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

## OSPF for EX4300 Switches

Release

14.1X53



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Published: 2014-12-18

Juniper Networks, Inc.  
1194 North Mathilda Avenue  
Sunnyvale, California 94089  
USA  
408-745-2000  
[www.juniper.net](http://www.juniper.net)

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Release 14.1X53  
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# About the Documentation

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- Documentation Feedback on page xiii
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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.

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## 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.	<pre>user@host&gt; show chassis alarms</pre> <p>No alarms currently active</p>
<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.	<p>Configure the machine's domain name:</p> <pre>[edit] root@# set system domain-name domain-name</pre>
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 <b>[edit protocols ospf area area-id]</b> hierarchy level.</li> <li>The console port is labeled <b>CONSOLE</b>.</li> </ul>
< > (angle brackets)	Encloses optional keywords or variables.	<b>stub &lt;default-metric metric&gt;;</b>
(pipe symbol)	Indicates a choice between the mutually exclusive keywords or variables on either side of the symbol. The set of choices is often enclosed in parentheses for clarity.	<b>broadcast   multicast</b> <b>(string1   string2   string3)</b>
# (pound sign)	Indicates a comment specified on the same line as the configuration statement to which it applies.	<b>rsvp { # Required for dynamic MPLS only</b>
[ ] (square brackets)	Encloses a variable for which you can substitute one or more values.	<b>community name members [ community-ids ]</b>
Indentation and braces ( { } )	Identifies a level in the configuration hierarchy.	<pre>[edit] routing-options {   static {     route default {       nexthop address;       retain;     }   } }</pre>
;(semicolon)	Identifies a leaf statement at a configuration hierarchy level.	
<b>GUI Conventions</b>		
<b>Bold text like this</b>	Represents graphical user interface (GUI) items you click or select.	<ul style="list-style-type: none"> <li>In the Logical Interfaces box, select <b>All Interfaces</b>.</li> <li>To cancel the configuration, click <b>Cancel</b>.</li> </ul>

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

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

## Documentation Feedback

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

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## Requesting Technical Support

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

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

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

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

## Opening a Case with JTAC

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

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

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

## PART 1

# Overview

- [Layer 3 Protocols on page 3](#)
- [OSPF Overview on page 7](#)





## 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

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 on EX2200, EX3200, EX3300, EX4200, EX6200, and EX8200 switches.	<a href="#">Junos OS Multicast Protocols Configuration Guide</a>
PPM	Supported. See <a href="#">EX Series Switch Software Features Overview</a> 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</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](#)

## CHAPTER 2

# OSPF Overview

- [Understanding IPsec Authentication for OSPF Packets on EX Series Switches on page 7](#)

## Understanding IPsec Authentication for OSPF Packets on EX Series Switches

---

IP Security (IPsec) provides a secure way to authenticate senders and encrypt IP version 4 (IPv4) traffic between network devices. IPsec offers network administrators for Juniper Networks EX Series Ethernet Switches and their users the benefits of data confidentiality, data integrity, sender authentication, and anti-replay services.

IPsec is a framework for ensuring secure private communication over IP networks and is based on standards developed by the International Engineering Task Force (IETF). IPsec provides security services at the network layer of the Open Systems Interconnection (OSI) model by enabling a system to select required security protocols, determine the algorithms to use for the security services, and implement any cryptographic keys required to provide the requested services. You can use IPsec to protect one or more paths between a pair of hosts, between a pair of security gateways (such as switches), or between a security gateway and a host.

OSPF version 3 (OSPFv3), unlike OSPF version 2 (OSPFv2), does not have a built-in authentication method and relies on IPsec to provide this functionality. You can secure specific OSPFv3 interfaces and protect OSPFv3 virtual links.

- [Authentication Algorithms on page 7](#)
- [Encryption Algorithms on page 8](#)
- [IPsec Protocols on page 8](#)
- [Security Associations on page 9](#)
- [IPsec Modes on page 9](#)

## Authentication Algorithms

Authentication is the process of verifying the identity of the sender. Authentication algorithms use a shared key to verify the authenticity of the IPsec devices. The Juniper Networks Junos operating system (Junos OS) uses the following authentication algorithms:

- Message Digest 5 (MD5) uses a one-way hash function to convert a message of arbitrary length to a fixed-length message digest of 128 bits. Because of the conversion process,

it is mathematically infeasible to calculate the original message by computing it backwards from the resulting message digest. Likewise, a change to a single character in the message will cause it to generate a very different message digest number.

To verify that the message has not been tampered with, Junos OS compares the calculated message digest against a message digest that is decrypted with a shared key. Junos OS uses the MD5 hashed message authentication code (HMAC) variant that provides an additional level of hashing. MD5 can be used with an authentication header (AH) and Encapsulating Security Payload (ESP).

- Secure Hash Algorithm 1 (SHA-1) uses a stronger algorithm than MD5. SHA-1 takes a message of less than 264 bits in length and produces a 160-bit message digest. The large message digest ensures that the data has not been changed and that it originates from the correct source. Junos OS uses the SHA-1 HMAC variant that provides an additional level of hashing. SHA-1 can be used with AH, ESP, and Internet Key Exchange (IKE).

## Encryption Algorithms

Encryption encodes data into a secure format so that it cannot be deciphered by unauthorized users. As with authentication algorithms, a shared key is used with encryption algorithms to verify the authenticity of IPsec devices. Junos OS uses the following encryption algorithms:

- Data Encryption Standard cipher-block chaining (DES-CBC) is a symmetric secret-key block algorithm. DES uses a key size of 64 bits, where 8 bits are used for error detection and the remaining 56 bits provide encryption. DES performs a series of simple logical operations on the shared key, including permutations and substitutions. CBC takes the first block of 64 bits of output from DES, combines this block with the second block, feeds this back into the DES algorithm, and repeats this process for all subsequent blocks.
- Triple DES-CBC (3DES-CBC) is an encryption algorithm that is similar to DES-CBC but provides a much stronger encryption result because it uses three keys for 168-bit (3 x 56-bit) encryption. 3DES works by using the first key to encrypt the blocks, the second key to decrypt the blocks, and the third key to reencrypt the blocks.

## IPsec Protocols

IPsec protocols determine the type of authentication and encryption applied to packets that are secured by the switch. Junos OS supports the following IPsec protocols:

- AH—Defined in *RFC 2402*, AH provides connectionless integrity and data origin authentication for IPv4. It also provides protection against replays. AH authenticates as much of the IP header as possible, as well as the upper-level protocol data. However, some IP header fields might change in transit. Because the value of these fields might not be predictable by the sender, they cannot be protected by AH. In an IP header, AH can be identified with a value of 51 in the Protocol field of an IPv4 packet.
- ESP—Defined in *RFC 2406*, ESP can provide encryption and limited traffic flow confidentiality or connectionless integrity, data origin authentication, and an anti-replay

service. In an IP header, ESP can be identified with a value of 50 in the Protocol field of an IPv4 packet.

## Security Associations

An IPsec consideration is the type of security association (SA) that you wish to implement. An SA is a set of IPsec specifications that are negotiated between devices that are establishing an IPsec relationship. These specifications include preferences for the type of authentication, encryption, and IPsec protocol to be used when establishing the IPsec connection. An SA can be either unidirectional or bidirectional, depending on the choices made by the network administrator. An SA is uniquely identified by a Security Parameter Index (SPI), an IPv4 or IPv6 destination address, and a security protocol (AH or ESP) identifier.

## IPsec Modes

Junos OS supports the following IPsec modes:

- Tunnel mode is supported for both AH and ESP in Junos OS. In tunnel mode, the SA and associated protocols are applied to tunneled IPv4 or IPv6 packets. For a tunnel mode SA, an outer IP header specifies the IPsec processing destination and an inner IP header specifies the ultimate destination for the packet. The security protocol header appears after the outer IP header and before the inner IP header. In addition, there are slight differences for tunnel mode when you implement it with AH and ESP:
  - For AH, portions of the outer IP header are protected, as well as the entire tunneled IP packet.
  - For ESP, only the tunneled packet is protected, not the outer header.

When one side of an SA is a security gateway (such as a switch), the SA must use tunnel mode. However, when traffic (for example, SNMP commands or BGP sessions) is destined for a switch, the system acts as a host. Transport mode is allowed in this case because the system does not act as a security gateway and does not send or receive transit traffic.



**NOTE:** Tunnel mode is not supported for OSPF v3 control packet authentication.

- Transport mode provides an SA between two hosts. In transport mode, the protocols provide protection primarily for upper-layer protocols. A transport mode security protocol header appears immediately after the IP header and any options and before any higher-layer protocols (for example, TCP or UDP). There are slight differences for transport mode when you implement it with AH and ESP:
  - For AH, selected portions of the IP header are protected, as well as selected portions of the extension headers and selected options within the IPv4 header.
  - For ESP, only the higher-layer protocols are protected, not the IP header or any extension headers preceding the ESP header.

- Related Documentation**
- [Using IPsec to Secure OSPFv3 Networks \(CLI Procedure\) on page 17](#)
  - [Configuring an OSPF Network \(J-Web Procedure\) on page 13](#)



## PART 2

# Configuration

- [Configuration Tasks on page 13](#)
- [Configuration Statements on page 19](#)



## CHAPTER 3

# Configuration Tasks

- [Configuring an OSPF Network \(J-Web Procedure\) on page 13](#)
- [Using IPsec to Secure OSPFv3 Networks \(CLI Procedure\) on page 17](#)

### Configuring an OSPF Network (J-Web Procedure)

---



**NOTE:** This topic applies only to the J-Web Application package.

You can use the J-Web interface to create multiarea OSPF networks on an EX Series switch.

To configure a multiarea OSPF network:

1. Select **Configure > Routing > OSPF**.



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

2. Click one of the following options:
  - **Add**—Adds an OSPF area. Enter information into the configuration page as described in [Table 5 on page 14](#).
  - **Edit**—Modifies an existing OSPF area. Enter information into the configuration page as described in [Table 5 on page 14](#).
  - **Delete**—Deletes an existing OSPF area.
3. To modify OSPF global settings, click **Edit**. Enter information as described in [Table 6 on page 15](#).
4. To disable OSPF, click **Disable**.

Table 5: OSPF Routing Configuration Summary

Field	Function	Your Action
<b>General tab</b>		
Area Id	Uniquely identifies the area within its AS.	<p>Type a 32-bit numeric identifier for the area. Type an integer or select and edit the value.</p> <p>If you enter an integer, the value is converted to a 32-bit equivalent. For example, if you enter 3, the value assigned to the area is <b>0.0.0.3</b>.</p>
Area Ranges	Specifies a range of IP addresses for an area when sending summary link advertisements (within an area).	<p>To add a range:</p> <ol style="list-style-type: none"> <li>1. Click <b>Add</b>.</li> <li>2. Type the area range.</li> <li>3. Specify the subnet mask.</li> <li>4. To override the metric for the IP address range, type a specific metric value.</li> <li>5. If you do not want to display the routes that are contained within a summary, select <b>Restrict advertisements of this area range</b>.</li> <li>6. If you want a summary of a route to be advertised only when an exact match is made with the configured summary range, select <b>Enforce exact match for advertisement of this area range</b>.</li> <li>7. Click <b>OK</b>.</li> </ol> <p>To modify an existing area range, select the area range, click <b>Edit</b>, and edit the value. Click <b>OK</b>.</p> <p>To delete an area range, select the area range and click <b>Delete</b>.</p>
Area Type	<p>Designates the type of OSPF area.</p> <ul style="list-style-type: none"> <li>• <b>regular</b>—A regular OSPF area, including the backbone area</li> <li>• <b>stub</b>—A stub area</li> <li>• <b>nssa</b>—A not-so-stubby area (NSSA)</li> </ul>	<p>Select the type of OSPF area you are creating from the list.</p> <p>If you select <b>stub</b>:</p> <ol style="list-style-type: none"> <li>1. Enter the default metric.</li> <li>2. To flood summary LSAs into the stub area, select the check box.</li> </ol> <p>If you select <b>nssa</b>:</p> <ol style="list-style-type: none"> <li>1. Specify the metric type.</li> <li>2. Enter the default metric.</li> <li>3. To flood summary LSAs into the nssa area, select the check box.</li> <li>4. To flood Type-7 LSAs into the nssa area, select the check box.</li> </ol>
<b>Interfaces tab</b>		

Table 5: OSPF Routing Configuration Summary (*continued*)

Field	Function	Your Action
Interfaces	Specifies the interfaces to be associated with the OSPF configuration	<p>To associate an interface with the configuration, select the interface from the list, select <b>Associate</b> and click <b>OK</b>.</p> <p>To edit an interface's configuration:</p> <ol style="list-style-type: none"> <li>1. Select the interface from the list and click <b>Edit</b>.</li> <li>2. Specify the cost of an OSPF interface.</li> <li>3. Specify the traffic engineering metric.</li> <li>4. Specify how often the routing device sends hello packets from the interface.</li> <li>5. Specify how long the routing device waits to receive a link-state acknowledgment packet before retransmitting link-state advertisements to an interface's neighbors.</li> <li>6. To enable OSPF on the interface, select the check box.</li> <li>7. To inform other protocols about neighbor down events, select the check box.</li> <li>8. To treat the interface as a secondary interface, select the check box.</li> <li>9. To only advertise OSPF, select the check box.</li> <li>10. Click <b>OK</b>.</li> </ol>
<b>Policies tab</b>		
Import Policy	Specifies one or more policies to control which routes learned from an area are used to generate summary link-state advertisements (LSAs) into other areas.	<p>Click <b>Add</b> to add an import policy.</p> <p>Click <b>Move up</b> or <b>Move down</b> to move the selected policy up or down the list of policies.</p> <p>Click <b>Remove</b> to remove an import policy.</p>
Export Policy	Specifies one or more policies to control which summary LSAs are flooded into an area.	<p>Click <b>Add</b> to add an export policy.</p> <p>Click <b>Move up</b> or <b>Move down</b> to move the selected policy up or down the list of policies.</p> <p>Click <b>Remove</b> to remove an export policy.</p>

Table 6: Edit OSPF Global Settings

Field	Function	Your Action
<b>General tab</b>		
Router Id	Specifies the ID for the routing device.	Type or select and edit the value.
RIB Group	Installs the routes learned from OSPF routing instances into routing tables in the OSPF routing table group.	Select a value.
Internal Route Preference	Specifies the route preference for internal groups.	Type or select and edit the value.

Table 6: Edit OSPF Global Settings (*continued*)

Field	Function	Your Action
External Route Preference	Specifies the route preference for external groups.	Type or select and edit the value.
Graceful Restart	Configures graceful restart for OSPF.	<p>To configure graceful restart:</p> <ol style="list-style-type: none"> <li>1. Specify the estimated time to send out purged grace LSAs over all the interfaces.</li> <li>2. Specified the estimated time to reacquire a full OSPF neighbor from each area.</li> <li>3. To disable <b>No Strict LSA Checking</b>, select the check box.</li> <li>4. To disable graceful restart helper capability, select the check box. Helper mode is enabled by default.</li> <li>5. Click <b>OK</b>.</li> </ol>
SPF Options	Configure options for running the shortest-path-first (SPF) algorithm. You can configure a delay for when to run the SPF algorithm after a network topology change is detected, the maximum number of times the SPF algorithm can run in succession, and a hold-down interval after the SPF algorithm runs the maximum number of times.	<p>To configure SPF:</p> <ol style="list-style-type: none"> <li>1. Specify the time interval between the detection of a topology change and when the SPF algorithm runs.</li> <li>2. Specify the 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.</li> <li>3. Specify the maximum number of times the SPF algorithm can run in succession. After the maximum is reached, the hold-down interval begins.</li> </ol>
<b>Policies tab</b>		
Import Policy	Specifies one or more policies to control which routes learned from an area are used to generate summary link-state advertisements (LSAs) into other areas.	<p>Click <b>Add</b> to add an import policy.</p> <p>Click <b>Move up</b> or <b>Move down</b> to move the selected policy up or down the list of policies.</p> <p>Click <b>Remove</b> to remove an import policy.</p>
Export Policy	Specifies one or more policies to control which summary LSAs are flooded into an area.	<p>Click <b>Add</b> to add an export policy.</p> <p>Click <b>Move up</b> or <b>Move down</b> to move the selected policy up or down the list of policies.</p> <p>Click <b>Remove</b> to remove an export policy.</p>
<b>Trace Options tab</b>		
File Name	Specifies the name of the file to receive the output of the tracing operation.	Type or select and edit the name.
Number of Files	Specifies the maximum number of trace files.	Type or select and edit the name.
File Size	Specifies the maximum size for each trace file.	Type or select and edit the name.

Table 6: Edit OSPF Global Settings (*continued*)

Field	Function	Your Action
World Readable	Specifies whether the trace file can be read by any user or not.	Select <b>True</b> to allow any user to read the file.  Select <b>False</b> to disallow all users being able to read the file.
Flags	Specifies the tracing operation to perform.	Select a value from the list.

- Related Documentation**
- [Monitoring OSPF Routing Information on page 85](#)
  - [Layer 3 Protocols Supported on EX Series Switches on page 3](#)

## Using IPsec to Secure OSPFv3 Networks (CLI Procedure)

OSPF version 3 (OSPFv3) does not have a built-in authentication method and relies on IP Security (IPsec) to provide this functionality. You can use IPsec to secure OSPFv3 interfaces on EX Series switches.

This topic includes:

- [Configuring Security Associations on page 17](#)
- [Securing OPSFv3 Networks on page 18](#)

### Configuring Security Associations

When you configure a security association (SA), include your choices for authentication, encryption, direction, mode, protocol, and security parameter index (SPI).

