

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

## IS-IS Feature Guide for EX Series Switches

Release

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### Chapter 3

## Administration

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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.	user@host> <b>show chassis alarms</b>  No alarms currently active
<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 <i>metric</i>&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>(<i>string1</i>   <i>string2</i>   <i>string3</i>)</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.	
GUI Conventions		
Bold text like this	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 Partner Support Service support contract, or are covered under warranty, and need post-sales technical support, you can access our tools and resources online or open a case with JTAC.

- JTAC policies—For a complete understanding of our JTAC procedures and policies, review the *JTAC User Guide* located at <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.

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- 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

# Overview

- [Layer 3 Protocols on page 3](#)





## CHAPTER 1

# Layer 3 Protocols

- [Layer 3 Protocols Supported on EX Series Switches](#) on page 3
- [Layer 3 Protocols Not Supported on EX Series Switches](#) on page 4

### Layer 3 Protocols Supported on EX Series Switches

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EX Series switches support the Junos OS Layer 3 features and configuration statements listed in [Table 3](#) on page 3:

**Table 3: Supported Junos OS Layer 3 Protocol Statements and Features**

Protocol	Notes	For More Information
BGP	Fully supported.	<a href="#">Junos OS Routing Protocols Configuration Guide</a>
BFD	Fully supported.	<a href="#">Junos OS Routing Protocols Configuration Guide</a>
ICMP	Fully supported.	<a href="#">Junos OS Routing Protocols Configuration Guide</a>
IGMPv1, v2, and v3	Fully supported.	<a href="#">Junos OS Multicast Protocols Configuration Guide</a>
IS-IS	Supported, with the exceptions noted in “ <a href="#">Layer 3 Protocols Not Supported on EX Series Switches</a> ” on page 4.	<a href="#">Junos OS Routing Protocols Configuration Guide</a>
MLD	Fully supported (MLD versions 1 and 2).	<a href="#">Junos OS Multicast Protocols Configuration Guide</a>
MPLS	Supported, with the exceptions noted in “ <a href="#">Layer 3 Protocols Not Supported on EX Series Switches</a> ” on page 4.	<a href="#">Junos OS MPLS Applications Configuration Guide</a>
OSPFv1, v2 and v3	Supported, with the exceptions noted in “ <a href="#">Layer 3 Protocols Not Supported on EX Series Switches</a> ” on page 4.	<a href="#">Junos OS Routing Protocols Configuration Guide</a>
PIM	Fully supported.	<a href="#">Junos OS Multicast Protocols Configuration Guide</a>
PPM	Supported. See <i>EX Series Switch Software Features Overview</i> for specific platform information.	<a href="#">Junos OS Routing Protocols Configuration Guide</a>

Table 3: Supported Junos OS Layer 3 Protocol Statements and Features (*continued*)

Protocol	Notes	For More Information
RIP	Fully supported.	<a href="#">Junos OS Routing Protocols Configuration Guide</a>
RIPng	Fully supported.	<a href="#">Junos OS Routing Protocols Configuration Guide</a>
SNMP	Fully supported.	<a href="#">Junos OS Network Management Configuration Guide</a>
VRRP	Fully supported.	See <a href="#">Understanding VRRP on EX Series Switches</a> . See also <a href="#">Junos OS High Availability Guide</a> .

- Related Documentation**
- [Layer 3 Protocols Not Supported on EX Series Switches on page 4](#)
  - [EX Series Switch Software Features Overview](#)

## Layer 3 Protocols Not Supported on EX Series Switches

EX Series switches do not support the Junos OS Layer 3 protocols and features listed in [Table 4 on page 4](#):

Table 4: Junos OS Layer 3 Protocol Statements and Features That Are Not Supported

Feature	Configuration Statements Not Supported on EX Series Switches
DVMRP	<ul style="list-style-type: none"> <li>• <b>dvmp</b> and subordinate statements</li> </ul>
Flow aggregation (cflowd)	<ul style="list-style-type: none"> <li>• <b>cflow</b> and subordinate statements</li> </ul>
IPsec	<ul style="list-style-type: none"> <li>• <b>[edit services]</b> statements related to IPsec</li> </ul>
IS-IS: <ul style="list-style-type: none"> <li>• ES-IS</li> <li>• IPv6 in multicast routing protocols</li> </ul>	<ul style="list-style-type: none"> <li>• <b>clns-routing</b> statement</li> <li>• <b>ipv6-multicast</b> statement</li> <li>• <b>lsp-interval</b> statement</li> <li>• <b>label-switched-path</b> statement</li> <li>• <b>lsp-lifetime</b> statement</li> <li>• <b>te-metric</b> statement</li> </ul>
Logical routers	<ul style="list-style-type: none"> <li>• <b>logical-routers</b> and subordinate statements</li> </ul>

Table 4: Junos OS Layer 3 Protocol Statements and Features That Are Not Supported (*continued*)

Feature	Configuration Statements Not Supported on EX Series Switches
MPLS: <ul style="list-style-type: none"> <li>Fast Reroute (FRR)</li> <li>Label Distribution Protocol (LDP) (except on EX8200 switches)</li> <li>Layer 3 VPNs (except on EX8200 switches)</li> <li>Multiprotocol BGP (MP-BGP) for VPN-IPv4 family</li> <li>Pseudowire emulation (PWE3)</li> <li>Routing policy statements related to Layer 3 VPNs and MPLS (except on EX8200 switches)</li> <li>Virtual Private LAN Service (VPLS)</li> </ul>	<ul style="list-style-type: none"> <li><b>ldp</b> and all subordinate statements (except on EX8200 switches)</li> </ul>
Network Address Translation (NAT)	<ul style="list-style-type: none"> <li><b>nat</b> and subordinate statements</li> <li>Policy statements related to NAT</li> </ul>
OSPF	<ul style="list-style-type: none"> <li><b>demand-circuit</b> statement</li> <li><b>label-switched-path</b> and subordinate statements</li> <li><b>neighbor</b> statement within an OSPF area</li> <li><b>peer-interface</b> and subordinate statements within an OSPF area</li> <li><b>sham-link</b> statement</li> <li><b>te-metric</b> statement</li> </ul>
PPM	<ul style="list-style-type: none"> <li>Not supported on EX2200 and EX3300 switches</li> </ul>
Routing instances: <ul style="list-style-type: none"> <li>Routing instance forwarding</li> </ul>	<ul style="list-style-type: none"> <li><b>l2vpn</b> and subordinate statements (except on EX4500, EX4550, and EX8200 switches)</li> <li><b>ldp</b> and subordinate statements (except on EX8200 switches)</li> <li><b>vpls</b> and subordinate statements</li> </ul>
Routed VLAN interfaces (RVIs)	<ul style="list-style-type: none"> <li><b>family mpls</b> statement</li> </ul>
SAP and SDP	<ul style="list-style-type: none"> <li><b>sap</b> and all subordinate statements</li> </ul>
General routing options in the <b>routing-options</b> hierarchy: <ul style="list-style-type: none"> <li>MPLS and label-switched-paths</li> </ul>	<ul style="list-style-type: none"> <li><b>auto-export</b> and subordinate statements</li> <li><b>dynamic-tunnels</b> and subordinate statements</li> <li><b>lsp-next-hop</b> and subordinate statements</li> <li><b>multicast</b> and subordinate statements</li> <li><b>p2mp-lsp-next-hop</b> and subordinate statements</li> <li><b>route-distinguisher-id</b> statement (except on EX8200 switches)</li> </ul>

**Table 4: Junos OS Layer 3 Protocol Statements and Features That Are Not Supported (*continued*)**

Feature	Configuration Statements Not Supported on EX Series Switches
Traffic sampling and forwarding in the <b>forwarding-options</b> hierarchy	<ul style="list-style-type: none"> <li>• <b>accounting</b> and subordinate statements</li> <li>• <b>family mpls</b> and <b>family multiservice</b> under <b>hash-key</b> hierarchy</li> <li>• Under <b>monitoring group-name</b> family inet output hierarchy: <ul style="list-style-type: none"> <li>• <b>cflowd</b> statement</li> <li>• <b>export-format-cflowd-version-5</b> statement</li> <li>• <b>flow-active-timeout</b> statement</li> <li>• <b>flow-export-destination</b> statement</li> <li>• <b>flow-inactive-timeout</b> statement</li> <li>• <b>interface</b> statement</li> </ul> </li> <li>• <b>port-mirroring</b> statement (On EX Series switches, port mirroring is implemented using the <b>analyzer (Port Mirroring)</b> statement.)</li> <li>• <b>sampling</b> and subordinate statements</li> </ul>

- Related Documentation**
- [Layer 3 Protocols Supported on EX Series Switches on page 3](#)
  - [EX Series Switch Software Features Overview](#)

## PART 2

# Configuration

- [Configuration Statements on page 9](#)



## CHAPTER 2

# Configuration Statements

- [\[edit protocols isis\] Configuration Statement Hierarchy on EX Series Switches on page 10](#)
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- [metric \(Protocols IS-IS\)](#) on page 46
- [no-adjacency-holddown](#) on page 47
- [no-authentication-check](#) on page 48
- [no-csnp-authentication](#) on page 48
- [no-eligible-backup \(Protocols IS-IS\)](#) on page 49
- [no-hello-authentication](#) on page 49
- [no-ipv4-multicast](#) on page 50
- [no-ipv4-routing](#) on page 51
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- [node-link-protection \(Protocols IS-IS\)](#) on page 56
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- [reference-bandwidth \(Protocols IS-IS\)](#) on page 65
- [rib-group \(Protocols IS-IS\)](#) on page 66
- [spf-options \(Protocols IS-IS\)](#) on page 67
- [topologies \(Protocols IS-IS\)](#) on page 68
- [traceoptions \(Protocols IS-IS\)](#) on page 69
- [wide-metrics-only](#) on page 72

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## [\[edit protocols isis\] Configuration Statement Hierarchy on EX Series Switches](#)

This topic lists supported and unsupported configuration statements in the **[edit protocols isis]** hierarchy level on EX Series switches.

- *Supported* statements are those that you can use to configure some aspect of a software feature on the switch.



- *Unsupported* statements are those that appear in the command-line interface (CLI) on the switch, but that have no effect on switch operation if you configure them.
- Not all features are supported on all switch platforms. For detailed information about feature support on specific EX Series switch platforms, see *EX Series Switch Software Features Overview*.

This topic lists:

- [Supported Statements in the \[edit protocols isis\] Hierarchy Level on page 11](#)
- [Unsupported Statements in the \[edit protocols isis\] Hierarchy Level on page 13](#)

## Supported Statements in the [edit protocols isis] Hierarchy Level

The following hierarchy shows the [edit protocols isis] configuration statements supported on EX Series switches.

```

protocols {
  isis {
    disable;
    export [ policy-names ];
    graceful-restart {
      disable;
      helper-disable;
      restart-duration seconds;
    }
    ignore-attached-bit;
    interface interface-name {
      bfd-liveness-detection {
        authentication {
          algorithm (keyed-md5 | keyed-sha-1 | meticulous-keyed-md5 |
            meticulous-keyed-sha-1 | simple-password);
          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 (0 | 1 | automatic);
      }
      checksum;
      csnp-interval (seconds | disable);
      disable;
      hello-padding (adaptive | loose | strict);
      disable;
    }
    level (1 | 2) {
      disable;
    }
  }
}

```

```
hello-authentication-key key;  
hello-authentication-key-chain;  
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;  
}  
link-protection;  
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;  
}  
level (1 | 2) {  
    authentication-key key;  
    authentication-type authentication;  
    disable;  
    external-preference preference;  
    no-csnp-authentication;  
    no-hello-authentication;  
    no-psnp-authentication;  
    preference preference;  
    prefix-export-limit number;  
    wide-metrics-only;  
}  
loose-authentication-check;  
max-areas number;  
no-adjacency-holddown;  
no-authentication-check;  
no-ipv4-routing;  
no-ipv6-routing;  
overload {  
    advertise-high-metrics;  
    allow-route-leaking;  
    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>;
    }
}
}

```

### Unsupported Statements in the [edit protocols isis] Hierarchy Level


All statements in the [edit protocols isis] hierarchy level that are displayed in the command-line interface (CLI) on the switch are supported on the switch and operate as documented with the following exceptions:

**Table 5: Unsupported [edit protocols isis] Configuration Statements on EX Series Switches**

Statement	Hierarchy
<b>NOTE:</b> Variables, such as <i>filename</i> , are not shown in the statements or hierarchies.	
authentication-key-chain	[edit protocols isis level<1   2>]
lsp-interval	[edit protocols isis interface]
lsp-lifetime	[edit protocols isis]
key-chain	[edit protocols isis interface bfd-liveness-detection authentication]

- Related Documentation**
- *IS-IS Feature Guide for Routing Devices*
  - *[edit protocols] Configuration Statement Hierarchy on EX Series Switches*

## authentication-key (Protocols IS-IS)

<b>Syntax</b>	authentication-key <i>key</i> ;
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols isis <b>level</b> <i>level-number</i> ], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols isis <b>level</b> <i>level-number</i> ], [edit protocols isis <b>level</b> <i>level-number</i> ], [edit routing-instances <i>routing-instance-name</i> protocols isis <b>level</b> <i>level-number</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 12.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
<b>Description</b>	<p>Authentication key (password). Neighboring routing devices use the password to verify the authenticity of packets sent from this interface. For the key to work, you also must include the <b>authentication-type</b> statement.</p> <p>All routing devices must use the same password. If you are using the Junos OS IS-IS software with another implementation of IS-IS, the other implementation must be configured to use the same password for the domain, the area, and all interfaces adjacent to the Juniper Networks routing device.</p>
<b>Default</b>	If you do not include this statement and the <b>authentication-type</b> statement, IS-IS authentication is disabled.
<b>Options</b>	<b>key</b> —Authentication password. The password can be up to 1024 characters long. Characters can include any ASCII strings. If you include spaces, enclose all characters in quotation marks (" ").
<div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p><b>CAUTION:</b> A simple password for authentication is truncated if it exceeds 254 characters.</p> </div> </div>	
<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 Hitless Authentication Key Rollover for IS-IS</i></li> <li><i>Example: Configuring Hitless Authentication Key Rollover for IS-IS</i></li> </ul>

## authentication-type (Protocols IS-IS)

<b>Syntax</b>	<code>authentication-type <i>authentication</i>;</code>
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols isis <a href="#">level level-number</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols isis <a href="#">level level-number</a>],</p> <p>[edit protocols isis <a href="#">level level-number</a>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols isis <a href="#">level level-number</a>]</p>
<b>Release Information</b>	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
<b>Description</b>	Enable authentication and specify the authentication scheme for IS-IS. If you enable authentication, you must specify a password by including the <b>authentication-key</b> statement.
<b>Default</b>	If you do not include this statement and the <b>authentication-key</b> statement, IS-IS authentication is disabled.
<b>Options</b>	<p><b>authentication</b>—Authentication scheme:</p> <ul style="list-style-type: none"> <li>• <b>md5</b>—Use HMAC authentication in combination with MD5. HMAC-MD5 authentication is defined in RFC 2104, <i>HMAC: Keyed-Hashing for Message Authentication</i>.</li> <li>• <b>simple</b>—Use a simple password for authentication. The password is included in the transmitted packet, making this method of authentication relatively insecure. We recommend that you <i>not</i> use this authentication method.</li> </ul>
<b>Required Privilege Level</b>	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">authentication-key on page 14</a></li> <li>• <a href="#">no-authentication-check on page 48</a></li> <li>• <i>Understanding Hitless Authentication Key Rollover for IS-IS</i></li> <li>• <i>Example: Configuring Hitless Authentication Key Rollover for IS-IS</i></li> </ul>

## bfd-liveness-detection (Protocols IS-IS)

<b>Syntax</b>	<pre> bfd-liveness-detection {     authentication {         algorithm <i>algorithm-name</i>;         key-chain <i>key-chain-name</i>;         loose-check;     }     bfd-per-address-family;     detection-time {         threshold <i>milliseconds</i>;     }     minimum-interval <i>milliseconds</i>;     minimum-receive-interval <i>milliseconds</i>;     multiplier <i>number</i>;     no-adaptation;     transmit-interval {         minimum-interval <i>milliseconds</i>;         threshold <i>milliseconds</i>;     }     version (1   automatic); } </pre>
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols isis <a href="#">interface interface-name</a>],  [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols  isis <a href="#">interface interface-name</a>],  [edit protocols isis <a href="#">interface interface-name</a>],  [edit routing-instances <i>routing-instance-name</i> protocols isis <a href="#">interface interface-name</a>]</p>
<b>Release Information</b>	<p>Statement introduced before Junos OS Release 7.4.  Statement introduced in Junos OS Release 9.0 for EX Series switches.  <b>detection-time threshold</b> and <b>transmit-interval threshold</b> options added in Junos OS Release 8.2.  Support for logical systems introduced in Junos OS Release 8.3.  <b>no-adaptation</b> statement introduced in Junos OS Release 9.0.  <b>authentication algorithm</b>, <b>authentication key-chain</b>, and <b>authentication loose-check</b> options introduced in Junos OS Release 9.6.  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.  Support for IPv6 interfaces introduced in Junos OS Release 14.1R2.  <b>bfd-per-address-family</b> statement introduced in Junos OS Release 14.1R2.</p>
<b>Description</b>	Configure bidirectional failure detection timers and authentication.
<b>Options</b>	<p><b>authentication algorithm <i>algorithm-name</i></b> —Configure the algorithm used to authenticate the specified BFD session: <b>simple-password</b>, <b>keyed-md5</b>, <b>keyed-sha-1</b>, <b>meticulous-keyed-md5</b>, <b>meticulous-keyed-sha-1</b>.</p> <p><b>authentication key-chain <i>key-chain-name</i></b>—Associate a security key with the specified BFD session using the name of the security keychain. The name you specify must</p>

match one of the keychains configured in the **authentication-key-chains key-chain** statement at the **[edit security]** hierarchy level.

**authentication loose-check**—(Optional) Configure loose authentication checking on the BFD session. Use only for transitional periods when authentication might not be configured at both ends of the BFD session.

**bfd-per-address-family**—(Optional) Specify to enable BFD for IPv4 and IPv6 interfaces that are configured on the same IS-IS instance. You must include this statement on both the IPv4 and IPv6 interfaces.



**NOTE:** If IPv6 is enabled on both sides of the adjacency, you must either configure the **bfd-per-address-family** statement or the **no-ipv4-routing** statement at the **[edit protocols isis]** hierarchy level to ensure that the IPv6 BFD session is created.

**detection-time threshold *milliseconds***—Configure a threshold for the adaptation of the BFD session detection time. When the detection time adapts to a value equal to or greater than the threshold, a single trap and a single system log message are sent.

**minimum-interval *milliseconds***—Configure the minimum interval after which the local routing device transmits a hello packet and then expects to receive a reply from the neighbor with which it has established a BFD session. Optionally, instead of using this statement, you can specify the minimum transmit and receive intervals separately using the **transmit-interval minimum-interval** and **minimum-receive-interval** statements.

**Range:** 1 through 255,000

**minimum-receive-interval *milliseconds***—Configure the minimum interval after which the local routing device expects to receive a reply from a neighbor with which it has established a BFD session. Optionally, instead of using this statement, you can configure the minimum receive interval using the **minimum-interval** statement.

**Range:** 1 through 255,000

**multiplier *number***—Configure the number of hello packets not received by a neighbor that causes the originating interface to be declared down.

**Range:** 1 through 255

**Default:** 3

**no-adaptation**—Specify that BFD sessions not adapt to changing network conditions. We recommend that you not disable BFD adaptation unless it is preferable not to have BFD adaptation enabled in your network.

**transmit-interval threshold *milliseconds***—Configure the threshold for the adaptation of the BFD session transmit interval. When the transmit interval adapts to a value greater than the threshold, a single trap and a single system message are sent. The interval threshold must be greater than the minimum transmit interval.

**Range:** 0 through 4,294,967,295 ( $2^{32} - 1$ )

**transmit-interval minimum-interval *milliseconds***—Configure a minimum interval after which the local routing device transmits hello packets to a neighbor. Optionally, instead of using this statement, you can configure the minimum transmit interval using the **minimum-interval** statement.

**Range:** 1 through 255,000

**version**—Configure the BFD version to detect: **1** (BFD version 1) or **automatic** (autodetect the BFD version)

**Default:** **automatic**

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

**Related Documentation**

- *Example: Configuring BFD for IS-IS*
- *Understanding BFD for IS-IS*
- *Example: Configuring BFD Authentication for IS-IS*
- *Configuring BFD Authentication for IS-IS*

## checksum (Protocols IS-IS)

**Syntax** checksum;

**Hierarchy Level** [edit logical-systems *logical-system-name* protocols isis **interface** *interface-name*],  
[edit logical-systems *logical-system-name* routing-instances *routing-instance-name* protocols isis **interface** *interface-name*],  
[edit protocols isis **interface** *interface-name*],  
[edit routing-instances *routing-instance-name* protocols isis **interface** *interface-name*]

**Release Information** Statement introduced before Junos OS Release 7.4.  
Statement introduced in Junos OS Release 9.0 for EX Series switches.  
Statement introduced in Junos OS Release 12.1 for the QFX Series.  
Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

**Description** Enable checksums for packets on this interface.

Junos OS supports IS-IS checksums as documented in RFC 3358, *Optional Checksums in Intermediate System to Intermediate System (ISIS)*.

The checksum cannot be enabled with MD5 hello authentication on the same interface.

