {
        disable;
        bandwidth-based-metrics {
            bandwidth value metric number;
        }
        bfd-liveness-detection {
            authentication {
                algorithm (keyed-md5 | keyed-sha-1 | meticulous-keyed-md5 |
                    meticulous-keyed-sha-1 | simple-password);
                key-chain key-chain-name;
                loose-check;
            }
            detection-time {
                threshold milliseconds;
            }
            full-neighbors-only;
            minimum-interval milliseconds;
            minimum-receive-interval milliseconds;
            multiplier number;
            no-adaptation;
            transmit-interval {
                minimum-interval milliseconds;
                threshold milliseconds;
            }
            version (1 | automatic);
        }
        dead-interval seconds;
        demand-circuit;
        flood-reduction;
        hello-interval seconds;
        interface-type (p2mp-over-lan | p2p);
        ipsec-sa sa-name;
        (link-protection | node-link-protection);
        metric metric;
        no-eligible-backup;
        no-eligible-remote-backup;
        own-router-lsa;
        passive {
            traffic-engineering {
                remote-node-id address;
            }
        }
    }
}

```

```

        priority number;
        retransmit-interval seconds;
        transit-delay seconds;
    }
}

ospf3 {
    realm (ipv4-multicast| ipv6-multicast) {
        ... same statements as at the [edit protocols ospf3] hierarchy level, EXCEPT FOR ...
        area area-id {
            interface interface-name {
                no-eligible-backup;  # NOT valid at this level
            }
            virtual-link { ... }  # NOT valid at this level
        }
        backup-spf-options { ... }  # NOT valid at this level
        realm realm-identifier { ... }  # NOT valid at this level
        traffic-engineering { ... }  # NOT valid at this level
    }
}

ospf3 {
    realm ipv4-unicast {
        ... same statements as at the [edit protocols ospf3] hierarchy level, PLUS ...
        area area-id {
            interface interface-name {
                ldp-synchronization {
                    disable;
                    hold-time seconds;
                }
            }
        }

        ... BUT NOT ...
        area area-id {
            virtual-link { ... }  # NOT valid at this level
        }
        realm realm-identifier { ... }  # NOT valid at this level
        traffic-engineering { ... }  # NOT valid at this level
    }
}

ospf3 {
    realm ipv6-unicast {
        disable;
        backup-spf-options {
            disable;
            downstream-paths-only;
            no-install;
        }
    }
}

```

- Related Documentation**
- *Notational Conventions Used in Junos OS Configuration Hierarchies*
  - *[edit protocols] Hierarchy Level*

## [edit protocols pim] Hierarchy Level

The following statement hierarchy can also be included at the **[edit logical-systems *logical-system-name*]** hierarchy level.

```
protocols {
  pim {
    disable;
    assert-timeout seconds;
    default-vpn-source {
      interface-name interface-name;
    }
    dense-groups {
      address <announce | reject>;
    }
    dr-election-on-p2p;
    export [ policy-names ];
    family (inet | inet6) {
      disable;
    }
    graceful-restart {
      disable;
      no-bidirectional-mode;
      restart-duration seconds;
    }
    import [ policy-names ];
    interface interface-name {
      ... the interface subhierarchy appears after the main [edit protocols pim] hierarchy ...
      family (inet | inet6) {
        disable;
      }
    }
    join-load-balance;
    join-prune-timeout seconds;
    nonstop-routing {
      disable;
    }
    override-interval milliseconds;
    propagation-delay milliseconds;
    reset-tracking-bit;
    rib-group {
      inet group-name;
      inet6 group-name;
    }
    rp {
      ... the rp subhierarchy appears after the main [edit protocols pim] hierarchy ...
    }
    sglimit {
      family (inet | inet6) {
        log-interval seconds;
      }
    }
  }
}
```

```

        maximum limit;
        threshold value;
    }
}
log-interval seconds;
maximum limit;
threshold value;
}
}
spt-threshold {
    infinity [ policy-names ];
}
traceoptions {
    file filename <files number> <size maximum-file-size> <world-readable |
        no-world-readable>;
    flag flag <flag-modifier> <disable>;
    flag (route | state) <flag-modifier> <disable> <filter <match-on prefix>
        <policy [ policy-names ]>>;
}
}

pim {
    interface interface-name {
        accept-remote-source;
        disable;
        bfd-liveness-detection {
            authentication {
                algorithm (keyed-md5 | keyed-sha-1 | meticulous-keyed-md5 |
                    meticulous-keyed-sha-1 | simple-password);
                key-chain key-chain-name;
                loose-check;
            }
            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);
        }
        bidirectional {
            df-election {
                backoff-period milliseconds;
                offer-period milliseconds;
                robustness-count number;
            }
        }
        family (inet | inet6) {
            disable;
        }
        hello-interval seconds;
    }
}

```

```

        bidirectional-sparse | bidirectional-sparse-dense mode (bidirectional-sparse |
            bidirectional-sparse-dense | dense | sparse | sparse-dense);
        neighbor-policy [ policy-names ];
        override-interval milliseconds;
        priority number;
        propagation-delay milliseconds;
        reset-tracking-bit;
        version (1 | 2);
    }
}

pim {
    rp {
        auto-rp {
            (announce | discovery | mapping);
            (mapping-agent-election | no-mapping-agent-election);
        }
        bidirectional {
            address address {
                group-ranges {
                    destination-ip-prefix</prefix-length>;
                }
                hold-time seconds;
                priority number;
            }
        }
        bootstrap {
            family (inet | inet6) {
                export [ policy-names ];
                import [ policy-names ];
                priority number;
            }
        }
        bootstrap-export [ policy-names ];
        bootstrap-import [ policy-names ];
        bootstrap-priority number;
        dr-register-policy [ policy-names ];
        embedded-rp {
            group-ranges {
                ip-prefix</prefix-length>;
            }
            maximum-rps limit;
        }
        group-rp-mapping {
            family (inet | inet6) {
                log-interval seconds;
                maximum limit;
                threshold value;
            }
        }
        log-interval seconds;
        maximum limit;
        threshold value;
    }
}
local {

```

```

... the local subhierarchy appears after the main [edit protocols pim rp] hierarchy ...
}
register-limit {
  family (inet | inet6) {
    log-interval seconds;
    maximum limit;
    threshold value;
  }
}
log-interval seconds;
maximum limit;
threshold value;
}
}
rp-register-policy [ policy-names ];
static {
  address address {
    group-ranges {
      ip-prefix</prefix-length>;
    }
    override;
    version (1 | 2);
  }
}
}
rp {
  local {
    disable;
    address address;
    family (inet | inet6) {
      disable;
      address address;
      anycast-pim {
        local-address address;
        rp-set {
          address address <forward-msdp-sa>;
        }
      }
      group-ranges {
        ip-prefix</prefix-length>;
      }
      hold-time seconds;
      override;
      priority number;
    }
    group-ranges {
      ip-prefix</prefix-length>;
    }
    hold-time seconds;
    override;
    priority number;
  }
}
}
}

```

- Related Documentation**
- *Notational Conventions Used in Junos OS Configuration Hierarchies*
  - *[edit protocols] Hierarchy Level*

## [edit protocols protection-group] Hierarchy Level

```

protocols {
  protection-group {
    ethernet-ring ring-name {
      ... the ethernet-ring subhierarchy appears after the main [edit protocols
      protection-group] hierarchy ...
    }
    guard-interval milliseconds;
    hold-interval milliseconds;
    restore-interval minutes;
    traceoptions {
      file filename <files number> <size maximum-file-size> <world-readable |
      no-world-readable>;
      flag flag;
    }
  }
}

protection-group {
  ethernet-ring ring-name {
    data-channel {
      vlan number;
    }
    east-interface {
      control-channel {
        interface-name;
        vlan number;
      }
      interface-none;
      ring-protection-link-end;
    }
    guard-interval milliseconds;
    hold-interval milliseconds;
    node-id mac-address;
    restore-interval minutes;
    ring-protection-link-owner;
    west-interface {
      control-channel {
        interface-name;
        vlan number;
      }
      interface-none;
      ring-protection-link-end;
    }
  }
}

```

- Related Documentation**
- *Notational Conventions Used in Junos OS Configuration Hierarchies*

- *[edit protocols] Hierarchy Level*

## **[edit protocols rip] Hierarchy Level**

The following statement hierarchy can also be included at the **[edit logical-systems *logical-system-name*]** hierarchy level.

```

protocols {
  rip {
    authentication-key password;
    authentication-type type;
    (check-zero | no-check-zero);
    graceful-restart {
      disable;
      restart-time seconds;
    }
    group group-name {
      ... the group subhierarchy appears after the main [edit protocols rip] hierarchy ...
    }
    holddown seconds;
    import [ policy-names ];
    message-size number;
    metric-in metric;
    receive (both | none | version-1 | version-2);
    rib-group group-name;
    route-timeout seconds;
    send (broadcast | multicast | none | version-1);
    traceoptions {
      file filename <files number> <size maximum-file-size> <world-readable |
        no-world-readable>;
      flag flag <flag-modifier> <disable>;
    }
    update-interval seconds;
  }
}

rip {
  group group-name {
    bfd-liveness-detection {
      authentication {
        algorithm (keyed-md5 | keyed-sha-1 | meticulous-keyed-md5 |
          meticulous-keyed-sha-1 | simple-password);
        key-chain key-chain-name;
        loose-check;
      }
      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);
  }
  demand-circuit;
  export [ policy-names ];
  import [ policy-names ];
  max-retrans-time seconds;
  metric-out metric;
  neighbor interface-name {
    ... the neighbor subhierarchy appears after the main [edit protocols rip group
      group-name] hierarchy level ...
  }
  preference preference;
  route-timeout seconds;
  update-interval seconds;
}

group group-name {
  neighbor neighbor-name {
    any-sender;
    authentication-key password;
    authentication-type type;
    bfd-liveness-detection {
      ... same statements as at the [edit protocols rip group group-name
        bfd-liveness-detection] hierarchy level ...
    }
    (check-zero | no-check-zero);
    demand-circuit;
    import [ policy-names ];
    max-retrans-time seconds;
    message-size number;
    metric-in metric;
    receive (both | none | version-1 | version-2);
    route-timeout seconds;
    send (broadcast | multicast | none | version-1);
    update-interval seconds;
  }
}
}
}

```

- Related Documentation**
- *Notational Conventions Used in Junos OS Configuration Hierarchies*
  - *[edit protocols] Hierarchy Level*

## [edit protocols ripng] Hierarchy Level

The following statement hierarchy can also be included at the **[edit logical-systems *logical-system-name*]** hierarchy level.