To configure a security association:

1. Specify a name for the security association:
 

```
[edit security ipsec]
user@switch# set security-association sa-name
```
2. Specify the mode of the security association:
 

```
[edit security ipsec security-association sa-name]
user@switch# set mode transport
```
3. Specify the type of security association:
 

```
[edit security ipsec security-association sa-name]
user@switch# set type manual
```
4. Specify the direction of the security association:
 

```
[edit security ipsec security-association sa-name]
user@switch# set direction bidirectional
```
5. Specify the value of the security parameter index:
 

```
[edit security ipsec security-association sa-name]
user@switch# set spi spi-value
```
6. Specify the type of authentication to be used:
 

```
[edit security ipsec security-association sa-name]
```

```
user@switch# set authentication algorithm type
```

7. Specify the encryption algorithm and key:

```
[edit security ipsec security-association sa-name]
```

```
user@switch# set encryption algorithm algorithm key type
```

## Securing OPSFv3 Networks

You can secure the OSPFv3 network by applying the SA to the OSPFv3 configuration.

To secure the OSPFv3 network:

```
[edit protocols ospf3 area area-number interface interface-name]
```

```
user@switch# set ipsec-sa sa-name
```

### Related Documentation

- [Understanding IPsec Authentication for OSPF Packets on EX Series Switches on page 7](#)
- [Configuring an OSPF Network \(J-Web Procedure\) on page 13](#)
- [Junos OS System Basics Configuration Guide](#)



## CHAPTER 4

# Configuration Statements

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## area

<b>Syntax</b>	<pre> area <i>area-id</i> {     interface <i>interface-name</i> {         <b>passive</b>;         topology (ipv4-multicast   <i>name</i>) {             disable;         }     }     <b>virtual-link</b> neighbor-id <i>router-id</i> transit-area <i>area-id</i> {         topology (ipv4-multicast   <i>name</i>) {             disable;         }     } } </pre>
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols (<b>ospf</b>   <b>ospf3</b>)],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (<b>ospf</b>   <b>ospf3</b>)],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</p> <p>[edit protocols (<b>ospf</b>   <b>ospf3</b>)],</p> <p>[edit protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (<b>ospf</b>   <b>ospf3</b>)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast)]</p>
<b>Release Information</b>	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p>
<b>Description</b>	<p>Specify the area identifier for this routing device to use when participating in OSPF routing. All routing devices in an area must use the same area identifier to establish adjacencies.</p> <p>Specify multiple <b>area</b> statements to configure the routing device as an area border router. An area border router does not automatically summarize routes between areas. Use the <b>area-range</b> statement to configure route summarization. By definition, an area border router must be connected to the backbone area either through a physical link or through a virtual link. To create a virtual link, include the <b>virtual-link</b> statement.</p> <p>To specify that the routing device is directly connected to the OSPF backbone, include the <b>area 0.0.0.0</b> statement.</p> <p>All routing devices on the backbone must be contiguous. If they are not, use the <b>virtual-link</b> statement to create the appearance of connectivity to the backbone.</p>

You can also configure any interface that belongs to one or more topologies to advertise the direct interface addresses without actually running OSPF on that interface. By default, OSPF must be configured on an interface in order for direct interface addresses to be advertised as interior routes.



**NOTE:** If you configure an interface with the **passive** statement, it applies to all the topologies to which the interface belongs. You cannot configure an interface as passive for only one specific topology and have it remain active for any other topologies to which it belongs.

<b>Options</b>	<b>area-id</b> —Area identifier. The identifier can be up to 32 bits. It is common to specify the area number as a simple integer or an IP address. Area number <b>0.0.0.0</b> is reserved for the OSPF backbone area.
<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>OSPF Areas and Router Functionality Overview</i></li><li>• <i>Understanding Multiple Address Families for OSPFv3</i></li><li>• <a href="#">virtual-link on page 82</a></li></ul>

## area-range

<b>Syntax</b>	<b>area-range</b> <i>network/mask-length</i> <exact> <override-metric <i>metric</i> > <restrict>;
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols (ospf   ospf3) <b>area</b> <i>area-id</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols (ospf   ospf3) area <i>area-id</i> <b>nssa</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) <b>area</b> <i>area-id</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) area <i>area-id</i> <b>nssa</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast) <b>area</b> <i>area-id</i>],</p> <p>[edit protocols (ospf   ospf3) <b>area</b> <i>area-id</i>],</p> <p>[edit protocols (ospf   ospf3) area <i>area-id</i> <b>nssa</b>],</p> <p>[edit protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast) <b>area</b> <i>area-id</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) <b>area</b> <i>area-id</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) area <i>area-id</i> <b>nssa</b>],</p> <p>[edit routing-instances <i>routing-instance-name</i> <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast) <b>area</b> <i>area-id</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>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p>
<b>Description</b>	<p>(Area border routers only) For an area, summarize a range of IP addresses when sending summary link advertisements (within an area). To summarize multiple ranges, include multiple <b>area-range</b> statements.</p> <p>For a not-so-stubby area (NSSA), summarize a range of IP addresses when sending NSSA link-state advertisements. The specified prefixes are used to aggregate external routes learned within the area when the routes are advertised to other areas. To specify multiple prefixes, include multiple <b>area-range</b> statements. All external routes learned within the area that do not fall into one of the prefixes are advertised individually to other areas.</p>
<b>Default</b>	By default, area border routing devices do not summarize routes being sent from one area to other areas, but rather send all routes explicitly.
<b>Options</b>	<p><b>exact</b>—(Optional) Summarization of a route is advertised only when an exact match is made with the configured summary range.</p> <p><b>mask-length</b>—Number of significant bits in the network mask.</p> <p><b>network</b>—IP address. You can specify one or more IP addresses.</p>

**override-metric *metric***—(Optional) Override the metric for the IP address range and configure a specific metric value.

**restrict**—(Optional) Do not advertise the configured summary. This hides all routes that are contained within the summary, effectively creating a route filter.

**Range:** 1 through 16,777,215

<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: Summarizing Ranges of Routes in OSPF Link-State Advertisements</i></li></ul>
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## bandwidth-based-metrics

<b>Syntax</b>	<pre>bandwidth-based-metrics {     bandwidth <i>value</i>;     metric <i>number</i>; }</pre>
<b>Hierarchy Level</b>	<pre>[edit logical-systems <i>logical-system-name</i> protocols (ospf   ospf3) area <i>area-id</i> interface <i>interface-name</i>], [edit logical-systems <i>logical-system-name</i> protocols ospf area <i>area-id</i> interface <i>interface-name</i> topology <i>topology-name</i>], [edit logical-systems <i>logical-system-name</i> protocols ospf3 realm (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> interface <i>interface-name</i>], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) area <i>area-id</i> interface <i>interface-name</i>], [edit logical-systems <i>logical-system-name</i> protocols ospf area <i>area-id</i> interface <i>interface-name</i> topology <i>topology-name</i>], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instances</i> protocols ospf3 realm (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> interface <i>interface-name</i>], [edit protocols (ospf   ospf3) area <i>area-id</i> interface <i>interface-name</i>], [edit protocols ospf area <i>area-id</i> interface <i>interface-name</i> topology <i>topology-name</i>], [edit protocols ospf3 realm (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> interface <i>interface-name</i>], [edit routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) area <i>area-id</i> interface <i>interface-name</i>], [edit routing-instances <i>routing-instance-name</i> protocols ospf area <i>area-id</i> interface <i>interface-name</i> topology <i>topology-name</i>], [edit routing-instances <i>routing-instance-name</i> protocols ospf3 realm (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> interface <i>interface-name</i>]</pre>
<b>Release Information</b>	<p>Statement introduced in Junos OS Release 9.5.</p> <p>Statement introduced in Junos OS Release 9.5 for EX Series switches.</p>
<b>Description</b>	<p>Specify a set of bandwidth threshold values and associated metric values for an OSPF interface or for a topology on an OSPF interface. When the bandwidth of an interface changes, Junos OS automatically sets the interface metric to the value associated with the appropriate bandwidth threshold value.</p>
<b>Options</b>	<p><b>bandwidth <i>value</i></b>—Specify the bandwidth threshold in bits per second.</p> <p><b>Range:</b> 9600 through 1,000,000,000,000,000</p> <p><b>metric <i>number</i></b>—Specify a metric value to associate with a specific bandwidth value.</p> <p><b>Range:</b> 1 through 65,535</p>



**NOTE:** You must also configure a static metric value for the OSPF interface or topology with the metric statement. Junos OS uses this value to calculate the cost of a route from the OSPF interface or topology if the bandwidth for the interface is higher than of any bandwidth threshold values configured for bandwidth-based metrics.

<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 data-bbox="475 359 1326 394">• <i>Example: Dynamically Adjusting OSPF Interface Metrics Based on Bandwidth</i></li><li data-bbox="475 407 1326 443">• <a href="#">metric on page 51</a></li><li data-bbox="475 455 1326 491">• <i>Example: Dynamically Adjusting OSPF Interface Metrics Based on Bandwidth</i></li></ul>



## bfd-liveness-detection (Protocols OSPF)

<b>Syntax</b>	<pre> bfd-liveness-detection {     authentication {         algorithm <i>algorithm-name</i>;         key-chain <i>key-chain-name</i>;         loose-check;     }     detection-time {         threshold <i>milliseconds</i>;     }     full-neighbors-only     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>	<pre> [edit logical-systems <i>logical-system-name</i> protocols (ospf   ospf3) area <i>area-id</i> <b>interface</b> <i>interface-name</i>], [edit logical-systems <i>logical-system-name</i> protocols ospf3 realm (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> <b>interface</b> <i>interface-name</i>], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) area <i>area-id</i> <b>interface</b> <i>interface-name</i>], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf3 realm (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> <b>interface</b> <i>interface-name</i>], [edit protocols (ospf   ospf3) area <i>area-id</i> <b>interface</b> <i>interface-name</i>], [edit protocols ospf3 realm (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> <b>interface</b> <i>interface-name</i>], [edit routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) area <i>area-id</i> <b>interface</b> <i>interface-name</i>], [edit routing-instances <i>routing-instance-name</i> protocols ospf3 realm (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> <b>interface</b> <i>interface-name</i>] </pre>
<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><b>detection-time threshold</b> and <b>transmit-interval threshold</b> options added in Junos OS Release 8.2.</p> <p>Support for logical systems introduced in Junos OS Release 8.3.</p> <p><b>no-adaptation</b> option introduced in Junos OS Release 9.0.</p> <p><b>no-adaptation</b> option introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Support for OSPFv3 introduced in Junos OS Release 9.3.</p> <p>Support for OSPFv3 introduced in Junos OS Release 9.3 for EX Series switches.</p> <p><b>full-neighbors-only</b> option introduced in Junos OS Release 9.5.</p> <p><b>full-neighbors-only</b> option introduced in Junos OS Release 9.5 for EX Series switches.</p>

**authentication algorithm**, **authentication key-chain**, and **authentication loose-check** options introduced in Junos OS Release 9.6.

Statement introduced in Junos OS Release 12.1 for the QFX Series.

**Description** Configure bidirectional failure detection timers and authentication for OSPF.

The remaining statements are explained separately.

**Options** **authentication algorithm *algorithm-name***—Configure the algorithm used to authenticate the specified BFD session: **simple-password**, **keyed-md5**, **keyed-sha-1**, **meticulous-keyed-md5**, or **meticulous-keyed-sha-1**.

**authentication key-chain *key-chain-name***—Associate a security key with the specified BFD session using the name of the security keychain. The name you specify must 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 may not be configured at both ends of the BFD session.

**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.

**full-neighbors-only**—Establish BFD sessions only for OSPF neighbors in the full state. The default behavior is to establish BFD sessions for all OSPF neighbors.

**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 configure the minimum transmit and receive intervals separately using the **transmit-interval minimum-interval** and **minimum-receive-interval** statements.

**Range:** 1 through 255,000 milliseconds

**minimum-receive-interval *milliseconds***—Configure the minimum interval after which the 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 milliseconds

**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 should 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 the minimum interval at which the routing device transmits hello packets to a neighbor with which it has established

a BFD session. 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**

<b>Required Privilege Level</b>	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
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<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <i>Example: Configuring BFD for OSPF</i></li><li>• <i>Example: Configuring BFD Authentication for OSPF</i></li></ul>
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## dead-interval

<b>Syntax</b>	<code>dead-interval seconds;</code>
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols ospf area <i>area-id</i> peer-interface <i>interface-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols (ospf   ospf3) area <i>area-id</i> <b>interface</b> <i>interface-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols (ospf   ospf3) area <i>area-id</i> <b>virtual-link</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> <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 (ospf   ospf3) area <i>area-id</i> <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 (ospf   ospf3) area <i>area-id</i> <b>virtual-link</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> <b>interface</b> <i>interface-name</i>],</p> <p>[edit protocols ospf area <i>area-id</i> peer-interface <i>interface-name</i>],</p> <p>[edit protocols (ospf   ospf3) area <i>area-id</i> <b>interface</b> <i>interface-name</i>],</p> <p>[edit protocols (ospf   ospf3) area <i>area-id</i> <b>virtual-link</b>],</p> <p>[edit protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> <b>interface</b> <i>interface-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) area <i>area-id</i> <b>interface</b> <i>interface-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) area <i>area-id</i> <b>virtual-link</b>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> <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>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2 for EX Series switches.</p>
<b>Description</b>	Specify how long OSPF waits before declaring that a neighboring routing device is unavailable. This is an interval during which the routing device receives no hello packets from the neighbor.
<b>Options</b>	<p><b>seconds</b>—Interval to wait.</p> <p><b>Range:</b> 1 through 65,535 seconds</p> <p><b>Default:</b> Four times the hello interval—40 seconds (broadcast and point-to-point networks); 120 seconds (nonbroadcast multiple access (NBMA) networks)</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 OSPF Timers</i></li> <li>• <i>Configuring RSVP and OSPF for LMP Peer Interfaces</i></li> </ul>

- [hello-interval on page 42](#)

## default-lsa

<b>Syntax</b>	<pre>default-lsa {   default-metric metric;   metric-type type;   type-7; }</pre>
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols (ospf   ospf3) area <i>area-id</i> <a href="#">nssa</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> <a href="#">nssa</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) area <i>area-id</i> <a href="#">nssa</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> <a href="#">nssa</a>],</p> <p>[edit protocols (ospf   ospf3) area <i>area-id</i> <a href="#">nssa</a>],</p> <p>[edit protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> <a href="#">nssa</a>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) area <i>area-id</i> <a href="#">nssa</a>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> <a href="#">nssa</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>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2 for EX Series switches.</p>
<b>Description</b>	<p>On area border routers only, for a not-so-stubby area (NSSA), inject a default link-state advertisement (LSA) with a specified metric value into the area. The default route matches any destination that is not explicitly reachable from within the area.</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>• <a href="#">OSPF Areas and Router Functionality Overview</a></li> <li>• <a href="#">Example: Configuring OSPF Not-So-Stubby Areas</a></li> <li>• <a href="#">nssa on page 56</a></li> <li>• <a href="#">stub on page 73</a></li> </ul>

## default-metric

<b>Syntax</b>	<code>default-metric <i>metric</i>;</code>
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols (ospf   ospf3) <a href="#">area area-id nssa default-lsa</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols (ospf   ospf3) <a href="#">area area-id stub</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> nssa <a href="#">default-lsa</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> <a href="#">stub</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) <a href="#">area area-id nssa default-lsa</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) <a href="#">area area-id stub</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> nssa <a href="#">default-lsa</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> <a href="#">stub</a>],</p> <p>[edit protocols (ospf   ospf3) <a href="#">area area-id nssa default-lsa</a>],</p> <p>[edit protocols (ospf   ospf3) <a href="#">area area-id stub</a>],</p> <p>[edit protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> nssa <a href="#">default-lsa</a>],</p> <p>[edit protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> <a href="#">stub</a>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) <a href="#">area area-id nssa default-lsa</a>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) <a href="#">area area-id stub</a>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> nssa <a href="#">default-lsa</a>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> <a href="#">stub</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>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2 for EX Series switches.</p>
<b>Description</b>	On area border routing devices only, for a stub area, inject a default route with a specified metric value into the area. The default route matches any destination that is not explicitly reachable from within the area.
<b>Options</b>	<p><b><i>metric</i></b>—Metric value.</p> <p><b>Range:</b> 1 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>• <a href="#">OSPF Areas and Router Functionality Overview</a></li> <li>• <a href="#">nssa on page 56</a></li> </ul>

- [stub on page 73](#)



## disable (OSPF)

<b>Syntax</b>	disable;
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols (<b>ospf</b>   <b>ospf3</b>)],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols (ospf   ospf3) <b>area</b> <i>area-id</i> <b>interface</b> <i>interface-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf <b>area</b> <i>area-id</i> <b>peer-interface</b> <i>interface-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols (ospf   ospf3) <b>virtual-link</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast) <b>area</b> <i>area-id</i> <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 (<b>ospf</b>   <b>ospf3</b>)],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) <b>area</b> <i>area-id</i> <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 (ospf   ospf3) <b>virtual-link</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instances</i> protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast) <b>area</b> <i>area-id</i> <b>interface</b> <i>interface-name</i>],</p> <p>[edit protocols (<b>ospf</b>   <b>ospf3</b>)],</p> <p>[edit protocols (ospf   ospf3) <b>area</b> <i>area-id</i> <b>interface</b> <i>interface-name</i>],</p> <p>[edit protocols (ospf   ospf3) <b>virtual-link</b>],</p> <p>[edit protocols ospf <b>area</b> <i>area-id</i> <b>peer-interface</b> <i>interface-name</i>],</p> <p>[edit protocols ospf <b>area</b> <i>area-id</i> <b>virtual-link</b> neighbor-id <i>router-id</i> transit-area <i>area-id</i>],</p> <p>[edit protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</p> <p>[edit protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast) <b>area</b> <i>area-id</i> <b>interface</b> <i>interface-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (<b>ospf</b>   <b>ospf3</b>)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) <b>area</b> <i>area-id</i> <b>interface</b> <i>interface-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) <b>virtual-link</b>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast) <b>area</b> <i>area-id</i> <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>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p>
<b>Description</b>	<p>Disable OSPF, an OSPF interface, or an OSPF virtual link.</p> <p>By default, control packets sent to the remote end of a virtual link must be forwarded using the default topology. In addition, the transit area path consists only of links that</p>

are in the default topology. You can disable a virtual link for a configured topology, but not for a default topology. Include the **disable** statement at the **[edit protocols ospf area *area-id* virtual-link neighbor-id router-id transit-area *area-id* topology *name*]** hierarchy level.