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

**Related Documentation**

- *Example: Enabling Packet Checksums on IS-IS Interfaces for Error Checking*
- *Understanding Checksums on IS-IS Interfaces for Error Checking*



## csnp-interval


<b>Syntax</b>	csnp-interval ( <i>seconds</i>   disable);
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols isis <a href="#">interface interface-name</a> ], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols isis <a href="#">interface interface-name</a> ], [edit protocols isis <a href="#">interface interface-name</a> ], [edit routing-instances <i>routing-instance-name</i> protocols isis <a href="#">interface interface-name</a> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 12.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
<b>Description</b>	Configure the interval between complete sequence number PDUs (CSNPs) on a LAN interface.  If the routing device is the designated router on a LAN, IS-IS sends CSN packets every 10 seconds. If the routing device is on a point-to-point interface, it sends CSN packets every 5 seconds multiplied by the number of IS-IS adjacencies over point-to-point links, which are in UP state.  To configure the interface not to send any CSNPs, specify the <b>disable</b> option.
<b>Default</b>	By default, IS-IS sends CSNPs periodically. If the routing device is the designated router on a LAN, IS-IS sends CSNPs every 10 seconds. If the routing device is on a point-to-point interface, it sends CSNPs every 5 seconds multiplied by the number of IS-IS adjacencies over point-to-point links, which are in UP state.
<b>Options</b>	<b>disable</b> —Do not send CSNPs on this interface.  <b>seconds</b> —Number of seconds between the sending of CSNPs. <b>Range:</b> 1 through 65,535 seconds <b>Default:</b> 10 seconds on LAN broadcast links. 5 seconds on point-to-point links.
<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 the Transmission Frequency for CSNP Packets on IS-IS Interfaces</i></li> </ul>

## disable (Protocols IS-IS)

<b>Syntax</b>	disable;
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols <b>isis</b>],          [edit logical-systems <i>logical-system-name</i> protocols isis <b>interface</b> <i>interface-name</i>],          [edit logical-systems <i>logical-system-name</i> protocols isis interface <i>interface-name</i> level <i>level-number</i>],          [edit logical-systems <i>logical-system-name</i> protocols isis traffic-engineering],          [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <b>isis</b>],          [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols isis <b>interface</b> <i>interface-name</i>],          [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols isis interface <i>interface-name</i> level <i>level-number</i>],          [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols isis traffic-engineering],          [edit protocols <b>isis</b>],          [edit protocols isis <b>interface</b> <i>interface-name</i>],          [edit protocols isis interface <i>interface-name</i> level <i>level-number</i>],          [edit protocols isis traffic-engineering],          [edit routing-instances <i>routing-instance-name</i> protocols <b>isis</b>],          [edit routing-instances <i>routing-instance-name</i> protocols isis <b>interface</b> <i>interface-name</i>],          [edit routing-instances <i>routing-instance-name</i> protocols isis interface <i>interface-name</i> level <i>level-number</i>],          [edit routing-instances <i>routing-instance-name</i> protocols isis traffic-engineering]</p>
<b>Release Information</b>	<p>Statement introduced before Junos OS Release 7.4.          Statement introduced in Junos OS Release 9.0 for EX Series switches.          Statement introduced in Junos OS Release 12.1 for the QFX Series.          Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
<b>Description</b>	<p>Disable IS-IS on the routing device, on an interface, or on a level.</p> <p>At the <b>[edit protocols isis traffic-engineering]</b> hierarchy level, disable IS-IS support for traffic engineering.</p> <p>Enabling IS-IS on an interface (by including the <b>interface</b> statement at the <b>[edit protocols isis]</b> or the <b>[edit routing-instances routing-instance-name protocols isis]</b> hierarchy level), disabling it (by including the <b>disable</b> statement), and not actually having IS-IS run on an interface (by including the <b>passive</b> statement) are mutually exclusive states.</p>
<b>Default</b>	<p>IS-IS is enabled for Level 1 and Level 2 routers on all interfaces on which <b>family iso</b> is enabled.</p> <p>IS-IS support for traffic engineering is enabled.</p>
<b>Required Privilege Level</b>	<p>routing—To view this statement in the configuration.          routing-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>Example: Configuring a Multi-Level IS-IS Topology to Control Interarea Flooding</li> </ul>

- *IS-IS Overview*

## export (Protocols IS-IS)

<b>Syntax</b>	<code>export [ <i>policy-names</i> ];</code>
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols <i>isis</i>],          [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <i>isis</i>],          [edit protocols <i>isis</i>],          [edit routing-instances <i>routing-instance-name</i> protocols <i>isis</i>]</p>
<b>Release Information</b>	<p>Statement introduced before Junos OS Release 7.4.          Statement introduced in Junos OS Release 9.0 for EX Series switches.          Statement introduced in Junos OS Release 12.1 for the QFX Series.          Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
<b>Description</b>	<p>Apply one or more policies to routes being exported from the routing table into IS-IS.</p> <p>All routing protocols store the routes that they learn in the routing table. The routing table uses this collected route information to determine the active routes to destinations. The routing table then installs the active routes into its forwarding table and exports them into the routing protocols. It is these exported routes that the protocols advertise.</p> <p>For each protocol, you control which routes the protocol stores in the routing table and which routes the routing table exports into the protocol from the routing table by defining a <i>routing policy</i> for that protocol.</p>
<div>  <p><b>NOTE:</b> For IS-IS, you cannot apply routing policies that affect how routes are imported into the routing table; doing so with a link-state protocol can easily lead to an inconsistent topology database.</p> </div>	
<b>Options</b>	<i>policy-names</i> —Name of one or more policies.
<b>Required Privilege Level</b>	<p>routing—To view this statement in the configuration.          routing-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <i>Example: Redistributing OSPF Routes into IS-IS</i></li> <li>• <i>Example: Configuring an IS-IS Default Route Policy on Logical Systems</i></li> </ul>

## external-preference (Protocols IS-IS)

<b>Syntax</b>	<code>external-preference <i>preference</i>;</code>
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols isis <a href="#">level level-number</a> ], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols isis <a href="#">level level-number</a> ], [edit protocols isis <a href="#">level level-number</a> ], [edit routing-instances <i>routing-instance-name</i> protocols isis <a href="#">level level-number</a> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 12.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
<b>Description</b>	Configure the preference of external routes.
<b>Options</b>	<i>preference</i> —Preference value. <b>Range:</b> 0 through 4,294,967,295 ( $2^{32} - 1$ ) <b>Default:</b> 15 (for Level 1 internal routes), 18 (for Level 2 internal routes), 160 (for Level 1 external routes), 165 (for Level 2 external routes)
<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>Route Preferences Overview</i></li> <li>• <i>Example: Redistributing OSPF Routes into IS-IS</i></li> <li>• <i>Example: Configuring a Routing Policy to Redistribute BGP Routes with a Specific Community Tag into IS-IS</i></li> <li>• <i>Understanding BGP Communities and Extended Communities as Routing Policy Match Conditions</i></li> <li>• <i>Understanding Routing Policies</i></li> <li>• <a href="#">preference on page 62</a></li> </ul>

## graceful-restart (Protocols IS-IS)


<b>Syntax</b>	<pre> graceful-restart {   disable;   helper-disable;   restart-duration <i>seconds</i>; } </pre>
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols <a href="#">isis</a> ], [edit protocols <a href="#">isis</a> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
<b>Description</b>	<p>Configure graceful restart parameters for IS-IS.</p> <p>Graceful restart allows a routing device to restart with minimal effects to the network, and is enabled for all routing protocols at the <b>[edit routing-options]</b> hierarchy level. When graceful restart is enabled, the restarting routing device is not removed from the network topology during the restart period. The adjacencies are reestablished after restart is complete.</p> <p>On LAN interfaces where IS-IS is configured on a transit router that serves as the designated router (DR), a graceful restart causes:</p> <ul style="list-style-type: none"> <li>• The ingress router of the label-switched path (LSP), which passes through the DR, to break the LSP.</li> <li>• The ingress router to re-signal the LSP.</li> </ul>
<b>Options</b>	<p><b>disable</b>—Disable graceful restart for IS-IS.</p> <p><b>helper-disable</b>—Disable graceful restart helper capability. Helper mode is enabled by default.</p> <p><b>restart-duration <i>seconds</i></b>—Time period for the restart to last, in seconds.  <b>Range:</b> 30 through 300 seconds  <b>Default:</b> 30 seconds</p>
<b>Required Privilege Level</b>	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <i>Configuring Routing Protocols Graceful Restart</i></li> </ul>

## hello-authentication-key

---

<b>Syntax</b>	hello-authentication-key <i>password</i> ;
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols isis interface <i>interface-name</i> level <i>number</i> ], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols isis interface <i>interface-name</i> level <i>number</i> ], [edit protocols isis interface <i>interface-name</i> level <i>number</i> ], [edit routing-instances <i>routing-instance-name</i> protocols isis interface <i>interface-name</i> level <i>number</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 12.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
<b>Description</b>	Configure an authentication key (password) for hello packets. Neighboring routing devices use the password to verify the authenticity of packets sent from an interface. For the key to work, you also must include the <b>hello-authentication-type</b> statement.
<b>Default</b>	By default, hello authentication is not configured on an interface. However, if IS-IS authentication is configured, the hello packets are authenticated using the IS-IS authentication type and password.
<b>Options</b>	<b>password</b> —Authentication password. The password can be up to 255 characters. Characters can include any ASCII strings. If you include spaces, enclose all characters in quotation marks (" ").
<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="#">authentication-key on page 14</a></li><li>• <a href="#">authentication-type on page 15</a></li><li>• <a href="#">hello-authentication-type on page 25</a></li></ul>

## hello-authentication-type

<b>Syntax</b>	hello-authentication-type (md5   simple);
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols isis interface <i>interface-name</i> level <i>number</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols isis interface <i>interface-name</i> level <i>number</i>],</p> <p>[edit protocols isis interface <i>interface-name</i> level <i>number</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols isis interface <i>interface-name</i> level <i>number</i>]</p>
<b>Release Information</b>	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
<b>Description</b>	<p>Enable authentication on an interface for hello packets. If you enable authentication on hello packets, you must specify a password by including the <b>hello-authentication-key</b> statement.</p> <p>You can configure authentication for a given IS-IS level on an interface. On a point-to-point link, if you enable hello authentication for both IS-IS levels, the password configured for Level 1 is used for both levels.</p>
<div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p><b>CAUTION:</b> If no authentication is configured for Level 1 on a point-to-point link with both levels enabled, the hello packets are sent without any password, regardless of the Level 2 authentication configurations.</p> </div> </div>	
<b>Default</b>	By default, hello authentication is not configured on an interface. However, if IS-IS authentication is configured, the hello packets are authenticated using the IS-IS authentication type and password.
<b>Options</b>	<p><b>md5</b>—Specifies Message Digest 5 as the packet verification type.</p> <p><b>simple</b>—Specifies simple authentication as the packet verification type.</p>
<b>Required Privilege Level</b>	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">authentication-key on page 14</a></li> <li>• <a href="#">authentication-type on page 15</a></li> <li>• <a href="#">hello-authentication-key on page 24</a></li> </ul>

## hello-interval (Protocols IS-IS)

---

<b>Syntax</b>	<code>hello-interval <i>seconds</i>;</code>
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols isis interface <i>interface-name</i> level <i>level-number</i> ], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols isis interface <i>interface-name</i> level <i>level-number</i> ], [edit protocols isis interface <i>interface-name</i> level <i>level-number</i> ], [edit routing-instances <i>routing-instance-name</i> protocols isis interface <i>interface-name</i> level <i>level-number</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 12.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
<b>Description</b>	<p>Modify the frequency with which the routing device sends hello packets out of an interface, in seconds.</p> <p>Routing devices send hello packets at a fixed interval on all interfaces to establish and maintain neighbor relationships. This interval is advertised in the hello interval field in the hello packet.</p> <p>You can send out hello packets in subsecond intervals. To send out hello packets every 333 milliseconds, set the <b>hold-time</b> value to 1.</p>
<b>Options</b>	<b><i>seconds</i></b> —Frequency of transmission for hello packets. <b>Range:</b> 1 through 20,000 seconds <b>Default:</b> 3 seconds (for designated intermediate system [DIS] routers), 9 seconds (for non-DIS routers)
<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>hold-time</i></li></ul>



## hello-padding

<b>Syntax</b>	hello-padding (adaptive   disable   loose   strict);
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols isis <b>interface</b> <i>interface-name</i> ], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols isis <b>interface</b> <i>interface-name</i> ], [edit protocols isis <b>interface</b> <i>interface-name</i> ], [edit routing-instances <i>routing-instance-name</i> protocols isis <b>interface</b> <i>interface-name</i> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 8.0. Statement introduced in Junos OS Release 9.0 for EX Series switches. 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.
<b>Description</b>	<p>Configure padding on hello packets to accommodate asymmetrical maximum transfer units (MTUs) from different hosts.</p> <p>This helps to prevent a premature adjacency Up state when one routing device's MTU does not meet the requirements to establish the adjacency.</p> <p>As an OSI Layer 2 protocol, IS-IS does not support data fragmentation. Therefore, maximum packet sizes must be established and supported between two routers. During adjacency establishment, the IS-IS protocol makes sure that the link supports a packet size of 1492 bytes by padding outgoing hello packets up to the maximum packet size of 1492 bytes.</p> <p>This is the default behavior of the Junos OS IS-IS implementation. However, Junos OS provides an option to disable hello padding that can override this behavior.</p> <p>There are four types of hello padding:</p> <ul style="list-style-type: none"> <li>Adaptive padding—On point-to-point connections, the hello packets are padded from the initial detection of a new neighbor until the neighbor verifies the adjacency as Up in the adjacency state type, length, and value (TLV) tuple. If the neighbor does not support the adjacency state TLV, then padding continues. On LAN connections, padding starts from the initial detection of a new neighbor until there is at least one active adjacency on the interface. Adaptive padding has more overhead than loose padding and is able to detect MTU asymmetry from one side of the connection. This one-sided detection can result in generation of extra link-state PDUs that are flooded throughout the network. Specify the <b>adaptive</b> option to configure enough padding to establish an adjacency to neighbors.</li> <li>Disabled padding—Padding is disabled on all types of interfaces for all adjacency states. Specify the <b>disable</b> option to accommodate interfaces that support less than the default packet size of 1492 bytes.</li> <li>Loose padding (the default)—The hello packet is padded from the initial detection of a new neighbor until the adjacency transitions to the Up state. Loose padding might not be able to detect certain situations such as asymmetrical MTUs between the routing devices. Specify the <b>loose</b> option to configure enough padding to initialize an adjacency to neighbors.</li> </ul>

- **Strict padding**—Padding is done on all interface types and for all adjacency states, and is continuous. Strict padding has the most overhead. The advantage is that strict padding detects MTU issues on both sides of a link. Specify the **strict** option to configure padding to allow all adjacency states with neighbors.

**Options**    **adaptive**—Configure padding until the neighbor adjacency is established and active.

**disable**—Disable padding on all types of interfaces for all adjacency states.

**loose**—Configure padding until the state of the adjacency is initialized.

**strict**—Configure padding for all adjacency states.

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

**Related Documentation**

- *Understanding IS-IS Configuration*
- *Example: Configuring IS-IS*

## hold-time (Protocols IS-IS)

<b>Syntax</b>	<code>hold-time seconds;</code>
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols isis interface <i>interface-name</i> level <i>level-number</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols isis interface <i>interface-name</i> level <i>level-number</i>],</p> <p>[edit protocols isis interface <i>interface-name</i> level <i>level-number</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols isis interface <i>interface-name</i> level <i>level-number</i>]</p>
<b>Release Information</b>	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
<b>Description</b>	<p>Set the length of time a neighbor considers this router to be operative (up) after receiving a hello packet. If the neighbor does not receive another hello packet within the specified time, it marks this routing device as inoperative (down). The hold time itself is advertised in the hello packets.</p> <p>The hold time specifies how long a neighbor should consider this routing device to be operative without receiving another hello packet. If the neighbor does not receive a hello packet from this routing device within the hold time, it marks the routing device as being unavailable.</p> <p>For systems configured with graceful routing switchover (GRES) with Graceful Restart, the hold time for Master and Backup Routing Engines should be set to a value higher than 40 seconds. This ensures that adjacencies between the Routing Engine and the neighboring peer 'helper' routers do not time out, stopping graceful restart, and all traffic.</p>
<b>Options</b>	<p><b>seconds</b>—Hold-time value, in seconds.</p> <p><b>Range:</b> 3 through 65,535 seconds, or 1 to send out hello packets every 333 milliseconds</p> <p><b>Default:</b> 9 seconds (for designated intermediate system [DIS] routers), 27 seconds (for non-DIS routers; three times the default hello interval)</p>
<b>Required Privilege Level</b>	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <i>Configuring Graceful Routing Engine Switchover</i></li> <li>• <i>Example: Configuring IS-IS</i></li> <li>• <i>Example: Configuring IS-IS for GRES with Graceful Restart</i></li> <li>• <a href="#">hello-interval on page 26</a></li> </ul>

## ignore-attached-bit

---

<b>Syntax</b>	ignore-attached-bit;
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols <i>isis</i> ], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <i>isis</i> ], [edit protocols <i>isis</i> ], [edit routing-instances <i>routing-instance-name</i> protocols <i>isis</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 12.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
<b>Description</b>	<p>Ignore the attached bit on IS-IS Level 1 routers. Configuring this statement enables the routing device to ignore the attached bit on incoming Level 1 link-state PDUs. If the attached bit is ignored, no default route, which points to the routing device which has set the attached bit, is installed.</p> <p>There might be times, such as during a denial-of-service (DoS) attack, that you do not want a Level 1 router to be able to forward traffic based on a default route.</p> <p>To prevent a routing device from being able to reach interarea destinations, you can prevent the routing device from installing the default route without affecting the status of its IS-IS adjacencies. The <b>ignore-attached-bit</b> statement is used to tell the routing device to ignore the presence of the attached bit in Level 1 link-state PDUs, which blocks the installation of the IS-IS default route.</p>
<b>Default</b>	The <b>ignore-attached-bit</b> statement is disabled by default.
<b>Required Privilege Level</b>	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.

## interface (Protocols IS-IS)


```

Syntax  interface (all | interface-name) {
        disable;
        bfd-liveness-detection {
            authentication {
                algorithm algorithm-name;
                key-chain key-chain-name;
                loose-check;
            }
            detection-time {
                threshold milliseconds;
            }
            minimum-interval milliseconds;
            minimum-receive-interval milliseconds;
            transmit-interval {
                threshold milliseconds;
                minimum-interval milliseconds;
            }
            multiplier number;
        }
        checksum;
        csnp-interval (seconds | disable);
        hello-padding (adaptive | loose | strict);
        ldp-synchronization {
            disable;
            hold-time seconds;
        }
        lsp-interval milliseconds;
        mesh-group (value | blocked);
        no-adjacency-holddown;
        no-eligible-remote-backup;
        no-ipv4-multicast;
        no-ipv6-multicast;
        no-ipv6-unicast;
        no-unicast-topology;
        passive;
        point-to-point;
        level level-number {
            disable;
            hello-authentication-key key;
            hello-authentication-key-chain key-chain-name;
            hello-authentication-type authentication;
            hello-interval seconds;
            hold-time seconds;
            ipv4-multicast-metric metric;
            ipv6-multicast-metric metric;
            ipv6-unicast-metric metric;
            metric metric;
            passive;
            priority number;
            te-metric metric;
        }
    }

```

<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols <b>isis</b> ], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <b>isis</b> ], [edit protocols <b>isis</b> ], [edit routing-instances <i>routing-instance-name</i> protocols <b>isis</b> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 12.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series. <b>no-eligible-remote-backup</b> option introduced in Junos OS Release 14.2 for the MX Series.
<b>Description</b>	<p>Configure interface-specific IS-IS properties. To configure more than one interface, include the <b>interface</b> statement multiple times.</p> <p>Enabling IS-IS on an interface (by including the <b>interface</b> statement at the [edit protocols <b>isis</b>] or the [edit routing-instances <i>routing-instance-name</i> protocols <b>isis</b>] hierarchy level), disabling it (by including the <b>disable</b> statement), and not actually having IS-IS run on an interface (by including the <b>passive</b> statement) are mutually exclusive states.</p>
<b>Options</b>	<p><b>all</b>—Have Junos OS create IS-IS interfaces automatically. If you include this option, disable IS-IS on the management interface (fxp0).</p> <p><b>interface-name</b>—Name of an interface. Specify the full interface name, including the physical and logical address components.</p> <p>The remaining statements are explained separately.</p>
<b>Required Privilege Level</b>	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <i>Understanding IS-IS Configuration</i></li><li>• <i>Example: Configuring IS-IS</i></li><li>• <i>Understanding IS-IS Areas to Divide an Autonomous System into Smaller Groups</i></li><li>• <i>Example: Configuring a Multi-Level IS-IS Topology to Control Interarea Flooding</i></li></ul>

## ipv4-multicast

<b>Syntax</b>	ipv4-multicast;
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols isis <a href="#">topologies</a> ], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols isis <a href="#">topologies</a> ], [edit protocols isis <a href="#">topologies</a> ], [edit routing-instances <i>routing-instance-name</i> protocols isis <a href="#">topologies</a> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 12.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
<b>Description</b>	Configure alternate IPv4 multicast topologies.
<div>  <p><b>NOTE:</b> The IS-IS interface metrics for the IPv4 topology can be configured independently of the IPv6 metrics. You can also selectively disable interfaces from participating in the IPv6 topology while continuing to participate in the IPv4 topology. This lets you exercise control over the paths that unicast data takes through a network.</p> </div>	
<b>Default</b>	Multicast topologies are disabled.
<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 IS-IS Multicast Topology</i></li> <li>• <i>IS-IS Multicast Topologies Overview</i></li> </ul>

## ipv4-multicast-metric

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<b>Syntax</b>	ipv4-multicast-metric <i>metric</i> ;
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols isis interface <i>interface-name</i> level <i>level-number</i> ], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols isis interface <i>interface-name</i> level <i>level-number</i> ], [edit protocols isis interface <i>interface-name</i> level <i>level-number</i> ], [edit routing-instances <i>routing-instance-name</i> protocols isis interface <i>interface-name</i> level <i>level-number</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 12.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
<b>Description</b>	Specify the multicast topology metric value for the level.
<b>Options</b>	<i>metric</i> —Metric value. <b>Range:</b> 0 through 16,777,215
<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 IS-IS Multicast Topology</i></li><li>• <i>IS-IS Multicast Topologies Overview</i></li></ul>



## ipv6-multicast


<b>Syntax</b>	ipv6-multicast;
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols isis <a href="#">topologies</a> ], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols isis <a href="#">topologies</a> ], [edit protocols isis <a href="#">topologies</a> ], [edit routing-instances <i>routing-instance-name</i> protocols isis <a href="#">topologies</a> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
<b>Description</b>	Configure alternate IPv6 multicast topologies.
<b>Default</b>	Multicast topologies are disabled.
<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 IS-IS Multicast Topology</i></li> <li>• <i>IS-IS Multicast Topologies Overview</i></li> </ul>

## ipv6-multicast-metric

<b>Syntax</b>	ipv6-multicast-metric <i>metric</i> ;
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols isis interface <i>interface-name</i> level <i>level-number</i> ], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols isis interface <i>interface-name</i> level <i>level-number</i> ], [edit protocols isis interface <i>interface-name</i> level <i>level-number</i> ], [edit routing-instances <i>routing-instance-name</i> protocols isis interface <i>interface-name</i> level <i>level-number</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
<b>Description</b>	Specify the IPv6 alternate multicast topology metric value for the level.
<b>Options</b>	<i>metric</i> —Metric value. <b>Range:</b> 0 through 16,777,215
<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 IS-IS Multicast Topology</i></li> <li>• <i>IS-IS Multicast Topologies Overview</i></li> </ul>

## ipv6-unicast

---

<b>Syntax</b>	ipv6-unicast;
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols isis <a href="#">topologies</a> ], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols isis <a href="#">topologies</a> ], [edit protocols isis <a href="#">topologies</a> ], [edit routing-instances <i>routing-instance-name</i> protocols isis <a href="#">topologies</a> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
<b>Description</b>	<p>Configure alternate IPv6 unicast topologies.</p> <p>This statement causes IS-IS to calculate an alternate IPv6 unicast topology, in addition to the normal IPv4 unicast topology, and add the corresponding routes to inet6.0.</p>
	<div> <b>NOTE:</b> The IS-IS interface metrics for the IPv4 topology can be configured independently of the IPv6 metrics. You can also selectively disable interfaces from participating in the IPv6 topology while continuing to participate in the IPv4 topology. This lets you exercise control over the paths that unicast data takes through a network.</div>
<b>Default</b>	IPv6 unicast topologies are disabled.
<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 IS-IS IPv4 and IPv6 Unicast Topologies</i></li><li>• <i>Example: Configuring IS-IS IPv4 and IPv6 Unicast Topologies</i></li></ul>

## ipv6-unicast-metric

<b>Syntax</b>	<code>ipv6-unicast-metric <i>metric</i>;</code>
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols isis interface <i>interface-name</i> level <i>level-number</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols isis interface <i>interface-name</i> level <i>level-number</i>],</p> <p>[edit protocols isis interface <i>interface-name</i> level <i>level-number</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols isis interface <i>interface-name</i> level <i>level-number</i>]</p>
<b>Release Information</b>	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p>
<b>Description</b>	Specify the IPv6 unicast topology metric value for the level. The IS-IS interface metrics for the IPv4 topology can be configured independently of the IPv6 metrics.
<b>Options</b>	<p><i>metric</i>—Metric value.</p> <p><b>Range:</b> 0 through 16,777,215</p>
<b>Required Privilege Level</b>	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <i>Example: Configuring IS-IS IPv4 and IPv6 Unicast Topologies</i></li> <li>• <i>Understanding IS-IS IPv4 and IPv6 Unicast Topologies</i></li> </ul>

## isis

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<b>Syntax</b>	isis { ... }
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols], [edit protocols], [edit routing-instances <i>routing-instance-name</i> protocols]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 12.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
<b>Description</b>	Enable IS-IS routing on the routing device or for a routing instance.  The <b>isis</b> statement is the one statement you must include in the configuration to run IS-IS on the routing device or in a routing instance.
<b>Default</b>	IS-IS is disabled on the routing device.
<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 IS-IS</i></li><li>• <i>Example: Configuring a Multi-Level IS-IS Topology to Control Interarea Flooding</i></li></ul>

## level (Global IS-IS)

<b>Syntax</b>	<pre> level <i>level-number</i> {     authentication-key <i>key</i>;     authentication-key-chain (Protocols IS-IS) <i>key-chain-name</i>;     authentication-type <i>type</i>;     disable;     external-preference <i>preference</i>;     no-csnp-authentication;     no-hello-authentication;     no-psnp-authentication;     preference <i>preference</i>;     wide-metrics-only; } </pre>
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols <b>isis</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <b>isis</b>],</p> <p>[edit protocols <b>isis</b>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <b>isis</b>]</p>
<b>Release Information</b>	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
<b>Description</b>	<p>Configure the global-level properties.</p> <p>You can administratively divide a single AS into smaller groups called areas. You configure each routing device interface to be in an area. Any interface can be in any area. The area address applies to the entire routing device. You cannot specify one interface to be in one area and another interface in a different area. To route between areas, you must have two adjacent Level 2 routers that communicate with each other.</p> <p>Level 1 routers can only route within their IS-IS area. To send traffic outside their area, Level 1 routers must send packets to the nearest intra-area Level 2 router. A routing device can be a Level 1 router, a Level 2 router, or both. You specify the router level on a per-interface basis, and a routing device becomes adjacent to other routing devices on the same level on that link only.</p> <p>You can configure one Level 1 routing process and one Level 2 routing process on each interface, and you can configure the two levels differently.</p>
<b>Options</b>	<p><b><i>level-number</i></b>—IS-IS level number.</p> <p><b>Values:</b> 1 or 2</p> <p>The remaining statements are explained separately.</p>
<b>Required Privilege Level</b>	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>