```

protocols {
  ripng {
    graceful-restart {
      disable;
      restart-time seconds;
    }
  }
}

```

```

}
group group-name {
  export [ policy-names ];
  import [ policy-names ];
  metric-out metric;
  neighbor neighbor-name {
    import [ policy-names ];
    metric-in metric;
    receive <none>;
    route-timeout seconds;
    send <none>;
    update-interval seconds;
  }
  preference number;
  route-timeout seconds;
  update-interval seconds;
}
holddown seconds;
import [ policy-names ];
metric-in metric;
receive <none>;
route-timeout seconds;
send <none>;
update-interval seconds;
traceoptions {
  file filename <files number> <size maximum-file-size> <world-readable |
    no-world-readable>;
  flag flag <flag-modifier> <disable>;
}
}
}

```

- Related Documentation**
- *Notational Conventions Used in Junos OS Configuration Hierarchies*
  - *[edit protocols] Hierarchy Level*

## [\[edit protocols router-advertisement\] Hierarchy Level](#)

The following statement hierarchy can also be included at the **[edit logical-systems *logical-system-name*]** hierarchy level.

```

protocols {
  router-advertisement {
    interface interface-name {
      current-hop-limit number;
      default-lifetime seconds;
      dns-server-address address;
      (link-mtu | no-link-mtu);
      (managed-configuration | no-managed-configuration);
      max-advertisement-interval seconds;
      min-advertisement-interval seconds;
      (other-stateful-configuration | no-other-stateful-configuration);
      prefix prefix {
        (autonomous | no-autonomous);
        (on-link | no-on-link);
      }
    }
  }
}

```

```

        preferred-lifetime seconds;
        valid-lifetime seconds;
    }
    reachable-time milliseconds;
    retransmit-timer milliseconds;
    virtual-router-only;
}
traceoptions {
    file filename <files number> <size maximum-file-size> <world-readable |
    no-world-readable>;
    flag flag;
}
}
}

```

**Related  
Documentation**

- *Example: Configuring IPv6 Interfaces and Enabling Neighbor Discovery*
- *Notational Conventions Used in Junos OS Configuration Hierarchies*
- *[edit protocols] Hierarchy Level*

## [edit protocols router-discovery] Hierarchy Level

The following statement hierarchy can also be included at the **[edit logical-systems *logical-system-name*]** hierarchy level.

```

protocols {
    router-discovery {
        disable;
        address address {
            (advertise | ignore);
            (broadcast | multicast);
            (ineligible | priority number);
        }
        interface interface-name {
            lifetime seconds;
            max-advertisement-interval seconds;
            min-advertisement-interval seconds;
        }
        traceoptions {
            file filename <files number> <size size> <world-readable | no-world-readable>;
            flag flag <flag-modifier> <disable>;
        }
    }
}
}

```

**Related  
Documentation**

- *Notational Conventions Used in Junos OS Configuration Hierarchies*
- *[edit protocols] Hierarchy Level*

## [edit protocols rstp] Hierarchy Level

The following statement hierarchy can also be included at the **[edit logical-systems *logical-system-name*]** hierarchy level.

```
protocols {
  rstp {
    disable;
    backup-bridge-priority priority;
    bpdu-block-on-edge;
    bpdu-destination-mac-address provider-bridge-group;
    bridge-priority priority;
    extended-system-id id;
    force-version stp;
    forward-delay seconds;
    hello-time seconds;
    interface interface-name {
      bpdu-timeout-action {
        alarm;
        block;
      }
      cost cost;
      edge;
      mode (point-to-point | shared);
      no-root-port;
      priority interface-priority;
    }
    max-age seconds;
    priority-hold-time seconds;
    system-id mac-address {
      ip-address ip-address </prefix-length>;
    }
    traceoptions {
      file filename <files number> <size maximum-file-size> <world-readable |
        no-world-readable>;
      flag flag <disable>;
    }
    vpls-flush-on-topology-change;
  }
}
```

- Related Documentation**
- *Notational Conventions Used in Junos OS Configuration Hierarchies*
  - *[edit protocols] Hierarchy Level*

---

## [edit protocols sap] Hierarchy Level

The following statement hierarchy can also be included at the [edit logical-systems *logical-system-name*] hierarchy level.

```
protocols {
  sap {
    disable;
    listen address <port port>;
  }
}
```

- Related Documentation**
- *Notational Conventions Used in Junos OS Configuration Hierarchies*
  - *[edit protocols] Hierarchy Level*

## [edit protocols vrrp] Hierarchy Level

The following statement hierarchy can also be included at the **[edit logical-systems *logical-system-name*]** hierarchy level.

```
protocols {
  vrrp {
    asymmetric-hold-time;
    delegate-processing;
    failover-delay milliseconds;
    global-advertisements-threshold advertisement-value;
    skew-timer-disable;
    startup-silent-period seconds;
    traceoptions {
      file <filename> <files number> <match regular-expression> <microsecond-stamp>
        <size maximum-file-size> <world-readable | no-world-readable>;
      flag flag;
      no-remote-trace;
    }
    version-3;
  }
}
```

### Related Documentation

- *Notational Conventions Used in Junos OS Configuration Hierarchies*
- *[edit protocols] Hierarchy Level*
- *Junos OS Hierarchy and RFC Reference*
- *Ethernet Interfaces Feature Guide for Routing Devices*
- *Junos OS Network Interfaces Library for Routing Devices*

## [edit protocols vstp] Hierarchy Level

The following statement hierarchy can also be included at the **[edit logical-systems *logical-system-name*]** hierarchy level.

```
protocols {
  vstp {
    disable;
    bpdu-block-on-edge;
    force-version stp;
    interface interface-name {
      access-trunk
      bpdu-timeout-action {
        alarm;
        block;
      }
      cost cost;
      edge;
      mode (point-to-point | shared);
      no-root-port;
      priority interface-priority;
    }
  }
}
```

```

    }
    priority-hold-time seconds;
    system-id mac-address {
        ip-address ip-address </prefix-length>;
    }
    vlan vlan-id {
        ... the vlan subhierarchy appears after the main [edit protocols vstp] hierarchy level ...
    }
    vpls-flush-on-topology-change;
}

vstp {
    vlan vlan-id {
        backup-bridge-priority priority;
        bridge-priority priority;
        forward-delay seconds;
        hello-time seconds;
        interface interface-name {
            ... same statements as at the [edit protocols vstp interface interface-name] hierarchy
            level ...
        }
        max-age seconds;
        traceoptions {
            file filename <files number> <size maximum-file-size> <world-readable |
            no-world-readable>;
            flag flag <disable>;
        }
    }
}
}
}

```

**Related  
Documentation**

- *Notational Conventions Used in Junos OS Configuration Hierarchies*
- *[edit protocols] Hierarchy Level*

## Layer 2 Routing Instances Configuration Hierarchy

Use the **vpls** routing instance type for point-to-multipoint LAN implementations between a set of sites in a VPN.

To configure routing instances for Layer 2 networks, include the following statements:

```

routing-instances {
    routing-instance-name {
        access {
            address-assignment {
                ... same statements as in the address-assignment subhierarchy in [edit access]
                Hierarchy Level ...
            }
            address-protection;
            description text;
            egress-protection {
                context-identifier context-id;
            }
            forwarding-options {

```

```

    ...forwarding-options...
}
instance-role role;
instance-type type;
interface interface-name;
l2-domain-id-for-l3 id;
l2vpn-id community;
layer3-domain-identifier identifier;
multicast-snooping-options {
    ... same statements as in [edit multicast-snooping-options] Hierarchy Level EXCEPT
    FOR ...
    traceoptions {...} # NOT valid at this level
}
no-irb-layer-2-copy;
no-local-switching;
no-vrf-advertise;
no-vrf-propagate-ttl;
pbb-options {
    default-bvlan bvlan;
    peer-instance instance;
    vlan-id vlan-id isid-list [ isid-numbers ]
}
protocols {
    ... the protocols subhierarchy appears after the main [edit routing-instances
    routing-instance-name] hierarchy ...
}
provider-tunnel {
    ... the provider-tunnel subhierarchy appears after the main [edit routing-instances
    routing-instance-name] hierarchy ...
}
route-distinguisher (as-number:number | ip-address:number);
routing-interface interface;
routing-options {
    ... the routing-options subhierarchy appears after the main [edit routing-instances
    routing-instance-name] hierarchy ...
}
service-groups {
    service-group-name {
        pbb-service-options {
            default-isid isid-number;
            isid isid-number vlan-id-list [ vlan-ids ];
            mac-address mac-address;
        }
        service-type type;
    }
}
switch-options {
    ... same statements as in [edit switch-options] Hierarchy Level ...
}
vlan-id (id | all | none);
vlan-model one-to-one;
vlan-tags outer <tpid.>vlan-id inner <tpid.>vlan-id;
\[edit vlans\] Hierarchy Level on page 149 {
    ... same statements as in [edit vlans] Hierarchy Level ...
}
vrf-advertise-selective {

```

```

        family {
            inet-mvpn;
            inet6-mvpn;
        }
    }
    vrf-export [ policy-names ];
    vrf-import [ policy-names ];
    vrf-propagate-ttl;
    vrf-table-label;
    vrf-target {
        export community-name;
        import community-name;
    }
    protocols {
        ... protocols-configuration ...
    }
    routing-options {
        ... routing-options-configuration ...
    }
    bridge-domains {
        bridge-domain-name {
            domain-type bridge;
            interface interface-name;
            routing-interface routing-interface-name;
            vlan-id (Bridge Domain or VLAN) (none | all | number);
            vlan-tags outer number inner number;
            bridge-options {
                interface-mac-limit limit {
                    packet-action drop;
                }
                interface interface-name {
                    interface-mac-limit limit {
                        packet-action drop;
                    }
                }
                mac-statistics;
                mac-table-size limit {
                    packet-action drop;
                }
                no-mac-learning;
                static-mac mac-address;
            }
        }
    }
}

```

With the exception of the **instance-type virtual-switch** statement (which configures a virtual-switch routing instance), you can include the statements at the following hierarchy levels:

- **[edit]**
- **[edit logical-systems *logical-system-name*]**



The **instance-type virtual-switch** statement is not supported at the **[edit logical-systems logical-system-name]** hierarchy level.

**Related  
Documentation**

- *Routing Instances Overview*
- *Layer 2 Routing Instance Types*
- *Configuring a Layer 2 Virtual Switch*
- *Configuring a Layer 2 Control Protocol Routing Instance*

## **[edit routing-options] Hierarchy Level**

Several statements in the **[edit routing-options]** hierarchy are valid at numerous locations within the hierarchy. To make the complete hierarchy easier to read, the repeated statements are listed in “[Common Routing Options](#)” on page 115 and that section is referenced at the appropriate locations in “[Complete \[edit routing-options\] Hierarchy](#)” on page 117.

- [Common Routing Options](#) on page 115
- [Complete \[edit routing-options\] Hierarchy](#) on page 117

## **Common Routing Options**

This section lists statements that are valid at the following hierarchy levels, and is referenced at those levels in “[Complete \[edit routing-options\] Hierarchy](#)” on page 117 instead of the statements being repeated.

- **[edit routing-options aggregate defaults]**
- **[edit routing-options aggregate route *ip-prefix* </prefix-length>]**
- **[edit routing-options generate defaults]**
- **[edit routing-options generate route *ip-prefix* </prefix-length>]**
- **[edit routing-options static defaults]**
- **[edit routing-options static route *ip-prefix* </prefix-length>]**

The common routing options are as follows:

```
(active | passive);
as-path {
    aggregator as-number address;
    atomic-aggregate;
    origin (egp | igp | incomplete);
    path path-identifier;
}
color metric <type metric-type>;
color2 metric <type metric-type>;
community [ community-id no-advertise no-export no-export-subconfed ];
metric metric <type metric-type>;
metric2 metric <type metric-type>;
metric3 metric <type metric-type>;
```

```
metric4 metric <type metric-type>;  
passive;  
preference preference-value <type metric-type>;  
preference2 preference-value <type metric-type>;  
tag metric <type metric-type>;  
tag2 metric <type metric-type>;
```

## Complete [edit routing-options] Hierarchy

The statement hierarchy in this section can also be included at the [edit logical-systems *logical-system-name*] hierarchy level.