**NOTE:** If you disable the virtual link by including the **disable** statement at the **[edit protocols ospf area *area-id* virtual-link neighbor-id router-id transit-area *area-id*]** hierarchy level, you disable the virtual link for all topologies, including the default topology. You cannot disable the virtual link only in the default topology.

<b>Default</b>	The configured object is enabled (operational) unless explicitly 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>OSPF Configuration Overview</i></li> <li>• <i>Configuring RSVP and OSPF for LMP Peer Interfaces</i></li> </ul>

## domain-id

<b>Syntax</b>	<code>domain-id <i>domain-id</i>;</code>
<b>Hierarchy Level</b>	<code>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (<i>ospf</i>   <i>ospf3</i>)],</code> <code>[edit routing-instances <i>routing-instance-name</i> protocols (<i>ospf</i>   <i>ospf3</i>)]</code>
<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 a domain ID for a route. The domain ID identifies the OSPF domain from which the route originated.
<b>Options</b>	<p><b><i>domain-id</i></b>—You can specify either an IP address or an IP address and a local identifier using the following format: <b><i>ip-address:local-identifier</i></b>. If you do not specify a local identifier with the IP address, the identifier is assumed to have a value of 0.</p> <p><b>Default:</b> If the router ID is not configured in the routing instance, the router ID is derived from an interface address belonging to the routing instance.</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 Between PE and CE Routers in Layer 3 VPNs</i></li> </ul>

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## domain-vpn-tag

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<b>Syntax</b>	<code>domain-vpn-tag <i>number</i>;</code>
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ( <a href="#">ospf</a>   <a href="#">ospf3</a> )], [edit routing-instances <i>routing-instance-name</i> protocols ( <a href="#">ospf</a>   <a href="#">ospf3</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>	Set a virtual private network (VPN) tag for OSPFv2 external routes generated by the provider edge (PE) routing device.
<b>Options</b>	<i>number</i> —VPN tag.
<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 Between PE and CE Routers in Layer 3 VPNs</i></li></ul>

## export (Protocols OSPF)

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<b>Syntax</b>	<code>export [ <i>policy-names</i> ];</code>
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols (<a href="#">ospf</a>   <a href="#">ospf3</a>)],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (<a href="#">ospf</a>   <a href="#">ospf3</a>)],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</p> <p>[edit protocols (<a href="#">ospf</a>   <a href="#">ospf3</a>)],</p> <p>[edit protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (<a href="#">ospf</a>   <a href="#">ospf3</a>)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast)]</p>
<b>Release Information</b>	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p>
<b>Description</b>	Apply one or more policies to routes being exported from the routing table into OSPF.
<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.</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 OSPF Routing Policy</i></li><li>• <i>Import and Export Policies for Network Summaries Overview</i></li><li>• <a href="#">import on page 44</a></li><li>• <i>Routing Policies, Firewall Filters, and Traffic Policers Feature Guide for Routing Devices</i></li></ul>

## external-preference (Protocols OSPF)

<b>Syntax</b>	<code>external-preference <i>preference</i>;</code>
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols (<a href="#">ospf</a>   <a href="#">ospf3</a>)],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (<a href="#">ospf</a>   <a href="#">ospf3</a>)],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</p> <p>[edit protocols (<a href="#">ospf</a>   <a href="#">ospf3</a>)],</p> <p>[edit protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (<a href="#">ospf</a>   <a href="#">ospf3</a>)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast)]</p>
<b>Release Information</b>	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p>
<b>Description</b>	Set the route preference for OSPF external routes.
<b>Options</b>	<p><b><i>preference</i></b>—Preference value.</p> <p><b>Range:</b> 0 through 4,294,967,295 (<math>2^{32} - 1</math>)</p> <p><b>Default:</b> 150</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="#">Example: Controlling OSPF Route Preferences</a></li> <li>• <a href="#">preference on page 62</a></li> </ul>

## graceful-restart (Protocols OSPF)

<b>Syntax</b>	<pre> graceful-restart {   disable;   helper-disable (standard   restart-signaling   both);   no-strict-lsa-checking;   notify-duration <i>seconds</i>;   restart-duration <i>seconds</i>; } </pre>
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols (<a href="#">ospf</a>   <a href="#">ospf3</a>)],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (<a href="#">ospf</a>   <a href="#">ospf3</a>)],</p> <p>[edit protocols (<a href="#">ospf</a>   <a href="#">ospf3</a>)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf]</p>
<b>Release Information</b>	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Support for the <b>no-strict-lsa-checking</b> statement introduced in Junos OS Release 8.5.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Support for the helper mode <b>standard</b>, <b>restart-signaling</b>, and <b>both</b> options introduced in Junos OS Release 11.4.</p> <p>Statement introduced in Junos OS Release 12.1 for the QFX Series.</p>
<b>Description</b>	<p>Configure graceful restart for OSPF.</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 [edit routing-options] hierarchy level.</p>
<b>Options</b>	<p><b>disable</b>—Disable graceful restart for OSPF.</p> <p><b>helper-disable (standard   restart-signaling   both)</b>—Disable helper mode for graceful restart. When helper mode is disabled, a device cannot help a neighboring device that is attempting to restart. Beginning with Junos OS Release 11.4, you can configure restart signaling-based helper mode for OSPFv2 graceful restart configurations. The <b>standard</b>, <b>restart-signaling</b>, and <b>both</b> options are only supported for OSPFv2. Specify <b>standard</b> to disable helper mode for standard graceful restart (based on RFC 3623). Specify <b>restart-signaling</b> to disable helper mode for restart signaling-based graceful restart (based on RFC 4811, RFC 4812, and RFC 4813). Specify <b>both</b> to disable helper mode for both standard and restart signaling-based graceful restart. The last committed statement takes precedence over the previously configured statement.</p> <p><b>Default:</b> Helper mode is enabled by default. For OSPFv2, both standard and restart-signaling based helper modes are enabled by default.</p> <p><b>no-strict-lsa-checking</b>—Disable strict OSPF link-state advertisement (LSA) checking to prevent the termination of graceful restart by a helping router. LSA checking is enabled by default.</p>



**NOTE:** The **helper-disable** statement and the **no-strict-lsa-checking** statement cannot be configured at the same time. If you attempt to configure both

statements at the same time, the routing device displays a warning message when you enter the `show protocols (ospf | ospf3)` command.

.....  
**notify-duration seconds**—Estimated time needed to send out purged grace LSAs over all the interfaces.

**Range:** 1 through 3600 seconds

**Default:** 30 seconds

**restart-duration seconds**—Estimated time needed to reacquire a full OSPF neighbor from each area.

**Range:** 1 through 3600 seconds

**Default:** 180 seconds

<b>Required Privilege Level</b>	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
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<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <i>Example: Configuring Graceful Restart for OSPF</i></li><li>• <i>Example: Configuring the Helper Capability Mode for OSPFv2 Graceful Restart</i></li><li>• <i>Example: Configuring the Helper Capability Mode for OSPFv3 Graceful Restart</i></li><li>• <i>Example: Disabling Strict LSA Checking for OSPF Graceful Restart</i></li><li>• <i>Junos OS High Availability Library for Routing Devices</i></li></ul>
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## hello-interval (Protocols OSPF)

<b>Syntax</b>	<code>hello-interval seconds;</code>
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols ospf area <i>area-id</i> peer-interface <i>interface-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols (ospf   ospf3) area <i>area-id</i> <a href="#">interface interface-name</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols (ospf   ospf3) area <i>area-id</i> <a href="#">virtual-link</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> <a href="#">interface interface-name</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) area <i>area-id</i> <a href="#">interface interface-name</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) area <i>area-id</i> <a href="#">virtual-link</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> <a href="#">interface interface-name</a>],</p> <p>[edit protocols ospf area <i>area-id</i> peer-interface <i>interface-name</i>],</p> <p>[edit protocols (ospf   ospf3) area <i>area-id</i> <a href="#">interface interface-name</a>],</p> <p>[edit protocols (ospf   ospf3) area <i>area-id</i> <a href="#">virtual-link</a>],</p> <p>[edit protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> <a href="#">interface interface-name</a>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) area <i>area-id</i> <a href="#">interface interface-name</a>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) area <i>area-id</i> <a href="#">virtual-link</a>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> <a href="#">interface interface-name</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>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2 for EX Series switches.</p>
<b>Description</b>	Specify how often the routing device sends hello packets out the interface. The hello interval must be the same for all routing devices on a shared logical IP network.
<b>Options</b>	<p><b>seconds</b>—Time between hello packets, in seconds.</p> <p><b>Range:</b> 1 through 255 seconds</p> <p><b>Default:</b> 10 seconds (broadcast and point-to-point networks); 30 seconds (nonbroadcast multiple access [NBMA] networks)</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 OSPF Timers</i></li> <li>• <i>Configuring RSVP and OSPF for LMP Peer Interfaces</i></li> <li>• <a href="#">dead-interval on page 31</a></li> </ul>



## ignore-lsp-metrics

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<b>Syntax</b>	ignore-lsp-metrics;
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols ospf <a href="#">traffic-engineering shortcuts</a> ], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf <a href="#">traffic-engineering shortcuts</a> ], [edit protocols ospf <a href="#">traffic-engineering</a> ], [edit routing-instances <i>routing-instance-name</i> protocols ospf <a href="#">traffic-engineering shortcuts</a> ]
<b>Release Information</b>	Statement introduced in Junos OS Release 7.5. Statement introduced in Junos OS Release 9.0 for EX Series switches. Support for (OSPFv3) introduced in Junos OS Release 9.4. Support for (OSPFv3) introduced in Junos OS Release 9.4 for EX Series switches.
<b>Description</b>	Ignore RSVP LSP metrics in OSPF traffic engineering shortcut calculations.
<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 OSPF Traffic Engineering Support</i></li> </ul>

## import (Protocols OSPF)

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<b>Syntax</b>	<code>import [ <i>policy-names</i> ];</code>
<b>Hierarchy Level</b>	<code>[edit logical-systems <i>logical-system-name</i> protocols (<a href="#">ospf</a>   <a href="#">ospf3</a>)],</code> <code>[edit logical-systems <i>logical-system-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast  </code> <code>  ipv4-multicast   ipv6-multicast)],</code> <code>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols</code> <code>  (<a href="#">ospf</a>   <a href="#">ospf3</a>)],</code> <code>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols</code> <code>  ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</code> <code>[edit protocols (<a href="#">ospf</a>   <a href="#">ospf3</a>)],</code> <code>[edit protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</code> <code>[edit routing-instances <i>routing-instance-name</i> protocols (<a href="#">ospf</a>   <a href="#">ospf3</a>)],</code> <code>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast  </code> <code>  ipv4-multicast   ipv6-multicast)]</code>
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Support for the <b>realm</b> statement introduced in Junos OS Release 9.2. Support for the <b>realm</b> statement introduced in Junos OS Release 9.2 for EX Series switches. Statement introduced in Junos OS Release 11.3 for the QFX Series.
<b>Description</b>	Filter OSPF routes from being added to the routing table.
<b>Options</b>	<i>policy-names</i> —Name of one or more policies.
<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 OSPF Routing Policy</i></li><li>• <i>Import and Export Policies for Network Summaries Overview</i></li><li>• <a href="#">export on page 38</a></li><li>• <i>Routing Policies, Firewall Filters, and Traffic Policers Feature Guide for Routing Devices</i></li></ul>

## inter-area-prefix-export

<b>Syntax</b>	<code>inter-area-prefix-export [ <i>policy-names</i> ];</code>
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 <b>area</b> <i>area-id</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf3 <b>area</b> <i>area-id</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf3 <b>realm</b> (ip4-unicast   ipv4-multicast   ipv6-multicast) <b>area</b> <i>area-id</i>],</p> <p>[edit protocols ospf3 <b>area</b> <i>area-id</i>],</p> <p>[edit protocols ospf3 <b>realm</b> (ip4-unicast   ipv4-multicast   ipv6-multicast) <b>area</b> <i>area-id</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 <b>area</b> <i>area-id</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 <b>realm</b> (ip4-unicast   ipv4-multicast   ipv6-multicast) <b>area</b> <i>area-id</i>]</p>
<b>Release Information</b>	<p>Statement introduced in Junos OS Release 9.1.</p> <p>Statement introduced in Junos OS Release 9.1 for EX Series switches.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2 for EX Series switches.</p>
<b>Description</b>	Apply an export policy for OSPFv3 to specify which interarea prefix link-state advertisements (LSAs) are flooded into an area.
<b>Options</b>	<b><i>policy-name</i></b> —Name of a policy configured at the [edit policy-options policy-statement <i>policy-name</i> term <i>term-name</i> ] hierarchy level.
<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>Import and Export Policies for Network Summaries Overview</i></li> <li>• <a href="#">inter-area-prefix-import on page 46</a></li> <li>• <i>Routing Policies, Firewall Filters, and Traffic Policers Feature Guide for Routing Devices</i></li> </ul>

## inter-area-prefix-import

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<b>Syntax</b>	<code>inter-area-prefix-import [ <i>policy-names</i> ];</code>
<b>Hierarchy Level</b>	<code>[edit logical-systems <i>logical-system-name</i> protocols ospf3 <b>area</b> <i>area-id</i>],</code> <code>[edit logical-systems <i>logical-system-name</i> protocols ospf3 <b>realm</b> (ipv4-unicast  </code> <code>  ipv4-multicast   ipv6-multicast) <b>area</b> <i>area-id</i>],</code> <code>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols</code> <code>  ospf3 <b>area</b> <i>area-id</i>],</code> <code>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols</code> <code>  ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast) <b>area</b> <i>area-id</i>],</code> <code>[edit protocols ospf3 <i>area</i> <i>area-id</i>],</code> <code>[edit protocols ospf3 <b>realm</b> (ip4-unicast   ipv4-multicast   ipv6-multicast)], <b>area</b> <i>area-id</i>],</code> <code>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 <b>area</b> <i>area-id</i>],</code> <code>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 <b>realm</b> (ipv4-unicast  </code> <code>  ipv4-multicast   ipv6-multicast) <b>area</b> <i>area-id</i>]</code>
<b>Release Information</b>	Statement introduced in Junos OS Release 9.1. Statement introduced in Junos OS Release 9.1 for EX Series switches. Support for the <b>realm</b> statement introduced in Junos OS Release 9.2. Support for the <b>realm</b> statement introduced in Junos OS Release 9.2 for EX Series switches.
<b>Description</b>	Apply an import policy for OSPFv3 to specify which routes learned from an area are used to generate interarea prefixes into other areas.
<b>Options</b>	<i>policy-name</i> —Name of a policy configured at the <code>[edit policy-options policy-statement <i>policy-name</i> term <i>term-name</i>]</code> hierarchy level.
<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>Import and Export Policies for Network Summaries Overview</i></li><li>• <a href="#">inter-area-prefix-export on page 45</a></li><li>• <i>Routing Policies, Firewall Filters, and Traffic Policers Feature Guide for Routing Devices</i></li></ul>

## interface (Protocols OSPF)

**Syntax** interface *interface-name* {  
 disable;  
 authentication *key* <*key-id identifier*>;  
 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*;  
 }  
 dead-interval *seconds*;  
 demand-circuit;  
 hello-interval *seconds*;  
 ipsec-sa *name*;  
 interface-type *type*;  
 ldp-synchronization {  
 disable;  
 hold-time *seconds*;  
 }  
 metric *metric*;  
 neighbor *address* <*eligible*>;  
 no-interface-state-traps;  
 passive;  
 poll-interval *seconds*;  
 priority *number*;  
 retransmit-interval *seconds*;  
 te-metric *metric*;  
 topology (ipv4-multicast | *name*) {  
 metric *metric*;  
 }  
 transit-delay *seconds*;  
}

**Hierarchy Level** [edit logical-systems *logical-system-name* protocols (ospf | ospf3) *area area-id*],  
 [edit logical-systems *logical-system-name* protocols ospf3 *realm* (ipv4-unicast |  
 ipv4-multicast | ipv6-multicast) *area area-id*],  
 [edit logical-systems *logical-system-name* routing-instances *routing-instance-name* protocols  
 (ospf | ospf3) *area area-id*],  
 [edit logical-systems *logical-system-name* routing-instances *routing-instance-name* protocols  
 ospf3 *realm* (ipv4-unicast | ipv4-multicast | ipv6-multicast) *area area-id*],  
 [edit protocols (ospf | ospf3) *area area-id*],  
 [edit protocols ospf3 *realm* (ipv4-unicast | ipv4-multicast | ipv6-multicast) *area area-id*],

[edit routing-instances *routing-instance-name* protocols (ospf | ospf3) *area area-id*],  
 [edit routing-instances *routing-instance-name* protocols ospf3 *realm* (ipv4-unicast |  
 ipv4-multicast | ipv6-multicast) *area area-id*]

**Release Information** Statement introduced before Junos OS Release 7.4.  
 Statement introduced in Junos OS Release 9.0 for EX Series switches.  
 Support for the **topology** statement introduced in Junos OS Release 9.0.  
 Support for the **topology** statement introduced in Junos OS Release 9.0 for EX Series switches.  
 Support for the **realm** statement introduced in Junos OS Release 9.2.  
 Support for the **realm** statement introduced in Junos OS Release 9.2 for EX Series switches.  
 Support for the **no-interface-state-traps** statement introduced in Junos OS Release 10.3.  
 This statement is supported only for OSPFv2.  
 Statement introduced in Junos OS Release 11.3 for the QFX Series.