- |                              |   |
|------------------------------|---|
| <b>Related Documentation</b> | <ul style="list-style-type: none"><li>• <i>Understanding IS-IS Configuration</i></li><li>• <i>Example: Configuring IS-IS</i></li><li>• <i>Understanding IS-IS Areas to Divide an Autonomous System into Smaller Groups</i></li><li>• <i>Example: Configuring a Multi-Level IS-IS Topology to Control Interarea Flooding</i></li></ul> |
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## link-protection (Protocols IS-IS)

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<b>Syntax</b>	link-protection;
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols isis interface <i>interface-name</i> ], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols isis interface <i>interface-name</i> ], [edit protocols isis interface <i>interface-name</i> ], [edit routing-instances <i>routing-instance-name</i> protocols isis interface <i>interface-name</i> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 9.5. Statement introduced in Junos OS Release 9.0 for EX Series switches. 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.
<b>Description</b>	Enable link protection on the specified IS-IS interface. Junos OS creates a backup loop-free alternate path to the primary next hop for all destination routes that traverse the protected interface.
<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 Loop-Free Alternate Routes for IS-IS</i></li><li>• <i>Example: Configuring Node-Link Protection for IS-IS Routes in a Layer 3 VPN</i></li><li>• <a href="#">node-link-protection on page 56</a></li></ul>

## loose-authentication-check

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<b>Syntax</b>	loose-authentication-check;
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols <a href="#">isis</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <a href="#">isis</a>],</p> <p>[edit protocols <a href="#">isis</a>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <a href="#">isis</a>]</p>
<b>Release Information</b>	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
<b>Description</b>	Allow the use of MD5 authentication without requiring network-wide deployment.
<b>Required Privilege Level</b>	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <i>Understanding Hitless Authentication Key Rollover for IS-IS</i></li> <li>• <i>Example: Configuring Hitless Authentication Key Rollover for IS-IS</i></li> </ul>

## lsp-interval

<b>Syntax</b>	<code>lsp-interval milliseconds;</code>
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols isis <b>interface</b> <i>interface-name</i>],          [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols isis <b>interface</b> <i>interface-name</i>],          [edit protocols isis <b>interface</b> <i>interface-name</i>],          [edit routing-instances <i>routing-instance-name</i> protocols isis <b>interface</b> <i>interface-name</i>]</p>
<b>Release Information</b>	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
<b>Description</b>	<p>Configure the link-state PDU interval time.</p> <p>By default, the routing device sends one link-state PDU packet out an interface every 100 milliseconds. To disable the transmission of all link-state PDUs, set the interval to 0.</p> <p>Link-state PDU throttling by use of the <b>lsp-interval</b> statement controls the flooding pace to neighboring routing devices in order to not overload them.</p> <p>Also, consider that control traffic (such as link-state PDUs and related packets) might delay user traffic (information packets) because control traffic always has precedence in terms of scheduling on the routing device interface cards. Unfortunately, the control traffic transmission rate is not decreased on low-bandwidth interfaces, such as DS-0 or fractional T1 and E1 interface. Line control traffic stays the same. On a low-bandwidth circuit that is transmitting 30 full-MTU-sized packets, there is not much bandwidth left over for other types of packets.</p>
<b>Default</b>	By default, the routing device sends one link-state PDU out an interface every 100 milliseconds.
<b>Options</b>	<p><b>milliseconds</b>—Number of milliseconds between the sending of link-state PDUs. Specifying a value of 0 blocks all link-state PDU transmission.</p> <p><b>Range:</b> 0 through 1000 milliseconds</p> <p><b>Default:</b> 100 milliseconds</p>
<b>Required Privilege Level</b>	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <i>Example: Configuring the Transmission Frequency for Link-State PDUs on IS-IS Interfaces</i></li> <li>• <i>Understanding Link-State PDU Throttling for IS-IS Interfaces</i></li> <li>• <i>Example: Configuring the Transmission Frequency for CSNPs on IS-IS Interfaces</i></li> </ul>



## **lsp-lifetime**

<b>Syntax</b>	<code>lsp-lifetime seconds;</code>
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols <a href="#">isis</a>],  [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <a href="#">isis</a>],  [edit protocols <a href="#">isis</a>],  [edit routing-instances <i>routing-instance-name</i> protocols <a href="#">isis</a>]</p>
<b>Release Information</b>	<p>Statement introduced before Junos OS Release 7.4.  Statement introduced in Junos OS Release 9.0 for EX Series switches.  Statement introduced in Junos OS Release 12.1 for the QFX Series.  Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
<b>Description</b>	<p>Specify how long a link-state PDU originating from the routing device should persist in the network. The routing device sends link-state PDUs often enough so that the link-state PDU lifetime never expires.</p> <p>Because link-state PDUs have a maximum lifetime, they need to be refreshed. Refreshing means that a routing device needs to re-originate its link-state PDUs periodically. The re-origination interval must be less than the link-state PDU's lifetime. For example, if the link-state PDU is valid for 1200 seconds, the routing device needs to refresh the link-state PDU in less than 1200 seconds to avoid removal of the link-state PDU from the link-state database by other routing devices. The recommended maximum link-state PDU origination interval is the lifetime minus 300 seconds. So, in a default environment this would be 900 seconds. In Junos OS, the refresh interval is derived from the lifetime and is equal to the lifetime minus 317 seconds. You can change the lifetime to a higher value to reduce the number of refreshes in the network. (You would rarely want to increase the number of refreshes.) Often these periodic link-state PDU refreshes are referred to as refresh noise, and network administrators want to reduce this noise as much as possible.</p> <p>The <a href="#">show isis overview</a> command displays the link-state PDU lifetime.</p>
<b>Default</b>	By default, link-state PDUs are maintained in network databases for 1200 seconds (20 minutes) before being considered invalid. This length of time, called the <i>LSP lifetime</i> , normally is sufficient to guarantee that link-state PDUs never expire.
<b>Options</b>	<p><b>seconds</b>—link-state PDU lifetime, in seconds.</p> <p><b>Range:</b> 350 through 65,535 seconds</p> <p><b>Default:</b> 1200 seconds</p>
<b>Required Privilege Level</b>	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <i>Example: Configuring the Transmission Frequency for Link-State PDUs on IS-IS Interfaces</i></li> <li>• <i>Understanding Link-State PDU Throttling for IS-IS Interfaces</i></li> <li>• <i>Example: Configuring the Transmission Frequency for CSNPs on IS-IS Interfaces</i></li> </ul>

- [http://www.juniper.net/us/en/training/certification/JNCIP\\_studyguide.pdf](http://www.juniper.net/us/en/training/certification/JNCIP_studyguide.pdf)

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## max-areas

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<b>Syntax</b>	<code>max-areas <i>number</i>;</code>
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols <i>isis</i> ], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <i>isis</i> ] [edit protocols <i>isis</i> ], [edit routing-instances <i>routing-instance-name</i> protocols <i>isis</i> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 8.1. Statement introduced in Junos OS Release 9.0 for EX Series switches. 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.
<b>Description</b>	<p>Modify the maximum number of IS-IS areas advertised.</p> <p>This value is included in the Maximum Address Area field of the IS-IS common PDU header included in all outgoing PDUs.</p> <p>The maximum number of areas you can advertise is restricted to 36 to ensure that the IIH PDUs have enough space to include other type, length, and value (TLV) fields, such as the Authentication and IPv4 and IPv6 Interface Address TLVs.</p>
<b>Options</b>	<p><i>number</i>—Maximum number of areas to include in the IS-IS hello (IIH) PDUs and link-state PDUs.</p> <p><b>Range:</b> 3 through 36</p> <p><b>Default:</b> 3</p>
<b>Required Privilege Level</b>	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <i>Understanding IS-IS Areas to Divide an Autonomous System into Smaller Groups</i></li><li>• <i>Example: Configuring a Multi-Level IS-IS Topology to Control Interarea Flooding</i></li></ul>

## mesh-group (Protocols IS-IS)

<b>Syntax</b>	mesh-group (blocked   <i>value</i> );
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols isis <b>interface</b> <i>interface-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols isis <b>interface</b> <i>interface-name</i>],</p> <p>[edit protocols isis <b>interface</b> <i>interface-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols isis <b>interface</b> <i>interface-name</i>]</p>
<b>Release Information</b>	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
<b>Description</b>	<p>Configure an interface to be part of a mesh group, which is a set of fully connected nodes.</p> <p><i>A mesh group</i> is a set of routing devices that are fully connected. That is, they have a fully meshed topology. When link-state PDUs are being flooded throughout an area, each router within a mesh group receives only a single copy of a link-state PDU instead of receiving one copy from each neighbor, thus minimizing the overhead associated with the flooding of link-state PDUs.</p> <p>To create a mesh group and designate that an interface be part of the group, assign a mesh-group number to all the routing device interfaces in the group. To prevent an interface in the mesh group from flooding link-state PDUs, configure blocking on that interface.</p>
<b>Options</b>	<p><b>blocked</b>—Configure the interface so that it does not flood link-state PDUs.</p> <p><b>value</b>—Number that identifies the mesh group.</p> <p><b>Range:</b> 1 through 4,294,967,295 (<math>2^{32} - 1</math>; 32 bits are allocated to identify a mesh group)</p>
<b>Required Privilege Level</b>	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <i>Example: Configuring Mesh Groups of IS-IS Interfaces</i></li> <li>• <i>Understanding IS-IS Mesh Groups</i></li> </ul>

## metric (Protocols IS-IS)

<b>Syntax</b>	<code>metric <i>metric</i>;</code>
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols isis interface <i>interface-name</i> level <i>level-number</i> ], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols isis interface <i>interface-name</i> level <i>level-number</i> ], [edit protocols isis interface <i>interface-name</i> level <i>level-number</i> ], [edit routing-instances <i>routing-instance-name</i> protocols isis interface <i>interface-name</i> level <i>level-number</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 12.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
<b>Description</b>	Specify the metric value for the level.  All IS-IS routes have a cost, which is a routing metric that is used in the IS-IS link-state calculation. The cost is an arbitrary, dimensionless integer that can be from 1 through 63, or from 1 through 16,777,215 ( $2^{24} - 1$ ) if you are using wide metrics.  Similar to other routing protocols, IS-IS provides a way of exporting routes from the routing table into the IS-IS network. When a route is exported into the IS-IS network without a specified metric, IS-IS uses default metric values for the route, depending on the protocol that was used to learn the route.

Table 6 on page 46 depicts IS-IS route export metric default values.

**Table 6: Default Metric Values for Routes Exported into IS-IS**

Protocol Used for Learning the Route	Default Metric Value
Direct	10
Static	Same as reported by the protocol used for exporting the route
Aggregate	10
Generate	10
RIP	Same as reported by the protocol used for exporting the route
OSPF	Same as reported by the protocol used for exporting the route
BGP	10

The default metric values behavior can be customized by using routing policies.

**Options** `metric`—Metric value.

**Range:** 1 through 63, or 1 through 16,777,215 (if you have configured wide metrics)

**Default:** 10 (for all interfaces except lo0), 0 (for the lo0 interface)

<b>Required Privilege</b>	routing—To view this statement in the configuration.
<b>Level</b>	routing-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <i>Example: Enabling Wide IS-IS Metrics for Traffic Engineering</i></li> <li>• <i>Understanding Wide IS-IS Metrics for Traffic Engineering</i></li> <li>• <i>te-metric</i></li> <li>• <a href="#">wide-metrics-only on page 72</a></li> </ul>

## no-adjacency-holddown

<b>Syntax</b>	no-adjacency-holddown;
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols <a href="#">isis</a> ], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <a href="#">isis</a> ], [edit protocols <a href="#">isis</a> ], [edit routing-instances <i>routing-instance-name</i> protocols <a href="#">isis</a> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 8.0. Statement introduced in Junos OS Release 9.0 for EX Series switches. 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.
<b>Description</b>	<p>Disable the hold-down timer for IS-IS adjacencies.</p> <p>A hold-down timer delays the advertising of adjacencies by waiting until a time period has elapsed before labeling adjacencies in the up state. You can disable this hold-down timer, which labels adjacencies up faster. However, disabling the hold-down timer creates more frequent link-state PDU updates and SPF computation.</p>
<b>Required Privilege</b>	routing—To view this statement in the configuration.
<b>Level</b>	routing-control—To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">hold-time on page 29</a></li> </ul>

## no-authentication-check

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<b>Syntax</b>	no-authentication-check;
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols <a href="#">isis</a> ], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <a href="#">isis</a> ], [edit protocols <a href="#">isis</a> ], [edit routing-instances <i>routing-instance-name</i> protocols <a href="#">isis</a> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 12.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
<b>Description</b>	Generate authenticated packets and check the authentication on received packets, but do not reject packets that cannot be authenticated.
<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="#">csnp-interval on page 19</a></li><li>• <a href="#">hello-authentication-type on page 25</a></li></ul>

## no-csnp-authentication

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<b>Syntax</b>	no-csnp-authentication;
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols isis <a href="#">level level-number</a> ], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols isis <a href="#">level level-number</a> ], [edit protocols isis <a href="#">level level-number</a> ], [edit routing-instances <i>routing-instance-name</i> protocols isis <a href="#">level level-number</a> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 12.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
<b>Description</b>	Suppress authentication check on complete sequence number PDU (CSNP) packets.
<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="#">csnp-interval on page 19</a></li></ul>

## no-eligible-backup (Protocols IS-IS)

<b>Syntax</b>	no-eligible-backup;
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols isis interface <i>interface-name</i> ], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols isis interface <i>interface-name</i> ], [edit protocols isis interface <i>interface-name</i> ], [edit routing-instances <i>routing-instance-name</i> protocols isis interface <i>interface-name</i> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 9.5. Statement introduced in Junos OS Release 9.5 for EX Series switches. 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.
<b>Description</b>	Exclude the specified interface as a backup interface for IS-IS interfaces on which link protection or node-link protection is enabled.
<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 Loop-Free Alternate Routes for IS-IS</i></li> <li>• <i>Example: Configuring Node-Link Protection for IS-IS Routes in a Layer 3 VPN</i></li> <li>• <a href="#">link-protection on page 40</a></li> <li>• <a href="#">node-link-protection on page 56</a></li> </ul>

## no-hello-authentication

<b>Syntax</b>	no-hello-authentication;
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols isis <a href="#">level level-number</a> ], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols isis <a href="#">level level-number</a> ], [edit protocols isis <a href="#">level level-number</a> ], [edit routing-instances <i>routing-instance-name</i> protocols isis <a href="#">level level-number</a> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 12.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
<b>Description</b>	Suppress authentication check on complete sequence number hello packets.
<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="#">hello-authentication-type on page 25</a></li> </ul>


## no-ipv4-multicast

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<b>Syntax</b>	no-ipv4-multicast;
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols isis <a href="#">interface interface-name</a> ], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols isis <a href="#">interface interface-name</a> ], [edit protocols isis <a href="#">interface interface-name</a> ], [edit routing-instances <i>routing-instance-name</i> protocols isis <a href="#">interface interface-name</a> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 12.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
<b>Description</b>	Exclude an interface from IPv4 multicast topologies.
<b>Default</b>	Multicast topologies are disabled.
<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 IS-IS Multicast Topology</i></li><li>• <i>IS-IS Multicast Topologies Overview</i></li></ul>



## no-ipv4-routing

<b>Syntax</b>	no-ipv4-routing;
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols <a href="#">isis</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <a href="#">isis</a>],</p> <p>[edit protocols <a href="#">isis</a>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <a href="#">isis</a>]</p>
<b>Release Information</b>	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
<b>Description</b>	<p>Disable IP version 4 (IPv4) routing.</p> <p>Disabling IPv4 routing has the following results:</p> <ul style="list-style-type: none"> <li>• The routing device does not advertise the network layer protocol identifier (NLPID) for IPv4 in the Junos OS link-state PDU fragment zero.</li> <li>• The routing device does not advertise any IPv4 prefixes in Junos OS link-state PDUs.</li> <li>• The routing device does not advertise the NLPID for IPv4 in Junos OS hello packets.</li> <li>• The routing device does not advertise any IPv4 addresses in Junos OS hello packets.</li> <li>• The routing device does not calculate any IPv4 routes.</li> </ul>
	<div>  <p><b>NOTE:</b> Note: Even when no-ipv4-routing is configured, an IS-IS traceoptions log can list rejected IPv4 addresses. When a configuration is committed, IS-IS schedules a scan of the routing table to determine whether any routes need to be exported into the IS-IS link state database. The implicit default export policy action is to reject everything. IPv4 addresses from the routing table are examined for export, rejected by the default policy, and the rejections are logged.</p> </div>
<b>Required Privilege Level</b>	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <i>Example: Configuring IS-IS IPv4 and IPv6 Unicast Topologies</i></li> <li>• <i>Understanding IS-IS IPv4 and IPv6 Unicast Topologies</i></li> </ul>

## no-ipv6-multicast

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<b>Syntax</b>	no-ipv6-multicast;
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols isis <a href="#">interface interface-name</a> ], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols isis <a href="#">interface interface-name</a> ], [edit protocols isis <a href="#">interface interface-name</a> ], [edit routing-instances <i>routing-instance-name</i> protocols isis <a href="#">interface interface-name</a> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
<b>Description</b>	Exclude an interface from the IPv6 multicast topologies.
<b>Default</b>	Multicast topologies are disabled.
<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 IS-IS Multicast Topology</i></li><li>• <i>IS-IS Multicast Topologies Overview</i></li></ul>

## no-ipv6-routing

<b>Syntax</b>	no-ipv6-routing;
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols <a href="#">isis</a> ], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <a href="#">isis</a> ], [edit protocols <a href="#">isis</a> ], [edit routing-instances <i>routing-instance-name</i> protocols <a href="#">isis</a> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
<b>Description</b>	Disable IP version 6 (IPv6) routing.  Disabling IPv6 routing has the following results: <ul style="list-style-type: none"> <li>• The routing device does not advertise the network layer protocol identifier (NLPID) for IPv6 in the Junos OS link-state PDU fragment zero.</li> <li>• The routing device does not advertise any IPv6 prefixes in Junos OS link-state PDUs.</li> <li>• The routing device does not advertise the NLPID for IPv6 in Junos OS hello packets.</li> <li>• The routing device does not advertise any IPv6 addresses in Junos OS hello packets.</li> <li>• The routing device does not calculate any IPv6 routes.</li> </ul>
<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 IS-IS IPv4 and IPv6 Unicast Topologies</i></li> <li>• <i>Understanding IS-IS IPv4 and IPv6 Unicast Topologies</i></li> </ul>

## no-ipv6-unicast

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<b>Syntax</b>	no-ipv6-unicast;
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols isis <a href="#">interface interface-name</a> ], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols isis <a href="#">interface interface-name</a> ], [edit protocols isis <a href="#">interface interface-name</a> ], [edit routing-instances <i>routing-instance-name</i> protocols isis <a href="#">interface interface-name</a> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
<b>Description</b>	Exclude an interface from the IPv6 unicast topologies. This enables you to exercise control over the paths that unicast data takes through a network.
<b>Default</b>	IPv6 unicast topologies are disabled.
<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 IS-IS IPv4 and IPv6 Unicast Topologies</i></li><li>• <i>Understanding IS-IS IPv4 and IPv6 Unicast Topologies</i></li></ul>

## no-psnp-authentication

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<b>Syntax</b>	no-psnp-authentication;
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols isis <a href="#">level level-number</a> ], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols isis <a href="#">level level-number</a> ], [edit protocols isis <a href="#">level level-number</a> ], [edit routing-instances <i>routing-instance-name</i> protocols isis <a href="#">level level-number</a> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 12.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
<b>Description</b>	Suppress authentication check on partial sequence number PDU (PSNP) packets.
<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 IS-IS Authentication</i></li></ul>

## no-unicast-topology

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<b>Syntax</b>	no-unicast-topology;
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols isis <a href="#">interface interface-name</a> ], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols isis <a href="#">interface interface-name</a> ], [edit protocols isis <a href="#">interface interface-name</a> ], [edit routing-instances <i>routing-instance-name</i> protocols isis <a href="#">interface interface-name</a> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 12.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
<b>Description</b>	Exclude an interface from the IPv4 unicast topologies.
<b>Default</b>	IPv4 unicast topologies are disabled.
<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 IS-IS Multicast Topology</i></li> <li>• <i>IS-IS Multicast Topologies Overview</i></li> </ul>

## node-link-protection (Protocols IS-IS)

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<b>Syntax</b>	node-link-protection;
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols isis interface <i>interface-name</i> ], [edit logical-routers <i>logical-router-name</i> routing-instances <i>routing-instance-name</i> protocols isis interface <i>interface-name</i> ], [edit protocols isis interface <i>interface-name</i> ], [edit routing-instances <i>routing-instance-name</i> protocols isis interface <i>interface-name</i> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 9.5. Statement introduced in Junos OS Release 9.5 for EX Series switches. 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.
<b>Description</b>	Enable node-link protection on the specified IS-IS interface. Junos OS creates an alternate loop-free path to the primary next hop for all destination routes that traverse a protected interface. This alternate path avoids the primary next-hop routing device altogether and establishes a path through a different routing device.
<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 Loop-Free Alternate Routes for IS-IS</i></li><li>• <i>Example: Configuring Node-Link Protection for IS-IS Routes in a Layer 3 VPN</i></li><li>• <a href="#">link-protection on page 40</a></li></ul>

## overload (Protocols IS-IS)

<b>Syntax</b>	<pre> overload {     advertise-high-metrics;     allow-route-leaking;     timeout <i>seconds</i>; } </pre>
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols <i>isis</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <i>isis</i>],</p> <p>[edit protocols <i>isis</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <i>isis</i>]</p>
<b>Release Information</b>	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
<b>Description</b>	<p>Configure the local routing device so that it appears to be overloaded. This statement causes the routing device to continue participating in IS-IS routing, but prevents it from being used for transit traffic. Traffic destined to immediately attached subnets continues to transit the routing device.</p> <p>You can also advertise maximum link metrics in network layer reachability information (NLRI) instead of setting the overload bit.</p> <p>You configure or disable overload mode in IS-IS with or without a timeout. Without a timeout, overload mode is set until it is explicitly deleted from the configuration. With a timeout, overload mode is set if the time elapsed since the IS-IS instance started is less than the specified timeout.</p> <p>A timer is started for the difference between the timeout and the time elapsed since the instance started. If the time elapsed after the IS-IS instance is enabled is less than the specified timeout, overload mode is set. When the timer expires, overload mode is cleared. In overload mode, the routing device IS-IS advertisements are originated with the overload bit set. This causes the transit traffic to take paths around the routing device. However, the overloaded routing device's own links are still accessible.</p> <p>The value of the overload bit depends on these three scenarios:</p> <ol style="list-style-type: none"> <li>1. When the overload bit has already been set to a given value and the routing process is restarted: Link-state PDUs are regenerated with the overload bit cleared.</li> <li>2. When the overload bit is reset to a lesser value while the routing process is running: Link-state PDUs are regenerated with the overload bit cleared.</li> <li>3. When the overload bit is reset to a greater value while the routing process is running: Link-state PDUs are regenerated with the overload bit set to the difference between the old and new value.</li> </ol>

In overload mode, the routing device advertisement is originated with all the transit routing device links (except stub) set to a metric of 0xFFFF. The stub routing device links are advertised with the actual cost of the interfaces corresponding to the stub. This causes the transit traffic to avoid the overloaded routing device and take paths around the routing device.

To understand the reason for setting the overload bit, consider that BGP converges slowly. It is not very good at detecting that a neighbor is down because it has slow-paced keepalive timers. Once the BGP neighbor is determined to be down, it can take up to 2 minutes for a BGP router to declare the neighbor down. IS-IS is much quicker. IS-IS only takes 10-30 seconds to detect absent peers. It is the slowness of BGP, more precisely the slowness of internal BGP (IBGP), that necessitates the use of the overload bit. IS-IS and BGP routing are mutually dependent on each other. If both do not converge at the same time, traffic is dropped without notification (black holed).

You might want to configure the routing device so that it appears to be overloaded when you are restarting routing on the device. Setting the overload bit for a fixed amount of time right after a restart of the routing protocol process (rpd) ensures that the router does not receive transit traffic while the routing protocols (especially IBGP) are still converging.

Setting the overload bit is useful when performing hardware or software maintenance work on a routing device. After the maintenance work, clear the overload bit to carry on forwarding transit traffic. Manual clearing of the overload bit is not always possible. What is needed is an automated way of clearing the overload bit after some amount of time. Most networks use a time value of 300 seconds. This 5-minute value provides a good balance, allowing time to bring up even large internal IBGP meshes, while still relatively quick.