```

routing-options {
  access {
    route ip-prefix</prefix-length> {
      metric metric;
      next-hop [ addresses ];
      preference preference-value;
      qualified-next-hop address;
      tag route-tag;
    }
  }
  access-internal {
    route ip-prefix</prefix-length> {
      next-hop [ addresses ];
      qualified-next-hop address;
      tag route-tag;
    }
  }
  admin-groups-extended group-name {
    group-value group-identifier;
  }
  admin-groups-extended-range {
    maximum maximum-number;
    minimum minimum-number;
  }
  aggregate {
    defaults {
      ... statements in Common Routing Options on page 115 PLUS ...
      (brief | full);
      discard;
    }
    route ip-prefix</prefix-length> {
      ... statements in Common Routing Options on page 115 PLUS ...
      (brief | full);
      discard;
      policy [ policy-names ];
    }
  }
  auto-export {
    disable;
    family inet {
      disable;
      flow {
        disable;
        rib-group rib-group;
      }
      multicast {
        disable;
        rib-group rib-group;
      }
      unicast {

```

```

        disable;
        rib-group rib-group;
    }
}
family inet6 {
    disable;
    multicast {
        disable;
        rib-group rib-group;
    }
    unicast {
        disable;
        rib-group rib-group;
    }
}
family iso {
    disable;
    unicast {
        disable;
        rib-group rib-group;
    }
}
traceoptions {
    file filename <files number> <size maximum-file-size> <world-readable |
        no-world-readable>;
    flag flag <flag-modifier> <disable>;
}
}
autonomous-system autonomous-system <asdot-notation> <loops number>;
no-bfd-triggered-local-repair;
bgp-orf-cisco-mode;
bmp {
    memory-limit bytes;
    station-address (ip-address | name);
    station-port-number port-number;
    statistics-timeout seconds;
}
confederation as-number members [ as-numbers ];
dynamic-tunnels tunnel-name {
    destination-networks prefix;
    gre;
    rsvp-te entry-name {
        destination-networks network-prefix;
        label-switched-path-template (Multicast) {
            default-template;
            template-name;
        }
    }
    source-address address;
}
fate-sharing {
    group group-name {
        cost value;
        from {
            address <to address>;
        }
    }
}

```

```

    }
  }
  flow {
    firewall-install-disable;
    route name {
      match {
        destination address;
        destination-port [ afs bgp biff bootpc bootps cmd cvspserver dhcp domain eklogin
          ekshell exec finger ftp ftp-data http https ident imap kerberos-sec klogin kpasswd
          krb-prop krbupdate kshell ldap ldp login mobileip-agent mobilip-mn msdp
          netbios-dgm netbios-ns netbios-ssn nfsd nntp ntalk ntp pop3 pptp printer radacct
          radius rip rkinit smtp snmp snmptrap snpp socks ssh sunrpc syslog tacacs
          tacacs-ds talk telnet tftp timed who xdmcp ];
        dscp [ code-points ];
        fragment [ don't-fragment first-fragment is-fragment last-fragment
          not-a-fragment ];
        icmp-code [ communication-prohibited-by-filtering destination-host-prohibited
          destination-host-unknown fragmentation-needed host-precedence-violation
          host-unreachable host-unreachable-for-tos ip-header-bad network-unreachable
          network-unreachable-for-tos port-unreachable precedence-cutoff-in-effect
          protocol-unreachable redirect-for-host redirect-for-network
          redirect-for-tos-and-host redirect-for-tos-and-net required-option-missing
          source-host-isolated source-route-failed ttl-eq-zero-during-reassembly
          ttl-eq-zero-during-transit ];
        icmp-type [ echo-reply echo-request info-reply info-request mask-reply
          mask-request parameter-problem redirect router-advertisement router-solicit
          source-quench time-exceeded timestamp timestamp-reply unreachable ];
        packet-length [ values ];
        port [ ... same values as for the preceding destination-port statement ... ];
        protocol [ ah esp gre icmp igmp ipip ospf pim rsvp sctp tcp udp ];
        source address;
        source-port [ ... same values as for the preceding destination-port statement ... ];
        tcp-flags [ ack fin push rst syn urgent ];
      }
      then {
        (accept | discard);
        community community-name;
        next-term;
        rate-limit value;
        routing-instance routing-instance-name;
        sample;
      }
    }
  }
  term order (legacy | standard);
  validation {
    traceoptions {
      file filename <files number> <size maximum-file-size> <world-readable |
        no-world-readable>;
      flag flag <flag-modifier> <disable>;
    }
  }
}
forwarding-table {
  chained-composite-next-hop {
    ingress {
      l3vpn {

```

```

        extended-space;
    }
}
export [ policy-name ];
(indirect-next-hop | no-indirect-next-hop);
(indirect-next-hop-change-acknowledgements |
    no-indirect-next-hop-change-acknowledgements);
krt-nexthop-ack-timeout interval;
unicast-reverse-path (active-paths | feasible-paths);
}
generate {
    defaults {
        ... statements in Common Routing Options on page 115 PLUS ...
        (brief | full);
        discard;
    }
    route ip-prefix</prefix-length> {
        ... statements in Common Routing Options on page 115 PLUS ...
        (brief | full);
        discard;
        policy [ policy-names ];
    }
}
graceful-restart {
    disable;
    restart-duration seconds;
}
host-fast-reroute {
    global-arp-prefix-limit number;
    global-supplementary-blackout-timer minutes;
}
instance-export [ policy-names ];
instance-import [ policy-names ];
interface interface-name { # In the routing-instance only
    arp-prefix-limit number;
    link-protection;
    supplementary-blackout-timer minutes;
}
interface-routes {
    family (inet | inet6) {
        export {
            lan;
            point-to-point;
        }
        import [ policy-names ];
    }
    rib-group {
        inet group-name;
        inet6 group-name;
    }
}
martians {
    ip-prefix</prefix-length> (exact | longer | orlonger |
        prefix-length-range /minimum-prefix-length–/maximum-prefix-length |
        through ip-prefix</prefix-length> | upto /prefix-length> <allow>;

```

```

}
maximum-paths path-limit <log-only | threshold value> <log-interval seconds>;
maximum-prefixes prefix-limit <log-only | threshold value> <log-interval seconds>;
med-igp-update-interval minutes;
multicast {
  ... the multicast subhierarchy appears after the main [edit routing-options] hierarchy ...
}
nonstop-routing;
options {
  mark seconds;
  syslog {
    level level;
    upto level;
  }
}
ppm {
  no-delegate-processing;
}
resolution {
  rib routing-table-name {
    import [ policy-names ];
    resolution-ribs [ routing-table-names ];
  }
  tracefilter [ filter-policy-names ];
  traceoptions {
    file filename <files number> <size maximum-file-size> <world-readable |
      no-world-readable>;
    flag flag <flag-modifier> <disable>;
  }
}
rib routing-table-name {
  access {
    ... same statements as at the [edit routing-options access] hierarchy level ...
  }
  access-internal {
    ... same statements as at the [edit routing-options access-internal] hierarchy level ...
  }
  aggregate {
    ... same statements as at the [edit routing-options aggregate] hierarchy level ...
  }
  generate {
    ... same statements as at the [edit routing-options generate] hierarchy level ...
  }
  martians {
    ip-prefix</prefix-length> (exact | longer | orlonger |
      prefix-length-range /minimum-prefix-length–/maximum-prefix-length |
      through ip-prefix</prefix-length> | upto /prefix-length) <allow>;
  }
  maximum-paths path-limit <log-only | threshold value> <log-interval seconds>;
  maximum-prefixes prefix-limit <log-only | threshold value> <log-interval seconds>;
  static {
    ... same statements as at the [edit routing-options static] hierarchy level ...
  }
}
rib-groups {
  group-name {

```

```

        export-rib table-name;
        import-policy [ policy-names ];
        import-rib [ table-names ];
    }
}
route-distinguisher-id address;
route-record;
router-id address;
source-routing {
    ip;
    ipv6;
}
srlg {
    srlg-name {
        srlg-cost srlg-cost;
        srlg-value srlg-value;
    }
}
static {
    ... the static subhierarchy appears after the main [edit routing-options] hierarchy ...
}
topologies {
    family (inet | inet6) {
        topology topology-name;
    }
}
traceoptions {
    file filename <files number> <size maximum-file-size> <world-readable |
        no-world-readable>;
    flag flag <disable>;
}
validation {
    group group-name {
        max-sessions number;
        session address {
            hold-time seconds;
            local-address local-ip-address;
            port port-number;
            preference number;
            record-lifetime seconds;
            refresh-time seconds;
        }
    }
}
notification-rib value;
static {
    record destination {
        maximum-length prefix-length {
            origin-autonomous-system as-number {
                validation-state (invalid | valid);
            }
        }
    }
}
}
traceoptions {
    file filename <files number> <size size> <world-readable | no-world-readable>;
    flag flag;
}

```



```

    }
  }
}

routing-options {
  multicast {
    asm-override-ssm;
    backup-pe-group group-name {
      backups [ addresses ];
      local-address address;
    }
    flow-map flow-map-name {
      bandwidth <bps> <adaptive>;
      forwarding-cache {
        timeout (never <non-discard-entry-only> | minutes);
      }
      policy [ policy-names ];
      redundant-sources [ addresses ];
    }
    forwarding-cache {
      family (inet | inet6) {
        threshold {
          log-warning value;
          suppress value <reuse value>;
        }
        threshold {
          log-warning value;
          suppress value <reuse value>;
        }
        timeout minutes;
      }
    }
    interface interface-name {
      maximum-bandwidth bps;
      no-qos-adjust;
      reverse-oif-mapping {
        no-qos-adjust;
      }
      subscriber-leave-timer seconds;
    }
  }
  pim-to-igmp-proxy {
    upstream-interface [ interface-names ];
  }
  pim-to-mld-proxy {
    upstream-interface [ interface-names ];
  }
  rpf-check-policy [ policy-names ];
  scope scope-name {
    interface [ interface-names ];
    prefix ip-prefix </prefix-length>;
  }
  scope-policy [ policy-names ];
  ssm-groups [ ip-prefix </prefix-length> ];
  ssm-map ssm-map-name {
    policy [ policy-names ];
    source [ addresses ];
  }
}

```