**Description** Enable OSPF routing on a routing device interface.

You must include at least one **interface** statement in the configuration to enable OSPF on the routing device.

**Options** *interface-name*—Name of the interface. Specify the interface by IP address or interface name for OSPFv2, or only the interface name for OSPFv3. Using both the interface name and IP address of the same interface produces an invalid configuration. To configure all interfaces, you can specify **all**. Specifying a particular interface and **all** produces an invalid configuration.



**NOTE:** For nonbroadcast interfaces, specify the IP address of the nonbroadcast interface as *interface-name*.

The remaining statements are explained separately.



**NOTE:** You cannot run both OSPF and ethernet-tcc encapsulation between two Juniper Networks routing devices.

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

**Related Documentation**

- *OSPF Configuration Overview*
- *Example: Configuring Multitopology Routing Based on Applications*
- *Example: Configuring Multitopology Routing Based on a Multicast Source*
- *Example: Configuring Multiple Address Families for OSPFv3*
- *neighbor*

## interface-type (Protocols OSPF)

<b>Syntax</b>	<code>interface-type (nbma   p2mp   p2p);</code>
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols (ospf   ospf3) area <i>area-id</i> <b>interface</b> <i>interface-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 realm (ipv4-multicast   ipv4-unicast   ipv6-multicast) area <i>area-id</i> interface <i>interface-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) area <i>area-id</i> <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 ospf3 realm (ipv4-multicast   ipv4-unicast   ipv6-multicast) area <i>area-id</i> interface <i>interface-name</i>],</p> <p>[edit protocols (ospf   ospf3) area <i>area-id</i> <b>interface</b> <i>interface-name</i>],</p> <p>[edit protocols ospf3 realm (ipv4-multicast   ipv4-unicast   ipv6-multicast) area <i>area-id</i> interface <i>interface-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) area <i>area-id</i> <b>interface</b> <i>interface-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 realm (ipv4-multicast   ipv4-unicast   ipv6-multicast) area <i>area-id</i> interface <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>Support for OSPFv3 for interface type <b>p2p</b> only introduced in Junos OS Release 9.4. You cannot configure other interface types for OSPFv3.</p> <p>Support for OSPFv3 for interface type <b>p2p</b> only introduced in Junos OS Release 9.4 for EX Series switches.</p>
<b>Description</b>	<p>Specify the type of interface.</p> <p>By default, the software chooses the correct interface type based on the type of physical interface. Therefore, you should never have to set the interface type. The exception to this is for NBMA interfaces, which default to an interface type of point-to-multipoint. To have these interfaces explicitly run in Nonbroadcast multiaccess (NBMA) mode, configure the <b>nbma</b> interface type, using the IP address of the local ATM interface.</p> <p>In Junos OS Release 9.3 and later, a point-to-point interface can be an Ethernet interface without a subnet.</p>
<b>Default</b>	The software chooses the correct interface type based on the type of physical interface.
<b>Options</b>	<p><b>nbma</b> (OSPFv2 only)—Nonbroadcast multiaccess (NBMA) interface.</p> <p><b>p2mp</b> (OSPFv2 only)—Point-to-multipoint interface.</p> <p><b>p2p</b>—Point-to-point interface.</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>

- Related Documentation**
- *About OSPF Interfaces*
  - *Example: Configuring an OSPFv2 Interface on a Nonbroadcast Multiaccess Network*

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## **`lsp-metric-into-summary`**

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<b>Syntax</b>	<code>lsp-metric-into-summary;</code>
<b>Hierarchy Level</b>	<code>[edit logical-systems <i>logical-system-name</i> protocols (ospf   ospf3) <a href="#">traffic-engineering shortcuts</a>],</code> <code>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) <a href="#">traffic-engineering shortcuts</a>],</code> <code>[edit protocols (ospf   ospf3) <a href="#">traffic-engineering shortcuts</a>],</code> <code>[edit routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) <a href="#">traffic-engineering shortcuts</a>]</code>
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Support for OSPFv3 ( <b>ospf3</b> ) introduced in Junos OS Release 9.4. Support for OSPFv3 ( <b>ospf3</b> ) introduced in Junos OS Release 9.4 for EX Series switches.
<b>Description</b>	Advertise the LSP metric in summary LSAs.
<b>Required Privilege Level</b>	<code>routing</code> —To view this statement in the configuration. <code>routing-control</code> —To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"><li>• <i>OSPF Support for Traffic Engineering</i></li><li>• <i>Example: Enabling OSPF Traffic Engineering Support</i></li></ul>



## metric (Protocols OSPF Interface)

<b>Syntax</b>	<code>metric <i>metric</i>;</code>
<b>Hierarchy Level</b>	<pre>[edit logical-systems <i>logical-system-name</i> protocols (ospf   ospf3) area <i>area-id</i> interface <i>interface-name</i>], [edit logical-systems <i>logical-system-name</i> protocols ospf area <i>area-id</i> interface <i>interface-name</i> topology (ipv4-multicast   <i>name</i>)], [edit logical-systems <i>logical-system-name</i> protocols ospf3 <i>realm</i> (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> interface <i>interface-name</i>], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) area <i>area-id</i> interface <i>interface-name</i>], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf <i>area</i> <i>area-id</i> sham-link-remote], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf area <i>area-id</i> interface <i>interface-name</i> topology (ipv4-multicast   <i>name</i>)], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf3 <i>realm</i> (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> interface <i>interface-name</i>], [edit protocols (ospf   ospf3) area <i>area-id</i> interface <i>interface-name</i>], [edit protocols ospf area <i>area-id</i> interface <i>interface-name</i> topology (ipv4-multicast   <i>name</i>)], [edit protocols ospf3 <i>realm</i> (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> interface <i>interface-name</i>], [edit routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) area <i>area-id</i> interface <i>interface-name</i>], [edit routing-instances <i>routing-instance-name</i> protocols ospf <i>area</i> <i>area-id</i> sham-link-remote], [edit routing-instances <i>routing-instance-name</i> protocols ospf area <i>area-id</i> interface <i>interface-name</i> topology (ipv4-multicast   <i>name</i>)], [edit routing-instances <i>routing-instance-name</i> protocols ospf3 <i>realm</i> (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> interface <i>interface-name</i>]</pre>
<b>Release Information</b>	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Support for Multitopology Routing introduced in Junos OS Release 9.0.</p> <p>Support for Multitopology Routing introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2 for EX Series switches.</p>
<b>Description</b>	<p>Specify the cost of an OSPF interface. The cost is a routing metric that is used in the link-state calculation.</p> <p>To set the cost of routes exported into OSPF, configure the appropriate routing policy.</p>
<b>Options</b>	<p><b>metric</b>—Cost of the route.</p> <p><b>Range:</b> 1 through 65,535</p> <p><b>Default:</b> By default, the cost of an OSPF route is calculated by dividing the reference-bandwidth value by the bandwidth of the physical interface. Any specific value you configure for the <b>metric</b> overrides the default behavior of using the reference-bandwidth value to calculate the cost of the route for that interface.</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>Example: Controlling the Cost of Individual OSPF Network Segments</i></li><li>• <i>Example: Configuring OSPFv2 Sham Links</i></li><li>• <i>Example: Configuring Multitopology Routing Based on Applications</i></li><li>• <i>Example: Configuring Multitopology Routing Based on a Multicast Source</i></li><li>• <a href="#">bandwidth-based-metrics on page 25</a></li><li>• <a href="#">reference-bandwidth on page 66</a></li></ul>

## metric-type

<b>Syntax</b>	<code>metric-type type;</code>
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols (ospf   ospf3) area <i>area-id</i> <b>nssa default-lsa</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast)) area <i>area-id</i> nssa<b>default-lsa</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) area <i>area-id</i> <b>nssa default-lsa</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast)) area <i>area-id</i> nssa <b>default-lsa</b>],</p> <p>[edit protocols (ospf   ospf3) area <i>area-id</i> <b>nssa default-lsa</b>],</p> <p>[edit protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast)) area <i>area-id</i> nssa <b>default-lsa</b>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) area <i>area-id</i> <b>nssa default-lsa</b>],</p> <p>[edit routing-instances <i>routing-instances</i> protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast)) area <i>area-id</i> nssa <b>default-lsa</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>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2 for EX Series switches.</p>
<b>Description</b>	<p>Specify the external metric type for the default LSA.</p> <p>The configured metric determines the method used to compute the cost to a destination:</p> <ul style="list-style-type: none"> <li>• The Type 1 external metric is equivalent to the link-state metric. The path cost uses the advertised external path cost and the path cost to the AS boundary router (the route is equal to the sum of all internal costs and the external cost).</li> <li>• The Type 2 external metric uses the cost assigned by the AS boundary router (the route is equal to the external cost alone). By default, OSPF uses the Type 2 external metric.</li> </ul>
<b>Options</b>	<b>type</b> —Metric type: 1 or 2
<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>OSPF Areas and Router Functionality Overview</i></li> <li>• <i>Example: Configuring OSPF Not-So-Stubby Areas</i></li> </ul>

## no-nssa-abr

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<b>Syntax</b>	no-nssa-abr;
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols ( <a href="#">ospf</a>   <a href="#">ospf3</a> )], [edit logical-systems <i>logical-system-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast)], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ( <a href="#">ospf</a>   <a href="#">ospf3</a> )], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast)], [edit protocols ( <a href="#">ospf</a>   <a href="#">ospf3</a> )], [edit protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast)], [edit routing-instances <i>routing-instance-name</i> protocols ( <a href="#">ospf</a>   <a href="#">ospf3</a> )], [edit routing-instances <i>routing-instance-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast)]
<b>Release Information</b>	Statement introduced in Junos OS Release 7.6. Statement introduced in Junos OS Release 9.0 for EX Series switches. Support for the <b>realm</b> statement introduced in Junos OS Release 9.2. Support for the <b>realm</b> statement introduced in Junos OS Release 9.2 for EX Series switches. Statement introduced in Junos OS Release 11.3 for the QFX Series.
<b>Description</b>	Disable exporting Type 7 link-state advertisements into not-so-stubby-areas (NSSAs) for an autonomous system boundary router (ASBR) or an area border router (ABR).
<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 OSPF Not-So-Stubby Areas</i></li></ul>

## no-rfc-1583

<b>Syntax</b>	no-rfc-1583;
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols (<a href="#">ospf</a>   <a href="#">ospf3</a>)],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (<a href="#">ospf</a>   <a href="#">ospf3</a>)],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</p> <p>[edit protocols (<a href="#">ospf</a>   <a href="#">ospf3</a>)],</p> <p>[edit protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (<a href="#">ospf</a>   <a href="#">ospf3</a>)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast)]</p>
<b>Release Information</b>	<p>Statement introduced in Junos OS Release 8.5.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p>
<b>Description</b>	Disable compatibility with RFC 1583, <i>OSPF Version 2</i> . If the same external destination is advertised by AS boundary routers that belong to different OSPF areas, disabling compatibility with RFC 1583 can prevent routing loops.
<b>Default</b>	Compatibility with RFC 1583 is enabled by default.
<b>Required Privilege Level</b>	<p>routing—To view this statement in the configuration.</p> <p>routing-control-level—To add this statement to the configuration.</p>
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li><i>Example: Disabling OSPFv2 Compatibility with RFC 1583</i></li> </ul>

## nssa

<b>Syntax</b>	<pre>nssa {   area-range network/mask-length &lt;restrict&gt; &lt;exact&gt; &lt;override-metric metric&gt;;   default-lsa {     default-metric metric;     metric-type type;     type-7;   }   (no-summaries   summaries); }</pre>
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols (ospf   ospf3) <b>area</b> <i>area-id</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) <b>area</b> <i>area-id</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</p> <p>[edit protocols (ospf   ospf3) <b>area</b> <i>area-id</i>],</p> <p>[edit protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) <b>area</b> <i>area-id</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast)]</p>
<b>Release Information</b>	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2 for EX Series switches.</p>
<b>Description</b>	<p>Configure a not-so-stubby area (NSSA). An NSSA allows external routes to be flooded within the area. These routes are then leaked into other areas.</p> <p>You cannot configure an area as being both a stub area and an NSSA.</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>OSPF Areas and Router Functionality Overview</i></li> <li>• <i>Example: Configuring OSPF Not-So-Stubby Areas</i></li> <li>• <b>stub</b> on page 73</li> </ul>

## ospf

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<b>Syntax</b>	<code>ospf { ... }</code>
<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 11.3 for the QFX Series.
<b>Description</b>	Enable OSPF routing on the routing device.  You must include the <b>ospf</b> statement to enable OSPF on the routing device.
<b>Default</b>	OSPF 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>OSPF Configuration Overview</i></li> <li>• <i>[edit protocols ospf] Hierarchy Level</i></li> </ul>


## ospf3

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<b>Syntax</b>	ospf3 { ... }
<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 11.3 for the QFX Series.
<b>Description</b>	Enable OSPFv3 routing on the routing device.  You must include the <b>ospf3</b> statement to enable OSPFv3.
<b>Default</b>	OSPFv3 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>OSPF Configuration Overview</i></li><li>• <i>[edit protocols ospf3] Hierarchy Level</i></li></ul>



## overload (Protocols OSPF)

<b>Syntax</b>	<pre>overload {     timeout <i>seconds</i>; }</pre>
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols (<b>ospf</b>   <b>ospf3</b>)],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf topology (default   ipv4-multicast   <i>name</i>)],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (<b>ospf</b>   <b>ospf3</b>)],</p> <p>[edit logical systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf topology (default   ipv4-multicast   <i>name</i>)],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</p> <p>[edit protocols (<b>ospf</b>   <b>ospf3</b>)],</p> <p>[edit protocols ospf topology (default   ipv4-multicast   <i>name</i>)],</p> <p>[edit protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (<b>ospf</b>   <b>ospf3</b>)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf topology (default   ipv4-multicast   <i>name</i>)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</p>
<b>Release Information</b>	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Support for Multitopology Routing introduced in Junos OS Release 9.0.</p> <p>Support for Multitopology Routing introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p>
<b>Description</b>	<p>Configure the local routing device so that it appears to be overloaded. You might do this when you want the routing device to participate in OSPF routing, but do not want it to be used for transit traffic.</p>
<div>  <p><b>NOTE:</b> Traffic destined to directly attached interfaces continues to reach the routing device.</p> </div>	
<b>Options</b>	<p><b>timeout <i>seconds</i></b>—(Optional) Number of seconds at which the overloading is reset. If no timeout interval is specified, the routing device remains in overload state until the <b>overload</b> statement is deleted or a timeout is set.</p> <p><b>Range:</b> 60 through 1800 seconds</p> <p><b>Default:</b> 0 seconds</p>



**NOTE:** Multitopology Routing does not support the timeout option.

**Required Privilege  
Level**

routing—To view this statement in the configuration.  
routing-control—To add this statement to the configuration.