Another appropriate application for setting for the overload bit is on dedicated devices such as BGP route reflectors, which are intentionally not meant to carry any transit traffic. In this case, you would not use the timer.

You can verify that the overload bit is set by running the **show isis database** command.



**Options** **advertise-high-metrics**—Advertise maximum link metrics in NLRI's instead of setting the overload bit.

The **advertise-high-metric** setting is only valid while the routing device is in overload mode.

When **advertise-high-metric** is configured, IS-IS does not set the overload bit. Rather, it sets the metric to 63 or 16,777,214, depending whether wide metrics are enabled. This allows the overloaded routing device to be used for transit as a last resort.

An L1-L2 router in overload mode stops leaking route information between L1 and L2 levels and clears its attached bit. This is also true when **advertise-high-metrics** is configured.

**allow-route-leaking**—Enable leaking of route information into the network even if the overload bit is set.



**NOTE:** The **allow-route-leaking** option does not work if the routing device is in dynamic overload mode. Dynamic overload can occur if the device has exceeded its resource limits, such as the prefix limit.

**timeout seconds**—Number of seconds at which the overloading is reset.

**Range:** 60 through 1800 seconds


**Default:** 0 seconds

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

**Related Documentation**

- *Understanding IS-IS Configuration*
- *Example: Configuring IS-IS*

## passive (Protocols IS-IS)

<b>Syntax</b>	<pre> passive {     remote-node-id <i>address</i>;     remote-node-iso <i>iso-id</i>; } </pre>
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols isis <b>interface</b> <i>interface-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols isis interface <i>interface-name</i> level <i>level-number</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols isis <b>interface</b> <i>interface-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols isis interface <i>interface-name</i> level <i>level-number</i>],</p> <p>[edit protocols isis <b>interface</b> <i>interface-name</i>],</p> <p>[edit protocols isis interface <i>interface-name</i> level <i>level-number</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols isis <b>interface</b> <i>interface-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols isis interface <i>interface-name</i> level <i>level-number</i>]</p>
<b>Release Information</b>	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 12.1 for the QFX Series.</p> <p><b>remote-node-id</b> <i>address</i> option introduced in Junos OS Release 14.2.</p> <p><b>remote-node-iso</b> <i>iso-id</i> option introduced in Junos OS Release 14.2.</p>
<b>Description</b>	<p>Advertise the direct interface addresses on an interface or into a level on the interface without actually running IS-IS on that interface or level.</p> <p>This statement effectively prevents IS-IS from running on the interface. To enable IS-IS on an interface, include the <b>interface</b> statement at the [edit protocols isis] or the [edit routing-instances <i>routing-instance-name</i> protocols isis] hierarchy level. To disable it, include the <b>disable</b> statement at those hierarchy levels. The three states—enabling, disabling, or not running IS-IS on an interface—are mutually exclusive.</p> <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <p> <b>NOTE:</b> Configuring IS-IS on a loopback interface automatically renders it as a passive interface, irrespective of whether the <b>passive</b> statement was used in the configuration of the interface.</p> </div> <p>If neither passive mode nor the <b>family iso</b> option is configured on the IS-IS interface, then the routing device treats the interface as not being operational, and no direct IPv4/IPv6 routes are exported into IS-IS. (You configure the <b>family iso</b> option at the [edit interfaces <i>interface-name</i> unit <i>logical-unit-number</i>] hierarchy level.)</p>
<b>Default</b>	By default, IS-IS must be configured on an interface or a level for direct interface addresses to be advertised into that level.
<b>Options</b>	<b>remote-node-id</b> <i>address</i> —IP address of the remote link.

**remote-node-iso iso-id**—ISO ID of the remote node.



**NOTE:** The options **remote-node-id address** and **remote-node-iso iso-id** do not apply under the [edit routing-instances *routing-instance-name* protocols isis] hierarchy level.

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

**Related Documentation**

- *Example: Configuring a Multi-Level IS-IS Topology to Control Interarea Flooding*
- *disable*

## point-to-point

**Syntax** point-to-point;

**Hierarchy Level** [edit logical-systems *logical-system-name* protocols isis **interface interface-name**],  
[edit logical-systems *logical-system-name* routing-instances *routing-instance-name* protocols isis **interface interface-name**],  
[edit protocols isis **interface interface-name**],  
[edit routing-instances *routing-instance-name* protocols isis **interface interface-name**]

**Release Information** Statement introduced before Junos OS Release 7.4.  
Statement introduced in Junos OS Release 9.0 for EX Series switches.  
Statement introduced in Junos OS Release 12.1 for the QFX Series.  
Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

**Description** Configure an IS-IS interface to behave like a point-to-point connection.

You can use the **point-to-point** statement to configure a LAN interface to act like a point-to-point interface for IS-IS. You do not need an unnumbered LAN interface, and it has no effect if configured on an interface that is already point-to-point.

The **point-to-point** statement affects only IS-IS protocol procedures on that interface. All other protocols continue to treat the interface as a LAN interface. Only two IS-IS routing devices can be connected to the LAN interface, and both must be configured as point-to-point.

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

**Related Documentation**

- *IS-IS Overview*
- *Example: Configuring Synchronization Between IS-IS and LDP*
- *Understanding LDP-IGP Synchronization*
- *Understanding IS-IS Designated Routers*

## preference (Protocols IS-IS)

<b>Syntax</b>	<code>preference preference;</code>
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols isis <a href="#">level level-number</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols isis <a href="#">level level-number</a>],</p> <p>[edit protocols isis <a href="#">level level-number</a>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols isis <a href="#">level level-number</a>]</p>
<b>Release Information</b>	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
<b>Description</b>	<p>Configure the preference of internal routes.</p> <p>Route preferences (also known as administrative distances) are used to select which route is installed in the forwarding table when several protocols calculate routes to the same destination. The route with the lowest preference value is selected.</p> <p>To change the preference values, include the <b>preference</b> statement (for internal routes) or the <b>external-preference</b> statement.</p>
<b>Options</b>	<p><b>preference</b>—Preference value.</p> <p><b>Range:</b> 0 through 4,294,967,295 (<math>2^{32} - 1</math>)</p> <p><b>Default:</b> 15 (for Level 1 internal routes), 18 (for Level 2 internal routes), 160 (for Level 1 external routes), 165 (for Level 2 external routes)</p>
<b>Required Privilege Level</b>	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <i>Route Preferences Overview</i></li> <li>• <i>Example: Configuring a Routing Policy to Redistribute BGP Routes with a Specific Community Tag into IS-IS</i></li> <li>• <i>Example: Redistributing OSPF Routes into IS-IS</i></li> <li>• <i>Understanding Routing Policies</i></li> <li>• <i>Understanding BGP Communities and Extended Communities as Routing Policy Match Conditions</i></li> <li>• <a href="#">external-preference on page 22</a></li> </ul>

## prefix-export-limit (Protocols IS-IS)

<b>Syntax</b>	<code>prefix-export-limit <i>number</i>;</code>
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols isis <a href="#">level level-number</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols isis <a href="#">level level-number</a>],</p> <p>[edit protocols isis <a href="#">level level-number</a>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols isis <a href="#">level level-number</a>]</p>
<b>Release Information</b>	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
<b>Description</b>	<p>Configure a limit to the number of prefixes exported into IS-IS.</p> <p>By default, there is no limit to the number of prefixes that can be exported into IS-IS. To configure a limit to the number of prefixes that can be exported into IS-IS, include the <b>prefix-export-limit</b> statement. The <b>prefix-export-limit</b> statement protects the rest of the network from a malicious policy by applying a threshold filter for exported routes.</p> <p>The number of prefixes depends on the size of your network. Good design advice is to set it to double the total number of IS-IS Level 1 and Level 2 routing devices in your network.</p> <p>If the number of prefixes exported into IS-IS exceeds the configured limit, the overload bit is set and the overload state is reached. When other routers detect that this bit is set, they do not use this routing device for transit traffic, but they do use it for packets destined to the overloaded routing device's directly connected networks and IP prefixes. The overload state can be cleared by using the <a href="#">clear isis overload</a> command.</p> <p>The <a href="#">show isis overview</a> command displays the prefix export limit when it is configured.</p>
<b>Options</b>	<p><b><i>number</i></b>—Prefix limit.</p> <p><b>Range:</b> 0 through 4,294,967,295 (<math>2^{32} - 1</math>)</p> <p><b>Default:</b> None</p>
<b>Required Privilege Level</b>	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <i>Example: Redistributing OSPF Routes into IS-IS</i></li> <li>• <i>Example: Configuring a Routing Policy to Redistribute BGP Routes with a Specific Community Tag into IS-IS</i></li> <li>• <i>Understanding BGP Communities and Extended Communities as Routing Policy Match Conditions</i></li> <li>• <i>Understanding Routing Policies</i></li> </ul>

## priority (Protocols IS-IS)

---

<b>Syntax</b>	<code>priority <i>number</i>;</code>
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols isis interface <i>interface-name</i> level <i>level-number</i> ], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols isis interface <i>interface-name</i> level <i>level-number</i> ], [edit protocols isis interface <i>interface-name</i> level <i>level-number</i> ], [edit routing-instances <i>routing-instance-name</i> protocols isis interface <i>interface-name</i> level <i>level-number</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 12.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
<b>Description</b>	<p>Configure the interface's priority for becoming the designated router. The interface with the highest priority value becomes that level's designated router.</p> <p>The priority value is meaningful only on a multiaccess network. It has no meaning on a point-to-point interface.</p> <p>A routing device advertises its priority to become a designated router in its hello packets. On all multiaccess networks, IS-IS uses the advertised priorities to elect a designated router for the network. This routing device is responsible for sending network link-state advertisements, which describe all the routing devices attached to the network. These advertisements are flooded throughout a single area.</p> <p>A routing device's priority for becoming the designated router is indicated by an arbitrary number from 0 through 127. Routing devices with a higher value are more likely to become the designated router.</p>
<b>Options</b>	<i>number</i> —Priority value. <b>Range:</b> 0 through 127 <b>Default:</b> 64
<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 IS-IS Designated Routers</i></li></ul>

## reference-bandwidth (Protocols IS-IS)

<b>Syntax</b>	<code>reference-bandwidth <i>reference-bandwidth</i>;</code>
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols <i>isis</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <i>isis</i>],</p> <p>[edit protocols <i>isis</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <i>isis</i>]</p>
<b>Release Information</b>	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
<b>Description</b>	<p>Optimize routing based on bandwidth by setting the reference bandwidth used in calculating the default interface cost.</p> <p>All IS-IS interfaces have a cost, which is a routing metric that is used in the IS-IS link-state calculation. Routes with lower total path metrics are preferred over those with higher path metrics. When there are several equal-cost routes to a destination, traffic is distributed equally among them.</p> <p>The cost of a route is described by a single dimensionless metric that is determined using the following formula:</p> $\text{cost} = \text{reference-bandwidth} / \text{bandwidth}$ <p>For example, if you set the reference bandwidth to 1 Gbps (that is, <i>reference-bandwidth</i> is set to 1,000,000,000), a 100-Mbps interface has a routing metric of 10.</p> <p>All IS-IS interfaces have a cost, which is a routing metric that is used in the IS-IS link-state calculation. Routes with lower total path metrics are preferred over those with higher path metrics.</p>
<b>Options</b>	<p><i>reference-bandwidth</i>—Reference bandwidth value in bits per second.</p> <p><b>Range:</b> 9600 through 1,000,000,000,000 bps</p> <p><b>Default:</b> None</p>
<b>Required Privilege Level</b>	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <i>Understanding IS-IS Configuration</i></li> <li>• <i>Example: Configuring IS-IS</i></li> <li>• <a href="http://www.juniper.net/us/en/training/certification/JNCIP_studyguide.pdf">http://www.juniper.net/us/en/training/certification/JNCIP_studyguide.pdf</a></li> </ul>

## rib-group (Protocols IS-IS)

---

<b>Syntax</b>	<pre>rib-group {     inet <i>group-name</i>;     inet6 <i>group-name</i>; }</pre>
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols <a href="#">isis</a> ], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <a href="#">isis</a> ], [edit protocols <a href="#">isis</a> ], [edit routing-instances <i>routing-instance-name</i> protocols <a href="#">isis</a> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 12.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
<b>Description</b>	<p>Install routes learned from IS-IS routing instances into routing tables in the IS-IS routing table group. You can install IPv4 routes or IPv6 routes.</p> <p>Support for IPv6 routing table groups in IS-IS enables IPv6 routes that are learned from IS-IS routing instances to be installed into other routing tables defined in an IS-IS routing table group.</p>
<b>Options</b>	<p><b><i>group-name</i></b>—Name of the routing table group.</p> <p><b>inet</b>—Install IPv4 IS-IS routes.</p> <p><b>inet6</b>—Install IPv6 IS-IS routes.</p>
<b>Required Privilege Level</b>	<p><b>routing</b>—To view this statement in the configuration.</p> <p><b>routing-control</b>—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <i>Example: Exporting Specific Routes from One Routing Table Into Another Routing Table</i></li><li>• <i>Example: Importing Direct and Static Routes Into a Routing Instance</i></li><li>• <i>Understanding Multiprotocol BGP</i></li></ul>



## spf-options (Protocols IS-IS)

<b>Syntax</b>	<pre>spf-options {     delay <i>milliseconds</i>;     holddown <i>milliseconds</i>;     rapid-runs <i>number</i>; }</pre>
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols <i>isis</i>],          [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <i>isis</i>],          [edit protocols <i>isis</i>],          [edit routing-instances <i>routing-instance-name</i> protocols <i>isis</i>]</p>
<b>Release Information</b>	<p>Statement introduced in Junos OS Release 8.5.          Statement introduced in Junos OS Release 9.0 for EX Series switches.</p>
<b>Description</b>	<p>Configure options for running the shortest-path-first (SPF) algorithm.</p> <p>Running the SPF algorithm is usually the beginning of a series of larger system-wide events. For example, the SPF algorithm can lead to interior gateway protocol (IGP) prefix changes, which then lead to BGP nexthop resolution changes. Consider what happens if there are rapid link changes in the network. The local routing device can become overwhelmed. This is why it sometimes makes sense to throttle the scheduling of the SPF algorithm.</p> <p>You can configure the following SPF options:</p> <ul style="list-style-type: none"> <li>• The delay in the time between the detection of a topology change and when the SPF algorithm actually runs.</li> <li>• The maximum number of times that the SPF algorithm can run in succession before the hold-down timer begins.</li> <li>• The time to hold down, or wait, before running another SPF calculation after the SPF algorithm has run in succession the configured maximum number of times.</li> </ul> <p>If the network stabilizes during the hold-down period and the SPF algorithm does not need to run again, the system reverts to the configured values for the <b>delay</b> and <b>rapid-runs</b> statements.</p>
<b>Options</b>	<p><b>delay <i>milliseconds</i></b>—Time interval between the detection of a topology change and when the SPF algorithm runs.</p> <p><b>Range:</b> 50 through 1000 milliseconds</p> <p><b>Default:</b> 200 milliseconds</p> <p><b>holddown <i>milliseconds</i></b>—Time interval to hold down, or wait before a subsequent SPF algorithm runs after the SPF algorithm has run the configured maximum number of times in succession.</p> <p><b>Range:</b> 2000 through 10,000 milliseconds</p> <p><b>Default:</b> 5000 milliseconds</p>

**rapid-runs *number***—Maximum number of times the SPF algorithm can run in succession.  
After the maximum is reached, the holddown interval begins.

**Range:** 1 through 5

**Default:** 3

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

**Related Documentation**

- *Understanding Loop-Free Alternate Routes for IS-IS*
- *Example: Configuring Node-Link Protection for IS-IS Routes in a Layer 3 VPN*

---

## topologies (Protocols IS-IS)

---

**Syntax**

```
topologies {  
  ipv4-multicast;  
  ipv6-multicast;  
  ipv6-unicast;  
}
```

**Hierarchy Level** [edit logical-systems *logical-system-name* protocols *isis*],  
[edit logical-systems *logical-system-name* routing-instances *routing-instance-name* protocols *isis*],  
[edit protocols *isis*],  
[edit routing-instances *routing-instance-name* protocols *isis*]

**Release Information** Statement introduced before Junos OS Release 7.4.  
Statement introduced in Junos OS Release 9.0 for EX Series switches.  
Statement introduced in Junos OS Release 12.1 for the QFX Series.  
Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

**Description** Configure alternate IS-IS topologies.

The remaining statements are explained separately.

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

**Related Documentation**

- *Example: Configuring IS-IS IPv4 and IPv6 Unicast Topologies*
- *Example: Configuring IS-IS Multicast Topology*
- *IS-IS Multicast Topologies Overview*
- *Understanding IS-IS IPv4 and IPv6 Unicast Topologies*

## traceoptions (Protocols IS-IS)

<b>Syntax</b>	<pre>traceoptions {     file <i>name</i> &lt;size <i>size</i>&gt; &lt;files <i>number</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 <b>isis</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <b>isis</b>],</p> <p>[edit protocols <b>isis</b>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <b>isis</b>]</p>
<b>Release Information</b>	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
<b>Description</b>	Configure IS-IS protocol-level tracing options. To specify more than one tracing operation, include multiple <b>flag</b> statements.



**NOTE:** The **traceoptions** statement is not supported on QFabric systems.

<b>Default</b>	The default IS-IS protocol-level tracing options are those inherited from the routing protocols <b>traceoptions</b> statement included at the [edit routing-options] hierarchy level.
<b>Options</b>	<p><b>disable</b>—(Optional) Disable the tracing operation. You can use this option to disable a single operation when you have defined a broad group of tracing operations, such as <b>all</b>.</p> <p><b>file <i>name</i></b>—Name of the file to receive the output of the tracing operation. Enclose the name within quotation marks (" "). All files are placed in the directory <b>/var/log</b>. We recommend that you place IS-IS tracing output in the file <b>isis-log</b>.</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> 10 files</p> <p><b>flag <i>flag</i></b>—Tracing operation to perform. To specify more than one flag, include multiple <b>flag</b> statements.</p>

### IS-IS Protocol-Specific Tracing Flags

- **csn**—Complete sequence number PDU (CSNP) packets
- **error**—Errored IS-IS packets
- **graceful-restart**—Graceful restart operation
- **hello**—Hello packets
- **ldp-synchronization**—Synchronization between IS-IS and LDP
- **lsp**—Link-state PDUs
- **lsp-generation**—Link-state PDU generation packets
- **packets**—All IS-IS protocol packets
- **psn**—Partial sequence number PDU (PSNP) packets
- **spf**—Shortest-path-first calculations

#### Global Tracing Flags

- **all**—All tracing operations
- **general**—A combination of the **normal** and **route** trace operations
- **normal**—All normal operations, including adjacency changes

**Default:** If you do not specify this option, only unusual or abnormal operations are traced.

- **policy**—Policy operations and actions
- **route**—Routing table changes
- **state**—State transitions
- **task**—Routing protocol task processing
- **timer**—Routing protocol timer processing

**flag-modifier**—(Optional) Modifier for the tracing flag. You can specify one or more of these modifiers:

- **detail**—Provide detailed trace information.
- **receive**—Trace the packets being received.
- **send**—Trace the packets being transmitted.

**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. Note that 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 the Transmission Frequency for CSNPs on IS-IS Interfaces</i></li><li>• <i>Example: Enabling Packet Checksums on IS-IS Interfaces for Error Checking</i></li><li>• <i>Example: Configuring the Transmission Frequency for Link-State PDUs on IS-IS Interfaces</i></li><li>• <i>Understanding Link-State PDU Throttling for IS-IS Interfaces</i></li><li>• <i>Understanding Checksums on IS-IS Interfaces for Error Checking</i></li></ul>

## wide-metrics-only

---

<b>Syntax</b>	wide-metrics-only;
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols isis <b>level</b> <i>level-number</i> ], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols isis <b>level</b> <i>level-number</i> ], [edit protocols isis <b>level</b> <i>level-number</i> ], [edit routing-instances <i>routing-instance-name</i> protocols isis <b>level</b> <i>level-number</i> ]
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 12.1 for the QFX Series. Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
<b>Description</b>	<p>Configure IS-IS to generate metric values greater than 63 on a per IS-IS level basis.</p> <p>Normally, IS-IS metrics can have values up to 63, and IS-IS generates two type, length, and value (TLV) tuples, one for an IS-IS adjacency and the second for an IP prefix. To allow IS-IS to support traffic engineering, a second pair of TLVs has been added to IS-IS, one for IP prefixes and the second for IS-IS adjacency and traffic engineering information. With these TLVs, IS-IS metrics can have values up to 16,777,215 (<math>2^{24} - 1</math>).</p> <p>To configure IS-IS to generate only the new pair of TLVs and thus to allow the wider range of metric values, include the <b>wide-metrics-only</b> statement.</p>
<b>Default</b>	By default, Junos OS supports the sending and receiving of wide metrics. Junos OS allows a maximum metric value of 63 and generates both pairs of TLVs.
<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: Enabling Wide IS-IS Metrics for Traffic Engineering</i></li><li>• <i>te-metric</i></li></ul>

## PART 3

# Administration

- [Operational Commands on page 75](#)





## CHAPTER 3

# Operational Commands

- clear isis adjacency
- clear isis database
- clear isis overload
- clear isis statistics
- show isis adjacency
- show isis authentication
- show isis backup coverage
- show isis backup label-switched-path
- show isis backup spf results
- show isis database
- show isis hostname
- show isis interface
- show isis overview
- show isis route
- show isis spf
- show isis statistics

## clear isis adjacency

<b>List of Syntax</b>	<a href="#">Syntax on page 76</a> <a href="#">Syntax (EX Series Switches and QFX Series) on page 76</a>
<b>Syntax</b>	<pre>clear isis adjacency &lt;all&gt; &lt;instance <i>instance-name</i>&gt; &lt;interface <i>interface-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt; &lt;neighbor&gt;</pre>
<b>Syntax (EX Series Switches and QFX Series)</b>	<pre>clear isis adjacency &lt;all&gt; &lt;instance <i>instance-name</i>&gt; &lt;interface <i>interface-name</i>&gt; &lt;neighbor&gt;</pre>
<b>Release Information</b>	<p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 12.1 for the QFX Series.</p> <p><b>all</b> option introduced in Junos OS Release 14.2.</p>
<b>Description</b>	Remove entries from the IS-IS adjacency database.
<b>Options</b>	<p><b>none   all</b>—(Optional) Remove all entries from the adjacency database.</p> <p>Both <b>clear isis adjacency</b> and <b>clear isis adjacency all</b> function identically.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Clear all adjacencies for the specified routing instance only.</p> <p><b>interface <i>interface-name</i></b>—(Optional) Clear all adjacencies for the specified interface only.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>neighbor</b>—(Optional) Clear adjacencies for the specified neighbor only.</p>
<b>Required Privilege Level</b>	clear
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">show isis adjacency on page 84</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">clear isis adjacency on page 77</a> <a href="#">clear isis adjacency all on page 77</a>
<b>Output Fields</b>	See <a href="#">show isis adjacency</a> for an explanation of output fields.

## Sample Output

### clear isis adjacency

The following sample output displays IS-IS adjacency database information before and after the **clear isis adjacency** command is entered:

```
user@host> show isis adjacency
IS-IS adjacency database:
Interface      System          L State          Hold (secs) SNPA
so-1/0/0.0     karakul         3 Up             26
so-1/1/3.0     1921.6800.5080 3 Up             23
so-5/0/0.0     1921.6800.5080 3 Up             19
```

```
user@host> clear isis adjacency karakul
```

```
user@host> show isis adjacency
IS-IS adjacency database:
Interface      System          L State          Hold (secs) SNPA
so-1/0/0.0     karakul         3 Initializing   26
so-1/1/3.0     1921.6800.5080 3 Up             24
so-5/0/0.0     1921.6800.5080 3 Up             21
```

### clear isis adjacency all

```
user@host> clear isis adjacency all
IS-IS adjacency database:
Interface      System          L State          Hold (secs) SNPA
so-1/0/0.0     karakul         3 Initializing   26
so-1/1/3.0     1921.6800.5080 3 Initializing   24
so-5/0/0.0     1921.6800.5080 3 Initializing   21
```

## clear isis database

<b>List of Syntax</b>	<a href="#">Syntax on page 78</a> <a href="#">Syntax (EX Series Switches and QFX Series) on page 78</a>
<b>Syntax</b>	clear isis database <entries> <instance <i>instance-name</i> > <logical-system (all   <i>logical-system-name</i> )>
<b>Syntax (EX Series Switches and QFX Series)</b>	clear isis database <entries> <instance <i>instance-name</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 12.1 for the QFX Series. Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
<b>Description</b>	Remove the entries from the IS-IS link-state database, which contains prefixes and topology information.
<b>Options</b>	<b>none</b> —Remove all entries from the IS-IS link-state database for all routing instances.  <b>entries</b> —(Optional) Name of the database entry.  <b>instance <i>instance-name</i></b> —(Optional) Clear all entries for the specified routing instance.  <b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.
<b>Required Privilege Level</b>	clear
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">show isis database on page 97</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">clear isis database on page 78</a>
<b>Output Fields</b>	See <a href="#">show isis database</a> for an explanation of output fields.