```

    traceoptions {
        file filename <files number> <size maximum-file-size> <world-readable |
            no-world-readable>;
        flag flag <disable>;
    }
}

routing-options {
    static {
        defaults {
            ... statements in Common Routing Options on page 115 PLUS ...
            (install | no-install);
            (readvertise | no-readvertise);
            (resolve | no-resolve);
            (retain | no-retain);
        }
        rib-group group-name;
        route destination-prefix {
            ... statements in Common Routing Options on page 115 PLUS ...
            backup-pe-group group-name;
            bfd-liveness-detection {
                detection-time {
                    threshold milliseconds;
                }
                holddown-interval milliseconds;
                local-address ip-address;
                minimum-interval milliseconds;
                minimum-receive-interval milliseconds;
                minimum-receive-ttl milliseconds;
                multiplier number;
                neighbor address;
                no-adaptation;
                transmit-interval {
                    minimum-interval milliseconds;
                    threshold milliseconds;
                }
                version (1 | automatic);
            }
            (discard | next-hop [ addresses ] | next-table address | receive | reject);
            (install | no-install);
            lsp-next-hop {
                metric metric;
                preference preference;
            }
            p2mp-lsp-next-hop lsp-name {
                metric metric;
                preference preference;
            }
            (readvertise | no-readvertise);
            (resolve | no-resolve);
            (retain | no-retain);
            static-lsp-next-hop lsp-name {
                metric metric;
                preference preference-value;
            }
        }
    }
}

```

```

    }
  }
}

```

**Related  
Documentation**

- *Notational Conventions Used in Junos OS Configuration Hierarchies*

## [edit security] Hierarchy Level

Each of the following topics lists the statements at a subhierarchy of the **[edit security]** hierarchy.

- [\[edit security alarms\] Hierarchy Level on page 125](#)
- [\[edit security authentication-key-chains\] Hierarchy Level on page 125](#)
- [\[edit security certificates\] Hierarchy Level on page 126](#)
- [\[edit security ike\] Hierarchy Level on page 126](#)
- [\[edit security ipsec\] Hierarchy Level on page 127](#)
- [\[edit security log\] Hierarchy Level on page 128](#)
- [\[edit security pki\] Hierarchy Level on page 128](#)
- [\[edit security ssh-known-hosts\] Hierarchy Level on page 129](#)
- [\[edit security traceoptions\] Hierarchy Level on page 129](#)

**Related  
Documentation**

- *Notational Conventions Used in Junos OS Configuration Hierarchies*

## [edit security alarms] Hierarchy Level

```

security {
  alarms {
    audible;
    potential-violation {
      policy;
      replay-attacks;
    }
  }
}

```

**Related  
Documentation**

- *Notational Conventions Used in Junos OS Configuration Hierarchies*
- [\[edit security\] Hierarchy Level on page 125](#)

## [edit security authentication-key-chains] Hierarchy Level

```

security {
  authentication-key-chains{
    key-chain key-chain-name}
    key key {

```

```
        secret secret-data;  
        start-time yyyy-mm-dd.hh:mm:ss;  
    }  
}
```

- Related Documentation**
- *Notational Conventions Used in Junos OS Configuration Hierarchies*
  - [\[edit security\] Hierarchy Level on page 125](#)

---

## [edit security certificates] Hierarchy Level

```
security {  
  certificates {  
    cache-size bytes;  
    cache-timeout-negative seconds;  
    certification-authority ca-profile-name {  
      ca-name ca-identity;  
      crl file-name;  
      encoding (binary | pem);  
      enrollment-url url-name;  
      file certificate-filename;  
      ldap-url url-name;  
    }  
    enrollment-retry attempts;  
    local certificate-filename {  
      certificate-key-string;  
      load-key-file URL key-filename;  
    }  
    maximum-certificates number;  
    path-length certificate-path-length;  
  }  
}
```

- Related Documentation**
- *Notational Conventions Used in Junos OS Configuration Hierarchies*
  - [\[edit security\] Hierarchy Level on page 125](#)

---

## [edit security ike] Hierarchy Level

```
security {  
  ike {  
    policy ike-peer-address {  
      description description;  
      encoding (binary | pem);  
      identity identity-name;  
      local-certificate certificate-filename;  
      local-key-pair private-public-key-file;  
      mode (aggressive | main);  
      pre-shared-key (ascii-text key | hexadecimal key);  
      proposals [ proposal-names ];  
    }  
    proposal ike-proposal-name {  
      authentication-algorithm (md5 | sha-256 | sha1);  
      authentication-method (dsa-signatures | pre-shared-keys | rsa-signatures);  
    }  
  }  
}
```

```

        description description;
        dh-group (group1 | group2 | group5);
        encryption-algorithm (3des-cbc | aes-128-cbc | aes-192-cbc | aes-256-cbc | des-cbc);
        lifetime-seconds seconds;
    }
}

```

**Related  
Documentation**

- *Notational Conventions Used in Junos OS Configuration Hierarchies*
- [\[edit security\] Hierarchy Level on page 125](#)

## [\[edit security ipsec\] Hierarchy Level](#)

```

security {
  ipsec {
    policy ipsec-policy-name {
      description text-description;
      perfect-forward-secrecy {
        keys (group1 | group14 | group2 | group5);
      }
      proposals [ proposal-names ];
    }
    proposal ipsec-proposal-name {
      authentication-algorithm (hmac-md5-96 | hmac-sha-256-128 | hmac-sha1-96);
      description text-description;
      encryption-algorithm (3des-cbc | aes-128-cbc | aes-192-cbc | aes-256-cbc | des-cbc);
      lifetime-seconds seconds;
      protocol (ah | bundle | esp);
    }
    security-association sa-name {
      description text-description;
      dynamic {
        ipsec-policy policy-name;
        replay-window-size (32 | 64);
      }
      manual {
        direction (bidirectional | inbound | outbound) {
          authentication {
            algorithm (hmac-md5-96 | hmac-sha1-96);
            key (ascii-text key | hexadecimal key);
          }
          auxiliary-spi spi-index;
          encryption {
            algorithm (3des-cbc | aes-128-cbc | aes-192-cbc | aes-256-cbc | des-cbc);
            key (ascii-text key | hexadecimal key);
          }
          protocol (ah | bundle | esp);
          spi spi-index;
          encryption {
            algorithm 3des-cbc;
            key ascii-text ascii-text-string;
          }
        }
      }
    }
  }
}

```

```
        mode (transport | tunnel);
    }
}
}
```

- Related Documentation**
- *Notational Conventions Used in Junos OS Configuration Hierarchies*
  - [\[edit security\] Hierarchy Level on page 125](#)

---

## [\[edit security log\] Hierarchy Level](#)

```
security {
  log {
    cache {
      exclude exclude-name {
        destination-address;
        destination-port;
        event-id;
        failure;
        interface-name;
        policy-name;
        process;
        protocol;
        source-address;
        source-port;
        success;
        username;
      }
      limit limit;
    }
  }
}
```

- Related Documentation**
- *Notational Conventions Used in Junos OS Configuration Hierarchies*
  - [\[edit security\] Hierarchy Level on page 125](#)

---

## [\[edit security pki\] Hierarchy Level](#)

```
security {
  pki {
    auto-re-enrollment {
      certificate-id certificate-id {
        ca-profile ca-profile-name;
        challenge-password password;
        re-enroll-trigger-time-percentage percentage;
        re-generate-keypair;
        validity-period days;
      }
    }
    ca-profile ca-profile-name {
      administrator {
        email-address email-address;
      }
      ca-identity ca-identifier;
      enrollment {
```

```

        retry attempts;
        retry-interval seconds;
        url url;
    }
    revocation-check {
        disable;
        crl {
            disable on-download-failure;
            refresh-interval hours;
            url url {
                password password;
            }
        }
    }
    routing-instance;
}
traceoptions {
    file <filename> <files number> <match regular-expression> <size maximum-file-size>
    <world-readable | no-world-readable>;
    flag flag;
}
}
}

```

- Related Documentation**
- *Notational Conventions Used in Junos OS Configuration Hierarchies*
  - [\[edit security\] Hierarchy Level on page 125](#)

## [\[edit security ssh-known-hosts\] Hierarchy Level](#)

```

security {
    ssh-known-hosts {
        fetch-from-server server-name;
        host hostname {
            dsa-key dsa-key;
            ecdsa-sha2-nistp256-key ecdsa-sha2-nistp256-key;
            ecdsa-sha2-nistp384-key ecdsa-sha2-nistp384-key;
            ecdsa-sha2-nistp521-key ecdsa-sha2-nistp521-key;
            rsa-key rsa-key;
            rsa1-key rsa1-key;
        }
        load-key-file key-file;
    }
}

```

- Related Documentation**
- *Notational Conventions Used in Junos OS Configuration Hierarchies*
  - [\[edit security\] Hierarchy Level on page 125](#)

## [\[edit security traceoptions\] Hierarchy Level](#)

```

security {
    traceoptions {
        file filename <files number> <size size>;
    }
}

```

```
    flag all;
    flag database;
    flag general;
    flag ike;
    flag parse;
    flag policy-manager;
    flag routing-socket;
    flag timer;
  }
}
```

- Related Documentation**
- *Notational Conventions Used in Junos OS Configuration Hierarchies*
  - [\[edit security\] Hierarchy Level on page 125](#)

---

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

```
snmp {
  client-list list-name {
    address {
      restrict;
    }
  }
  community community-name {
    authorization (read-only | read-write);
    client-list-name list-name;
    clients {
      address <restrict>;
    }
    logical-system logical-system-name {
      routing-instance instance-name;
    }
    routing-instance instance-name {
      client-list-name list-name;
      clients {
        address <restrict>;
      }
    }
  }
  view view-name;
}
contact contact-information;
description description;
engine-id {
  (local engine-id | use-default-ip-address | use-mac-address);
}
filter-duplicates;
filter-interfaces {
  interfaces
  all-internal-interfaces;
  interface 1;
  interface 2;
}
health-monitor {
  falling-threshold percentage;
  idp {
```