**Related  
Documentation**

- *Example: Configuring OSPF to Make Routing Devices Appear Overloaded*
- *Example: Configuring Multitopology Routing Based on Applications*
- *Example: Configuring Multitopology Routing Based on a Multicast Source*

## passive (Protocols OSPF)

<b>Syntax</b>	<pre> passive {     traffic-engineering {         remote-node-id address;     } } </pre>
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols (ospf   ospf3) area <i>area-id</i> <b>interface</b> <i>interface-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> <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 (ospf   ospf3) area <i>area-id</i> <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 ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> <b>interface</b> <i>interface-name</i>],</p> <p>[edit protocols (ospf   ospf3) area <i>area-id</i> <b>interface</b> <i>interface-name</i>],</p> <p>[edit protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> <b>interface</b> <i>interface-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) area <i>area-id</i> <b>interface</b> <i>interface-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> <b>interface</b> <i>interface-name</i>]</p>
<b>Release Information</b>	<p>Statement introduced before Junos OS Release 7.4.</p> <p><b>traffic-engineering</b> and <b>remote-node-id address</b> statements introduced in Junos OS Release 8.0.</p> <p><b>traffic-engineering</b> and <b>remote-node-id address</b> statements introduced in Junos OS Release 8.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2 for EX Series switches.</p>
<b>Description</b>	<p>Advertise the direct interface addresses on an interface without actually running OSPF on that interface. A passive interface is one for which the address information is advertised as an internal route in OSPF, but on which the protocol does not run.</p> <p>To configure an interface in OSPF passive traffic engineering mode, include the <b>traffic-engineering</b> statement. Configuring OSPF passive traffic engineering mode enables the dynamic discovery of OSPF AS boundary routers.</p> <p>Enable OSPF on an interface by including the <b>interface</b> statement at the [edit protocols (ospf   ospf3) area <i>area-id</i>] or the [edit routing-instances <i>routing-instance-name</i> protocols ospf area <i>area-id</i>] hierarchy levels. Disable it by including the <b>disable</b> statement. To prevent OSPF from running on an interface, include the <b>passive</b> statement. These three states are mutually exclusive.</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>

- Related Documentation**
- *Example: Configuring a Passive OSPF Interface*
  - *Example: Configuring OSPF Passive Traffic Engineering Mode*
  - [disable on page 35](#)

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## preference (Protocols OSPF)

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<b>Syntax</b>	<code>preference preference;</code>
<b>Hierarchy Level</b>	<code>[edit logical-systems <i>logical-system-name</i> protocols (<a href="#">ospf</a>   <a href="#">ospf3</a>)],</code> <code>[edit logical-systems <i>logical-system-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast  </code> <code>  ipv4-multicast   ipv6-multicast)],</code> <code>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols</code> <code>  (<a href="#">ospf</a>   <a href="#">ospf3</a>)],</code> <code>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols</code> <code>  ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</code> <code>[edit protocols (<a href="#">ospf</a>   <a href="#">ospf3</a>)],</code> <code>[edit protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</code> <code>[edit routing-instances <i>routing-instance-name</i> protocols (<a href="#">ospf</a>   <a href="#">ospf3</a>)],</code> <code>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast  </code> <code>  ipv4-multicast   ipv6-multicast)]</code>
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Support for the <b>realm</b> statement introduced in Junos OS Release 9.2. Support for the <b>realm</b> statement introduced in Junos OS Release 9.2 for EX Series switches. Statement introduced in Junos OS Release 11.3 for the QFX Series.
<b>Description</b>	Set the route preference for OSPF internal routes.
<b>Options</b>	<b>preference</b> —Preference value. <b>Range:</b> 0 through 4,294,967,295 ( $2^{32} - 1$ ) <b>Default:</b> 10
<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: Controlling OSPF Route Preferences</i></li><li>• <a href="#">external-preference on page 39</a></li></ul>

## prefix-export-limit (Protocols OSPF)

<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 (<a href="#">ospf</a>   <a href="#">ospf3</a>)],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf topology (default   ipv4-multicast   <i>name</i>)],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (<a href="#">ospf</a>   <a href="#">ospf3</a>)],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf topology (default   ipv4-multicast   <i>name</i>)],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</p> <p>[edit protocols (<a href="#">ospf</a>   <a href="#">ospf3</a>)],</p> <p>[edit protocols ospf topology (default   ipv4-multicast   <i>name</i>)],</p> <p>[edit protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (<a href="#">ospf</a>   <a href="#">ospf3</a>)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf topology (default   ipv4-multicast   <i>name</i>)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast)]</p>
<b>Release Information</b>	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Support for Multitopology Routing introduced in Junos OS Release 9.0.</p> <p>Support for Multitopology Routing introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p>
<b>Description</b>	Configure a limit to the number of prefixes exported into OSPF.
<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: Limiting the Number of Prefixes Exported to OSPF</i></li> <li>• <i>Example: Configuring Multitopology Routing Based on Applications</i></li> <li>• <i>Example: Configuring Multitopology Routing Based on a Multicast Source</i></li> </ul>


## priority (Protocols OSPF)

<b>Syntax</b>	<code>priority number;</code>
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols (ospf   ospf3) area <i>area-id</i> <b>interface</b> <i>interface-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast)) area <i>area-id</i> <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 (ospf   ospf3) area <i>area-id</i> <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 ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast)) area <i>area-id</i> <b>interface</b> <i>interface-name</i>],</p> <p>[edit protocols (ospf   ospf3) area <i>area-id</i> <b>interface</b> <i>interface-name</i>],</p> <p>[edit protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast)) area <i>area-id</i> <b>interface</b> <i>interface-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) area <i>area-id</i> <b>interface</b> <i>interface-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast)) area <i>area-id</i> <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>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2 for EX Series switches.</p>
<b>Description</b>	Specify the routing device's priority for becoming the designated routing device. The routing device that has the highest priority value on the logical IP network or subnet becomes the network's designated router. You must configure at least one routing device on each logical IP network or subnet to be the designated router. You also should specify a routing device's priority for becoming the designated router on point-to-point interfaces.
<b>Options</b>	<p><b>number</b>—Routing device's priority for becoming the designated router. A priority value of 0 means that the routing device never becomes the designated router. A value of 1 means that the routing device has the least chance of becoming a designated router.</p> <p><b>Range:</b> 0 through 255</p> <p><b>Default:</b> 128</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>OSPF Designated Router Overview</i></li> <li>• <i>Example: Controlling OSPF Designated Router Election</i></li> </ul>

## realm

<b>Syntax</b>	<pre> realm (ipv4-unicast   ipv4-multicast   ipv6-unicast) {     area area-id {         interface interface-name;     } } </pre>
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols <a href="#">ospf3</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <a href="#">ospf3</a>],</p> <p>[edit protocols <a href="#">ospf3</a>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <a href="#">ospf3</a>]</p>
<b>Release Information</b>	<p>Statement introduced in Junos OS Release 9.2.</p> <p>Statement introduced in Junos OS Release 9.2 for EX Series switches.</p>
<b>Description</b>	<p>Configure OSPFv3 to advertise address families other than unicast IPv6. Junos OS maps each address family you configure to a separate realm with its own set of neighbors and link-state database.</p>
<b>Options</b>	<p><b>ipv4-unicast</b>—Configure a realm for IPv4 unicast routes.</p> <p><b>ipv4-multicast</b>—Configure a realm for IPv4 multicast routes.</p> <p><b>ipv6-multicast</b>—Configure a realm for IPv6 multicast routes.</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>Example: Configuring Multiple Address Families for OSPFv3</i></li> </ul>

## reference-bandwidth (Protocols OSPF)

<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 (<a href="#">ospf</a>   <a href="#">ospf3</a>)],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (<a href="#">ospf</a>   <a href="#">ospf3</a>)],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</p> <p>[edit protocols (<a href="#">ospf</a>   <a href="#">ospf3</a>)],</p> <p>[edit protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (<a href="#">ospf</a>   <a href="#">ospf3</a>)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast)]</p>
<b>Release Information</b>	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p>
<b>Description</b>	<p>Set the reference bandwidth used in calculating the default interface cost. The cost is calculated using the following formula:</p> $\text{cost} = \text{ref-bandwidth} / \text{bandwidth}$
<b>Options</b>	<p><b><i>reference-bandwidth</i></b>—Reference bandwidth, in bits per second.</p> <p><b>Range:</b> 9600 through 1,000,000,000,000 bits</p> <p><b>Default:</b> 100 Mbps (100,000,000 bits)</p>
<div>  <p><b>NOTE:</b> The default behavior is to use the reference-bandwidth value to calculate the cost of OSPF interfaces. You can override this behavior for any OSPF interface by configuring a specific cost with the metric statement.</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>• <a href="#">Example: Controlling the Cost of Individual OSPF Network Segments</a></li> <li>• <a href="#">metric on page 51</a></li> </ul>



## retransmit-interval (OSPF)

<b>Syntax</b>	<code>retransmit-interval seconds;</code>
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols ospf area <i>area-id</i> peer-interface <i>interface-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols (ospf   ospf3) area <i>area-id</i> <b>interface</b> <i>interface-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols (ospf   ospf3) area <i>area-id</i> <b>virtual-link</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 realm (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> <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 (ospf   ospf3) area <i>area-id</i> <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 (ospf   ospf3) area <i>area-id</i> <b>virtual-link</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf3 realm (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> <b>interface</b> <i>interface-name</i>],</p> <p>[edit protocols ospf area <i>area-id</i> peer-interface <i>interface-name</i>],</p> <p>[edit protocols (ospf   ospf3) area <i>area-id</i> <b>interface</b> <i>interface-name</i>],</p> <p>[edit protocols (ospf   ospf3) area <i>area-id</i> <b>virtual-link</b>],</p> <p>[edit protocols ospf3 realm (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> <b>interface</b> <i>interface-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) area <i>area-id</i> <b>interface</b> <i>interface-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) area <i>area-id</i> <b>virtual-link</b>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 realm (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> <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>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2 for EX Series switches.</p>
<b>Description</b>	Specify how long the routing device waits to receive a link-state acknowledgment packet before retransmitting link-state advertisements (LSAs) to an interface's neighbors.
<b>Options</b>	<p><b>seconds</b>—Interval to wait.</p> <p><b>Range:</b> 1 through 65,535 seconds</p> <p><b>Default:</b> 5 seconds</p>



**NOTE:** You must configure LSA retransmit intervals to be equal to or greater than 3 seconds to avoid triggering a retransmit trap, because Junos OS delays LSA acknowledgments by up to 2 seconds.

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

**Related Documentation**

- *Example: Configuring OSPF Timers*
- *Configuring RSVP and OSPF for LMP Peer Interfaces*

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## rib-group (Protocols OSPF)

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<b>Syntax</b>	<code>rib-group group-name;</code>
<b>Hierarchy Level</b>	<code>[edit logical-systems logical-system-name protocols (ospf   ospf3)],</code> <code>[edit logical-systems logical-system-name protocols ospf3 realm (ipv4-unicast  </code> <code>ipv4-multicast   ipv6-multicast)],</code> <code>[edit logical-systems logical-system-name routing-instances routing-instance-name protocols</code> <code>(ospf   ospf3)],</code> <code>[edit logical-systems logical-system-name routing-instances routing-instance-name protocols</code> <code>ospf3 realm (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</code> <code>[edit protocols (ospf   ospf3)],</code> <code>[edit protocols ospf3 realm (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</code> <code>[edit routing-instances routing-instance-name protocols (ospf   ospf3)],</code> <code>[edit routing-instances routing-instance-name protocols ospf3 realm (ipv4-unicast  </code> <code>ipv4-multicast   ipv6-multicast)]</code>
<b>Release Information</b>	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Support for the <b>realm</b> statement introduced in Junos OS Release 9.2. Support for the <b>realm</b> statement introduced in Junos OS Release 9.2 for EX Series switches. Statement introduced in Junos OS Release 11.3 for the QFX Series.
<b>Description</b>	Install routes learned from OSPF routing instances into routing tables in the OSPF routing table group.
<b>Options</b>	<b>group-name</b> —Name of the routing table group.
<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: 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><li>• <i>interface-routes</i></li><li>• <i>rib-group</i></li></ul>

## route-type-community

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<b>Syntax</b>	<code>route-type-community (iana   vendor);</code>
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ( <code>ospf</code>   <code>ospf3</code> )], [edit routing-instances <i>routing-instance-name</i> protocols ( <code>ospf</code>   <code>ospf3</code> )]
<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 12.3 for ACX Series routers.
<b>Description</b>	Specify an extended community value to encode the OSPF route type. Each extended community is coded as an eight-octet value. This statement sets the most significant bit to either an IANA or vendor-specific route type.
<b>Options</b>	<b>iana</b> —Encode a route type with the value <b>0x0306</b> . This is the default value. <b>vendor</b> —Encode the route type with the value <b>0x8000</b> .
<b>Required Privilege Level</b>	<b>routing</b> —To view this statement in the configuration. <b>routing-control</b> —To add this statement to the configuration.
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li><i>Configuring Routing Between PE and CE Routers in Layer 3 VPNs</i></li> </ul>

## shortcuts (Protocols OSPF)

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<b>Syntax</b>	<pre>shortcuts {     lsp-metric-into-summary; }</pre>
<b>Hierarchy Level</b>	[edit logical-systems <i>logical-system-name</i> protocols (ospf   ospf3) <a href="#">traffic-engineering</a> ], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) <a href="#">traffic-engineering</a> ], [edit protocols (ospf   ospf3) <a href="#">traffic-engineering</a> ], [edit routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) <a href="#">traffic-engineering</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. Support for OSPFv3 ( <b>ospf3</b> ) introduced in Junos OS Release 9.4. Support for OSPFv3 ( <b>ospf3</b> ) introduced in Junos OS Release 9.4 for EX Series switches.
<b>Description</b>	Configure OSPF to use MPLS label-switched paths (LSPs) as shortcut next hops. By default, shortcut routes calculated through OSPFv2 are installed in the <b>inet.3</b> routing table, and shortcut routes calculated through OSPFv3 are installed in the <b>inet6.3</b> routing table.
<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 OSPF Traffic Engineering Support</i></li></ul>

## spf-options (Protocols OSPF)

<b>Syntax</b>	<pre> spf-options {     delay <i>milliseconds</i>;     holddown <i>milliseconds</i>;     rapid-runs <i>number</i>; } </pre>
<b>Hierarchy Level</b>	<pre> [edit logical-systems <i>logical-system-name</i> protocols (<b>ospf</b>   <b>ospf3</b>)], [edit logical-systems <i>logical-system-name</i> protocols ospf topology (default   ipv4-multicast   <i>name</i>)], [edit logical-systems <i>logical-system-name</i> protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast)], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (<b>ospf</b>   <b>ospf3</b>)], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf topology (default   ipv4-multicast   <i>name</i>)], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast)], [edit protocols (<b>ospf</b>   <b>ospf3</b>)], [edit protocols ospf topology (default   ipv4-multicast   <i>name</i>)], [edit protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast)], [edit routing-instances <i>routing-instance-name</i> protocols (<b>ospf</b>   <b>ospf3</b>)], [edit routing-instances <i>routing-instance-name</i> protocols ospf topology (default   ipv4-multicast   <i>name</i>)], [edit routing-instances <i>routing-instance-name</i> protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast)] </pre>
<b>Release Information</b>	<p>Statement introduced in Junos OS Release 8.5.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Support for Multitopology Routing introduced in Junos OS Release 9.0.</p> <p>Support for Multitopology Routing introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p>
<b>Description</b>	<p>Configure options for running the shortest-path-first (SPF) algorithm. You can configure the following:</p> <ul style="list-style-type: none"> <li>• A delay for when to run the SPF algorithm after a network topology change is detected.</li> <li>• The maximum number of times the SPF algorithm can run in succession.</li> <li>• A hold-down interval after the SPF algorithm runs the maximum number of times.</li> </ul> <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>

<b>Options</b>	<b>delay <i>milliseconds</i></b> —Time interval between the detection of a topology change and when the SPF algorithm runs. <b>Range:</b> 50 through 8000 milliseconds <b>Default:</b> 200 milliseconds
	<b>holddown <i>milliseconds</i></b> —Time interval to hold down, or to wait before a subsequent SPF algorithm runs after the SPF algorithm has run the configured maximum number of times in succession. <b>Range:</b> 2000 through 20,000 milliseconds <b>Default:</b> 5000 milliseconds
	<b>rapid-runs <i>number</i></b> —Maximum number of times the SPF algorithm can run in succession. After the maximum is reached, the hold down interval begins. <b>Range:</b> 1 through 10 <b>Default:</b> 3
<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 SPF Algorithm Options for OSPF</i></li><li>• <i>Example: Configuring Multitopology Routing Based on Applications</i></li><li>• <i>Example: Configuring Multitopology Routing Based on a Multicast Source</i></li></ul>

## stub

<b>Syntax</b>	stub <default-metric <i>metric</i> > <(no-summaries   summaries)>;
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols (ospf   ospf3) <b>area</b> <i>area-id</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) <b>area</b> <i>area-id</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</p> <p>[edit protocols (ospf   ospf3) <b>area</b> <i>area-id</i>],</p> <p>[edit protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) <b>area</b> <i>area-id</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 <b>realm</b> (ipv4-unicast   ipv4-multicast   ipv6-multicast)]</p>
<b>Release Information</b>	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2 for EX Series switches.</p>
<b>Description</b>	<p>Specify that this area not be flooded with AS external link-state advertisements (LSAs). You must include the <b>stub</b> statement when configuring all routing devices that are in the stub area.</p> <p>The backbone cannot be configured as a stub area.</p> <p>You cannot configure an area to be both a stub area and a not-so-stubby area (NSSA).</p>
<b>Options</b>	<p><b>no-summaries</b>—(Optional) Do not advertise routes into the stub area. If you include the <b>default-metric</b> option, only the default route is advertised.</p> <p><b>summaries</b>—(Optional) Flood summary LSAs into the stub area.</p> <p>The remaining statement is 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>OSPF Areas and Router Functionality Overview</i></li> <li>• <i>Example: Configuring OSPF Stub and Totally Stubby Areas</i></li> <li>• <a href="#">nssa on page 56</a></li> </ul>

## summaries

<b>Syntax</b>	(summaries   no-summaries);
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols (ospf   ospf3) <a href="#">area area-id nssa</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id nssa</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) <a href="#">area area-id nssa</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id nssa</i>],</p> <p>[edit protocols (ospf   ospf3) <a href="#">area area-id nssa</a>],</p> <p>[edit protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast)] area <i>area-id nssa</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) <a href="#">area area-id nssa</a>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 <a href="#">realm</a> (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id nssa</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>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2 for EX Series switches.</p>
<b>Description</b>	<p>Configure whether or not area border routers advertise summary routes into an not-so-stubby area (NSSA):</p> <ul style="list-style-type: none"> <li>• <b>summaries</b>—Flood summary link-state advertisements (LSAs) into the NSSA.</li> <li>• <b>no-summaries</b>—Prevent area border routers from advertising summaries into an NSSA. If <b>default-metric</b> is configured for an NSSA, a Type 3 LSA is injected into the area by default.</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>• <i>OSPF Areas and Router Functionality Overview</i></li> <li>• <i>Example: Configuring OSPF Not-So-Stubby Areas</i></li> <li>• <a href="#">nssa on page 56</a></li> <li>• <a href="#">stub on page 73</a></li> </ul>



## traceoptions (Protocols OSPF)

<b>Syntax</b>	<pre>traceoptions {     file <i>filename</i> &lt;files <i>number</i>&gt; &lt;size <i>size</i>&gt; &lt;world-readable   no-world-readable&gt;;     flag <i>flag</i> &lt;flag-modifier&gt; &lt;disable&gt;; }</pre>
<b>Hierarchy Level</b>	<pre>[edit logical-systems <i>logical-system-name</i> protocols (<i>ospf</i>   <i>ospf3</i>)], [edit logical-systems <i>logical-system-name</i> protocols ospf3 <i>realm</i> (ipv4-unicast     ipv4-multicast   ipv6-multicast)], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols   (<i>ospf</i>   <i>ospf3</i>)], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols   ospf3 <i>realm</i> (ipv4-unicast   ipv4-multicast   ipv6-multicast)], [edit protocols (<i>ospf</i>   <i>ospf3</i>)], [edit protocols ospf3 <i>realm</i> (ipv4-unicast   ipv4-multicast   ipv6-multicast)], [edit routing-instances <i>routing-instance-name</i> protocols (<i>ospf</i>   <i>ospf3</i>)], [edit routing-instances <i>routing-instance-name</i> protocols ospf3 <i>realm</i> (ipv4-unicast     ipv4-multicast   ipv6-multicast)]</pre>
<b>Release Information</b>	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p>
<b>Description</b>	<p>Configure OSPF protocol-level tracing options.</p> <p>To specify more than one tracing operation, include multiple <b>flag</b> statements.</p>



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

<b>Default</b>	The default OSPF protocol-level tracing options are those inherited from the routing protocols <b>traceoptions</b> statement included at the <b>[edit routing-options]</b> 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>filename</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 OSPF tracing output in the file <b>ospf-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>

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

**Range:** 2 through 1000 files

**Default:** 10 files

**flag flag**—Tracing operation to perform. To specify more than one tracing operation, include multiple **flag** statements.