## Sample Output

### clear isis database

The following sample output displays IS-IS link-state database information before and after the **clear isis database** command is entered:

```

user@host> show isis database
IS-IS level 1 link-state database:
LSP ID                Sequence Checksum Lifetime (secs)
crater.00-00          0x12    0x84dd          1139
    1 LSPs
IS-IS level 2 link-state database:

```

LSP ID	Sequence	Checksum	Lifetime (secs)
crater.00-00	0x19	0xe92c	1134
badlands.00-00	0x16	0x1454	985
carlsbad.00-00	0x33	0x220b	1015
ranier.00-00	0x2e	0xfc31	1007
1921.6800.5066.00-00	0x11	0x7313	566
1921.6800.5067.00-00	0x14	0xd9d4	939

6 LSPs

user@host> **clear isis database**

user@host> **show isis database**

IS-IS level 1 link-state database:

LSP ID	Sequence	Checksum	Lifetime (secs)
--------	----------	----------	-----------------

IS-IS level 2 link-state database:

LSP ID	Sequence	Checksum	Lifetime (secs)
--------	----------	----------	-----------------

## clear isis overload

---

List of Syntax	<a href="#">Syntax on page 80</a> <a href="#">Syntax (EX Series Switches and QFX Series) on page 80</a>
Syntax	<code>clear isis overload</code> <code>&lt;instance <i>instance-name</i>&gt;</code> <code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code>
Syntax (EX Series Switches and QFX Series)	<code>clear isis overload</code> <code>&lt;instance <i>instance-name</i>&gt;</code>
Release Information	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches. Command introduced in Junos OS Release 12.1 for the QFX Series. Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	<p>Reset the IS-IS dynamic overload bit. This command can appear to not work, continuing to display <b>overload</b> after execution. The bit is reset only if the root cause is corrected by configuration remotely or locally.</p> <p>When other routers detect that the overload bit is set, they do not use this routing device for transit traffic, but they do use it for packets destined to the overloaded routing device's directly connected networks and IP prefixes.</p>
Options	<p><b>none</b>—Reset the IS-IS dynamic overload bit.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Reset the IS-IS dynamic overload bit for the specified routing instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p>
Required Privilege Level	clear
Related Documentation	<ul style="list-style-type: none"><li>• <a href="#">show isis database on page 97</a></li></ul>
List of Sample Output	<a href="#">clear isis overload on page 80</a>
Output Fields	See <a href="#">show isis database</a> for an explanation of output fields.

## Sample Output

### clear isis overload

The following sample output displays IS-IS database information before and after the **clear isis overload** command is entered:

```
user@host> show isis database
```

IS-IS level 1 link-state database:

LSP ID	Sequence	Checksum	Lifetime	Attributes
pro3-c.00-00	0x4	0x10db	1185	L1 L2 <b>Overload</b>

1 LSPs

IS-IS level 2 link-state database:

LSP ID	Sequence	Checksum	Lifetime	Attributes
pro3-c.00-00	0x5	0x429f	1185	L1 L2 <b>Overload</b>

pro2-a.00-00	0x91e	0x2589	874	L1 L2
--------------	-------	--------	-----	-------

pro2-a.02-00	0x1	0xcbc	874	L1 L2
--------------	-----	-------	-----	-------

3 LSPs

user@host> clear isis overload

user@host> show isis database

IS-IS level 1 link-state database:

LSP ID	Sequence	Checksum	Lifetime	Attributes
pro3-c.00-00	0xa	0x429e	1183	L1 L2

1 LSPs

IS-IS level 2 link-state database:

LSP ID	Sequence	Checksum	Lifetime	Attributes
pro3-c.00-00	0xc	0x9c39	1183	L1 L2

pro2-a.00-00	0x91e	0x2589	783	L1 L2
--------------	-------	--------	-----	-------

pro2-a.02-00	0x1	0xcbc	783	L1 L2
--------------	-----	-------	-----	-------

3 LSPs

## clear isis statistics

<b>List of Syntax</b>	<a href="#">Syntax on page 82</a> <a href="#">Syntax (EX Series Switches and QFX Series) on page 82</a>
<b>Syntax</b>	clear isis statistics <instance <i>instance-name</i> > <logical-system (all   <i>logical-system-name</i> )>
<b>Syntax (EX Series Switches and QFX Series)</b>	clear isis statistics <instance <i>instance-name</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 12.1 for the QFX Series. Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
<b>Description</b>	Set statistics about IS-IS traffic to zero.
<b>Options</b>	<b>none</b> —Set IS-IS traffic statistics to zero for all routing instances.  <b>instance <i>instance-name</i></b> —(Optional) Set IS-IS traffic statistics to zero for the specified routing instance only.  <b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">show isis statistics on page 128</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">clear isis statistics on page 82</a>
<b>Output Fields</b>	See <a href="#">show isis statistics</a> for an explanation of output fields.

## Sample Output

### clear isis statistics

The following sample output displays IS-IS statistics before and after the **clear isis statistics** command is entered:

```
user@host> show isis statistics
IS-IS statistics for merino:
```

PDU type	Received	Processed	Drops	Sent	Rexmit
LSP	12793	12793	0	8666	719
IIH	116751	116751	0	118834	0
CSNP	203956	203956	0	204080	0
PSNP	7356	7350	6	8635	0
Unknown	0	0	0	0	0



```
Totals          340856    340850         6    340215        719
```

```
Total packets received: 340856 Sent: 340934
```

```
SNP queue length:          0 Drops:          0
LSP queue length:          0 Drops:          0
```

```
SPF runs:                1064
Fragments rebuilt:       1087
LSP regenerations:       436
Purges initiated:        0
```

```
user@host> clear isis statistics
```

```
user@host> show isis statistics
IS-IS statistics for merino:
```

PDU type	Received	Processed	Drops	Sent	Rexmit
LSP	0	0	0	0	0
IIH	3	3	0	3	0
CSNP	2	2	0	4	0
PSNP	0	0	0	0	0
Unknown	0	0	0	0	0
Totals	5	5	0	7	0

```
Total packets received: 5 Sent: 7
```

```
SNP queue length:          0 Drops:          0
LSP queue length:          0 Drops:          0
```

```
SPF runs:                0
Fragments rebuilt:       0
LSP regenerations:       0
Purges initiated:        0
```

## show isis adjacency

<b>List of Syntax</b>	<a href="#">Syntax on page 84</a> <a href="#">Syntax (EX Series Switches and QFX Series) on page 84</a>
<b>Syntax</b>	<pre>show isis adjacency &lt;system-id&gt; &lt;brief   detail   extensive&gt; &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>
<b>Syntax (EX Series Switches and QFX Series)</b>	<pre>show isis adjacency &lt;system-id&gt; &lt;brief   detail   extensive&gt; &lt;instance <i>instance-name</i>&gt;</pre>
<b>Release Information</b>	<p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
<b>Description</b>	Display information about IS-IS neighbors.
<b>Options</b>	<p><b>none</b>—Display standard information about IS-IS neighbors for all routing instances.</p> <p><b><i>system id</i></b>—(Optional) Display information about IS-IS neighbors for the specified intermediate system.</p> <p><b><i>brief   detail   extensive</i></b>—(Optional) Display standard information about IS-IS neighbors with the specified level of output.</p> <p><b><i>instance instance-name</i></b>—(Optional) Display information about IS-IS neighbors for the specified routing instance.</p> <p><b><i>logical-system (all   logical-system-name)</i></b>—(Optional) Display information about IS-IS neighbors for all logical systems or for a particular logical system.</p>
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">clear isis adjacency on page 76</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">show isis adjacency on page 86</a> <a href="#">show isis adjacency brief on page 86</a> <a href="#">show isis adjacency detail on page 87</a> <a href="#">show isis adjacency extensive on page 87</a>
<b>Output Fields</b>	<p><a href="#">Table 7 on page 85</a> describes the output fields for the <b>show isis adjacency</b> command. Output fields are listed in the approximate order in which they appear.</p>

Table 7: show isis adjacency Output Fields

Field Name	Field Description	Level of Output
<b>Interface</b>	Interface through which the neighbor is reachable.	All levels
<b>System</b>	System identifier ( <b>sysid</b> ), displayed as a name, if possible.	<b>brief</b>
<b>L or Level</b>	Level: <ul style="list-style-type: none"> <li>• 1—Level 1 only</li> <li>• 2—Level 2 only</li> <li>• 3—Level 1 and Level 2</li> </ul> An exclamation point (!) preceding the level number indicates that the adjacency is missing an IP address.	All levels
<b>State</b>	State of the adjacency: <b>Up</b> , <b>Down</b> , <b>New</b> , <b>One-way</b> , <b>Initializing</b> , or <b>Rejected</b> .	All levels
<b>Hold (secs)</b>	Remaining hold time of the adjacency.	<b>brief</b>
<b>SNPA</b>	Subnetwork point of attachment (MAC address of the next hop).	<b>brief</b>
<b>Expires in</b>	How long until the adjacency expires, in seconds.	<b>detail</b>
<b>Priority</b>	Priority to become the designated intermediate system.	<b>detail extensive</b>
<b>Up/Down transitions</b>	Count of adjacency status changes from <b>Up</b> to <b>Down</b> or from <b>Down</b> to <b>Up</b> .	<b>detail</b>
<b>Last transition</b>	Time of the last <b>Up/Down</b> transition.	<b>detail</b>
<b>Circuit type</b>	Bit mask of levels on this interface: 1=Level 1 router; 2=Level 2 router; 3=both Level 1 and Level 2 router.	<b>detail</b>
<b>Speaks</b>	Protocols supported by this neighbor.	<b>detail extensive</b>
<b>MAC address</b>	MAC address of the interface.	<b>detail extensive</b>
<b>Topologies</b>	Supported topologies.	<b>detail extensive</b>
<b>Restart capable</b>	Whether a neighbor is capable of graceful restart: <b>Yes</b> or <b>No</b> .	<b>detail extensive</b>
<b>Adjacency advertisement: Advertise</b>	This routing device has signaled to advertise this interface to its neighbors in their link-state PDUs.	<b>detail extensive</b>
<b>Adjacency advertisement: Suppress</b>	This neighbor has signaled not to advertise the interface in the routing device's outbound link-state PDUs.	<b>detail extensive</b>
<b>IP addresses</b>	IP address of this neighbor.	<b>detail extensive</b>

Table 7: show isis adjacency Output Fields (*continued*)

Field Name	Field Description	Level of Output
Transition log	<p>List of recent transitions, including:</p> <ul style="list-style-type: none"> <li>• <b>When</b>—Time at which an IS-IS adjacency transition occurred.</li> <li>• <b>State</b>—Current state of the IS-IS adjacency (<b>up</b>, <b>down</b>, or <b>rejected</b>). <ul style="list-style-type: none"> <li>• <b>Up</b>—Adjacency is up and operational.</li> <li>• <b>Down</b>—Adjacency is down and not available.</li> <li>• <b>Rejected</b>—Adjacency has been rejected.</li> </ul> </li> <li>• <b>Event</b>—Type of transition that occurred. <ul style="list-style-type: none"> <li>• <b>Seenself</b>—Possible routing loop has been detected.</li> <li>• <b>Interface down</b>—IS-IS interface has gone down and is no longer available.</li> <li>• <b>Error</b>—Adjacency error.</li> </ul> </li> <li>• <b>Down reason</b>—Reason that an IS-IS adjacency is down: <ul style="list-style-type: none"> <li>• <b>3-Way Handshake Failed</b>—Connection establishment failed.</li> <li>• <b>Address Mismatch</b>—Address mismatch caused link failure.</li> <li>• <b>Aged Out</b>—Link expired.</li> <li>• <b>ISO Area Mismatch</b>—IS-IS area mismatch caused link failure.</li> <li>• <b>Bad Hello</b>—Unacceptable hello message caused link failure.</li> <li>• <b>BFD Session Down</b>—Bidirectional failure detection caused link failure.</li> <li>• <b>Interface Disabled</b>—IS-IS interface is disabled.</li> <li>• <b>Interface Down</b>—IS-IS interface is unavailable.</li> <li>• <b>Interface Level Disabled</b>—IS-IS level is disabled.</li> <li>• <b>Level Changed</b>—IS-IS level has changed on the adjacency.</li> <li>• <b>Level Mismatch</b>—Levels on adjacency are not compatible.</li> <li>• <b>MPLS LSP Down</b>—Label-switched path (LSP) is unavailable.</li> <li>• <b>MT Topology Changed</b>—IS-IS topology has changed.</li> <li>• <b>MT Topology Mismatch</b>—IS-IS topology is mismatched.</li> <li>• <b>Remote System ID Changed</b>—Adjacency peer system ID changed.</li> <li>• <b>Protocol Shutdown</b>—IS-IS protocol is disabled.</li> <li>• <b>CLI Command</b>—Adjacency brought down by user.</li> <li>• <b>Unknown</b>—Unknown.</li> </ul> </li> </ul>	extensive

## Sample Output

### show isis adjacency

```

user@host> show isis adjacency
Interface          System      L State      Hold (secs) SNPA
at-2/3/0.0         ranier      3 Up         23

```

### show isis adjacency brief

The output for the **show isis adjacency brief** command is identical to that for the **show isis adjacency** command. For sample output, see [show isis adjacency on page 86](#).

### show isis adjacency detail

```
user@host> show isis adjacency detail
ranier
  Interface: at-2/3/0.0, Level: 3, State: Up, Expires in 21 secs
  Priority: 0, Up/Down transitions: 1, Last transition: 00:01:09 ago
  Circuit type: 3, Speaks: IP, IPv6
  Topologies: Unicast
  Restart capable: Yes
  IP addresses: 11.1.1.2
```

### show isis adjacency extensive

```
user@host> show isis adjacency extensive
ranier
  Interface: at-2/3/0.0, Level: 3, State: Up, Expires in 22 secs
  Priority: 0, Up/Down transitions: 1, Last transition: 00:01:16 ago
  Circuit type: 3, Speaks: IP, IPv6
  Topologies: Unicast
  Restart capable: Yes
  IP addresses: 11.1.1.2
  Transition log:
    When           State      Event      Down reason
    Wed Nov  8 21:24:25  Up        Seenself
```

## show isis authentication

<b>List of Syntax</b>	<a href="#">Syntax on page 88</a> <a href="#">Syntax (EX Series Switches and QFX Series) on page 88</a>
<b>Syntax</b>	<pre>show isis authentication &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>
<b>Syntax (EX Series Switches and QFX Series)</b>	<pre>show isis authentication &lt;instance <i>instance-name</i>&gt;</pre>
<b>Release Information</b>	<p>Command introduced in Junos OS Release 7.5.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Support for hitless authentication key rollover introduced in Junos OS Release 11.2.</p> <p>Command introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
<b>Description</b>	Display information about IS-IS authentication.
<b>Options</b>	<p><b>none</b>—Display information about IS-IS authentication.</p> <p><b>instance</b> <i>instance-name</i>—(Optional) Display IS-IS authentication for the specified routing instance.</p> <p><b>logical-system</b> (all   <i>logical-system-name</i>)—(Optional) Perform this operation on all logical systems or on a particular logical system.</p>
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li><a href="#">show security keychain</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">show isis authentication on page 89</a> <a href="#">show isis authentication (With Hitless Authentication Key Rollover Configured) on page 89</a>
<b>Output Fields</b>	<p><a href="#">Table 8 on page 88</a> describes the output fields for the <b>show isis authentication</b> command. Output fields are listed in the approximate order in which they appear.</p>

**Table 8: show isis authentication Output Fields**

Field Name	Field Description
<b>Interface</b>	Interface name.
<b>Level</b>	IS-IS level.

Table 8: show isis authentication Output Fields (*continued*)

Field Name	Field Description
IIH Auth	IS-IS Hello (IIH) packet authentication type.  Displays the name of the active keychain if hitless authentication key rollover is configured.
CSN Auth	Complete sequence number authentication type.
PSN Auth	Partial sequence number authentication type.
L1 LSP Authentication	Layer 1 link-state PDU authentication type.
L2 LSP Authentication	Layer 2 link-state PDU authentication type.

## Sample Output

### show isis authentication

```

user@host> show isis authentication
Interface          Level IIH Auth  CSN Auth  PSN Auth
at-2/3/0.0         1      Simple    Simple    Simple
                   2      MD5       MD5       MD5

L1 LSP Authentication: Simple
L2 LSP Authentication: MD5

```

### show isis authentication (With Hitless Authentication Key Rollover Configured)

```

user@host> show isis authentication
Interface          Level IIH Auth  CSN Auth  PSN Auth
so-0/1/3.0         2      hakrhello MD5       MD5

L2 LSP Authentication: MD5

```

## show isis backup coverage

<b>Syntax</b>	<pre>show isis backup coverage &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>
<b>Syntax (EX Series Switches and QFX Series)</b>	<pre>show isis backup coverage &lt;instance <i>instance-name</i>&gt;</pre>
<b>Release Information</b>	<p>Command introduced in Junos OS Release 9.5.</p> <p>Command introduced in Junos OS Release 9.5 for EX Series switches.</p> <p>Command introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
<b>Description</b>	Display information about the level of backup coverage available.
<b>Options</b>	<p><b>none</b>—Display information about the level of backup coverage available for all the nodes and prefixes in the network.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display information about the level of backup coverage for a specific IS-IS routing instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p>
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li><a href="#">Understanding Loop-Free Alternate Routes for IS-IS</a></li> <li><a href="#">Example: Configuring Node-Link Protection for IS-IS Routes in a Layer 3 VPN</a></li> <li><a href="#">show isis backup label-switched-path on page 92</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">show isis backup coverage on page 91</a>
<b>Output Fields</b>	<p><a href="#">Table 9 on page 90</a> lists the output fields for the <b>show isis backup coverage</b> command. Output fields are listed in the approximate order in which they appear.</p>

**Table 9: show isis backup coverage Output Fields**

Field Name	Field Description
<b>Topology</b>	Type of topology or address family: <b>IPv4 Unicast</b> or <b>IPv6 Unicast</b> .
<b>Level</b>	IS-IS level: <ul style="list-style-type: none"> <li>1—Level 1</li> <li>2—Level 2</li> </ul>
<b>Node</b>	By topology, the percentage of all routes configured on the node that are protected through backup coverage.



Table 9: show isis backup coverage Output Fields (*continued*)

Field Name	Field Description
IPv4	Percentage of IPv4 unicast routes that are protected through backup coverage.
IPv6	Percentage of IPv6 unicast routes that are protected through backup coverage.
CLNS	Percentage of Connectionless Network Service (CLNS) routes that are protected through backup coverage.

## Sample Output

show isis backup coverage

```

user@host> show isis backup coverage
Backup Coverage:
  Topology   Level  Node   IPv4   IPv6   CLNS
  IPV4 Unicast  2  28.57%  22.22%  0.00%  0.00%
  IPV6 Unicast  2   0.00%  0.00%  0.00%  0.00%

```

## show isis backup label-switched-path

<b>Syntax</b>	<b>show isis backup label-switched-path</b> <b>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</b>
<b>Syntax (EX Series Switches and QFX Series)</b>	<b>show isis backup label-switched-path</b>
<b>Release Information</b>	Command introduced in Junos OS Release 9.5. Command introduced in Junos OS Release 9.5 for EX Series switches. Command introduced in Junos OS Release 12.1 for the QFX Series. Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
<b>Description</b>	Display information about MPLS label-switched-paths (LSPs) designated as backup routes for IS-IS routes.
<b>Options</b>	<b>none</b> —Display information about MPLS LSPs designated as backup routes for IS-IS routes.  <b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <i>Understanding Loop-Free Alternate Routes for IS-IS</i></li> <li>• <i>Example: Configuring Node-Link Protection for IS-IS Routes in a Layer 3 VPN</i></li> <li>• <a href="#">show isis backup coverage on page 90</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">show isis backup label-switched-path on page 93</a>
<b>Output Fields</b>	<a href="#">Table 10 on page 92</a> lists the output fields for the <b>show isis backup label-switched-path</b> command. Output fields are listed in the approximate order in which they appear.

**Table 10: show isis backup label-switched-path Output Fields**

Field Name	Field Description
<b>Backup MPLS LSPs</b>	List of MPLS LSPs designated as backup paths for IS-IS routes.
<b>Egress</b>	IP address of the egress routing device for the LSP.

Table 10: show isis backup label-switched-path Output Fields (*continued*)

Field Name	Field Description
Status	<p>State of the LSP:</p> <ul style="list-style-type: none"> <li>• <b>Up</b>—The routing device can detect RSVP hello messages from the neighbor.</li> <li>• <b>Down</b>—The routing device has received one of the following indications: <ul style="list-style-type: none"> <li>• Communication failure from the neighbor.</li> <li>• Communication from IGP that the neighbor is unavailable.</li> <li>• Change in the sequence numbers in the RSVP hello messages sent by the neighbor.</li> </ul> </li> <li>• <b>Deleted</b>—LSP is no longer available as a backup path.</li> </ul>
Last change	Time elapsed since the neighbor state changed either from up to down or from down to up. The format is <i>hh:mm:ss</i> .
TE-metric	Configured traffic engineering metric.
Metric	Configured metric.

## Sample Output

### show isis backup label-switched-path

```

user@host> show isis backup label-switched-path
Backup MPLS LSPs:
f-to-g, Egress: 192.168.1.4, Status: up, Last change: 06:12:03
TE-metric: 9, Metric: 0

```

## show isis backup spf results

Syntax	<pre>show isis backup spf results &lt;instance <i>instance-name</i>&gt; &lt;level (1   2)&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt; &lt;no-coverage&gt; &lt;topology (ipv4-unicast   ipv6-multicast   ipv6-unicast   unicast)&gt;</pre>
Syntax (EX Series Switches)	<pre>show isis backup spf results &lt;instance <i>instance-name</i>&gt; &lt;level (1   2)&gt; &lt;no-coverage&gt; &lt;topology (ipv4-unicast   unicast)&gt;</pre>
Release Information	Command introduced in Junos OS Release 9.5.
Description	Display information about IS-IS shortest-path-first (SPF) calculations for backup paths.
Options	<p><b>none</b>—Display information about IS-IS SPF calculations for all backup paths for all destination nodes.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display SPF calculations for backup paths for the specified routing instance.</p> <p><b>level (1   2)</b>—(Optional) Display SPF calculations for the backup paths for the specified IS-IS level.</p> <p><b>logical-system <i>logical-system-name</i></b>—(Optional) Display SPF calculations for the backup paths for all logical systems or on a particular logical system.</p> <p><b>no-coverage</b>—(Optional) Display SPF calculations only for destinations that do not have backup coverage.</p> <p><b>topology (ipv4-multicast   ipv6-multicast   ipv6-unicast   unicast)</b>—(Optional) Display SPF calculations for backup paths for the specified topology only.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> <li>• <a href="#">show isis backup coverage on page 90</a></li> <li>• <i>Understanding Loop-Free Alternate Routes for IS-IS</i></li> <li>• <i>Example: Configuring Node-Link Protection for IS-IS Routes in a Layer 3 VPN</i></li> </ul>
List of Sample Output	<p><a href="#">show isis backup spf results on page 95</a></p> <p><a href="#">show isis backup spf results no-coverage on page 96</a></p>
Output Fields	Table 11 on page 95 lists the output fields for the <b>show isis backup spf results</b> command. Output fields are listed in the approximate order in which they appear.

Table 11: show isis backup spf results Output Fields

Field Name	Field Description
<i>node-name</i>	Name of the destination node.
<b>Address</b>	Address of the destination node.
<b>Primary next-hop</b>	Interface and name of the node of the primary next hop to reach the destination.
<b>Root</b>	Name of the next-hop neighbor.
<b>Metric</b>	Metric to the node.
<b>Eligible</b>	Indicates that the next-hop neighbor has been designated as a backup path to the destination node.
<b>Backup next-hop</b>	Name of the interface of the backup next hop.
<b>SNPA</b>	Subnetwork point of attachment (MAC address of the next hop).
<b>LSP</b>	Name of the MPLS label-switched path (LSP) designated as a backup path.
<b>Not eligible</b>	Indicates that the next-hop neighbor cannot function as a backup path to the destination.
<b>Reason</b>	Describes why the next-hop neighbor is designated as <b>Not eligible</b> as a backup path.