```

        falling-threshold;
        interval seconds;
        rising-threshold;
    }
    interval seconds;
    rising-threshold percentage;
}
interface [ interface-names ];
location location;
logical-system-trap-filter;
name system-name;
nonvolatile {
    commit-delay seconds;
}
rmon {
    alarm index {
        description description;
        falling-event-index index;
        falling-threshold integer;
        falling-threshold-interval seconds;
        interval seconds;
        request-type (get-next-request | get-request | walk-request);
        rising-event-index index;
        rising-threshold integer;
        sample-type (absolute-value | delta-value);
        startup-alarm (falling-alarm | rising-alarm | rising-or-falling alarm);
        syslog-subtag text-string;
        variable oid-variable;
    }
    event index {
        community community-name;
        description description;
        type (log | log-and-trap | none | snmptrap);
    }
    history index {
        bucket-size number;
        interface interface-name;
        interval seconds;
        owner owner-name;
    }
}
routing-instance-access {
    access-list {
        routing-instance-name <restrict>;
    }
}
traceoptions {
    file <files number> <match regular-expression> <size maximum-file-size>
        <world-readable | no-world-readable>;
    flag flag;
    no-remote-trace;
}
trap-group group-name {
    categories {
        authentication;
        chassis;
    }
}

```

```

    chassis-cluster;
    configuration;
    link;
    otn-alarms {
        alarm-name;
    }
    remote-operations;
    rmon-alarm;
    routing;
    services;
    sonet-alarms {
        alarm-name;
    }
    startup;
    vrrp-events;
}
destination-port port-number;
logical-system logical-system-name {
    routing-instance instance-name;
}
routing-instance instance-name;
targets {
    address;
}
version (all | v1 | v2);
}
trap-options {
    agent-address outgoing-interface;
    enterprise-oid;
    logical-system logical-system-name {
        routing-instance instance-name;
    }
    routing-instance instance-name {
        source-address (address | lo0);
    }
    source-address address;
}
v3 {
    ... the v3 subhierarchy appears after the main [edit snmp] hierarchy level ...
}
view view-name {
    oid object-identifier <exclude | include>;
}
}

snmp {
    v3 {
        notify name {
            tag tag-name;
            type (inform | trap);
        }
        notify-filter profile-name {
            oid oid <exclude | include>;
        }
        snmp-community community-index {
            community-name community-name;

```

```

context context-name;
security-name security-name;
tag tag-name;
}
target-address target-address-name {
    address address;
    address-mask address-mask;
    logical-system logical-system-name {
        routing-instance routing-instance-name;
    }
    port port-number;
    retry-count number;
    routing-instance routing-instance-name;
    tag-list tag-list;
    target-parameters parameter-name;
    timeout seconds;
}
target-parameters parameter-name {
    notify-filter profile-name;
    parameters {
        message-processing-model (v1 | v2c | v3);
        security-level (authentication | none | privacy);
        security-model (usm | v1 | v2c);
        security-name security-name;
    }
}
usm {
    local-engine {
        user username {
            authentication-md5 {
                authentication-password password;
            }
            authentication-none;
            authentication-sha {
                authentication-password password;
            }
            privacy-3des {
                privacy-password password;
            }
            privacy-aes128 {
                privacy-password password;
            }
            privacy-des {
                privacy-password password;
            }
            privacy-none;
        }
    }
    remote-engine engine-id {
        user username {
            authentication-md5 {
                authentication-password password;
            }
            authentication-none;
            authentication-sha {
                authentication-password password;
            }
        }
    }
}

```

```

    }
    privacy-3des {
        privacy-password password;
    }
    privacy-aes128 {
        privacy-password password;
    }
    privacy-des {
        privacy-password password;
    }
    privacy-none;
}
}
}
vacm {
    access {
        group group-name {
            context-prefix prefix {
                security-model (any | usm | v1 | v2c) {
                    security-level (authentication | none | privacy) {
                        context-match (exact | prefix);
                        notify-view view-name;
                        read-view view-name;
                        write-view view-name;
                    }
                }
            }
        }
    }
    default-context-prefix prefix {
        security-model (any | usm | v1 | v2c) {
            security-level (authentication | none | privacy) {
                context-match (exact | prefix);
                notify-view view-name;
                read-view view-name;
                write-view view-name;
            }
        }
    }
}
}
}
}
security-to-group {
    security-model (usm | v1 | v2c) {
        security-name security-name {
            group group-name;
        }
    }
}
}
}
}
}
}

```

**Related  
Documentation**

- *Notational Conventions Used in Junos OS Configuration Hierarchies*
- *Understanding the Integrated Local Management Interface*

## [edit switch-options] Hierarchy Level

```

switch-options {
  interface interface-name {
    interface-mac-limit {
      number-of-addresses;
      packet-action drop;
    }
    no-mac-learning;
  }
  interface-mac-limit {
    number-of-addresses;
    packet-action drop;
  }
  mac-statistics;
  mac-table-size {
    number-of-addresses;
    packet-action drop;
  }
  no-mac-learning;
  service-id number;
}

```

## [edit system] Hierarchy Level

```

system {
  accounting {
    destination {
      radius {
        server {
          server-address {
            accounting-port port-number;
            max-outstanding-requests
            port port-number;
            retry number;
            secret password;
            source-address address;
            timeout seconds;
          }
        }
      }
    }
  }
  tacplus {
    server {
      server-address {
        port port-number;
        secret password;
        single-connection;
        source-address address;
        timeout seconds;
      }
    }
  }
}
events [ change-log interactive-commands login ];

```

```

}
allow-6pe-traceroute;
allow-v4mapped-packets;
archival {
  configuration {
    archive-sites {
      ftp://<username>:<password>@<host>:<port>/<url-path>;
      scp://<username>:<password>@<host>:<port>/<url-path>;
    }
    transfer-interval interval;
    transfer-on-commit;
  }
}
arp {
  aging-timer minutes;
  gratuitous-arp-delay;
  gratuitous-arp-on-ifup;
  interfaces {
    logical-interface-name {
      aging-timer minutes;
    }
  }
  passive-learning;
  purging;
}
authentication-order [ authentication-methods ];
auto-configuration {
  traceoptions {
    file <filename> <files number> <match regular-expression> <size size>
      <world-readable | no-world-readable>;
    flag <all | auth | configuration | ;interfaces | io | rtsock | ui>
    level level;
    no-remote-trace;
  }
}
backup-router address <destination [ destination-addresses ]>;
commit {
  fast-synchronize;
  synchronize;
  server {
    commit-interval number;
    days-to-keep-error-logs number;
    maximum-aggregate-pool number;
    maximum-entries number;
    traceoptions {
      file <filename> <files number> <match regular-expression> <size size>
        <world-readable | no-world-readable>;
      flag <all | auth | configuration | ;interfaces | io | rtsock | ui>
      level level;
      no-remote-trace;
    }
  }
}
(compress-configuration-files | no-compress-configuration-files);
ddos-protection {
  global {

```

```

    disable-fpc;
    disable-logging;
    disable-routing-engine;
    flow-detection;
    flow-report-rate;
    violation-report-rate;
}
protocols protocol-group (aggregate | packet-type) {
    bandwidth packets-per-second;
    burst size;
    disable-fpc;
    disable-logging;
    disable-routing-engine;
    fpc {
        bandwidth-scale percentage;
        burst-scale percentage;
        disable-fpc;
    }
    priority level;
    recover-time seconds;
    flow-detection {
        flow-detect-time detect-period;
        no-flow-logging;
        timeout-active-flows enable-period;
        flow-level-bandwidth;
        flow-level-control (all | keep-all | police);
        flow-detection-mode (always-on | automatic | disabled);
        physical-interface;
        flow-recover-time recover-period;
        flow-timeout-time timeout-period;
        subscriber;
    }
}
}
traceoptions{
    file filename <files number> <match regular-expression> <size maximum-file-size>
        <world-readable | no-world-readable>;
    flag flag;
    level (all | error | info | notice | verbose | warning);
    no-remote-trace;
}
}
default-address-selection;
diag-port-authentication (encrypted-password "password" | plain-text-password);
dynamic-profile-options {
    versioning;
}
domain-name domain-name;
domain-search [ domain-list ];
donot-disable-ip6op-ondad;
extensions {
    providers {
        provider-id {
            license-type license deployment-scope [ deployments ];
        }
    }
}
resource-limits {

```

```

package package-name {
  resources {
    cpu {
      priority number;
      time seconds;
    }
    file {
      core-size bytes;
      open number;
      size bytes;
    }
    memory {
      data-size bytes;
      locked-in bytes;
      resident-set-size bytes;
      socket-buffers bytes;
      stack-size bytes;
    }
  }
}
process process-ui-name {
  resources {
    cpu {
      priority number;
      time seconds;
    }
    file {
      core-size bytes;
      open number;
      size bytes;
    }
    memory {
      data-size bytes;
      locked-in bytes;
      resident-set-size bytes;
      socket-buffers bytes;
      stack-size bytes;
    }
  }
}
}
fips {
  level level;
}
host-name hostname;
inet6-backup-router ipv6-address <destination address>;
internet-options {
  (gre-path-mtu-discovery | no-gre-path-mtu-discovery);
  icmpv4-rate-limit bucket-size number packet-rate rate;
  icmpv6-rate-limit bucket-size number packet-rate rate;
  (ipip-path-mtu-discovery | no-ipip-path-mtu-discovery);
  (ipv6-path-mtu-discovery | noipv6-path-mtu-discovery);
  ipv6-path-mtu-discovery-timeout;
  no-tcp-rfc1323-paws;
  no-tcp-rfc1323;
}

```



```

(path-mtu-discovery | no-path-mtu-discovery);
source-port upper-limit port-number;
(source-quench | no-source-quench);
tcp-drop-synfin-set;
}
kernel-replication;
license {
  autoupdate {
    url URL;
    password password;
  }
  renew before-expiration number;
  interval number
  traceoptions {
    file <filename> <files number> <size maximum-file-size> <world-readable |
      no-world-readable>;
    flag flag;
    no-remote-trace;
  }
}
location {
  altitude feet;
  building name;
  country-code code;
  floor number;
  hcoord horizontal-coordinate;
  lata service-area;
  latitude degrees;
  longitude degrees;
  npa-nxx number;
  postal-code postal-code;
  rack number;
  vcoord vertical-coordinate;
}
login {
  announcement "text";
  class class-name {
    access-end "hh<:mm:<ss>>";
    access-start "hh<:mm:<ss>>";
    allow-commands "regular-expression";
    ( allow-configuration | allow-configuration-regexps ) "regular expression 1" "regular
      expression 2";
    allowed-days [ sunday monday tuesday wednesday thursday friday saturday ];
    configuration-breadcrumbs;
    deny-commands "regular-expression";
    ( deny-configuration | deny-configuration-regexps ) "regular expression 1" "regular
      expression 2";
    idle-timeout minutes;
    logical-system logical-system-name;
    login-alarms;
    login-script filename;
    login-tip;
    permissions [ permissions ];
    security-role [ security-role ];
  }
  deny-sources (address address | apply-groups | apply-groups-except) ;
}

```