#### OSPF Tracing Flags

- **database-description**—Database description packets, which are used in synchronizing the OSPF and OSPFv3 topological database.
- **error**—OSPF and OSPFv3 error packets.
- **event**—OSPF and OSPFv3 state transitions.
- **flooding**—Link-state flooding packets.
- **graceful-restart**—Graceful-restart events.
- **hello**—Hello packets, which are used to establish neighbor adjacencies and to determine whether neighbors are reachable.
- **ldp-synchronization**—Synchronization events between OSPF and LDP.
- **lsa-ack**—Link-state acknowledgment packets, which are used in synchronizing the OSPF topological database.
- **lsa-analysis**—Link-state analysis. Specific to the Juniper Networks implementation of OSPF, Junos OS performs LSA analysis before running the shortest-path-first (SPF) algorithm. LSA analysis helps to speed the calculations performed by the SPF algorithm.
- **lsa-request**—Link-state request packets, which are used in synchronizing the OSPF topological database.
- **lsa-update**—Link-state updates packets, which are used in synchronizing the OSPF topological database.
- **nsr-synchronization**—Nonstop routing synchronization events.
- **on-demand**—Trace demand circuit extensions.
- **packet-dump**—Content of selected packet types.
- **packets**—All OSPF packets.
- **restart-signaling**—(OSPFv2 only) Restart-signaling graceful restart events.
- **spf**—Shortest-path-first (SPF) calculations.

#### Global Tracing Flags

- **all**—All tracing operations.
- **general**—A combination of the **normal** and **route** trace operations.
- **normal**—All normal operations. 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**—Detailed trace information.
- **receive**—Packets being received.
- **send**—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.

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: Tracing OSPF Protocol Traffic</i></li> </ul>

## traffic-engineering (OSPF)

---

Syntax	<pre>traffic-engineering {   &lt;advertise-unnumbered-interfaces&gt;;   &lt;credibility-protocol-preference&gt;;   ignore-lsp-metrics;   multicast-rpf-routes;   no-topology;   shortcuts {     lsp-metric-into-summary;   } }</pre>
Hierarchy Level	[edit logical-systems <i>logical-system-name</i> protocols ( <b>ospf</b>   ospf3)], [edit protocols ( <b>ospf</b>   ospf3)]
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p><b>multicast-rpf-routes</b> option introduced in Junos OS Release 7.5.</p> <p><b>advertise-unnumbered-interfaces</b> option introduced in Junos OS Release 8.5.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Support for OSPFv3 (<b>ospf3</b>) introduced in Junos OS Release 9.4.</p> <p>Support for OSPFv3 (<b>ospf3</b>) introduced in Junos OS Release 9.4 for EX Series switches.</p> <p><b>credibility-protocol-preference</b> statement introduced in Junos OS Release 9.4.</p> <p><b>credibility-protocol-preference</b> statement introduced in Junos OS Release 9.4 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p>
Description	Enable the OSPF traffic engineering features.
Default	Traffic engineering support is disabled.
Options	<p><b>advertise-unnumbered-interfaces</b>—(Optional) (OSPFv2 only) Include the link-local identifier in the link-local traffic-engineering link-state advertisement. This statement must be included on both ends of an unnumbered link to allow an ingress LER to update the link in its traffic engineering database and use it for CSPF calculations. The link-local identifier is then used by RSVP to signal unnumbered interfaces as defined in RFC 3477.</p> <p><b>credibility-protocol-preference</b>—(Optional) (OSPFv2 only) Use the configured preference value for OSPF routes to calculate the traffic engineering database credibility value used to select IGP routes. Use this statement to override the default behavior, in which the traffic engineering database prefers IS-IS routes even if OSPF routes are configured with a lower, that is, preferred, preference value. For example, OSPF routes have a default preference value of 10, whereas IS-IS Level 1 routes have a default preference value of 15. When protocol preference is enabled, the credibility value is determined by deducting the protocol preference value from a base value of 512. Using default protocol preference values, OSPF has a credibility value of 502, whereas IS-IS has a credibility value of 497. Because the traffic engineering database prefers IGP routes with the highest credibility value, OSPF routes are now preferred.</p>

**multicast-rpf-routes**—(Optional) (OSPFv2 only) Install routes for multicast RPF checks into the **inet.2** routing table. The **inet.2** routing table consists of unicast routes used for multicast RPF lookup. RPF is an antispoofing mechanism used to check whether the packet is coming in on an interface that is also sending data back to the packet source.



**NOTE:** You must enable OSPF traffic engineering shortcuts to use the **multicast-rpf-routes** statement. You must not allow LSP advertisements into OSPF when configuring the **multicast-rpf-routes** statement.

**no-topology**—(Optional) (OSPFv2 only) Disable the dissemination of the link-state topology information.

The remaining statements are explained separately.



**CAUTION:** When the OSPF traffic engineering configuration is considerably modified, the routing table entries are deleted and the routing table is recreated. Changes to configuration that can cause this behavior include enabling or disabling:

- Traffic engineering shortcuts
- IGP shortcuts
- LDP tunneling
- Multiprotocol LSP
- Advertise summary metrics
- Multicast RPF 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>Example: Enabling OSPF Traffic Engineering Support</i></li> </ul>

## transit-delay (OSPF)

<b>Syntax</b>	<code>transit-delay seconds;</code>
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols ospf area <i>area-id</i> peer-interface <i>interface-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols (ospf   ospf3) area <i>area-id</i> <b>interface</b> <i>interface-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols (ospf   ospf3) area <i>area-id</i> <b>virtual-link</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 realm (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> <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 ospf area <i>area-id</i> <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 ospf area <i>area-id</i> <b>virtual-link</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf3 realm (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> <b>interface</b> <i>interface-name</i>],</p> <p>[edit protocols ospf area <i>area-id</i> peer-interface <i>interface-name</i>],</p> <p>[edit protocols (ospf   ospf3) area <i>area-id</i> <b>interface</b> <i>interface-name</i>],</p> <p>[edit protocols (ospf   ospf3) area <i>area-id</i> <b>virtual-link</b>],</p> <p>[edit protocols ospf3 realm (ipv4-unicast   ipv4-multicast   ipv6-multicast)] area <i>area-id</i> <b>interface</b> <i>interface-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf area <i>area-id</i> <b>interface</b> <i>interface-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf area <i>area-id</i> <b>virtual-link</b>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 realm (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> <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>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2 for EX Series switches.</p>
<b>Description</b>	<p>Set the estimated time required to transmit a link-state update on the interface. When calculating this time, make sure to account for transmission and propagation delays.</p> <p>You should never have to modify the transit delay time.</p>
<b>Options</b>	<p><b>seconds</b>—Estimated time, in seconds.</p> <p><b>Range:</b> 1 through 65,535 seconds</p> <p><b>Default:</b> 1 second</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 OSPF Timers</i></li> <li>• <i>Configuring RSVP and OSPF for LMP Peer Interfaces</i></li> </ul>

## type-7

<b>Syntax</b>	<code>type-7;</code>
<b>Hierarchy Level</b>	<p>[edit logical-systems <i>logical-system-name</i> protocols (ospf   ospf3) area <i>area-id</i> nssa <a href="#">default-lsa</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 realm (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> nssa <a href="#">default-lsa</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) area <i>area-id</i> nssa <a href="#">default-lsa</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 realm (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> nssa <a href="#">default-lsa</a>],</p> <p>[edit protocols (ospf   ospf3) area <i>area-id</i> nssa <a href="#">default-lsa</a>],</p> <p>[edit protocols ospf3 realm (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> nssa <a href="#">default-lsa</a>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf   ospf3) area <i>area-id</i> nssa <a href="#">default-lsa</a>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 realm (ipv4-unicast   ipv4-multicast   ipv6-multicast) area <i>area-id</i> nssa <a href="#">default-lsa</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>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2.</p> <p>Support for the <b>realm</b> statement introduced in Junos OS Release 9.2 for EX Series switches.</p>
<b>Description</b>	<p>Flood Type 7 default link-state advertisements (LSAs) if the <b>no-summaries</b> statement is configured.</p> <p>By default, when the <b>no-summaries</b> statement is configured, a Type 3 LSA is injected into not-so-stubby areas (NSSAs) for Junos OS Release 5.0 and later. To support backward compatibility with earlier Junos OS releases, include the <b>type-7</b> statement. This statement enables NSSA ABRs to advertise a Type 7 default LSA into the NSSA if you have also included the <b>no-summaries</b> statement in the configuration.</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>OSPF Areas and Router Functionality Overview</i></li> <li>• <i>Example: Configuring OSPF Not-So-Stubby Areas</i></li> <li>• <a href="#">no-summaries on page 74</a></li> </ul>

## virtual-link

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<b>Syntax</b>	<pre>virtual-link neighbor-id <i>router-id</i> transit-area <i>area-id</i> {     disable;     authentication key &lt;key-id identifier&gt;;     dead-interval <i>seconds</i>;     hello-interval <i>seconds</i>;     ipsec-sa <i>name</i>;     retransmit-interval <i>seconds</i>;     transit-delay <i>seconds</i>; }</pre>
<b>Hierarchy Level</b>	<pre>[edit logical-systems <i>logical-system-name</i> protocols (ospf   ospf3) <i>area area-id</i>], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols   ospf <i>area area-id</i>], [edit protocols (ospf   ospf3) <i>area area-id</i>], [edit routing-instances <i>routing-instance-name</i> protocols ospf <i>area area-id</i>]</pre>
<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>	For backbone areas only, create a virtual link to use in place of an actual physical link. All area border routers and other routing devices on the backbone must be contiguous. If this is not possible and there is a break in OSPF connectivity, use virtual links to create connectivity to the OSPF backbone. When configuring virtual links, you must configure links on the two routing devices that form the end points of the link, and both of these routing devices must be area border routers. You cannot configure links through stub areas.
<b>Options</b>	<p><b>neighbor-id <i>router-id</i></b>—IP address of the routing device at the remote end of the virtual link.</p> <p><b>transit-area <i>area-id</i></b>—Area identifier of the area through which the virtual link transits. Virtual links are not allowed to transit the backbone area.</p> <p>The remaining statements are explained separately.</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>OSPF Areas and Router Functionality Overview</i></li><li>• <i>Example: Configuring OSPF Virtual Links</i></li></ul>



## PART 3

# Administration

- [Routine Monitoring on page 85](#)
- [Operational Commands on page 89](#)



## CHAPTER 5

# Routine Monitoring

- [Monitoring OSPF Routing Information on page 85](#)

## Monitoring OSPF Routing Information

### Purpose



**NOTE:** This topic applies only to the J-Web Application package.

Use the monitoring functionality to monitor OSPF routing information on routing devices.

### Action

To view OSPF routing information in the J-Web interface, select **Monitor > Routing > OSPF Information**.

To view OSPF routing information in the CLI, enter the following CLI commands:

- `show ospf neighbor`
- `show ospf interface`
- `show ospf statistics`

### Meaning

[Table 7 on page 85](#) summarizes key output fields in the OSPF routing display in the J-Web interface.

**Table 7: Summary of Key OSPF Routing Output Fields**

Field	Values	Additional Information
OSPF Interfaces		
Interface	Name of the interface running OSPF.	
State	State of the interface: <b>BDR</b> , <b>Down</b> , <b>DR</b> , <b>DROther</b> , <b>Loop</b> , <b>PtToPt</b> , or <b>Waiting</b> .	The <b>Down</b> state, indicating that the interface is not functioning, and <b>PtToPt</b> state, indicating that a point-to-point connection has been established, are the most common states.
Area	Number of the area that the interface is in.	
DR ID	Address of the area's designated device.	

Table 7: Summary of Key OSPF Routing Output Fields (*continued*)

Field	Values	Additional Information
BDR ID	Address of the area's backup designated device.	
Neighbors	Number of neighbors on this interface.	
Adjacency Count	Number of devices in the area using the same area identifier.	
Stub Type	The areas into which OSPF does not flood AS external advertisements	
Passive Mode	In this mode the interface is present on the network but does not transmit or receive packets.	
Authentication Type	The authentication scheme for the backbone or area.	
Interface Address	The IP address of the interface.	
Address Mask	The subnet mask or address prefix.	
MTU	The maximum transmission unit size.	
Interface Cost	The path cost used to calculate the root path cost from any given LAN segment is determined by the total cost of each link in the path.	
Hello Interval	How often the routing device sends hello packets out of the interface.	
Dead Interval	The interval during which the routing device receives no hello packets from the neighbor.	
Retransmit Interval	The interval for which the routing device waits to receive a link-state acknowledgment packet before retransmitting link-state advertisements to an interface's neighbors.	
OSPF Statistics		
Packets tab		
Sent	Displays the total number of packets sent.	
Received	Displays the total number of packets received.	
Details tab		
Flood Queue Depth	Number of entries in the extended queue.	
Total Retransmits	Number of retransmission entries enqueued.	

Table 7: Summary of Key OSPF Routing Output Fields (*continued*)

Field	Values	Additional Information
Total Database Summaries	Total number of database description packets.	
OSPF Neighbors		
Address	Address of the neighbor.	
Interface	Interface through which the neighbor is reachable.	
State	State of the neighbor: <b>Attempt, Down, Exchange, ExStart, Full, Init, Loading, or 2way.</b>	Generally, only the <b>Down</b> state, indicating a failed OSPF adjacency, and the <b>Full</b> state, indicating a functional adjacency, are maintained for more than a few seconds. The other states are transitional states that a neighbor is in only briefly while an OSPF adjacency is being established.
ID	ID of the neighbor.	
Priority	Priority of the neighbor to become the designated router.	
Activity Time	The activity time.	
Area	Area that the neighbor is in.	
Options	Option bits received in the hello packets from the neighbor.	
DR Address	Address of the designated router.	
BDR Address	Address of the backup designated router.	
Uptime	Length of time since the neighbor came up.	
Adjacency	Length of time since the adjacency with the neighbor was established.	