## Sample Output

### show isis backup spf results

```

user@host> show isis backup spf results
D.00
  Primary next-hop: fe-1/0/0.0, IPV4, R2.00, SNPA: 0:12:1e:cb:cc:dc
  Primary next-hop: fe-1/0/0.0, IPV6, R2.00, SNPA: 0:12:1e:cb:cc:dc
  Root: R2 via Direct, Root Metric: 1, Metric: 1, Root Preference: 0x0
Not eligible, IPV4, Reason: Primary next-hop link fate sharing
Not eligible, IPV6, Reason: Primary next-hop link fate sharing
  Root: S via Direct, Root Metric: 1, Metric: 3, Root Preference: 0x0
  track-item: R1.00-00
Not eligible, IPV4, Reason: Path loops
Not eligible, IPV6, Reason: Path loops
  Root: R4 via LDP, Root Metric: 3, Metric: 1, Root Preference: 0x0
  Eligible, IPV4, Protection-Type: Node Protect, Downstream Path
  Backup next-hop: fe-1/2/0.0, LSP LDP->R4(192.168.1.4)
  Eligible, IPV6, Protection-Type: Node Protect, Downstream Path
  Backup next-hop: fe-1/2/0.0, LSP LDP->R4(192.168.1.4)
  Root: R3 via LDP, Root Metric: 2, Metric: 2, Root Preference: 0x0
  Eligible, IPV4, Protection-Type: Node Protect, Downstream Path, Active
  Backup next-hop: fe-1/2/0.0, LSP LDP->R3(192.168.1.3)

```

Eligible, IPV6, Protection-Type: Node Protect, Downstream Path, Active  
Backup next-hop: fe-1/2/0.0, LSP LDP->R3(192.168.1.3)

### show isis backup spf results no-coverage

```
user@host> show isis backup spf results no-coverage
IS-IS level 1 SPF results:
pro-bng3-k.00
  Primary next-hop: fe-1/3/3.0, IPV4, pro-bng3-k, SNPA: b0:c6:9a:2c:f0:de
  Primary next-hop: fe-1/3/3.0, IPV6, pro-bng3-k, SNPA: b0:c6:9a:2c:f0:de
  Root: pro-bng3-k, Root Metric: 10, Metric: 0, Root Preference: 0x0
  Root: pro-bng3-i, Root Metric: 10, Metric: 20, Root Preference: 0x0
  track-item: pro-bng3-k.00-00
  track-item: pro-bng3-j.00-00
pro-bng3-i.00
  Primary next-hop: fe-0/1/2.0, IPV4, pro-bng3-i, SNPA: b0:c6:9a:2a:f4:21
  Primary next-hop: fe-0/1/2.0, IPV6, pro-bng3-i, SNPA: b0:c6:9a:2a:f4:21
  Root: pro-bng3-i, Root Metric: 10, Metric: 0, Root Preference: 0x0
  Root: pro-bng3-k, Root Metric: 10, Metric: 20, Root Preference: 0x0
  track-item: pro-bng3-j.00-00
  track-item: pro-bng3-i.00-00
2 nodes

IS-IS level 2 SPF results:
pro-bng3-k.00
  Primary next-hop: fe-1/3/3.0, IPV4, pro-bng3-k, SNPA: b0:c6:9a:2c:f0:de
  Primary next-hop: fe-1/3/3.0, IPV6, pro-bng3-k, SNPA: b0:c6:9a:2c:f0:de
  Root: pro-bng3-k, Root Metric: 10, Metric: 0, Root Preference: 0x0
  Root: pro-bng3-i, Root Metric: 10, Metric: 20, Root Preference: 0x0
  track-item: pro-bng3-k.00-00
  track-item: pro-bng3-j.00-00
pro-bng3-i.00
  Primary next-hop: fe-0/1/2.0, IPV4, pro-bng3-i, SNPA: b0:c6:9a:2a:f4:21
  Primary next-hop: fe-0/1/2.0, IPV6, pro-bng3-i, SNPA: b0:c6:9a:2a:f4:21
  Root: pro-bng3-i, Root Metric: 10, Metric: 0, Root Preference: 0x0
  Root: pro-bng3-k, Root Metric: 10, Metric: 20, Root Preference: 0x0
  track-item: pro-bng3-j.00-00
  track-item: pro-bng3-i.00-00
2 nodes
```

## show isis database

<b>List of Syntax</b>	<a href="#">Syntax on page 97</a> <a href="#">Syntax (EX Series Switches and QFX Series) on page 97</a>
<b>Syntax</b>	<pre>show isis database &lt;system-id&gt; &lt;brief   detail   extensive&gt; &lt;instance <i>instance-name</i>&gt; &lt;level (1   2)&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>
<b>Syntax (EX Series Switches and QFX Series)</b>	<pre>show isis database &lt;system-id&gt; &lt;brief   detail   extensive&gt; &lt;level (1   2)&gt; &lt;instance <i>instance-name</i>&gt;</pre>
<b>Release Information</b>	<p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
<b>Description</b>	Display the entries in the IS-IS link-state database, which contains data about PDU packets.
<b>Options</b>	<p><b>none</b>—Display standard information about IS-IS link-state database entries for all routing instances.</p> <p><b><i>system id</i></b>—(Optional) Display IS-IS link-state database entries for the specified intermediate system.</p> <p><b><i>brief   detail   extensive</i></b>—(Optional) Display the specified level of output.</p> <p><b><i>instance instance-name</i></b>—(Optional) Display IS-IS link-state database entries for the specified routing instance.</p> <p><b><i>level (1   2)</i></b>—(Optional) Display IS-IS link-state database entries for the specified IS-IS level.</p> <p><b><i>logical-system (all   logical-system-name)</i></b>—(Optional) Display standard information about IS-IS link-state database entries for all logical systems or for a particular logical system.</p>
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">clear isis database on page 78</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">show isis database on page 99</a> <a href="#">show isis database brief on page 100</a>

[show isis database detail on page 100](#)

[show isis database extensive on page 100](#)

**Output Fields** Table 12 on page 98 describes the output fields for the **show isis database** command. Output fields are listed in the approximate order in which they appear. Fields that contain internal IS-IS information useful only in troubleshooting obscure problems are not described in the table. For more details about these fields, contact your customer support representative.

**Table 12: show isis database Output Fields**

Field Name	Field Description	Level of Output
<b>Interface name</b>	Name of the interface on which the link-state PDU has been received; always <b>IS-IS</b> for this command.	All levels
level	Level of intermediate system: <ul style="list-style-type: none"> <li>• <b>1</b>—Intermediate system routes within an area; when the destination is outside an area, it routes toward a Level 2 system.</li> <li>• <b>2</b>—Intermediate system routes between areas and toward other ASs.</li> </ul>	All levels
LSP ID	Link-state PDU identifier.	All levels
Sequence	Sequence number of the link-state PDU.	All levels
Checksum	Checksum value of the link-state PDU.	All levels
Lifetime (secs)	Remaining lifetime of the link-state PDU, in seconds.	All levels
Attributes	Attributes of the specified database: <b>L1</b> , <b>L2</b> , <b>Overload</b> , or <b>Attached</b> (L1 only).	none <b>brief</b>
# LSPs	Total number of link-state PDUs in the specified link-state database.	none <b>brief</b>
IP prefix	Prefix advertised by this link-state PDU.	<b>detail extensive</b>
IS neighbor	IS-IS neighbor of the advertising system.	<b>detail extensive</b>
IP prefix	IPv4 prefix advertised by this link-state PDU.	<b>detail extensive</b>
V6 prefix	IPv6 prefix advertised by this link-state PDU.	<b>detail extensive</b>
Metric	Metric of the prefix or neighbor.	<b>detail extensive</b>
Header	<ul style="list-style-type: none"> <li>• <b>LSP ID</b>—Link state PDU identifier of the header.</li> <li>• <b>Length</b>—Header length.</li> <li>• <b>Allocated Length</b>—Amount of length available for the header.</li> <li>• <b>Router ID</b>—Address of the local routing device.</li> <li>• <b>Remaining Lifetime</b>—Remaining lifetime of the link-state PDU, in seconds.</li> </ul>	<b>extensive</b>



Table 12: show isis database Output Fields (*continued*)

Field Name	Field Description	Level of Output
Packet	<ul style="list-style-type: none"> <li>• <b>LSP ID</b>—The identifier for the link-state PDU.</li> <li>• <b>Length</b>—Packet length.</li> <li>• <b>Lifetime</b>—Remaining lifetime, in seconds.</li> <li>• <b>Checksum</b>—The checksum of the link-state PDU.</li> <li>• <b>Sequence</b>—The sequence number of the link-state PDU. Every time the link-state PDU is updated, this number increments.</li> <li>• <b>Attributes</b>—Packet attributes.</li> <li>• <b>NLPID</b>—Network layer protocol identifier.</li> <li>• <b>Fixed length</b>—Specifies the set length for the packet.</li> </ul>	extensive
TLVs	<ul style="list-style-type: none"> <li>• <b>Area Address</b>—Area addresses that the routing device can reach.</li> <li>• <b>Speaks</b>—Supported routing protocols.</li> <li>• <b>IP router id</b>—ID of the routing device (usually the IP address).</li> <li>• <b>IP address</b>—IPv4 address.</li> <li>• <b>Hostname</b>—Assigned name of the routing device.</li> <li>• <b>IP prefix</b>—IP prefix of the routing device.</li> <li>• <b>Metric</b>—IS-IS metric that measures the cost of the adjacency between the originating routing device and the advertised routing device.</li> <li>• <b>IP extended prefix</b>—Extended IP prefix of the routing device.</li> <li>• <b>IS neighbor</b>—Directly attached neighbor's name and metric.</li> <li>• <b>IS extended neighbor</b>—Directly attached neighbor's name, metric, IP address, local interface index, and remote interface index.</li> </ul> <p>The interface indexes enable Junos OS to support unnumbered extensions for IS-IS, as described in RFC 4205.</p>	extensive

## Sample Output

### show isis database

```

user@host> show isis database
IS-IS level 1 link-state database:
LSP ID                Sequence Checksum Lifetime Attributes
kobuk.00-00           0x3    0x3167    1057 L1 L2
camaro.00-00          0x5    0x770e    1091 L1 L2
ranier.00-00          0x4    0xaa95    1091 L1 L2
glacier.00-00         0x4    0x206f    1089 L1 L2
glacier.02-00         0x1    0xd141    1089 L1 L2
badlands.00-00        0x3    0x87a2    1093 L1 L2
  6 LSPs

IS-IS level 2 link-state database:
LSP ID                Sequence Checksum Lifetime Attributes
kobuk.00-00           0x6    0x8d6b    1096 L1 L2
camaro.00-00          0x9    0x877b    1101 L1 L2
ranier.00-00          0x8    0x855d    1103 L1 L2
glacier.00-00         0x7    0xf892    1098 L1 L2
glacier.02-00         0x1    0xd141    1089 L1 L2
badlands.00-00        0x6    0x562     1105 L1 L2
  6 LSPs

```

### show isis database brief

The output for the **show isis database brief** command is identical to that for the **show isis database** command. For sample output, see [show isis database on page 99](#).

### show isis database detail

```
user@host> show isis database logical-system CE3 sisira.00-00 detail
```

IS-IS level 1 link-state database:

```
sisira.00-00 Sequence: 0x11, Checksum: 0x10fc, Lifetime: 975 secs
  IS neighbor: hemantha-CE3.02           Metric:      10
  ES neighbor: 0015.0015.0015           Metric:      10 Down
  ES neighbor: 0025.0025.0025           Metric:      10 Down
  ES neighbor: 0030.0030.0030           Metric:      10 Down
  ES neighbor: 0040.0040.0040           Metric:      10 Down
  ES neighbor: sisira                     Metric:       0
  IP prefix: 1.0.0.0/24                  Metric:      10 External Down
  IP prefix: 3.0.0.0/24                  Metric:      10 External Down
  IP prefix: 4.0.0.0/24                  Metric:      10 External Down
  IP prefix: 5.0.0.0/24                  Metric:      10 Internal Up
  IP prefix: 15.15.15.15/32              Metric:      10 External Down
  IP prefix: 25.25.25.25/32              Metric:      10 External Down
  IP prefix: 30.30.30.30/32              Metric:      10 External Down
  IP prefix: 40.40.40.40/32              Metric:      10 External Down
  IP prefix: 60.60.60.60/32              Metric:       0 Internal Up
```

IS-IS level 2 link-state database:

```
sisira.00-00 Sequence: 0x13, Checksum: 0x69ac, Lifetime: 993 secs
  IS neighbor: hemantha-CE3.02           Metric:      10
  IP prefix: 1.0.0.0/24                  Metric:      10 External Down
  IP prefix: 3.0.0.0/24                  Metric:      10 External Down
  IP prefix: 4.0.0.0/24                  Metric:      10 External Down
  IP prefix: 5.0.0.0/24                  Metric:      10 Internal Up
  IP prefix: 15.15.15.15/32              Metric:      10 External Down
  IP prefix: 25.25.25.25/32              Metric:      10 External Down
  IP prefix: 30.30.30.30/32              Metric:      10 External Down
  IP prefix: 40.40.40.40/32              Metric:      10 External Down
  IP prefix: 50.50.50.50/32              Metric:      10 Internal Up
  IP prefix: 60.60.60.60/32              Metric:       0 Internal Up
  ISO prefix: 60.0006.80ff.f800.0000.0108.0001.0015.0015.0015/152
                                          Metric:      10 External Down
  ISO prefix: 60.0006.80ff.f800.0000.0108.0001.0025.0025.0025/152
                                          Metric:      10 External Down
  ISO prefix: 60.0006.80ff.f800.0000.0108.0001.0030.0030.0030/152
                                          Metric:      10 External Down
  ISO prefix: 60.0006.80ff.f800.0000.0108.0001.0040.0040.0040/152
                                          Metric:      10 External Down
  ISO prefix: 60.0006.80ff.f800.0000.0108.0001.0060.0060.0060/152
                                          Metric:       0 Internal Up
```

### show isis database extensive

```
user@host> show isis database extensive
```

IS-IS level 1 link-state database:

```
Router-A.00-00 Sequence: 0x1, Checksum: 0xf75c, Lifetime: 1116 secs
```

IP prefix: 192.168.0.1/32                      Metric:              0 Internal Up

Header: LSP ID: Router-A.00-00, Length: 85 bytes  
 Allocated length: 1492 bytes, Router ID: 192.168.0.1  
 Remaining lifetime: 1116 secs, Level: 1, Interface: 0  
 Estimated free bytes: 1353, Actual free bytes: 1407  
 Aging timer expires in: 1116 secs  
 Protocols: IP, IPv6

Packet: LSP ID: Router-A.00-00, Length: 85 bytes, Lifetime : 1200 secs  
 Checksum: 0xf75c, Sequence: 0x1, Attributes: 0x3 <L1 L2>  
 NLPID: 0x83, Fixed length: 27 bytes, Version: 1, Sysid length: 0 bytes  
 Packet type: 18, Packet version: 1, Max area: 0

#### TLVs:

Area address: 49.0002 (3)  
 LSP Buffer Size: 1492  
 Speaks: IP  
 Speaks: IPV6  
 IP router id: 192.168.0.1  
 IP address: 192.168.0.1  
 Hostname: Router-A  
 IP prefix: 192.168.0.1/32, Internal, Metric: default 0, Up  
 IP extended prefix: 192.168.0.1/32 metric 0 up

No queued transmissions

#### IS-IS level 2 link-state database:

Router-A.00-00 Sequence: 0x5, Checksum: 0x3196, Lifetime: 1158 secs  
 IS neighbor: Router-B.02                      Metric:              10  
     Two-way fragment: Router-B.02-00, Two-way first fragment: Router-B.02-00  
 IS neighbor: Router-E.02                      Metric:              10  
     Two-way fragment: Router-E.02-00, Two-way first fragment: Router-E.02-00  
 IP prefix: 10.0.0.0/30                      Metric:              10 Internal Up  
 IP prefix: 10.0.0.4/30                      Metric:              10 Internal Up  
 IP prefix: 192.168.0.1/32                      Metric:              0 Internal Up

Header: LSP ID: Router-A.00-00, Length: 208 bytes  
 Allocated length: 1492 bytes, Router ID: 192.168.0.1  
 Remaining lifetime: 1158 secs, Level: 2, Interface: 0  
 Estimated free bytes: 1233, Actual free bytes: 1284  
 Aging timer expires in: 1158 secs  
 Protocols: IP, IPv6

Packet: LSP ID: Router-A.00-00, Length: 208 bytes, Lifetime : 1198 secs  
 Checksum: 0x3196, Sequence: 0x5, Attributes: 0x3 <L1 L2>  
 NLPID: 0x83, Fixed length: 27 bytes, Version: 1, Sysid length: 0 bytes  
 Packet type: 20, Packet version: 1, Max area: 0

#### TLVs:

Area address: 49.0002 (3)  
 LSP Buffer Size: 1492  
 Speaks: IP  
 Speaks: IPV6  
 IP router id: 192.168.0.1  
 IP address: 192.168.0.1  
 Hostname: Router-A  
 IP prefix: 192.168.0.1/32, Internal, Metric: default 0, Up  
 IP prefix: 10.0.0.4/30, Internal, Metric: default 10, Up  
 IP prefix: 10.0.0.0/30, Internal, Metric: default 10, Up  
 IP extended prefix: 192.168.0.1/32 metric 0 up

```

IP extended prefix: 10.0.0.4/30 metric 10 up
IP extended prefix: 10.0.0.0/30 metric 10 up
IS neighbor: Router-E.02, Internal, Metric: default 10
IS neighbor: Router-B.02, Internal, Metric: default 10
IS extended neighbor: Router-E.02, Metric: default 10
  IP address: 10.0.0.1
    Local interface index: 101, Remote interface index: 0
IS extended neighbor: Router-B.02, Metric: default 10
  IP address: 10.0.0.5
    Local interface index: 102, Remote interface index: 0
No queued transmissions

Router-B.00-00 Sequence: 0x5, Checksum: 0xf8f, Lifetime: 1183 secs
  IS neighbor: Router-B.02                      Metric: 10
    Two-way fragment: Router-B.02-00, Two-way first fragment: Router-B.02-00
  IS neighbor: Router-C.02                      Metric: 10
    Two-way fragment: Router-C.02-00, Two-way first fragment: Router-C.02-00
IP prefix: 10.0.0.4/30                          Metric: 10 Internal Up
IP prefix: 10.0.0.8/30                          Metric: 10 Internal Up
IP prefix: 192.168.0.2/32                      Metric: 0 Internal Up

Header: LSP ID: Router-B.00-00, Length: 208 bytes
  Allocated length: 284 bytes, Router ID: 192.168.0.2
  Remaining lifetime: 1183 secs, Level: 2, Interface: 102
  Estimated free bytes: 114, Actual free bytes: 76
  Aging timer expires in: 1183 secs
  Protocols: IP, IPv6

Packet: LSP ID: Router-B.00-00, Length: 208 bytes, Lifetime : 1196 secs
  Checksum: 0xf8f, Sequence: 0x5, Attributes: 0x3 <L1 L2>
  NLPID: 0x83, Fixed length: 27 bytes, Version: 1, Sysid length: 0 bytes
  Packet type: 20, Packet version: 1, Max area: 0

TLVs:
  Area address: 49.0002 (3)
  LSP Buffer Size: 1492
  Speaks: IP
  Speaks: IPV6
  IP router id: 192.168.0.2
  IP address: 192.168.0.2
  Hostname: Router-B
  IP prefix: 192.168.0.2/32, Internal, Metric: default 0, Up
  IP prefix: 10.0.0.4/30, Internal, Metric: default 10, Up
  IP prefix: 10.0.0.8/30, Internal, Metric: default 10, Up
  IP extended prefix: 192.168.0.2/32 metric 0 up
  IP extended prefix: 10.0.0.4/30 metric 10 up
  IP extended prefix: 10.0.0.8/30 metric 10 up
  IS neighbor: Router-B.02, Internal, Metric: default 10
  IS neighbor: Router-C.02, Internal, Metric: default 10
  IS extended neighbor: Router-B.02, Metric: default 10
    IP address: 10.0.0.6
      Local interface index: 108, Remote interface index: 0
  IS extended neighbor: Router-C.02, Metric: default 10
    IP address: 10.0.0.9
      Local interface index: 109, Remote interface index: 0
No queued transmissions

Router-B.02-00 Sequence: 0x1, Checksum: 0x3c7c, Lifetime: 1156 secs
  IS neighbor: Router-A.00                      Metric: 0
    Two-way fragment: Router-A.00-00, Two-way first fragment: Router-A.00-00
  IS neighbor: Router-B.00                      Metric: 0

```

Two-way fragment: Router-B.00-00, Two-way first fragment: Router-B.00-00

Header: LSP ID: Router-B.02-00, Length: 76 bytes  
 Allocated length: 284 bytes, Router ID: 0.0.0.0  
 Remaining lifetime: 1156 secs, Level: 2, Interface: 102  
 Estimated free bytes: 208, Actual free bytes: 208  
 Aging timer expires in: 1156 secs

Packet: LSP ID: Router-B.02-00, Length: 76 bytes, Lifetime : 1196 secs  
 Checksum: 0x3c7c, Sequence: 0x1, Attributes: 0x3 <L1 L2>  
 NLPID: 0x83, Fixed length: 27 bytes, Version: 1, Sysid length: 0 bytes  
 Packet type: 20, Packet version: 1, Max area: 0

TLVs:

IS neighbor: Router-B.00, Internal, Metric: default 0  
 IS neighbor: Router-A.00, Internal, Metric: default 0  
 IS extended neighbor: Router-B.00, Metric: default 0  
 IS extended neighbor: Router-A.00, Metric: default 0

No queued transmissions

Router-C.00-00 Sequence: 0x5, Checksum: 0x255b, Lifetime: 1182 secs  
 IS neighbor: Router-C.02 Metric: 10  
 Two-way fragment: Router-C.02-00, Two-way first fragment: Router-C.02-00  
 IS neighbor: Router-D.03 Metric: 10  
 Two-way fragment: Router-D.03-00, Two-way first fragment: Router-D.03-00  
 IP prefix: 10.0.0.8/30 Metric: 10 Internal Up  
 IP prefix: 10.0.0.12/30 Metric: 10 Internal Up  
 IP prefix: 192.168.0.3/32 Metric: 0 Internal Up

Header: LSP ID: Router-C.00-00, Length: 208 bytes  
 Allocated length: 284 bytes, Router ID: 192.168.0.3  
 Remaining lifetime: 1182 secs, Level: 2, Interface: 102  
 Estimated free bytes: 114, Actual free bytes: 76  
 Aging timer expires in: 1182 secs  
 Protocols: IP, IPv6

Packet: LSP ID: Router-C.00-00, Length: 208 bytes, Lifetime : 1196 secs  
 Checksum: 0x255b, Sequence: 0x5, Attributes: 0x3 <L1 L2>  
 NLPID: 0x83, Fixed length: 27 bytes, Version: 1, Sysid length: 0 bytes  
 Packet type: 20, Packet version: 1, Max area: 0

TLVs:

Area address: 49.0002 (3)  
 LSP Buffer Size: 1492  
 Speaks: IP  
 Speaks: IPV6  
 IP router id: 192.168.0.3  
 IP address: 192.168.0.3  
 Hostname: Router-C  
 IP prefix: 192.168.0.3/32, Internal, Metric: default 0, Up  
 IP prefix: 10.0.0.8/30, Internal, Metric: default 10, Up  
 IP prefix: 10.0.0.12/30, Internal, Metric: default 10, Up  
 IP extended prefix: 192.168.0.3/32 metric 0 up  
 IP extended prefix: 10.0.0.8/30 metric 10 up  
 IP extended prefix: 10.0.0.12/30 metric 10 up  
 IS neighbor: Router-C.02, Internal, Metric: default 10  
 IS neighbor: Router-D.03, Internal, Metric: default 10  
 IS extended neighbor: Router-C.02, Metric: default 10  
 IP address: 10.0.0.10  
 Local interface index: 105, Remote interface index: 0  
 IS extended neighbor: Router-D.03, Metric: default 10

```

    IP address: 10.0.0.13
    Local interface index: 106, Remote interface index: 0
    No queued transmissions

Router-C.02-00 Sequence: 0x1, Checksum: 0xaa09, Lifetime: 1181 secs
  IS neighbor: Router-B.00 Metric: 0
    Two-way fragment: Router-B.00-00, Two-way first fragment: Router-B.00-00
  IS neighbor: Router-C.00 Metric: 0
    Two-way fragment: Router-C.00-00, Two-way first fragment: Router-C.00-00

Header: LSP ID: Router-C.02-00, Length: 76 bytes
  Allocated length: 284 bytes, Router ID: 0.0.0.0
  Remaining lifetime: 1181 secs, Level: 2, Interface: 102
  Estimated free bytes: 208, Actual free bytes: 208
  Aging timer expires in: 1181 secs

Packet: LSP ID: Router-C.02-00, Length: 76 bytes, Lifetime : 1194 secs
  Checksum: 0xaa09, Sequence: 0x1, Attributes: 0x3 <L1 L2>
  NLPID: 0x83, Fixed length: 27 bytes, Version: 1, Sysid length: 0 bytes
  Packet type: 20, Packet version: 1, Max area: 0

TLVs:
  IS neighbor: Router-C.00, Internal, Metric: default 0
  IS neighbor: Router-B.00, Internal, Metric: default 0
  IS extended neighbor: Router-C.00, Metric: default 0
  IS extended neighbor: Router-B.00, Metric: default 0
  No queued transmissions

Router-D.00-00 Sequence: 0x4, Checksum: 0x8ab7, Lifetime: 1180 secs
  IS neighbor: Router-D.02 Metric: 10
    Two-way fragment: Router-D.02-00, Two-way first fragment: Router-D.02-00
  IS neighbor: Router-D.03 Metric: 10
    Two-way fragment: Router-D.03-00, Two-way first fragment: Router-D.03-00
  IP prefix: 10.0.0.12/30 Metric: 10 Internal Up
  IP prefix: 10.0.0.20/30 Metric: 10 Internal Up
  IP prefix: 192.168.0.4/32 Metric: 0 Internal Up

Header: LSP ID: Router-D.00-00, Length: 208 bytes
  Allocated length: 284 bytes, Router ID: 192.168.0.4
  Remaining lifetime: 1180 secs, Level: 2, Interface: 102
  Estimated free bytes: 114, Actual free bytes: 76
  Aging timer expires in: 1180 secs
  Protocols: IP, IPv6

Packet: LSP ID: Router-D.00-00, Length: 208 bytes, Lifetime : 1192 secs
  Checksum: 0x8ab7, Sequence: 0x4, Attributes: 0x3 <L1 L2>
  NLPID: 0x83, Fixed length: 27 bytes, Version: 1, Sysid length: 0 bytes
  Packet type: 20, Packet version: 1, Max area: 0

TLVs:
  Area address: 49.0002 (3)
  LSP Buffer Size: 1492
  Speaks: IP
  Speaks: IPV6
  IP router id: 192.168.0.4
  IP address: 192.168.0.4
  Hostname: Router-D
  IP prefix: 192.168.0.4/32, Internal, Metric: default 0, Up
  IP prefix: 10.0.0.12/30, Internal, Metric: default 10, Up
  IP prefix: 10.0.0.20/30, Internal, Metric: default 10, Up
  IP extended prefix: 192.168.0.4/32 metric 0 up

```

```

IP extended prefix: 10.0.0.12/30 metric 10 up
IP extended prefix: 10.0.0.20/30 metric 10 up
IS neighbor: Router-D.02, Internal, Metric: default 10
IS neighbor: Router-D.03, Internal, Metric: default 10
IS extended neighbor: Router-D.02, Metric: default 10
  IP address: 10.0.0.22
  Local interface index: 115, Remote interface index: 0
IS extended neighbor: Router-D.03, Metric: default 10
  IP address: 10.0.0.14
  Local interface index: 114, Remote interface index: 0
No queued transmissions

Router-D.02-00 Sequence: 0x1, Checksum: 0xebbc, Lifetime: 1128 secs
IS neighbor: Router-D.00 Metric: 0
  Two-way fragment: Router-D.00-00, Two-way first fragment: Router-D.00-00
IS neighbor: Router-F.00 Metric: 0
  Two-way fragment: Router-F.00-00, Two-way first fragment: Router-F.00-00

Header: LSP ID: Router-D.02-00, Length: 76 bytes
  Allocated length: 284 bytes, Router ID: 0.0.0.0
  Remaining lifetime: 1128 secs, Level: 2, Interface: 101
  Estimated free bytes: 208, Actual free bytes: 208
  Aging timer expires in: 1128 secs

Packet: LSP ID: Router-D.02-00, Length: 76 bytes, Lifetime : 1160 secs
  Checksum: 0xebbc, Sequence: 0x1, Attributes: 0x3 <L1 L2>
  NLPID: 0x83, Fixed length: 27 bytes, Version: 1, Sysid length: 0 bytes
  Packet type: 20, Packet version: 1, Max area: 0

TLVs:
  IS neighbor: Router-D.00, Internal, Metric: default 0
  IS neighbor: Router-F.00, Internal, Metric: default 0
  IS extended neighbor: Router-D.00, Metric: default 0
  IS extended neighbor: Router-F.00, Metric: default 0
No queued transmissions

Router-D.03-00 Sequence: 0x1, Checksum: 0x129b, Lifetime: 1180 secs
IS neighbor: Router-C.00 Metric: 0
  Two-way fragment: Router-C.00-00, Two-way first fragment: Router-C.00-00
IS neighbor: Router-D.00 Metric: 0
  Two-way fragment: Router-D.00-00, Two-way first fragment: Router-D.00-00

Header: LSP ID: Router-D.03-00, Length: 76 bytes
  Allocated length: 284 bytes, Router ID: 0.0.0.0
  Remaining lifetime: 1180 secs, Level: 2, Interface: 101
  Estimated free bytes: 208, Actual free bytes: 208
  Aging timer expires in: 1180 secs

Packet: LSP ID: Router-D.03-00, Length: 76 bytes, Lifetime : 1192 secs
  Checksum: 0x129b, Sequence: 0x1, Attributes: 0x3 <L1 L2>
  NLPID: 0x83, Fixed length: 27 bytes, Version: 1, Sysid length: 0 bytes
  Packet type: 20, Packet version: 1, Max area: 0

TLVs:
  IS neighbor: Router-D.00, Internal, Metric: default 0
  IS neighbor: Router-C.00, Internal, Metric: default 0
  IS extended neighbor: Router-D.00, Metric: default 0
  IS extended neighbor: Router-C.00, Metric: default 0
No queued transmissions

Router-E.00-00 Sequence: 0x4, Checksum: 0x9da9, Lifetime: 1155 secs

```

```

IS neighbor: Router-E.02                      Metric:      10
  Two-way fragment: Router-E.02-00, Two-way first fragment: Router-E.02-00
IS neighbor: Router-F.02                      Metric:      20
  Two-way fragment: Router-F.02-00, Two-way first fragment: Router-F.02-00
IP prefix: 10.0.0.0/30                        Metric:      10 Internal Up
IP prefix: 10.0.0.16/30                      Metric:      20 Internal Up
IP prefix: 192.168.0.5/32                   Metric:       0 Internal Up

```

```

Header: LSP ID: Router-E.00-00, Length: 208 bytes
  Allocated length: 284 bytes, Router ID: 192.168.0.5
  Remaining lifetime: 1155 secs, Level: 2, Interface: 101
  Estimated free bytes: 114, Actual free bytes: 76
  Aging timer expires in: 1155 secs
  Protocols: IP, IPv6

```

```

Packet: LSP ID: Router-E.00-00, Length: 208 bytes, Lifetime : 1185 secs
  Checksum: 0x9da9, Sequence: 0x4, Attributes: 0x3 <L1 L2>
  NLPID: 0x83, Fixed length: 27 bytes, Version: 1, Sysid length: 0 bytes
  Packet type: 20, Packet version: 1, Max area: 0

```

#### TLVs:

```

Area address: 49.0002 (3)
LSP Buffer Size: 1492
Speaks: IP
Speaks: IPV6
IP router id: 192.168.0.5
IP address: 192.168.0.5
Hostname: Router-E
IP prefix: 192.168.0.5/32, Internal, Metric: default 0, Up
IP prefix: 10.0.0.16/30, Internal, Metric: default 20, Up
IP prefix: 10.0.0.0/30, Internal, Metric: default 10, Up
IP extended prefix: 192.168.0.5/32 metric 0 up
IP extended prefix: 10.0.0.16/30 metric 20 up
IP extended prefix: 10.0.0.0/30 metric 10 up
IS neighbor: Router-E.02, Internal, Metric: default 10
IS neighbor: Router-F.02, Internal, Metric: default 20
IS extended neighbor: Router-E.02, Metric: default 10
  IP address: 10.0.0.2
  Local interface index: 112, Remote interface index: 0
IS extended neighbor: Router-F.02, Metric: default 20
  IP address: 10.0.0.17
  Local interface index: 111, Remote interface index: 0
No queued transmissions

```

```

Router-E.02-00 Sequence: 0x1, Checksum: 0xb4fa, Lifetime: 1130 secs
IS neighbor: Router-A.00                      Metric:       0
  Two-way fragment: Router-A.00-00, Two-way first fragment: Router-A.00-00
IS neighbor: Router-E.00                      Metric:       0
  Two-way fragment: Router-E.00-00, Two-way first fragment: Router-E.00-00

```

```

Header: LSP ID: Router-E.02-00, Length: 76 bytes
  Allocated length: 284 bytes, Router ID: 0.0.0.0
  Remaining lifetime: 1130 secs, Level: 2, Interface: 101
  Estimated free bytes: 208, Actual free bytes: 208
  Aging timer expires in: 1130 secs

```

```

Packet: LSP ID: Router-E.02-00, Length: 76 bytes, Lifetime : 1161 secs
  Checksum: 0xb4fa, Sequence: 0x1, Attributes: 0x3 <L1 L2>
  NLPID: 0x83, Fixed length: 27 bytes, Version: 1, Sysid length: 0 bytes
  Packet type: 20, Packet version: 1, Max area: 0

```



## TLVs:

IS neighbor: Router-E.00, Internal, Metric: default 0  
 IS neighbor: Router-A.00, Internal, Metric: default 0  
 IS extended neighbor: Router-E.00, Metric: default 0  
 IS extended neighbor: Router-A.00, Metric: default 0

No queued transmissions

Router-F.00-00 Sequence: 0x5, Checksum: 0x94bd, Lifetime: 1153 secs  
 IS neighbor: Router-D.02 Metric: 10  
 Two-way fragment: Router-D.02-00, Two-way first fragment: Router-D.02-00  
 IS neighbor: Router-F.02 Metric: 10  
 Two-way fragment: Router-F.02-00, Two-way first fragment: Router-F.02-00  
 IP prefix: 10.0.0.16/30 Metric: 10 Internal Up  
 IP prefix: 10.0.0.20/30 Metric: 10 Internal Up  
 IP prefix: 192.168.0.6/32 Metric: 0 Internal Up

Header: LSP ID: Router-F.00-00, Length: 208 bytes  
 Allocated length: 284 bytes, Router ID: 192.168.0.6  
 Remaining lifetime: 1153 secs, Level: 2, Interface: 101  
 Estimated free bytes: 76, Actual free bytes: 76  
 Aging timer expires in: 1153 secs  
 Protocols: IP, IPv6

Packet: LSP ID: Router-F.00-00, Length: 208 bytes, Lifetime : 1183 secs  
 Checksum: 0x94bd, Sequence: 0x5, Attributes: 0x3 <L1 L2>  
 NLPID: 0x83, Fixed length: 27 bytes, Version: 1, Sysid length: 0 bytes  
 Packet type: 20, Packet version: 1, Max area: 0

## TLVs:

Area address: 49.0002 (3)  
 LSP Buffer Size: 1492  
 Speaks: IP  
 Speaks: IPV6  
 IP router id: 192.168.0.6  
 IP address: 192.168.0.6  
 Hostname: Router-F  
 IP prefix: 192.168.0.6/32, Internal, Metric: default 0, Up  
 IP prefix: 10.0.0.16/30, Internal, Metric: default 10, Up  
 IP prefix: 10.0.0.20/30, Internal, Metric: default 10, Up  
 IP extended prefix: 192.168.0.6/32 metric 0 up  
 IP extended prefix: 10.0.0.16/30 metric 10 up  
 IP extended prefix: 10.0.0.20/30 metric 10 up  
 IS neighbor: Router-D.02, Internal, Metric: default 10  
 IS neighbor: Router-F.02, Internal, Metric: default 10  
 IS extended neighbor: Router-D.02, Metric: default 10  
 IP address: 10.0.0.21  
 Local interface index: 94, Remote interface index: 0  
 IS extended neighbor: Router-F.02, Metric: default 10  
 IP address: 10.0.0.18  
 Local interface index: 93, Remote interface index: 0

No queued transmissions

Router-F.02-00 Sequence: 0x1, Checksum: 0xf5ae, Lifetime: 1153 secs  
 IS neighbor: Router-E.00 Metric: 0  
 Two-way fragment: Router-E.00-00, Two-way first fragment: Router-E.00-00  
 IS neighbor: Router-F.00 Metric: 0  
 Two-way fragment: Router-F.00-00, Two-way first fragment: Router-F.00-00

Header: LSP ID: Router-F.02-00, Length: 76 bytes  
 Allocated length: 284 bytes, Router ID: 0.0.0.0  
 Remaining lifetime: 1153 secs, Level: 2, Interface: 101

Estimated free bytes: 208, Actual free bytes: 208  
Aging timer expires in: 1153 secs

Packet: LSP ID: Router-F.02-00, Length: 76 bytes, Lifetime : 1183 secs  
Checksum: 0xf5ae, Sequence: 0x1, Attributes: 0x3 <L1 L2>  
NLPID: 0x83, Fixed length: 27 bytes, Version: 1, Sysid length: 0 bytes  
Packet type: 20, Packet version: 1, Max area: 0

TLVs:

IS neighbor: Router-F.00, Internal, Metric: default 0  
IS neighbor: Router-E.00, Internal, Metric: default 0  
IS extended neighbor: Router-F.00, Metric: default 0  
IS extended neighbor: Router-E.00, Metric: default 0

No queued transmissions

## show isis hostname

<b>List of Syntax</b>	<a href="#">Syntax on page 109</a> <a href="#">Syntax (EX Series Switches and QFX Series) on page 109</a>
<b>Syntax</b>	<pre>show isis hostname &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>
<b>Syntax (EX Series Switches and QFX Series)</b>	show isis hostname
<b>Release Information</b>	<p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
<b>Description</b>	<p>Display IS-IS hostname database information.</p> <p>This command displays the system ID-to-name cache. The output shows if the mapping has been learned by receipt of a Hostname TLV #137 (type dynamic) configured in Junos OS with the <b>set system host-name</b> command, or a static mapping defined in Junos OS with the <b>set system static-host-mapping hostname sysid</b> command (type static). The local router always has its type set to static even if <b>static-host-mapping</b> is not configured.</p>
<b>Options</b>	<p><b>none</b>—Display IS-IS hostname database information.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p>
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<a href="#">show isis hostname on page 110</a>
<b>Output Fields</b>	<p><a href="#">Table 13 on page 109</a> describes the output fields for the <b>show isis hostname</b> command. Output fields are listed in the approximate order in which they appear.</p>

**Table 13: show isis hostname Output Fields**

Field Name	Field Description
<b>System Id</b>	System identifier mapped to the hostname.
<b>Hostname</b>	Hostname mapped to the system identifier.
<b>Type</b>	<p>Type of mapping between system identifier and hostname.</p> <ul style="list-style-type: none"> <li><b>Dynamic</b>—Hostname mapping determined as described in RFC 2763, <i>Dynamic Hostname Exchange Mechanism for IS-IS</i>.</li> <li><b>Static</b>—Hostname mapping configured by user.</li> </ul>

## Sample Output

show isis hostname

```
user@host> show isis hostname
IS-IS hostname database:
System Id      Hostname
1921.6800.4201 isis1
1921.6800.4202 isis2
1921.6800.4203 isis3
```

	Type
1921.6800.4201 isis1	Dynamic
1921.6800.4202 isis2	Static
1921.6800.4203 isis3	Dynamic

## show isis interface

**List of Syntax**    [Syntax on page 111](#)  
                          [Syntax \(EX Series Switches and QFX Series\) on page 111](#)

**Syntax**    show isis interface  
                  <brief | detail | extensive>  
                  <interface-name>  
                  <logical-system (all | *logical-system-name*)>

**Syntax (EX Series Switches and QFX Series)**    show isis interface  
                          <brief | detail | extensive>  
                          <interface-name>

**Release Information**    Command introduced before Junos OS Release 7.4.  
                          Command introduced in Junos OS Release 9.0 for EX Series switches.  
                          Command introduced in Junos OS Release 12.1 for the QFX Series.

**Description**    Display status information about IS-IS-enabled interfaces.



**NOTE:** If the configured metric for an IS-IS level is above 63, and the **wide-metrics-only** statement is not configured, the **show isis interface detail** command and the **show isis interface extensive** command display 63 as the metric value for that level. Configure the **wide-metrics-only** statement to generate metric values greater than 63 on a per IS-IS level basis.

The **show isis interface** command displays the configured metric value for an IS-IS level irrespective of whether is configured or not.

**Options**    **none**—Display standard information about all IS-IS-enabled interfaces.  
                  **brief | detail | extensive**—(Optional) Display the specified level of output.  
                  **interface-name**—(Optional) Display information about the specified interface only.  
                  **logical-system (all | *logical-system-name*)**—(Optional) Perform this operation on all logical systems or on a particular logical system.

**Required Privilege Level**    view

**Related Documentation**    • *Understanding Wide IS-IS Metrics for Traffic Engineering*  
                                      • *Example: Enabling Wide IS-IS Metrics for Traffic Engineering*

**List of Sample Output**    [show isis interface on page 114](#)  
                                      [show isis interface brief on page 114](#)  
                                      [show isis interface detail on page 114](#)

[show isis interface extensive on page 114](#)

**Output Fields** [Table 14 on page 112](#) describes the output fields for the **show isis interface** command. Output fields are listed in the approximate order in which they appear.

**Table 14: show isis interface Output Fields**

Field Name	Field Description	Level of Output
<i>interface-name</i>	Name of the interface.	<b>detail</b>
<b>Designated router</b>	Routing device selected by other routers that is responsible for sending link-state advertisements that describe the network. Used only on broadcast networks.	<b>detail</b>
<b>Index</b>	Interface index assigned by the Junos OS kernel.	<b>detail</b>
<b>State</b>	Internal implementation information.	<b>detail</b>
<b>Circuit id</b>	Circuit identifier.  <b>NOTE:</b> Each IS-IS interface is assigned a circuit ID value to identify the interface within the linkstate database. All interfaces (loopback, broadcast, and so on) and all point-to-point links share the locally significant value of 0x01, and this value is not incremented.	<b>detail</b>
<b>Circuit type</b>	Circuit type: <ul style="list-style-type: none"> <li>• 1—Level 1 only</li> <li>• 2—Level 2 only</li> <li>• 3—Level 1 and Level 2</li> </ul>	<b>detail</b>
<b>LSP interval</b>	Interval between link-state PDUs sent from the interface.	<b>detail</b>
<b>CSNP interval</b>	Interval between complete sequence number PDUs sent from the interface.	<b>detail extensive</b>
<b>Sysid</b>	System identifier.	<b>detail</b>
<b>Interface</b>	Interface through which the adjacency is made.	<b>none brief</b>
<b>L or Level</b>	Level: <ul style="list-style-type: none"> <li>• 1—Level 1 only</li> <li>• 2—Level 2 only</li> <li>• 3—Level 1 and Level 2</li> </ul> <b>NOTE:</b> The default IS-IS level on loopback interfaces are always same as the IS-IS level configured on other IS-IS interfaces in a router. You can also configure IS-IS level on loopback interfaces per your requirement.	All levels
<b>CirID</b>	Circuit identifier.	<b>none brief</b>
<b>Level 1 DR</b>	Level 1 designated intermediate system.	<b>none brief</b>
<b>Level 2 DR</b>	Level 2 designated intermediate system.	<b>none brief</b>

Table 14: show isis interface Output Fields (*continued*)

Field Name	Field Description	Level of Output
<b>L1/L2 Metric</b>	Interface's metric for Level 1 and Level 2. If there is no information, the metric is 0.	none <b>brief</b>
<b>Adjacency advertisement: Advertise</b>	This routing device has signaled to advertise this interface to its neighbors in their label-switched paths (LSPs).	<b>detail extensive</b>
<b>Adjacency advertisement: Suppress</b>	This neighbor has signaled not to advertise this interface in the routing device's outbound LSPs.	<b>detail extensive</b>
<b>Adjacencies</b>	Number of adjacencies established on this interface.	<b>detail</b>
<b>Priority</b>	Priority value for this interface.	<b>detail</b>
<b>Metric</b>	Metric value for this interface.	<b>detail</b>
<b>Hello(s) / Hello Interval</b>	Interface's hello interval.	<b>detail extensive</b>
<b>Hold(s) / Hold Time</b>	Interface's hold time.	<b>detail extensive</b>
<b>Designated Router</b>	Router responsible for sending network link-state advertisements, which describe all the routing devices attached to the network.	<b>detail</b>
<b>Hello padding</b>	Type of hello padding: <ul style="list-style-type: none"> <li>• <b>Adaptive</b>—On point-to-point connections, the hello packets are padded from the initial detection of a new neighbor until the neighbor verifies the adjacency as Up in the adjacency state TLV. If the neighbor does not support the adjacency state TLV, then padding continues. On LAN connections, padding starts from the initial detection of a new neighbor until there is at least one active adjacency on the interface.</li> <li>• <b>Loose</b>—(Default) The hello packet is padded from the initial detection of a new neighbor until the adjacency transitions to the Up state.</li> <li>• <b>Strict</b>—Padding is performed on all interface types and for all adjacency states, and is continuous.</li> </ul>	<b>extensive</b>
<b>LDP sync state</b>	Current LDP synchronization state: <b>in sync</b> , <b>in holddown</b> , or <b>not supported</b> .	<b>extensive</b>
<b>reason</b>	Reason for being in the LDP sync state.	<b>extensive</b>
<b>config holdtime</b>	Configured value of the hold timer.	<b>extensive</b>
<b>remaining</b>	If the state is not in sync and the hold time is not infinity, then this field displays the remaining hold time in seconds.	<b>extensive</b>

## Sample Output

### show isis interface

```
user@host> show isis interface
IS-IS interface database:
Interface          L CirID Level 1 DR      Level 2 DR      L1/L2 Metric
at-2/3/0.0         3  0x1 Point to Point    Point to Point    10/10
lo0.0              3  0x1 Passive          Passive           0/0
```

### show isis interface brief

The output for the **show isis interface brief** command is identical to that for the **show isis interface** command. For sample output, see [show isis interface on page 114](#).

### show isis interface detail

```
user@host> show isis interface detail
IS-IS interface database:
at-2/3/0.0
  Index: 66, State: 0x6, Circuit id: 0x1, Circuit type: 3
  LSP interval: 100 ms, CSNP interval: 5 s
  Level Adjacencies Priority Metric Hello (s) Hold (s) Designated Router
    1                1      64    10    9.000    27
    2                1      64    10    9.000    27
lo0.0
  Index: 64, State: 0x6, Circuit id: 0x1, Circuit type: 0
  LSP interval: 100 ms, CSNP interval: disabled
  Adjacency advertisement: Advertise
  Protection Type: Node Link, No eligible Backup
  Level Adjacencies Priority Metric Hello (s) Hold (s) Designated Router
    1                0      64     0 Passive
    2                0      64     0 Passive
```

### show isis interface extensive

```
user@host> show isis interface extensive
IS-IS interface database:
xe-6/1/0.0
  Index: 75, State: 0x6, Circuit id: 0x1, Circuit type: 2
  LSP interval: 100 ms, CSNP interval: 10 s, Loose Hello padding
  Adjacency advertisement: Advertise
  Level 1
    Adjacencies: 0, Priority: 64, Metric: 10
    Disabled
  Level 2
    Adjacencies: 1, Priority: 64, Metric: 10
    Hello Interval: 20.000 s, Hold Time: 60 s
    Designated Router: nemean.03
```



## show isis overview

<b>Syntax</b>	<pre>show isis overview &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>
<b>Syntax (EX Series Switches and QFX Series)</b>	<pre>show isis overview &lt;instance <i>instance-name</i>&gt;</pre>
<b>Release Information</b>	<p>Command introduced in Junos OS Release 8.5.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
<b>Description</b>	Display IS-IS overview information.
<b>Options</b>	<p><b>none</b>—Display standard overview information about IS-IS for all routing instances.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display overview information for the specified routing instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p>
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<a href="#">show isis overview on page 117</a>
<b>Output Fields</b>	<a href="#">Table 15 on page 115</a> lists the output fields for the <b>show isis overview</b> command. Output fields are listed in the approximate order in which they appear.

**Table 15: show isis overview Output Fields**

Field Name	Field Description
Hostname	Name of the router.
Sysid	Part of the ISO address of the routing device.
Areaid	The area number of the routing device.
Instance	IS-IS routing instance.
Router ID	Router ID of the routing device.
Adjacency holddown	Adjacency holddown capability: <b>enabled</b> or <b>disabled</b> .
Maximum Areas	Maximum number of IS-IS areas advertised by the routing device.
LSP life time	Lifetime of the link-state PDU, in seconds.