```

message "text";
password {
    change-type (character-sets | set-transitions);
    format (des | md5 | sha1);
    maximum-length length;
    minimum-changes number;
    minimum-length length;
    minimum-lower-cases number;
    minimum-nums number;
    minimum-punctuations number;
    minimum-upper-cases number;
}
retry-options {
    backoff-factor number;
    backoff-threshold number;
    maximum-time number;
    minimum-time number;
    tries-before-disconnect number;
}
user username {
    authentication {
        (encrypted-password "password" | plain-text-password);
        load-key-file filename;
        ssh-dsa "public-key" <from hostname>;
        ssh-ecdsa "public-key" <from hostname>;
        ssh-rsa "public-key" <from hostname>;
    }
    class class-name;
    full-name "complete-name";
    uid uid-value;
}
}
max-configurations-on-flash number;
mirror-flash-on-disk;
name-server {
    address;
}
nd-maxmcast-solicit
nd-retransmit-timer
no-multicast-echo;
no-neighbor-learn;;
no-ping-record-route;
no-ping-time-stamp;
no-redirects;
no-redirects-ipv6;
ntp {
    authentication-key key-number type md5 value password;
    boot-server address;
    broadcast <address> <key key-number> <ttl value> <version value>;
    broadcast-client;
    multicast-client <address>;
    peer address <key key-number> <prefer> <version value>;
    server address <key key-number> <prefer> <version value>;
    source-address source-address;
    trusted-key [ key-numbers ];
}

```

```

pic-console-authentication {
  (encrypted-password "encrypted-password" | plain-text-password);
}
ports {
  auxiliary {
    disable;
    insecure;
    type (ansi | small-xterm | vt100 | xterm);
    port-type (mini-usb | rj45);
  }
  console {
    disable;
    insecure;
    log-out-on-disconnect;
    type (ansi | small-xterm | vt100 | xterm);
  }
}
processes {
  process-name (enable | disable) failover (alternate-media | other-routing-engine);
  command path;
  timeout seconds;
}
proxy {
  password password;
  port port-number;
  server (hostname | ip-address);
  username username;
}
radius-options {
  attributes {
    nas-ip-address address;
  }
  password-protocol mschap-v2;
}
radius-server {
  server-address {
    accounting-port port-number;
    max-outstanding-requests number;
    port port-number;
    retry number;
    secret password;
    source-address source-address;
    timeout seconds;
  }
}
root-authentication {
  (encrypted-password "password" | plain-text-password);
  load-key-file filename;
  ssh-dsa "public-key" <from hostname>;
  ssh-ecdsa "public-key" <from hostname>;
  ssh-rsa "public-key" <from hostname>;
}
(saved-core-context | no-saved-core-context);
saved-core-files number;
scripts {

```

```
load-scripts-from-flash;
commit {
  allow-transients;
  direct-access;
  file filename.xml {
    checksum (md5 | sha-256 | sha1) hash;
    optional;
    refresh;
    refresh-from url;
    source url;
  }
  max-datasize
  refresh;
  refresh-from url;
  traceoptions {
    file <filename> <files number> <size maximum-file-size> <world-readable |
      no-world-readable>;
    flag flag;
    no-remote-trace;
  }
}
op {
  file filename.xml {
    arguments {
      argument-name {
        description descriptive-text;
      }
    }
    checksum (md5 | sha-256 | sha1) hash;
    command filename-alias;
    description descriptive-text;
    refresh;
    refresh-from url;
    source url;
  }
  max-datasize
  no-allow-url
  refresh;
  refresh-from url;
  traceoptions {
    file <filename> <files number> <size maximum-file-size> <world-readable |
      no-world-readable>;
    flag flag;
    no-remote-trace;
  }
}
}
static-host-mapping {
  hostname {
    alias [ aliases ];
    inet [ addresses ];
    inet6 [ addresses ];
    sysid system-identifier;
  }
}
syslog {
```

```

allow-duplicates;
archive <binary-data | no-binary-data> <files number> <size size> <world-readable |
  no-world-readable>;
console {
  any | authorization | change-log | conflict-log | daemon | dfc | external | firewall | ftp
    | interactive-commands | kernel | ntp | pfe | security | user) (alert | any | critical |
    emergency | error | info | none | notice | warning);
}
file filename {
  facility severity;
  allow-duplicates;
  any (alert | any | critical | emergency | error | info | none | notice | warning);
  archive <archive-sites {ftp-url <password password>}> <files number> <size size>
    <start-time "YYYY-MM-DD.hh:mm"> <transfer-interval minutes> <world-readable |
    no-world-readable>;
  authorization (alert | any | critical | emergency | error | info | none | notice | warning);
  change-log (alert | any | critical | emergency | error | info | none | notice | warning);
  conflict-log (alert | any | critical | emergency | error | info | none | notice | warning);
  daemon (alert | any | critical | emergency | error | info | none | notice | warning);
  dfc (alert | any | critical | emergency | error | info | none | notice | warning);
  explicit-priority;
  external (alert | any | critical | emergency | error | info | none | notice | warning);
  firewall (alert | any | critical | emergency | error | info | none | notice | warning);
  ftp (alert | any | critical | emergency | error | info | none | notice | warning);
  interactive-commands (alert | any | critical | emergency | error | info | none | notice
    | warning);
  kernel (alert | any | critical | emergency | error | info | none | notice | warning);
  match "regular-expression";
  ntp (alert | any | critical | emergency | error | info | none | notice | warning);
  pfe (alert | any | critical | emergency | error | info | none | notice | warning);
  security (alert | any | critical | emergency | error | info | none | notice | warning);
  structured-data {
    brief
  }
}
host (hostname | other-routing-engine | scc-master) {
  facility severity;
  authorization (alert | any | critical | emergency | error | info | none | notice | warning);
  change-log (alert | any | critical | emergency | error | info | none | notice | warning);
  conflict-log (alert | any | critical | emergency | error | info | none | notice | warning);
  daemon (alert | any | critical | emergency | error | info | none | notice | warning);
  dfc (alert | any | critical | emergency | error | info | none | notice | warning);
  explicit-priority;
  external (alert | any | critical | emergency | error | info | none | notice | warning);
  facility-override facility;
  firewall (alert | any | critical | emergency | error | info | none | notice | warning);
  ftp (alert | any | critical | emergency | error | info | none | notice | warning);
  interactive-commands (alert | any | critical | emergency | error | info | none | notice
    | warning);
  kernel (alert | any | critical | emergency | error | info | none | notice | warning);
  log-prefix string;
  match "regular-expression";
  ntp (alert | any | critical | emergency | error | info | none | notice | warning);
  pfe (alert | any | critical | emergency | error | info | none | notice | warning);
  security (alert | any | critical | emergency | error | info | none | notice | warning);
  source-address source-address;
  structured-data {

```

```

    brief
    user (username | *) {
    }
    log-rotate-frequency minutes;
    server;
    source-address address;
    time-format (year | millisecond | year millisecond);
    user (username | *) {
        facility severity;
        match "regular-expression";
    }
}
tacplus-options {
    (exclude-cmd-attribute | no-cmd-attribute-value);
    service-name service-name;
}
tacplus-server {
    server-address {
        port port-number;
        secret password;
        single-connection;
        source-address source-address;
        timeout seconds;
    }
}
time-zone (GMT | GMT+hour-offset | GMT-hour-offset | zone-name);
tracing destination-override syslog host address;
use-imported-time-zones;
}
}
system {
    services {
        database-replication {
            traceoptions {
                file <filename> <files number> <match regular-expression>
                <size maximum-file-size> <world-readable | no-world-readable>;
                flag flag;
                no-remote-trace;
            }
        }
    }
    dhcp-local-server {
        authentication {
            password password;
            username-include {
                circuit-type;
                delimiter delimiter-character;
                domain-name domain-name;
                logical-system-name;
                mac-address;
                option-60;
                option-82 <circuit-id> <remote-id>;
                routing-instance-name;
                user-prefix user-prefix;
            }
        }
    }
    OBSOLETE – duplicate-clients-on-interface;
}

```

```

dynamic-profile (profile-name | junos-default-profile) <aggregate-clients <merge |
  replace> | use-primary primary-profile-name>;
forward-snooped-clients (all-interfaces | configured-interfaces |
  non-configured-interfaces);
group group-name {
  dynamic-profile (profile-name | junos-default-profile) <aggregate-clients <merge |
    replace> | use-primary primary-profile-name>;
  interface interface-name {
    exclude;
    overrides {
      ...same statements as at the [edit system services dhcp-local-server overrides]
        hierarchy level ...
    }
    trace;
    upto upto-interface-name;
  }
}
overrides {
  client-discover-match <option60-and-option82>;
  interface-client-limit number;
  OBSOLETE - no-arp;
  process-inform {
    pool pool-name;
  }
}
pool-match-order {
  external-authority;
  ip-address-first;
  option-82;
}
reconfigure {
  attempts attempt-count;
  clear-on-abort;
  strict;
  timeout timeout-value;
  token token-value;
  trigger {
    radius-disconnect;
  }
}
}
dhcpv4-profiles profile-name {
  bind-interface interface-name;
  dead-server-retry-interval interval-in-seconds;
  dead-server-successive-retry-attempt number-of-attempts;
  dhcp-server-selection-algorithm (highest-priority-server | round-robin);
  lease-time time-in-seconds;
  pool-name pool-name;
  retransmission-attempt number-of-attempts;
  retransmission-interval interval-in-seconds;
  servers ip-address {
    priority value;
  }
}
}
dhcpv6-profiles profile-name {
  bind-interface interface-name;

```

```

        lease-time time-in-seconds;
        pool-name pool-name;
        retransmission-attempt number-of-attempts;
        retransmission-interval interval-in-seconds;
    }
}
finger {
    connection-limit limit;
    rate-limit limit;
}
flow-tap-dtcp {
    ssh {
        connection-limit limit;
        rate-limit limit;
    }
}
ftp {
    connection-limit limit;
    rate-limit limit;
}
local-policy-decision-function {
    statistics {
        aacl-statistics-profile profile-name {
            aacl-fields {
                address;
                all-fields;
                application;
                application-group;
                input-bytes;
                input-interface;
                input-packets;
                ipv6-address
                ipv6-prefix-length
                mask;
                output-bytes;
                output-packets;
                subscriber-name;
                timestamp;
                vrf-name;
            }
            file filename;
            record-type (delta | interim);
        }
        file filename {
            archive-sites {
                url;
            }
            files number;
            size bytes;
            transfer-interval minutes;
        }
        record-type (data | interim);
    }
}
traceoptions {
    file <filename> <files number> <match regular-expression>
        <size maximum-file-size> <world-readable | no-world-readable>;

```



```

        flag flag;
        no-remote-trace;
    }
}
netconf {
    ssh {
        connection-limit limit;
        port port;
        rate-limit limit;
    }
    traceoptions {
        file <filename> <files number> <match regular-expression> <size size>
            <world-readable | no-world-readable>;
        flag flag;
        no-remote-trace;
        on-demand;
    }
}
outbound-ssh {
    client client-id {
        address {
            port port-number;
            retry number;
            timeout seconds;
        }
        device-id device-id;
        keep-alive {
            retry number;
            timeout seconds;
        }
        reconnect-strategy (in-order | sticky);
        secret secret;
        services netconf;
    }
    traceoptions {
        file <filename> <files number> <match regular-expression>
            <size maximum-file-size> <world-readable | no-world-readable>;
        flag flag;
        no-remote-trace;
    }
}
resource-monitor {
    resource-category jtree {
        resource-type free-dwords {
            low-watermark number;
            high-watermark number;
        }
        resource-type free-pages {
            low-watermark number;
            high-watermark number;
        }
    }
}
no-throttle;
no-logging;
high-threshold number;
traceoptions {

```