**Related Documentation**

- [Configuring an OSPF Network \(J-Web Procedure\) on page 13](#)
- [Layer 3 Protocols Supported on EX Series Switches on page 3](#)



## CHAPTER 6

# Operational Commands

- `clear (ospf | ospf3) database`
- `clear (ospf | ospf3) io-statistics`
- `clear (ospf | ospf3) neighbor`
- `clear (ospf | ospf3) statistics`
- `clear (ospf | ospf3) overload`
- `show (ospf | ospf3) interface`
- `show (ospf | ospf3) io-statistics`
- `show (ospf | ospf3) log`
- `show (ospf | ospf3) neighbor`
- `show (ospf | ospf3) overview`
- `show (ospf | ospf3) route`
- `show (ospf | ospf3) statistics`
- `show ospf database`
- `show ospf3 database`

## clear (ospf | ospf3) database

---

**List of Syntax**    [Syntax on page 90](#)  
                          [Syntax \(EX Series Switch and QFX Series\) on page 90](#)

**Syntax**    clear (ospf | ospf3) database  
              <advertising-router (*router-id* | self)>  
              <area *area-id*>  
              <asbrsummary>  
              <external>  
              <instance *instance-name*>  
              <inter-area-prefix>  
              <inter-area-router>  
              <intra-area-prefix>  
              <link-local>  
              <logical-system (all | *logical-system-name*)>  
              <lsa-id *lsa-id*>  
              <netsummary>  
              <network>  
              <nssa>  
              <opaque-area>  
              <purge>  
              <realm (ipv4-multicast | ipv4-unicast | ipv6-multicast)>  
              <router>

**Syntax (EX Series Switch and QFX Series)**    clear (ospf | ospf3) database  
  <advertising-router (*router-id* | self)>  
  <area *area-id*>  
  <asbrsummary>  
  <external>  
  <instance *instance-name*>  
  <inter-area-prefix>  
  <inter-area-router>  
  <intra-area-prefix>  
  <link-local>  
  <lsa-id *lsa-id*>  
  <netsummary>  
  <network>  
  <nssa>  
  <opaque-area>  
  <purge>  
  <router>

**Release Information**    Command introduced before Junos OS Release 7.4.  
                              **advertising-router** *router-id*, **netsummary**, **network**, **nssa**, **opaque-area**, and **router** options added in Junos OS Release 8.3. You must use the **purge** command with these options.  
                              **area** *area-id* option added in Junos OS Release 8.3.  
                              Command introduced in Junos OS Release 9.0 for EX Series switches.  
                              **realm** option added in Junos OS Release 9.2.  
                              **advertising-router** (*router-id* | **self**) option added in Junos OS Release 9.5.  
                              **advertising-router** (*router-id* | **self**) option introduced in Junos OS Release 9.5 for EX Series switches.  
                              Command introduced in Junos OS Release 11.3 for the QFX Series.



**purge** option (and all options that are dependent on the **purge** option) hidden in Junos OS Release 13.3.

**Description** With the master Routing Engine, delete entries in the Open Shortest Path First (OSPF) link-state advertisement (LSA) database. With the backup Routing Engine, delete the OSPF LSA database and sync the new database with the master Routing Engine.



**CAUTION:** You can also use the **purge** command with any of the options to discard rather than delete the specified LSA entries. This command is useful only for testing. Use it with care, because it causes significant network disruption.

**Options** **none**—Delete all LSAs other than the system's own LSAs, which are regenerated. To resynchronize the database, the system destroys all adjacent neighbors that are in the state **EXSTART** or higher. The neighbors are then reacquired and the databases are synchronized.

**advertising-router** (*router-id* | **self**)—(Hidden) Discard entries for the LSA entries advertised by the specified routing device or by this routing device.

**area** *area-id*—(Optional) Discard entries for the LSAs in the specified area.

**asbrsummary**—(Optional) Discard summary AS boundary router LSA entries.

**external**—(Optional) Discard external LSAs.

**instance** *instance-name*—(Optional) Delete or discard entries for the specified routing instance only.

**inter-area-prefix**—(OSPFv3 only) (Optional) Discard interarea prefix LSAs.

**inter-area-router**—(OSPFv3 only) (Optional) Discard interarea router LSAs.

**intra-area-prefix**—(OSPFv3 only) (Optional) Discard intra-area prefix LSAs.

**logical-system** (**all** | *logical-system-name*)—(Optional) Perform this operation on all logical systems or on a particular logical system.

**link-local**—(Optional) Delete link-local LSAs.

**lsa-id** *lsa-id*—(Optional) Discard the LSA entries with the specified LSA identifier.

**netsummary**—(Hidden) Discard summary network LSAs.

**network**—(Hidden) Discard network LSAs.

**nssa**—(Hidden) Discard not-so-stubby area (NSSA) LSAs.

**opaque-area**—(Hidden) Discard opaque area-scope LSAs.

**purge**—(Hidden) Discard all entries in the link-state advertisement database. All link-state advertisements are set to **MAXAGE** and are flooded. The database is repopulated when the originators of the link-state advertisements receive the **MAXAGE** link-state advertisements and reissue them.

**realm (ipv4-multicast | ipv4-unicast | ipv6-multicast)**—(OSPFv3 only) (Optional) Delete the entries for the specified OSPFv3 realm, or address family. Use the **realm** option to specify an address family for OSPFv3 other than IPv6 unicast, which is the default.

**router**—(Hidden) Discard router LSAs.

**Required Privilege Level**

clear

**Related Documentation**

- [show ospf database on page 131](#)
- [show ospf3 database on page 139](#)

**List of Sample Output** [clear ospf database on page 92](#)

**Output Fields** When you enter this command, you are provided feedback on the status of your request.

## Sample Output

### [clear ospf database](#)

```
user@host> clear ospf database
```

## clear (ospf | ospf3) io-statistics

---

<b>List of Syntax</b>	<a href="#">Syntax on page 93</a> <a href="#">Syntax (EX Series Switch and QFX Series) on page 93</a>
<b>Syntax</b>	clear (ospf   ospf3) io-statistics <logical-system (all   <i>logical-system-name</i> )>
<b>Syntax (EX Series Switch and QFX Series)</b>	clear (ospf   ospf3) io-statistics
<b>Release Information</b>	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches. Command introduced in Junos OS Release 11.3 for the QFX Series.
<b>Description</b>	Clear Open Shortest Path First (OSPF) input and output statistics.
<b>Options</b>	<b>none</b> —Clear OSPF input and output statistics.  <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>List of Sample Output</b>	<a href="#">clear ospf io-statistics on page 93</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

#### clear ospf io-statistics

```
user@host> clear ospf io-statistics
```

## clear (ospf | ospf3) neighbor

---

List of Syntax	<a href="#">Syntax on page 94</a> <a href="#">Syntax (EX Series Switch and QFX Series) on page 94</a>
Syntax	<pre>clear (ospf   ospf3) neighbor &lt;area <i>area-id</i>&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; &lt;realm (ipv4-multicast   ipv4-unicast   ipv6-multicast)&gt;</pre>
Syntax (EX Series Switch and QFX Series)	<pre>clear (ospf   ospf3) neighbor &lt;area <i>area-id</i>&gt; &lt;instance <i>instance-name</i>&gt; &lt;interface <i>interface-name</i>&gt; &lt;neighbor&gt;</pre>
Release Information	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches. <b>realm</b> option introduced in Junos OS Release 9.2. Command introduced in Junos OS Release 11.3 for the QFX Series.
Description	Tear down Open Shortest Path First (OSPF) neighbor connections.
Options	<p><b>none</b>—Tear down OSPF connections with all neighbors for all routing instances.</p> <p><b>area <i>area-id</i></b>—(Optional) Tear down neighbor connections for the specified area only.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Tear down neighbor connections for the specified routing instance only.</p> <p><b>interface <i>interface-name</i></b>—(Optional) Tear down neighbor connections 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 the state of the specified neighbor only.</p> <p><b>realm (ipv4-multicast   ipv4-unicast   ipv6-multicast)</b>—(Optional) (OSPFv3 only) Clear the state of the specified OSPFv3 realm, or address family. Use the <b>realm</b> option to specify an address family for OSPFv3 other than IPv6 unicast, which is the default.</p>
Required Privilege Level	clear
Related Documentation	<ul style="list-style-type: none"><li>• <a href="#">show (ospf   ospf3) neighbor on page 110</a></li></ul>
List of Sample Output	<a href="#">clear ospf neighbor on page 95</a>

**Output Fields** When you enter this command, you are provided feedback on the status of your request.

### Sample Output

clear ospf neighbor

```
user@host> clear ospf neighbor
```

## clear (ospf | ospf3) statistics

---

List of Syntax	<a href="#">Syntax on page 96</a> <a href="#">Syntax (EX Series Switch and QFX Series) on page 96</a>
Syntax	<code>clear (ospf   ospf3) statistics</code> <code>&lt;instance <i>instance-name</i>&gt;</code> <code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code> <code>&lt;realm (ipv4-multicast   ipv4-unicast   ipv6-multicast)&gt;</code>
Syntax (EX Series Switch and QFX Series)	<code>clear (ospf   ospf3) statistics</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. <b>realm</b> option introduced in Junos OS Release 9.2. Command introduced in Junos OS Release 11.3 for the QFX Series.
Description	Clear Open Shortest Path First (OSPF) statistics.
Options	<b>none</b> —Clear OSPF statistics.  <b>instance <i>instance-name</i></b> —(Optional) Clear statistics 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>realm (ipv4-multicast   ipv4-unicast   ipv6-multicast)</b> —(Optional) (OSPFv3 only) Clear statistics for the specified OSPFv3 realm, or address family. Use the <b>realm</b> option to specify an address family for OSPFv3 other than IPv6 unicast, which is the default.
Required Privilege Level	clear
Related Documentation	<ul style="list-style-type: none"><li>• <a href="#">show (ospf   ospf3) statistics on page 127</a></li></ul>
List of Sample Output	<a href="#">clear ospf statistics on page 96</a>
Output Fields	See <a href="#">show (ospf   ospf3) statistics</a> for an explanation of output fields.

## Sample Output

### clear ospf statistics

The following sample output displays OSPF statistics before and after the **clear ospf statistics** command is entered:

```
user@host> show ospf statistics
```

Packet type	Total	Last 5 seconds
-------------	-------	----------------

	Sent	Received	Sent	Received
Hello	3254	2268	3	1
DbD	41	46	0	0
LSReq	8	7	0	0
LSUpdate	212	154	0	0
LSAck	65	98	0	0

DBDs retransmitted	:	3, last 5 seconds	:	0
LSAs flooded	:	12, last 5 seconds	:	0
LSAs flooded high-prio	:	0, last 5 seconds	:	0
LSAs retransmitted	:	0, last 5 seconds	:	0
LSAs transmitted to nbr:	:	3, last 5 seconds	:	0
LSAs requested	:	5, last 5 seconds	:	0
LSAs acknowledged	:	19, last 5 seconds	:	0

Flood queue depth	:	0
Total rexmit entries	:	0
db summaries	:	0
lsreq entries	:	0

Receive errors:  
626 subnet mismatches

user@host> clear ospf statistics

user@host> show ospf statistics

Packet type	Total		Last 5 seconds	
	Sent	Received	Sent	Received
Hello	3	1	3	1
DbD	0	0	0	0
LSReq	0	0	0	0
LSUpdate	0	0	0	0
LSAck	0	0	0	0

DBDs retransmitted	:	0, last 5 seconds	:	0
LSAs flooded	:	0, last 5 seconds	:	0
LSAs flooded high-prio	:	0, last 5 seconds	:	0
LSAs retransmitted	:	0, last 5 seconds	:	0
LSAs transmitted to nbr:	:	0, last 5 seconds	:	0
LSAs requested	:	0, last 5 seconds	:	0
LSAs acknowledged	:	0, last 5 seconds	:	0

Flood queue depth	:	0
Total rexmit entries	:	0
db summaries	:	0
lsreq entries	:	0

Receive errors:  
None

## clear (ospf | ospf3) overload

---

<b>List of Syntax</b>	<a href="#">Syntax on page 98</a> <a href="#">Syntax (EX Series Switches) on page 98</a>
<b>Syntax</b>	<code>clear (ospf   ospf3) overload</code> <code>&lt;instance <i>instance-name</i>&gt;</code> <code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code>
<b>Syntax (EX Series Switches)</b>	<code>clear (ospf   ospf3) overload</code> <code>&lt;instance <i>instance-name</i>&gt;</code>
<b>Release Information</b>	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches. Command introduced in Junos OS Release 11.3 for the QFX Series.
<b>Description</b>	Clear the Open Shortest Path First (OSPF) overload bit and rebuild link-state advertisements (LSAs).
<b>Options</b>	<b>none</b> —Clear the overload bit and rebuild LSAs for all routing instances.  <b>instance <i>instance-name</i></b> —(Optional) Clear the overload bit and rebuild LSAs 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>	clear
<b>List of Sample Output</b>	<a href="#">clear ospf overload on page 98</a>
<b>Output Fields</b>	When you enter this command, you are provided feedback on the status of your request.

### Sample Output

#### clear ospf overload

```
user@host> clear ospf overload
```



## show (ospf | ospf3) interface

<b>List of Syntax</b>	<a href="#">Syntax on page 99</a> <a href="#">Syntax (EX Series Switches and QFX Series) on page 99</a>
<b>Syntax</b>	<pre>show (ospf   ospf3) interface &lt;brief   detail   extensive&gt; &lt;area <i>area-id</i>&gt; &lt;<i>interface-name</i>&gt; &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt; &lt;realm (ipv4-multicast   ipv4-unicast   ipv6-multicast)&gt;</pre>
<b>Syntax (EX Series Switches and QFX Series)</b>	<pre>show (ospf   ospf3) interface &lt;brief   detail   extensive&gt; &lt;area <i>area-id</i>&gt; &lt;<i>interface-name</i>&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><b>area</b> option introduced in Junos OS Release 9.2.</p> <p><b>area</b> option introduced in Junos OS Release 9.2 for EX Series switches.</p> <p><b>realm</b> option introduced in Junos OS Release 9.2.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>
<b>Description</b>	Display the status of OSPF interfaces.
<b>Options</b>	<p><b>none</b>—Display standard information about the status of all OSPF interfaces for all routing instances</p> <p><b>brief   detail   extensive</b>—(Optional) Display the specified level of output.</p> <p><b>area <i>area-id</i></b>—(Optional) Display information about the interfaces that belong to the specified area.</p> <p><b><i>interface-name</i></b>—(Optional) Display information for the specified interface.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display all OSPF interfaces under the named 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> <p><b>realm (ipv4-multicast   ipv4-unicast   ipv6-multicast)</b>—(OSPFv3 only) (Optional) Display information about the interfaces for the specified OSPFv3 realm, or address family. Use the <b>realm</b> option to specify an address family for OSPFv3 other than IPv6 unicast, which is the default.</p>
<b>Required Privilege Level</b>	view

**List of Sample Output** [show ospf interface brief on page 102](#)  
[show ospf interface detail on page 102](#)  
[show ospf3 interface detail on page 102](#)  
[show ospf interface detail\(When Multiarea Adjacency Is Configured\) on page 102](#)  
[show ospf interface area area-id on page 104](#)  
[show ospf interface extensive \(When Flooding Reduction Is Enabled\) on page 104](#)  
[show ospf interface extensive \(When LDP Synchronization Is Configured\) on page 104](#)

**Output Fields** [Table 8 on page 100](#) lists the output fields for the **show (ospf | ospf3) interface** command. Output fields are listed in the approximate order in which they appear.

**Table 8: show (ospf | ospf3) interface Output Fields**

Field Name	Field Description	Level of Output
<b>Interface</b>	Name of the interface running OSPF version 2 or OSPF version 3.	All levels
<b>State</b>	State of the interface: <b>BDR</b> , <b>Down</b> , <b>DR</b> , <b>DRother</b> , <b>Loop</b> , <b>PtToPt</b> , or <b>Waiting</b> .	All levels
<b>Area</b>	Number of the area that the interface is in.	All levels
<b>DR ID</b>	Address of the area's designated router.	All levels
<b>BDR ID</b>	Backup designated router for a particular subnet.	All levels
<b>Nbrs</b>	Number of neighbors on this interface.	All levels
<b>Type</b>	Type of interface: <b>LAN</b> , <b>NBMA</b> , <b>P2MP</b> , <b>P2P</b> , or <b>Virtual</b> .	<b>detail extensive</b>
<b>Address</b>	IP address of the neighbor.	<b>detail extensive</b>
<b>Mask</b>	Netmask of the neighbor.	<b>detail extensive</b>
<b>Prefix-length</b>	(OSPFv3) IPv6 prefix length, in bits.	<b>detail extensive</b>
<b>OSPF3-Intf-Index</b>	(OSPFv3) OSPF version 3 interface index.	<b>detail extensive</b>
<b>MTU</b>	Interface maximum transmission unit (MTU).	<b>detail extensive</b>
<b>Cost</b>	Interface cost (metric).	<b>detail extensive</b>
<b>DR addr</b>	Address of the designated router.	<b>detail extensive</b>
<b>BDR addr</b>	Address of the backup designated router.	<b>detail extensive</b>
<b>Adj count</b>	Number of adjacent neighbors.	<b>detail extensive</b>
<b>Secondary</b>	Indicates that this interface is configured as a secondary interface for this area. This interface can belong to more than one area, but can be designated as a primary interface for only one area.	<b>detail extensive</b>

Table 8: show (ospf | ospf3) interface Output Fields (*continued*)