Table 15: show isis overview Output Fields (*continued*)

Field Name	Field Description
Attached bit evaluation	Attached bit capability: <b>enabled</b> or <b>disabled</b> .
SPF delay	Delay before performing consecutive shortest-path-first (SPF) calculations.
SPF holddown	Delay before performing additional SPF calculations after the maximum number of consecutive SPF calculations is reached.
SPF rapid runs	Maximum number of SPF calculations that can be performed in succession before the holddown timer begins.
Overload bit at startup is set	Overload bit capability is enabled.
Overload high metrics	Overload high metrics capability: <b>enabled</b> or <b>disabled</b> .
Overload timeout	Time period after which overload is reset and the time that remains before the timer is set to expire.
Traffic engineering	Traffic engineering capability: <b>enabled</b> or <b>disabled</b> .
Restart	Graceful restart capability: <b>enabled</b> or <b>disabled</b> .
Restart duration	Time period for complete reacquisition of IS-IS neighbors.
Helper mode	Graceful restart helper capability: <b>enabled</b> or <b>disabled</b> .
Level	IS-IS level: <ul style="list-style-type: none"> <li>• 1—Level 1 information</li> <li>• 2—Level 2 information</li> </ul>
IPv4 is enabled	IP Protocol version 4 capability is enabled.
IPv6 is enabled	IP Protocol version 6 capability is enabled.
Internal route preference	Preference value of internal routes.
External route preference	Preference value of external routes.
Prefix export limit	Number of prefixes allowed to be exported, as configured by the <a href="#">prefix-export-limit</a> statement.
Prefix export count	Number of prefixes exported.
Wide area metrics are enabled	Wide area metrics capability is enabled.

Table 15: show isis overview Output Fields (*continued*)

Field Name	Field Description
Narrow metrics are enabled	Narrow metrics capability is enabled.

## Sample Output

### show isis overview

```

user@host> show isis overview
Instance: master
  Router ID: 10.255.107.183
  Hostname: pro-bng3-a
  Sysid: 0192.0168.0001
  Areaid: 49.0002
  Adjacency holddown: disabled
  Maximum Areas: 3
  LSP life time: 1200
  Attached bit evaluation: enabled
  SPF delay: 200 msec, SPF holddown: 5000 msec, SPF rapid runs: 3
  IPv4 is enabled, IPv6 is enabled
  Traffic engineering: enabled
  Restart: Disabled
    Helper mode: Enabled
Level 1
  Internal route preference: 15
  External route preference: 160
  Wide metrics are enabled, Narrow metrics are enabled
Level 2
  Internal route preference: 18
  External route preference: 165
  Prefix export limit: 5, Prefix export count: 5
  Wide metrics are enabled

```

```

user@host> show isis overview logical-system R2
Instance: master
  Router ID: 192.168.0.2
  Hostname: pro-bng3-a-R2
  Sysid: 0192.0168.0002
  Areaid: 49.0002
  Adjacency holddown: enabled
  Maximum Areas: 3
  LSP life time: 1200
  Attached bit evaluation: enabled
  SPF delay: 200 msec, SPF holddown: 5000 msec, SPF rapid runs: 3
  IPv4 is enabled, IPv6 is enabled
  Traffic engineering: enabled
  Restart: Disabled
    Helper mode: Enabled
Level 1
  Internal route preference: 15
  External route preference: 160
  Prefix export count: 0
  Wide metrics are enabled, Narrow metrics are enabled
Level 2
  Internal route preference: 18
  External route preference: 165

```

```
Prefix export count: 0
Wide metrics are enabled, Narrow metrics are enabled

user@host> show isis overview logical-system R3
Instance: master
Router ID: 192.168.0.3
Hostname: pro-bng3-a-R3
Sysid: 0192.0168.0003
Areaid: 49.0002
Adjacency holddown: enabled
Maximum Areas: 3
LSP life time: 1200
Attached bit evaluation: enabled
SPF delay: 200 msec, SPF holddown: 5000 msec, SPF rapid runs: 3
IPv4 is enabled, IPv6 is enabled
Traffic engineering: enabled
Restart: Disabled
  Helper mode: Enabled
Level 1
  Internal route preference: 15
  External route preference: 160
  Prefix export count: 0
  Wide metrics are enabled, Narrow metrics are enabled
Level 2
  Internal route preference: 18
  External route preference: 165
  Prefix export count: 0
  Wide metrics are enabled, Narrow metrics are enabled
```

## show isis route

<b>List of Syntax</b>	<a href="#">Syntax on page 119</a> <a href="#">Syntax (EX Series Switches and QFX Series) on page 119</a>
<b>Syntax</b>	<pre>show isis route &lt;destination&gt; &lt;inet   inet6&gt; &lt;instance instance-name&gt; &lt;logical-system (all   logical-system-name)&gt; &lt;topology (ipv4-multicast   ipv6-multicast   ipv6-unicast   unicast)&gt;</pre>
<b>Syntax (EX Series Switches and QFX Series)</b>	<pre>show isis route &lt;destination&gt; &lt;inet   inet6&gt; &lt;instance instance-name&gt; &lt;topology (ipv4-multicast   ipv6-multicast   ipv6-unicast   unicast)&gt;</pre>
<b>Release Information</b>	<p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>
<b>Description</b>	Display the routes in the IS-IS routing table.
<b>Options</b>	<p><b>none</b>—Display all routes in the IS-IS routing table for all supported address families for all routing instances.</p> <p><b>destination</b>—(Optional) Destination address for the route.</p> <p><b>inet   inet6</b>—(Optional) Display inet (IPv4) or inet6 (IPv6) routes, respectively.</p> <p><b>instance instance-name</b>—(Optional) Display routes for the specified routing instance only.</p> <p><b>logical-system (all   logical-system-name)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>topology (ipv4-multicast   ipv6-multicast   ipv6-unicast   unicast)</b>—(Optional) Display routes for the specified topology only, or use unicast to display information, if available, for both IPv4 and IPv6 unicast topologies.</p>
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<a href="#">show isis route logical-system on page 120</a> <a href="#">show isis route (CLNS) on page 120</a> <a href="#">show isis route on page 121</a>
<b>Output Fields</b>	<p><a href="#">Table 16 on page 120</a> describes the output fields for the <b>show isis route</b> command. Output fields are listed in the approximate order in which they appear.</p>

Table 16: show isis route Output Fields

Field Name	Field Description
<b>Current version</b>	Number of the current version of the IS-IS routing table.
<b>L1</b>	Version of Level 1 SPF that was run.
<b>L2</b>	Version of Level 2 SPF that was run.
<b>Prefix</b>	Destination of the route.
<b>L</b>	IS-IS level: <ul style="list-style-type: none"> <li>• 1—Level 1 only</li> <li>• 2—Level 2 only</li> <li>• 3—Level 1 and Level 2</li> </ul>
<b>Version</b>	Version of SPF that generated the route.
<b>Metric</b>	Metric value associated with the route.
<b>Type</b>	Metric type: <b>int</b> (internal) or <b>ext</b> (external).
<b>Interface</b>	Interface to the next hop.
<b>Via</b>	System identifier of the next hop, displayed as a name if possible.
<b>ISO Routes</b>	ISO routing table entries.
<b>snpa</b>	MAC address.

## Sample Output

### show isis route logical-system

```

user@host> show isis route logical-system ls1
IS-IS routing table           Current version: L1: 8 L2: 11
Prefix      L Version Metric Type Interface  Via
10.9.7.0/30  2      11     20 int  gr-0/2/0.0  h
10.9.201.1/32 2      11     60 int  gr-0/2/0.0  h
IPv6 Unicast IS-IS routing table   Current version: L1: 9 L2: 11
Prefix      L Version Metric Type Interface  Via
8009:3::a09:3200/126 2      11     20 int  gr-0/2/0.0  h

```

### show isis route (CLNS)

```

user@host> show isis route
IS-IS routing table           Current version: L1: 10 L2: 8
IPv4/IPv6 Routes
Prefix      L Version Metric Type Interface  Via
0.0.0.0/0    1      10     10 int  fe-0/0/1.0  ISIS.0
ISO Routes
Prefix L   Version Metric Type Interface  Via  snpa

```

```

0/0
  1      10      10 int fe-0/0/1.0 isis.0 0:12:0:34:0:56
47.0005.80ff.f800.0000.0108.0001/104
  1      10      0 int
47.0005.80ff.f800.0000.0108.0001.1921.6800.4001/152
  1      10      10 int fe-0/0/1.0 isis.0 0:12:0:34:0:56
47.0005.80ff.f800.0000.0108.0001.1921.6800.4002/152
  1      10      20 int fe-0/0/1.0 isis.0 0:12:0:34:0:56
47.0005.80ff.f800.0000.0108.0002/104
  1      10      0 int
47.0005.80ff.f800.0000.0108.0002.1921.6800.4001/152
  1      10      10 int fe-0/0/1.0 isis.0 0:12:0:34:0:56

```

### show isis route

```
user@host> show isis route
```

```

IS-IS routing table          Current version: L1: 4 L2: 13
IPv4/IPv6 Routes
-----
Prefix                      L   Version  Metric Type Interface      NH   Via
10.255.71.52/32             2    13        10   int  ae0.0                 IPV4 camaro
10.255.71.238/32            2    13        20   int  so-6/0/0.0           IPV4 olympic
                             as0.0                 IPV4 glacier
10.255.71.239/32            2    13        20   int  so-6/0/0.0           IPV4 olympic
                             ae0.0                 IPV4 camaro
10.255.71.242/32            2    13        10   int  as0.0                 IPV4 glacier
10.255.71.243/32            2    13        10   int  so-6/0/0.0           IPV4 olympic
12.13.0.0/30                2    13        20   int  so-6/0/0.0           IPV4 olympic
12.15.0.0/30                2    13        20   int  so-6/0/0.0           IPV4 olympic
13.15.0.0/30                2    13        30   int  ae0.0                 IPV4 camaro
                             so-6/0/0.0           IPV4 olympic
                             as0.0                 IPV4 glacier
13.16.0.0/30                2    13        25   int  as0.0                 IPV4 glacier
14.15.0.0/30                2    13        20   int  ae0.0                 IPV4 camaro
192.2.1.0/30                2    13        30   int  so-6/0/0.0           IPV4 olympic
                             as0.0                 IPV4 glacier
1eee::/64                   2    13        30   int  so-6/0/0.0           IPV6 olympic
                             as0.0                 IPV6 glacier
abcd::10:255:71:52/128      2    13        10   int  ae0.0                 IPV6 camaro
abcd::10:255:71:238/128     2    13        20   int  so-6/0/0.0           IPV6 olympic

```

					as0.0	IPV6 glacier
abcd::10:255:71:239/128	2	13	20	int	so-6/0/0.0	IPV6 olympic
					ae0.0	IPV6 camaro
abcd::10:255:71:242/128	2	13	10	int	as0.0	IPV6 glacier
abcd::10:255:71:243/128	2	13	10	int	so-6/0/0.0	IPV6 olympic



## show isis spf

<b>List of Syntax</b>	<a href="#">Syntax on page 123</a> <a href="#">Syntax (EX Series Switches) on page 123</a>
<b>Syntax</b>	<pre>show isis spf (brief   log   results) &lt;instance <i>instance-name</i>&gt; &lt;level (1   2)&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt; &lt;topology (ipv4-multicast   ipv6-multicast   ipv6-unicast   unicast)&gt;</pre>
<b>Syntax (EX Series Switches)</b>	<pre>show isis spf (brief   log   results) &lt;instance <i>instance-name</i>&gt; &lt;level (1   2)&gt; &lt;topology (ipv4-multicast   ipv6-multicast   ipv6-unicast   unicast)&gt;</pre>
<b>Release Information</b>	<p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p>
<b>Description</b>	Display information about IS-IS shortest-path-first (SPF) calculations.
<b>Options</b>	<p><b>brief</b>—Display an overview of SPF calculations.</p> <p><b>instance <i>instance instance-name</i></b>—(Optional) Display SPF calculations for the specified routing instance.</p> <p><b>level (1   2)</b>—(Optional) Display SPF calculations for the specified IS-IS level.</p> <p><b>log</b>—Display the log of SPF calculations.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>results</b>—Display the results of SPF calculations.</p> <p><b>topology (ipv4-multicast   ipv6-multicast   ipv6-unicast   unicast)</b>—(Optional) Display SPF calculations for the specified topology only.</p>
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<a href="#">show isis spf log on page 124</a> <a href="#">show isis spf results logical-system on page 125</a> <a href="#">show isis spf results (CLNS) on page 126</a>
<b>Output Fields</b>	<p><a href="#">Table 17 on page 123</a> describes the output fields for the <b>show isis spf</b> command. Output fields are listed in the approximate order in which they appear.</p>

**Table 17: show isis spf Output Fields**

Field Name	Field Description
Node	System ID of a node.

Table 17: show isis spf log Output Fields (*continued*)

Field Name	Field Description
Metric	Metric to the node.
Interface	Interface of the next hop.
Via	System ID of the next hop.
SNPA	Subnetwork point of attachment (MAC address of the next hop).
Start time	(log option only) Time that the SPF computation started.
Elapsed (secs)	(log option only) Length of time, in seconds, required to complete the SPF computation.
Count	(log option only) Number of times the SPF was triggered.
Reason	(log option only) Reason that the SPF computation was completed.

## Sample Output

### show isis spf log

```

user@host> show isis spf log logical-system lsl
IS-IS level 1 SPF log:
Start time           Elapsed (secs) Count Reason
Fri Oct 31 12:41:18   0.000069    1 Reconfig
Fri Oct 31 12:41:18   0.000107    3 Updated LSP fix.00-00
Fri Oct 31 12:41:18   0.000050    3 Address change on so-1/2/0.0
Fri Oct 31 12:41:23   0.000033    1 Updated LSP fix.00-00
Fri Oct 31 12:41:28   0.000178    5 New adjacency scat on ge-1/1/0.0
Fri Oct 31 12:41:59   0.000060    1 Updated LSP fix.00-00
Fri Oct 31 12:42:30   0.000161    2 Multi area attachment change
Fri Oct 31 12:56:58   0.000198    1 Periodic SPF
Fri Oct 31 13:10:29   0.000209    1 Periodic SPF
IS-IS level 2 SPF log:
Start time           Elapsed (secs) Count Reason
Fri Oct 31 12:41:18   0.000035    1 Reconfig
Fri Oct 31 12:41:18   0.000047    2 Updated LSP fix.00-00
Fri Oct 31 12:41:18   0.000043    5 Address change on gr-0/2/0.0
Fri Oct 31 12:41:23   0.000022    1 Updated LSP fix.00-00
Fri Oct 31 12:41:59   0.000144    3 New adjacency h on gr-0/2/0.0
Fri Oct 31 12:42:30   0.000257    3 New LSP skag.00-00
Fri Oct 31 12:54:37   0.000195    1 Periodic SPF
Fri Oct 31 12:55:50   0.000178    1 Updated LSP fix.00-00
Fri Oct 31 12:55:55   0.000174    1 Updated LSP h.00-00
Fri Oct 31 12:55:58   0.000176    1 Updated LSP skag.00-00
Fri Oct 31 13:08:14   0.000198    1 Periodic SPF
IPv6 Unicast IS-IS level 1 SPF log:
Start time           Elapsed (secs) Count Reason
Fri Oct 31 12:41:18   0.000028    1 Reconfig
Fri Oct 31 12:41:18   0.000043    3 Updated LSP fix.00-00

```

```

Fri Oct 31 12:41:18      0.000112    4 Updated LSP fix.00-00
Fri Oct 31 12:41:23      0.000059    1 Updated LSP fix.00-00
Fri Oct 31 12:41:25      0.000041    1 Updated LSP fix.00-00
Fri Oct 31 12:41:28      0.000103    5 New adjacency scat on ge-1/1/0.0
Fri Oct 31 12:41:59      0.000040    1 Updated LSP fix.00-00
Fri Oct 31 12:42:30      0.000118    2 Multi area attachment change
Fri Oct 31 12:56:08      0.000289    1 Periodic SPF
Fri Oct 31 13:11:07      0.000214    1 Periodic SPF
IPV6 Unicast IS-IS level 2 SPF log:

```

```

Start time      Elapsed (secs) Count Reason
Fri Oct 31 12:41:18      0.000027    1 Reconfig
Fri Oct 31 12:41:18      0.000039    2 Updated LSP fix.00-00
Fri Oct 31 12:41:18      0.000049    6 Updated LSP fix.00-00
Fri Oct 31 12:41:23      0.000025    1 Updated LSP fix.00-00
Fri Oct 31 12:41:25      0.000023    1 Updated LSP fix.00-00
Fri Oct 31 12:41:59      0.000087    3 New adjacency h on gr-0/2/0.0
Fri Oct 31 12:42:30      0.000123    3 New LSP skag.00-00
Fri Oct 31 12:55:50      0.000121    1 Updated LSP fix.00-00
Fri Oct 31 12:55:55      0.000121    1 Updated LSP h.00-00
Fri Oct 31 12:55:58      0.000121    1 Updated LSP skag.00-00
Fri Oct 31 13:09:46      0.000201    1 Periodic SPF
...

```

#### show isis spf results logical-system

```
user@host> show isis spf results logical-system ls1
```

```
IS-IS level 1 SPF results:
```

Node	Metric	Interface	Via	SNPA
scat.00	10	ge-1/1/0.0	scat	0:90:69:a6:48:9d
	20	10.9.1.0/30		
fix.02	10			
fix.00	0			
	10	10.9.1.0/30		
	10	10.9.5.0/30		
	10	10.9.6.0/30		
	20	10.9.7.0/30		
	60	10.9.201.1/32		
3 nodes				

```
IS-IS level 2 SPF results:
```

Node	Metric	Interface	Via	SNPA
skag.00	20	gr-0/2/0.0	h	
	30	10.9.7.0/30		
skag.02	20	gr-0/2/0.0	h	
h.00	10	gr-0/2/0.0	h	
	20	10.9.6.0/30		
	20	10.9.7.0/30		
	60	10.9.201.1/32		
fix.00	0			
	10	10.9.1.0/30		
	10	10.9.5.0/30		
	10	10.9.6.0/30		
4 nodes				

```
IPV6 Unicast IS-IS level 1 SPF results:
```

Node	Metric	Interface	Via	SNPA
scat.00	10	ge-1/1/0.0	scat	0:90:69:a6:48:9d
		ge-1/1/0.0	scat	0:90:69:a6:48:9d
	20	8009:1::a09:1400/126		
fix.02	10			

```

fix.00          0
                10      8009:1::a09:1400/126
                10      8009:2::a09:1e00/126
                20      8009:3::a09:3200/126
                10      8009:4::a09:2800/126
3 nodes

IPv6 Unicast IS-IS level 2 SPF results:
Node      Metric  Interface      Via      SNPA
skag.00    20      gr-0/2/0.0    h
           30      8009:3::a09:3200/126
skag.02    20      gr-0/2/0.0    h
           20      gr-0/2/0.0    h
h.00       10      gr-0/2/0.0    h
           20      8009:3::a09:3200/126
           20      8009:4::a09:2800/126
fix.00     0
           10      8009:1::a09:1400/126
           10      8009:2::a09:1e00/126
           10      8009:4::a09:2800/126
4 nodes

Multicast IS-IS level 1 SPF results:
Node      Metric  Interface      Via      SNPA
scat.00    10      ge-1/1/0.0    scat    0:90:69:a6:48:9d
fix.02     10
fix.00     0
3 nodes

Multicast IS-IS level 2 SPF results:
Node      Metric  Interface      Via      SNPA
skag.00    20      gr-0/2/0.0    h
skag.02    20      gr-0/2/0.0    h
h.00       10      gr-0/2/0.0    h
fix.00     0
4 nodes
...

```

### show isis spf results (CLNS)

```

user@host> show isis spf results
IS-IS level 1 SPF results:
Node      Metric  Interface      Via      SNPA
skag.00 10      fe-0/0/1.0     toothache 0:12:0:34:0:56
           20      fe-0/0/1.0     toothache 0:12:0:34:0:56
           10      192.168.37.64/29
           20      192.168.37.64/29
           20      192.168.37.64/29
pro1-a.02 10
pro1-a.00 0
           0      10.255.245.1/32
           10      192.168.37.64/29
           0      192.168.37.64/29
3 nodes

IS-IS level 2 SPF results:
Node      Metric  Interface      Via      SNPA
skag.00 10      fe-0/0/1.0     toothache 0:12:0:34:0:56
           10      fe-0/0/1.0     toothache 0:12:0:34:0:56

```

	20	10.255.245.1/32
	20	192.168.37.64/29
	20	47.0005.80ff.f800.0000.0109.0010/104
pro1-a.02	10	
pro1-a.00	0	
	0	10.255.245.1/32
	10	192.168.37.64/29
3 nodes		

## show isis statistics

---

List of Syntax	<a href="#">Syntax on page 128</a> <a href="#">Syntax (EX Series Switches and QFX Series) on page 128</a>
Syntax	show isis statistics <instance <i>instance-name</i> > <logical-system (all   <i>logical-system-name</i> )>
Syntax (EX Series Switches and QFX Series)	show isis statistics <instance <i>instance-name</i> >
Release Information	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches. Command introduced in Junos OS Release 12.1 for the QFX Series. Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.
Description	Display statistics about IS-IS traffic.
Options	<b>none</b> —Display IS-IS traffic statistics for all routing instances.  <b>instance <i>instance-name</i></b> —(Optional) Display statistics for the specified routing instance.  <b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"><li>• <a href="#">clear isis statistics on page 82</a></li></ul>
List of Sample Output	<a href="#">show isis statistics on page 130</a>
Output Fields	<a href="#">Table 18 on page 129</a> describes the output fields for the <b>show isis statistics</b> command. Output fields are listed in the approximate order in which they appear.

Table 18: show isis statistics Output Fields

Field Name	Field Description
PDU type	<p>PDU type:</p> <ul style="list-style-type: none"> <li>• <b>CSNP</b>—Complete sequence number PDUs contain a complete list of all link-state PDUs in the IS-IS database. CSNPs are sent periodically on all links, and the receiving systems use the information in the CSNP to update and synchronize their link-state PDU databases. The designated router multicasts CSNPs on broadcast links in place of sending explicit acknowledgments for each link-state PDU.</li> <li>• <b>IIH</b>—IS-IS hello packets are broadcast to discover the identity of neighboring IS-IS systems and to determine whether the neighbors are Level 1 or Level 2 intermediate systems.</li> <li>• <b>LSP</b>—Link-state PDUs contain information about the state of adjacencies to neighboring IS-IS systems. Link-state PDUs are flooded periodically throughout an area.</li> <li>• <b>PSNP</b>—Partial sequence number PDUs are sent multicast by a receiver when it detects that it is missing a link-state PDU (when its link-state PDU database is out of date). The receiver sends a PSNP to the system that transmitted the CSNP, effectively requesting that the missing link-state PDU be transmitted. That routing device, in turn, forwards the missing link-state PDU to the requesting routing device.</li> <li>• <b>Unknown</b>—The PDU type is unknown.</li> </ul>
Received	Number of PDUs received since IS-IS started or since the statistics were set to zero.
Processed	Number of PDUs received less the number dropped.
Drops	Number of PDUs dropped.
Sent	Number of PDUs transmitted since IS-IS started or since the statistics were set to zero.
Rexmit	Number of PDUs retransmitted since IS-IS started or since the statistics were set to zero.
Total packets received/sent	Total number of PDUs received and transmitted since IS-IS started or since the statistics were set to zero.
SNP queue length	Number of CSPN and PSNP packets currently waiting in the queue for processing. This value is almost always 0.
LSP queue length	Number of link-state PDUs waiting in the queue for processing. This value is almost always 0.
SPF runs	Number of shortest-path-first (SPF) calculations that have been performed. If this number is incrementing rapidly, it indicates that the network is unstable.
Fragments rebuilt	Number of link-state PDU fragments that the local system has computed.
LSP regenerations	Number of link-state PDUs that have been regenerated. A link-state PDU is regenerated when it is nearing the end of its lifetime and it has not changed.
Purges initiated	Number of purges that the system initiated. A purge is initiated if the software decides that a link-state PDU must be removed from the network.

## Sample Output

### show isis statistics

```
user@host> show isis statistics
```

```
IS-IS statistics for merino:
```

PDU type	Received	Processed	Drops	Sent	Rexmit
LSP	12227	12227	0	8184	683
IIH	113808	113808	0	115817	0
CSNP	198868	198868	0	198934	0
PSNP	6985	6979	6	8274	0
Unknown	0	0	0	0	0
Totals	331888	331882	6	331209	683

```
Total packets received: 331888 Sent: 331892
```

```
SNP queue length:          0 Drops:          0  
LSP queue length:          0 Drops:          0
```

```
SPF runs:                  1014  
Fragments rebuilt:         1038  
LSP regenerations:         425  
Purges initiated:          0
```