```

        file filename <files number> <match regular-expression> <size maximum-file-size>
          <world-readable | no-world-readable>;
        flag flag;
        no-remote-trace;
      }
    }
  service-deployment {
    local-certificate certificate-name;
    servers {
      server-address {
        port port-number;
        security-options {
          (ssl3 | tls);
        }
        user username;
      }
    }
    source-address source-address;
    traceoptions {
      flag flag;
    }
  }
  ssh {
    ciphers [ cipher-1 cipher-2 cipher-3 ...]
    client-alive-count-max seconds;
    client-alive-interval seconds;
    connection-limit limit;
    hostkey-algorithm limit;
    key-exchange limit;
    macs limit;
    max-sessions-per-connection number;
    no-tcp-forwarding;
    protocol-version [v1 v2];
    rate-limit limit;
    root-login (allow | deny | deny-password);
  }
  subscriber-management {
    enforce-strict-scale-limit-license;
    gres-route-flush-delay;
    maintain-subscriber {
      interface-delete;
    }
    traceoptions {
      file filename <files number> <match regular-expression> <size maximum-file-size>
        <world-readable | no-world-readable>;
      flag flag;
      no-remote-trace;
    }
  }
  traceoptions {
    file filename <files number> <match regular-expression> <size maximum-file-size>
      <world-readable | no-world-readable>;
    flag flag;
    no-remote-trace;
  }
  telnet {

```

```

        connection-limit limit;
        rate-limit limit;
    }
    tftp-server {
        connection-limit limit;
        rate-limit limit;
    }
    xnm-clear-text {
        connection-limit limit;
        rate-limit limit;
    }
    xnm-ssl {
        connection-limit limit;
        local-certificate certificate-name;
        rate-limit limit;
        ssl-renegotiation ;
    }
}

```

Related Documentation • [Notational Conventions Used in Junos OS Configuration Hierarchies](#)

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

```

vlans {
    vlan-name {
        description text-description;
        domain-type bridge;
        forwarding-options {
            dhcp-security {
                arp-inspection;
            }
            group name {
                interface interface-name {
                    static-ip ip-address {
                        mac mac-address;
                    }
                }
            }
            overrides {
                no-option82;
                trusted;
                untrusted;
            }
        }
        ip-source-guard;
        no-dhcp-snooping;
        option-82 {
            circuit-id {
                prefix {
                    host-name;
                    logical-system-name;
                    routing-instance-name;
                }
            }
            use-interface-description (device | logical);
            use-vlan-id;
        }
    }
}

```

```

        remote-id {
            host-name;
            use-interface-description (device | logical);
            use-string string;
        }
        vendor-id {
            use-string string;
        }
    }
}
filter {
    input filter-name;
    output filter-name;
}
flood {
    input filter-name;
}
}
interface interface-name;
l3-interface interface-name;
mcae-mac-synchronize;
multicast-snooping-options {
    ... same statements as in multicast-snooping-options ...
}
no-irb-layer-2-copy;
service-id number;
switch-options {
    ... the switch-options subhierarchy appears after the main [edit vlans vlan-name]
    hierarchy ...
}
vlan-id (all | none | number);
vlan-id-list [ vlan-id-numbers ];
vlan-tags outer <tpid.>vlan-id <inner <tpid.>vlan-id>;
}

vlan-name {
    switch-options {
        interface interface-name {
            interface-mac-limit {
                limit;
                packet-action drop;
            }
            no-mac-learning;
            static-mac mac-address {
                vlan-id number;
            }
        }
    }
    interface-mac-limit {
        limit;
        packet-action drop;
    }
    mac-statistics;
    mac-table-size {
        number-of-addresses;
        packet-action drop;
    }
}

```

```
        no-mac-learning;  
    }  
}  

```



## PART 2

# Administration

- [Operational Commands on page 155](#)





## CHAPTER 2

# Operational Commands

- `set cli complete-on-space`
- `set cli directory`
- `set cli idle-timeout`
- `set cli prompt`
- `set cli restart-on-upgrade`
- `set cli screen-length`
- `set cli screen-width`
- `set cli terminal`
- `set cli timestamp`
- `show cli`
- `show cli authorization`
- `show cli directory`
- `show cli history`
- `start shell`

## set cli complete-on-space

---

<b>Syntax</b>	set cli complete-on-space (off   on)
<b>Release Information</b>	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches.
<b>Description</b>	Set the command-line interface (CLI) to complete a partial command entry when you type a space or a tab. This is the default behavior of the CLI.
<b>Options</b>	<b>off</b> —Turn off command completion. <b>on</b> —Allow either a space or a tab to be used for command completion.
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <i>CLI User Interface Overview</i></li><li>• <a href="#">show cli on page 165</a></li></ul>
<b>List of Sample Output</b>	<a href="#">set cli complete-on-space on page 156</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

## Sample Output

### set cli complete-on-space

In the following example, pressing the Spacebar changes the partial command entry from **com** to **complete-on-space**. The example shows how adding the keyword **off** at the end of the command disables command completion.

```
user@host> set cli com<Space>
user@host>set cli complete-on-space off
Disabling complete-on-space
```

## set cli directory

---

<b>Syntax</b>	set cli directory <i>directory</i>
<b>Release Information</b>	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches.
<b>Description</b>	Set the current working directory.
<b>Options</b>	<i>directory</i> —Pathname of the working directory.
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <i>CLI User Interface Overview</i></li><li>• <a href="#">show cli directory on page 171</a></li></ul>
<b>List of Sample Output</b>	<a href="#">set cli directory on page 157</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

#### set cli directory

```
user@host> set cli directory /var/home/regress
Current directory: /var/home/regress
```

## set cli idle-timeout

---

<b>Syntax</b>	set cli idle-timeout < <i>minutes</i> >
<b>Release Information</b>	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches.
<b>Description</b>	Set the maximum time that an individual session can be idle before the user is logged off the router or switch.
<b>Options</b>	<i>minutes</i> —(Optional) Maximum idle time. The range of values, in minutes, is 0 through 100,000. If you do not issue this command, and the user's login class does not specify this value, the user is never forced off the system after extended idle times. Setting the value to 0 disables the timeout.
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <i>CLI User Interface Overview</i></li><li>• <a href="#">show cli on page 165</a></li></ul>
<b>List of Sample Output</b>	<a href="#">set cli idle-timeout on page 158</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

#### set cli idle-timeout

```
user@host> set cli idle-timeout 60
Idle timeout set to 60 minutes
```

## set cli prompt

---

<b>Syntax</b>	set cli prompt <i>string</i>
<b>Release Information</b>	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches.
<b>Description</b>	Set the prompt so that it is displayed within the CLI.
<b>Options</b>	<i>string</i> —CLI prompt string. To include spaces in the prompt, enclose the string in quotation marks. By default, the string is <i>username@hostname</i> .
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <i>CLI User Interface Overview</i></li><li>• <a href="#">show cli on page 165</a></li></ul>
<b>List of Sample Output</b>	<a href="#">set cli prompt on page 159</a>
<b>Output Fields</b>	When you enter this command, the new CLI prompt is displayed.

### Sample Output

#### set cli prompt

```
user@host> set cli prompt lab1-router>
lab1-router>
```

## set cli restart-on-upgrade

---

<b>Syntax</b>	set cli restart-on-upgrade string (off   on)
<b>Release Information</b>	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches.
<b>Description</b>	For an individual session, set the CLI to prompt you to restart the router or switch after upgrading the software.
<b>Options</b>	<b>off</b> —Disables the prompt. <b>on</b> —Enables the prompt.
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <i>CLI User Interface Overview</i></li><li>• <a href="#">show cli on page 165</a></li></ul>
<b>List of Sample Output</b>	<a href="#">set cli restart-on-upgrade on page 160</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

#### set cli restart-on-upgrade

```
user@host> set cli restart-on-upgrade on
Enabling restart-on-upgrade
```

## set cli screen-length

---

<b>Syntax</b>	set cli screen-length <i>length</i>
<b>Release Information</b>	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches.
<b>Description</b>	Set terminal screen length.
<b>Options</b>	<i>length</i> —Number of lines of text that the terminal screen displays (0 through 10,000). The default is 24.
<b>Additional Information</b>	The point at which the ---( <b>more</b> )--- prompt appears on the screen is a function of this setting and the settings for the <b>set cli screen-width</b> and <b>set cli terminal</b> commands.
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <i>CLI User Interface Overview</i></li> <li>• <a href="#">set cli screen-width on page 162</a></li> <li>• <a href="#">set cli terminal on page 163</a></li> <li>• <a href="#">show cli on page 165</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">set cli screen-length on page 161</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

## Sample Output

### set cli screen-length

```
user@host> set cli screen-length 75
Screen length set to 75
```

## set cli screen-width

---

<b>Syntax</b>	set cli screen-width <i>width</i>
<b>Release Information</b>	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches.
<b>Description</b>	Set the terminal screen width.
<b>Options</b>	<i>width</i> —Number of characters (0 through 1024) in a line. The default is 80.
<b>Additional Information</b>	The point at which the ---( <b>more</b> )--- prompt appears on the screen is a function of this setting and the settings for the <b>set cli screen-length</b> and <b>set cli terminal</b> commands.
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <i>CLI User Interface Overview</i></li><li>• <a href="#">set cli screen-length on page 161</a></li><li>• <a href="#">set cli terminal on page 163</a></li><li>• <a href="#">show cli on page 165</a></li></ul>
<b>List of Sample Output</b>	<a href="#">set cli screen-width on page 162</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

#### set cli screen-width

```
user@host> set cli screen-width
Screen width set to 132
```



## set cli terminal

---

<b>Syntax</b>	<code>set cli terminal <i>terminal-type</i></code>
<b>Release Information</b>	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches.
<b>Description</b>	Set the terminal type.
<b>Options</b>	<p><b><i>terminal-type</i></b>—Type of terminal that is connected to the Ethernet management port:</p> <ul style="list-style-type: none"> <li>• <b>ansi</b>—ANSI-compatible terminal (80 characters by 24 lines)</li> <li>• <b>small-xterm</b>—Small xterm window (80 characters by 24 lines)</li> <li>• <b>vt100</b>—VT100-compatible terminal (80 characters by 24 lines)</li> <li>• <b>xterm</b>—Large xterm window (80 characters by 65 lines)</li> </ul>
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <i>CLI User Interface Overview</i></li> <li>• <a href="#">set cli screen-length on page 161</a></li> <li>• <a href="#">set cli screen-width on page 162</a></li> <li>• <a href="#">show cli on page 165</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">set cli terminal on page 163</a>
<b>Output Fields</b>	This command provides no output.


### Sample Output

`set cli terminal`

```
user@host> set cli terminal xterm
```

## set cli timestamp

---

<b>Syntax</b>	set cli timestamp (format <i>timestamp-format</i>   disable)
<b>Release Information</b>	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches.
<b>Description</b>	Set a timestamp for CLI output.
<b>Options</b>	<p><b>format <i>timestamp-format</i></b>—Set the date and time format for the timestamp. The timestamp format you specify can include the following placeholders in any order:</p> <ul style="list-style-type: none"><li>• <b>%m</b>—Two-digit month</li><li>• <b>%d</b>—Two-digit date</li><li>• <b>%T</b>—Six-digit hour, minute, and seconds</li></ul> <p><b>disable</b>—Remove the timestamp from the CLI.</p>
	<div><b>NOTE:</b> A timestamp is displayed by default when no command output is generated.</div>
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <i>CLI User Interface Overview</i></li><li>• <a href="#">show cli on page 165</a></li></ul>
<b>List of Sample Output</b>	<a href="#">set cli timestamp on page 164</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

## Sample Output

### set cli timestamp

```
user@host> set cli timestamp format '%m-%d-%T'
'04-21-17:39:13'
CLI timestamp set to: '%m-%d-%T'
```

## show cli

<b>List of Syntax</b>	<a href="#">Syntax on page 165</a> <a href="#">Syntax (QFX Series and OCX Series) on page 165</a>
<b>Syntax</b>	show cli
<b>Syntax (QFX Series and OCX Series)</b>	show cli <authorization> <directory> <history <i>count</i> >
<b>Release Information</b>	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches. Command introduced in Junos OS Release 11.1 for the QFX Series. Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
<b>Description</b>	Display configured CLI settings.
<b>Options</b>	This command has no options.
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<a href="#">show cli on page 166</a>
<b>Output Fields</b>	<a href="#">Table 3 on page 165</a> lists the output fields for the <b>show cli</b> command. Output fields are listed in the approximate order in which they appear.

**Table 3: show cli Output Fields**

Field Name	Field Description
CLI complete-on-space	Capability to complete a partial command entry when you type a space or a tab: <b>on</b> or <b>off</b> .
CLI idle-timeout	Maximum time that an individual session can be idle before the user is logged out from the router or switch. When this feature is enabled, the number of minutes is displayed. Otherwise, the state is <b>disabled</b> .
CLI restart-on-upgrade	CLI is set to prompt you to restart the router or switch after upgrading the software: <b>on</b> or <b>off</b> .
CLI screen-length	Number of lines of text that the terminal screen displays.
CLI screen-width	Number of characters in a line on the terminal screen.
CLI terminal	Terminal type.
CLI is operating in	Mode: <b>enhanced</b> .
CLI timestamp	Date and time format for the timestamp. If the timestamp is not set, the state is <b>disabled</b> .
CLI working directory	Pathname of the working directory.

## Sample Output

show cli

```
user@host> show cli
CLI complete-on-space set to on
CLI idle-timeout disabled
CLI restart-on-upgrade set to on
CLI screen-length set to 47
CLI screen-width set to 132
CLI terminal is 'vt100'
CLI is operating in enhanced mode
CLI timestamp disabled
CLI working directory is '/var/home/regress'
```

## show cli authorization

<b>Syntax</b>	show cli authorization
<b>Release Information</b>	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches. Command introduced in Junos OS Release 11.1 for the QFX Series. Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
<b>Description</b>	Display the permissions for the current user.
<b>Options</b>	This command has no options.
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<a href="#">show cli authorization on page 169</a>
<b>Output Fields</b>	<a href="#">Table 4 on page 167</a> lists the output fields for the <b>show cli authorization</b> command. In the table, all possible permissions are displayed and output fields are listed in alphabetical order.

**Table 4: show cli authorization Output Fields**

Field Name	Field Description
access	Can view access configuration information.
access-control	Can modify access configuration.
admin	Can view user account information.
admin-control	Can modify user account information.
clear	Can clear learned network information.
configure	Can enter configuration mode.
control	Can modify any configuration.
edit	Can edit configuration files.
field	Reserved for field (debugging) support.
firewall	Can view firewall configuration information.
firewall-control	Can modify firewall configuration information.
floppy	Can read from and write to removable media.
flow-tap	Can view flow-tap configuration information.

Table 4: show cli authorization Output Fields (*continued*)

Field Name	Field Description
<b>flow-tap-control</b>	Can configure flow-tap configuration information.
<b>idp-profiler-operation</b>	Can configure Profiler data.
<b>interface</b>	Can view interface configuration information.
<b>interface-control</b>	Can modify interface configuration information.
<b>maintenance</b>	Can perform system maintenance.
<b>network</b>	Can access the network by entering the <b>ping</b> , <b>ssh</b> , <b>telnet</b> , and <b>traceroute</b> commands.
<b>pgcp-session-mirroring</b>	Can view Packet Gateway Control Protocol session mirroring configuration.
<b>pgcp-session-mirroring-control</b>	Can modify Packet Gateway Control Protocol session mirroring configuration all-control.
<b>reset</b>	Can reset or restart interfaces and system processes.
<b>rollback</b>	Can roll back to previous configurations.
<b>routing</b>	Can view routing configuration information.
<b>routing-control</b>	Can modify routing configuration information.
<b>secret</b>	Can view passwords and authentication keys in the configuration.
<b>secret-control</b>	Can modify passwords and authentication keys in the configuration.
<b>security</b>	Can view security configuration information.
<b>security-control</b>	Can modify security configuration information.
<b>shell</b>	Can start a local shell.
<b>snmp</b>	Can view SNMP configuration information.
<b>snmp-control</b>	Can modify SNMP configuration information.
<b>system</b>	Can view system configuration information.
<b>system-control</b>	Can modify system configuration information.
<b>trace</b>	Can view trace file settings information.

Table 4: show cli authorization Output Fields (*continued*)

Field Name	Field Description
<b>trace-control</b>	Can modify trace file settings information.
<b>view</b>	Can view current values and statistics.
<b>view-configuration</b>	Can view all configuration information (not including secrets).

## Sample Output

### show cli authorization

```

user@host> show cli authorization
Current user: 'remote' login: 'user' class ''
Permissions:
  admin      -- Can view user accounts
  admin-control-- Can modify user accounts
  clear      -- Can clear learned network information
  configure  -- Can enter configuration mode
  control    -- Can modify any configuration
  edit       -- Can edit full files
  field      -- Special for field (debug) support
  floppy     -- Can read and write from the floppy
  interface  -- Can view interface configuration
  interface-control-- Can modify interface configuration
  network    -- Can access the network
  reset      -- Can reset/restart interfaces and daemons
  routing    -- Can view routing configuration
  routing-control-- Can modify routing configuration
  shell      -- Can start a local shell
  snmp       -- Can view SNMP configuration
  snmp-control-- Can modify SNMP configuration
  system     -- Can view system configuration
  system-control-- Can modify system configuration
  trace      -- Can view trace file settings
  trace-control-- Can modify trace file settings
  view       -- Can view current values and statistics
  maintenance -- Can become the super-user
  firewall   -- Can view firewall configuration
  firewall-control-- Can modify firewall configuration
  secret     -- Can view secret configuration
  secret-control-- Can modify secret configuration
  rollback   -- Can rollback to previous configurations
  security   -- Can view security configuration
  security-control-- Can modify security configuration
  access     -- Can view access configuration
  access-control-- Can modify access configuration
  view-configuration-- Can view all configuration (not including secrets)
  flow-tap   -- Can view flow-tap configuration
  flow-tap-control-- Can configure flow-tap service
Individual command authorization:
  Allow regular expression: none
  Deny regular expression: none
  Allow configuration regular expression: none
  Deny configuration regular expression: none

```





## show cli directory

<b>Syntax</b>	show cli directory
<b>Release Information</b>	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches. Command introduced in Junos OS Release 11.1 for the QFX Series. Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
<b>Description</b>	Display the current working directory.
<b>Options</b>	This command has no options.
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<a href="#">show cli directory on page 171</a>
<b>Output Fields</b>	<a href="#">Table 5 on page 171</a> lists the output fields for the <b>show cli directory</b> command. Output fields are listed in the approximate order in which they appear.

**Table 5: show cli directory Output Fields**

Field Name	Field Description
Current directory	Pathname of the current working directory.

## Sample Output

### show cli directory

```
user@host> show cli directory
Current directory: /var/home/regress
```

## show cli history

<b>Syntax</b>	<code>show cli history</code> <code>&lt;count&gt;</code>
<b>Release Information</b>	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches. Command introduced in Junos OS Release 11.1 for the QFX Series. Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
<b>Description</b>	Display a list of previous CLI commands.
<b>Options</b>	<b>none</b> —Display all previous CLI commands.  <b>count</b> —(Optional) Maximum number of commands to display.
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<a href="#">show cli history on page 172</a>
<b>Output Fields</b>	<a href="#">Table 6 on page 172</a> lists the output fields for the <b>show cli history</b> command. Output fields are listed in the approximate order in which they appear.

**Table 6: show cli history Output Fields**


Field Name	Field Description
<i>timestamp</i>	Time at which the command was entered.
<i>command-syntax</i>	Command that was entered.

## Sample Output

### show cli history

```
user@host> show cli history
11:14:14 -- show arp
11:22:10 -- show cli authorization
11:27:12 -- show cli history
```

## start shell

<b>Syntax</b>	start shell (csh   sh) <user <i>username</i> >
<b>Release Information</b>	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches. Command introduced in Junos OS Release 11.1 for the QFX Series. Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
<b>Description</b>	Exit from the CLI environment and create a UNIX-level shell. To return to the CLI, type <b>exit</b> from the shell.
<div>  <b>NOTE:</b> <ul style="list-style-type: none"> <li>To issue this command, the user must have the required login access privileges configured by including the <b>permissions</b> statement at the [edit <b>system login class</b> <i>class-name</i>] hierarchy level.</li> <li>UNIX wheel group membership or permissions are no longer required to issue this command.</li> </ul> </div>	
<b>Options</b>	<b>csh</b> —Create a UNIX C shell.  <b>sh</b> —Create a UNIX Bourne shell.  <b>user <i>username</i></b> —(Optional) Start the shell as another user.
<b>Additional Information</b>	When you are in the shell, the shell prompt has the following format: <i>username@hostname%</i> An example of the prompt is: root@host%
<b>Required Privilege Level</b>	shell and maintenance
<b>List of Sample Output</b>	<a href="#">start shell csh on page 173</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

## Sample Output

### start shell csh

```

user@host> start shell csh
%
exit
%
```

```
username@hostname% start shell sh
%

exit
user@host>
```