Field Name	Field Description	Level of Output
<b>Flood Reduction</b>	Indicates that this interface is configured with flooding reduction. All self-originated LSAs from this interface are initially sent with the <b>DoNotAge</b> bit set. As a result, LSAs are refreshed only when a change occurs.	<b>extensive</b>
<b>Priority</b>	Router priority used in designated router (DR) election on this interface.	<b>detail extensive</b>
<b>Flood list</b>	List of link-state advertisements (LSAs) that might be about to flood this interface.	<b>extensive</b>
<b>Ack list</b>	Acknowledgment list. List of pending acknowledgments on this interface.	<b>extensive</b>
<b>Descriptor list</b>	List of packet descriptors.	<b>extensive</b>
<b>Hello</b>	Configured value for the hello timer.	<b>detail extensive</b>
<b>Dead</b>	Configured value for the dead timer.	<b>detail extensive</b>
<b>Auth type</b>	(OSPFv2) Authentication mechanism for sending and receiving OSPF protocol packets: <ul style="list-style-type: none"> <li>• <b>MD5</b>—The MD5 mechanism is configured in accordance with RFC 2328.</li> <li>• <b>None</b>—No authentication method is configured.</li> <li>• <b>Password</b>—A simple password (RFC 2328) is configured.</li> </ul>	<b>detail extensive</b>
<b>Topology</b>	(Multiarea adjacency) Name of topology: <b>default</b> or <b>name</b> .	
<b>LDP sync state</b>	(OSPFv2 and LDP synchronization) Current state of LDP synchronization: <b>in sync</b> , <b>in holddown</b> , and <b>not supported</b> .	<b>extensive</b>
<b>reason</b>	(OSPFv2 and LDP synchronization) Reason for the current state of LDP synchronization. The LDP session might be up or down, or adjacency might be up or down.	<b>extensive</b>
<b>config holdtime</b>	(OSPFv2 and LDP synchronization) Configured value of the hold timer.  If the state is not synchronized, and the hold time is not infinity, the <b>remaining</b> field displays the number of seconds that remain until the configured hold timer expires.	<b>extensive</b>
<b>IPSec SA name</b>	(OSPFv2) Name of the IPSec security association name.	<b>detail extensive</b>
<b>Active key ID</b>	(OSPFv2 and MD5) Number from <b>0</b> to <b>255</b> that uniquely identifies an MD5 key.	<b>detail extensive</b>
<b>Start time</b>	(OSPFv2 and MD5) Time at which the routing device starts using an MD5 key to authenticate OSPF packets transmitted on the interface on which this key is configured. To authenticate received OSPF protocol packets, the key becomes effective immediately after the configuration is committed. If the start time option is not configured, the key is effective immediately for send and receive and is displayed as <b>Start time 1970 Jan 01 00:00:00 PST</b> .	<b>detail extensive</b>

Table 8: show (ospf | ospf3) interface Output Fields (*continued*)

Field Name	Field Description	Level of Output
ReXmit	Configured value for the Retransmit timer.	detail extensive
Stub, Not Stub, or Stub NSSA	Type of area.	detail extensive

## Sample Output

### show ospf interface brief

```

user@host> show ospf interface brief
Intf          State   Area      DR ID      BDR ID      Nbrs
at-5/1/0.0    PtToPt 0.0.0.0    0.0.0.0    0.0.0.0     1
ge-2/3/0.0    DR      0.0.0.0    192.168.4.16 192.168.4.15 1
lo0.0         DR      0.0.0.0    192.168.4.16 0.0.0.0     0
so-0/0/0.0    Down    0.0.0.0    0.0.0.0    0.0.0.0     0
so-6/0/1.0    PtToPt 0.0.0.0    0.0.0.0    0.0.0.0     1
so-6/0/2.0    Down    0.0.0.0    0.0.0.0    0.0.0.0     0
so-6/0/3.0    PtToPt 0.0.0.0    0.0.0.0    0.0.0.0     1

```

### show ospf interface detail

```

user@host> show ospf interface detail
Interface      State   Area      DR ID      BDR ID      Nbrs
fe-0/0/1.0     BDR    0.0.0.0    192.168.37.12 10.255.245.215 1
Type LAN, address 192.168.37.11, Mask 255.255.255.248, MTU 4460, Cost 40
DR addr 192.168.37.12, BDR addr 192.168.37.11, Adj count 1, Priority 128
Hello 10, Dead 40, ReXmit 5, Not Stub
t1-0/2/1.0     PtToPt 0.0.0.0    0.0.0.0    0.0.0.0     0
Type P2P, Address 0.0.0.0, Mask 0.0.0.0, MTU 1500, Cost 2604
Adj count 0
Hello 10, Dead 40, ReXmit 5, Not Stub
Auth type: MD5, Active key ID 3, Start time 2002 Nov 19 10:00:00 PST
IPsec SA Name: sa

```

### show ospf3 interface detail

```

user@host> show ospf3 interface so-0/0/3.0 detail
Interface      State   Area      DR-ID      BDR-ID      Nbrs
so-0/0/3.0     PtToPt 0.0.0.0    0.0.0.0    0.0.0.0     1
Address fe80::2a0:a5ff:fe28:1dfc, Prefix-length 64
OSPF3-Intf-index 1, Type P2P, MTU 4470, Cost 12, Adj-count 1
Hello 10, Dead 40, ReXmit 5, Not Stub

```

### show ospf interface detail (When Multiarea Adjacency Is Configured)

```

user@host> show ospf interface detail
regress@router> show ospf interface detail
Interface      State   Area      DR ID      BDR ID      Nbrs
lo0.0          DR      0.0.0.0    10.255.245.2 0.0.0.0     0

Type: LAN, Address: 127.0.0.1, Mask: 255.255.255.255, MTU: 65535, Cost: 0
DR addr: 127.0.0.1, Adj count: 0, Priority: 128
Hello: 10, Dead: 40, ReXmit: 5, Not Stub
Auth type: None

```

```

Topology default (ID 0) -> Cost: 0
1o0.0          DR          0.0.0.0          10.255.245.2    0.0.0.0          0

Type: LAN, Address: 10.255.245.2, Mask: 255.255.255.255, MTU: 65535, Cost: 0
DR addr: 10.255.245.2, Adj count: 0, Priority: 128
Hello: 10, Dead: 40, ReXmit: 5, Not Stub
Auth type: None
Topology default (ID 0) -> Cost: 0
so-0/0/0.0      PtToPt  0.0.0.0          0.0.0.0          0.0.0.0          1

Type: P2P, Address: 0.0.0.0, Mask: 0.0.0.0, MTU: 4470, Cost: 1
Adj count: 1
Hello: 10, Dead: 40, ReXmit: 5, Not Stub
Auth type: None
Topology default (ID 0) -> Cost: 1
so-0/0/0.0      PtToPt  0.0.0.0          0.0.0.0          0.0.0.0          0

Type: P2P, Address: 192.168.37.46, Mask: 255.255.255.254, MTU: 4470, Cost: 1
Adj count: 0, , Passive
Hello: 10, Dead: 40, ReXmit: 5, Not Stub
Auth type: None
Topology default (ID 0) -> Passive, Cost: 1
so-1/0/0.0      PtToPt  0.0.0.0          0.0.0.0          0.0.0.0          1

Type: P2P, Address: 0.0.0.0, Mask: 0.0.0.0, MTU: 4470, Cost: 1
Adj count: 1
Hello: 10, Dead: 40, ReXmit: 5, Not Stub
Auth type: None
Topology default (ID 0) -> Cost: 1
so-1/0/0.0      PtToPt  0.0.0.0          0.0.0.0          0.0.0.0          0

Type: P2P, Address: 192.168.37.54, Mask: 255.255.255.254, MTU: 4470, Cost: 1
Adj count: 0, , Passive
Hello: 10, Dead: 40, ReXmit: 5, Not Stub
Auth type: None
Topology default (ID 0) -> Passive, Cost: 1
so-0/0/0.0      PtToPt  1.1.1.1          0.0.0.0          0.0.0.0          1

Type: P2P, Address: 0.0.0.0, Mask: 0.0.0.0, MTU: 4470, Cost: 1
Adj count: 1, Secondary
Hello: 10, Dead: 40, ReXmit: 5, Not Stub
Auth type: None
Topology default (ID 0) -> Cost: 1
so-1/0/0.0      PtToPt  1.1.1.1          0.0.0.0          0.0.0.0          1

Type: P2P, Address: 0.0.0.0, Mask: 0.0.0.0, MTU: 4470, Cost: 1
Adj count: 1, Secondary
Hello: 10, Dead: 40, ReXmit: 5, Not Stub
Auth type: None
Topology default (ID 0) -> Cost: 1
so-0/0/0.0      PtToPt  2.2.2.2          0.0.0.0          0.0.0.0          1

Type: P2P, Address: 0.0.0.0, Mask: 0.0.0.0, MTU: 4470, Cost: 1
Adj count: 1, Secondary
Hello: 10, Dead: 40, ReXmit: 5, Not Stub
Auth type: None
Topology default (ID 0) -> Cost: 1
so-1/0/0.0      PtToPt  2.2.2.2          0.0.0.0          0.0.0.0          1

Type: P2P, Address: 0.0.0.0, Mask: 0.0.0.0, MTU: 4470, Cost: 1
Adj count: 1, Secondary

```

```
Hello: 10, Dead: 40, ReXmit: 5, Not Stub
Auth type: None
Topology default (ID 0) -> Cost: 1
```

#### show ospf interface area area-id

```
user@host> show ospf interface area 1.1.1.1
Interface      State   Area      DR ID      BDR ID      Nbrs
so-0/0/0.0     PtToPt 1.1.1.1    0.0.0.0    0.0.0.0     1
so-1/0/0.0     PtToPt 1.1.1.1    0.0.0.0    0.0.0.0     1
```

#### show ospf interface extensive (When Flooding Reduction Is Enabled)

```
user@host> show ospf interface extensive
Interface      State   Area      DR ID      BDR ID      Nbrs
fe-0/0/0.0     PtToPt 0.0.0.0    0.0.0.0    0.0.0.0     0

Type: P2P, Address: 10.10.10.1, Mask: 255.255.255.0, MTU: 1500, Cost: 1
Adj count: 0
Secondary, Flood Reduction
Hello: 10, Dead: 40, ReXmit: 5, Not Stub
Auth type: None
Topology default (ID 0) -> Cost: 1
```

#### show ospf interface extensive (When LDP Synchronization Is Configured)

```
user@host> show ospf interface extensive
Interface      State   Area      DR ID      BDR ID
Nbrs
so-1/0/3.0     Down    0.0.0.0    0.0.0.0    0.0.0.0
0
Type: P2P, Address: 0.0.0.0, Mask: 0.0.0.0, MTU: 4470, Cost: 65535
Adj count: 0
Hello: 10, Dead: 40, ReXmit: 5, Not Stub
Auth type: None
LDP sync state: in holddown, for: 00:00:08, reason: LDP down during config
config holddtime: 10 seconds, remaining: 1
```

## show (ospf | ospf3) io-statistics

<b>List of Syntax</b>	<a href="#">Syntax on page 105</a> <a href="#">Syntax (EX Series Switch and QFX Series) on page 105</a>
<b>Syntax</b>	show (ospf   ospf3) io-statistics <logical-system (all   <i>logical-system-name</i> )>
<b>Syntax (EX Series Switch and QFX Series)</b>	show (ospf   ospf3) io-statistics
<b>Release Information</b>	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches. Command introduced in Junos OS Release 11.3 for the QFX Series.
<b>Description</b>	Display Open Shortest Path First (OSPF) input and output statistics.
<b>Options</b>	<b>none</b> —Display OSPF input and output statistics.  <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="#">clear (ospf   ospf3) statistics on page 96</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">show ospf io-statistics on page 106</a>
<b>Output Fields</b>	<a href="#">Table 9 on page 105</a> lists the output fields for the <b>show ospf io-statistics</b> command. Output fields are listed in the approximate order in which they appear.

**Table 9: show (ospf | ospf3) io-statistics Output Fields**

Field Name	Field Description
Packets read	Number of OSPF packets read since the last time the routing protocol was started.
average per run	Total number of packets divided by the total number of times the OSPF read operation is scheduled to run.
max run	Maximum number of packets for a given run among all scheduled runs.
Receive errors	Number of faulty packets received with errors.

## Sample Output

### show ospf io-statistics

```
user@host> show ospf io-statistics
```

```
Packets read: 7361, average per run: 1.00, max run: 1  
Receive errors:  
None
```



## show (ospf | ospf3) log

**List of Syntax** [Syntax on page 107](#)  
[Syntax \(EX Series Switch and QFX Series\) on page 107](#)

**Syntax** show (ospf | ospf3) log  
 <instance *instance-name*>  
 <logical-system (all | *logical-system-name*)>  
 <realm (ipv4-multicast | ipv4-unicast | ipv6-multicast)>  
 <topology *topology-name*>

**Syntax (EX Series Switch and QFX Series)** show (ospf | ospf3) log  
 <instance *instance-name*>  
 <topology *topology-name*>

**Release Information** Command introduced before Junos OS Release 7.4.  
 Command introduced in Junos OS Release 9.0 for EX Series switches.  
**topology** option introduced in Junos OS Release 9.0.  
**topology** option introduced in Junos OS Release 9.0 for EX Series switches.  
**realm** option introduced in Junos OS Release 9.2.  
 Command introduced in Junos OS Release 11.3 for the QFX Series.

**Description** Display the entries in the Open Shortest Path First (OSPF) log of SPF calculations.

**Options** **none**—Display entries in the OSPF log of SPF calculations for all routing instances.

**instance *instance-name***—(Optional) Display entries for the specified routing instance.

**logical-system (all | *logical-system-name*)**—(Optional) Perform this operation on all logical systems or on a particular logical system.

**topology *topology-name***—(Optional) (OSPFv2 only) Display entries for the specified topology.

**realm (ipv4-multicast | ipv4-unicast | ipv6-multicast)**—(OSPFv3 only) (Optional) Display entries for the specified OSPFv3 realm, or address family. Use the **realm** option to specify an address family for OSPFv3 other than IPv6 unicast, which is the default.

**Required Privilege Level** view

**List of Sample Output** [show ospf log on page 108](#)  
[show ospf log topology voice on page 108](#)

**Output Fields** [Table 10 on page 107](#) lists the output fields for the **show (ospf | ospf3) log** command. Output fields are listed in the approximate order in which they appear.

**Table 10: show (ospf | ospf3) log Output Fields**

Field Name	Field Description
<b>When</b>	Time, in weeks ( <b>w</b> ) and days ( <b>d</b> ), since the SPF calculation was made.

Table 10: show (ospf | ospf3) log Output Fields (*continued*)

Field Name	Field Description
Type	Type of calculation: Cleanup, External, Interarea, NSSA, Redist, SPF, Stub, Total, or Virtuallink.
Elapsed	Amount of time, in seconds, that elapsed during the operation, or the time required to complete the SPF calculation. The start time is the time displayed in the When field.

## Sample Output

### show ospf log

```

user@host> show ospf log
When          Type          Elapsed
1w4d 17:25:58 Stub          0.000017
1w4d 17:25:58 SPF           0.000070
1w4d 17:25:58 Stub          0.000019
1w4d 17:25:58 Interarea     0.000054
1w4d 17:25:58 External      0.000005
1w4d 17:25:58 Cleanup       0.000203
1w4d 17:25:58 Total        0.000537
1w4d 17:24:48 SPF           0.000125
1w4d 17:24:48 Stub          0.000017
1w4d 17:24:48 SPF           0.000100
1w4d 17:24:48 Stub          0.000016
1w4d 17:24:48 Interarea     0.000056
1w4d 17:24:48 External      0.000005
1w4d 17:24:48 Cleanup       0.000238
1w4d 17:24:48 Total        0.000600
...

```

### show ospf log topology voice

```

user@host> show ospf log topology voice
Topology voice SPF log:

    Last instance of each event type
When          Type          Elapsed
00:06:11      SPF           0.000116
00:06:11      Stub          0.000114
00:06:11      Interarea     0.000126
00:06:11      External      0.000067
00:06:11      NSSA          0.000037
00:06:11      Cleanup       0.000186

    Maximum length of each event type
When          Type          Elapsed
00:13:43      SPF           0.000140
00:13:33      Stub          0.000116
00:13:43      Interarea     0.000128
00:13:33      External      0.000075
00:13:38      NSSA          0.000039
00:13:53      Cleanup       0.000657

    Last 100 events

```

When	Type	Elapsed
00:13:53	SPF	0.000090
00:13:53	Stub	0.000041
00:13:53	Interarea	0.000123
00:13:53	External	0.000040
00:13:53	NSSA	0.000038
00:13:53	Cleanup	0.000657
00:13:53	Total	0.001252
.		
.		
00:06:11	SPF	0.000116
00:06:11	Stub	0.000114
00:06:11	Interarea	0.000126
00:06:11	External	0.000067
00:06:11	NSSA	0.000037
00:06:11	Cleanup	0.000186
00:06:11	Total	0.000818

## show (ospf | ospf3) neighbor

---

**List of Syntax**    [Syntax on page 110](#)  
                          [Syntax \(EX Series Switches and QFX Series\) on page 110](#)

**Syntax**    `show (ospf | ospf3) neighbor`  
              `<brief | detail | extensive>`  
              `<area area-id>`  
              `<instance (all | instance-name)>`  
              `<interface interface-name>`  
              `<logical-system (all | logical-system-name)>`  
              `<neighbor>`  
              `<realm (ipv4-multicast | ipv4-unicast | ipv6-multicast)>`

**Syntax (EX Series Switches and QFX Series)**    `show (ospf | ospf3) neighbor`  
  `<brief | detail | extensive>`  
  `<area area-id>`  
  `<instance (all | instance-name)>`  
  `<interface interface-name>`  
  `<neighbor>`

**Release Information**    Command introduced before Junos OS Release 7.4.  
                              Command introduced in Junos OS Release 9.0 for EX Series switches.  
                              **instance all** option introduced in Junos OS Release 9.1.  
                              **instance all** option introduced in Junos OS Release 9.1 for EX Series switches.  
                              **area**, **interface**, and **realm** options introduced in Junos OS Release 9.2.  
                              **area** and **interface** options introduced in Junos OS Release 9.2 for EX Series switches.  
                              Command introduced in Junos OS Release 11.3 for the QFX Series.

**Description**    Display information about OSPF neighbors.

CPU utilization might increase while the device learns its OSPF neighbors. We recommend that you use the **show (ospf | ospf3) neighbor** command after the device learns and establishes OSPF neighbor adjacencies. Depending on the size of your network, this might take several minutes. If you receive a “timeout communicating with routing daemon” error when using the **show (ospf | ospf3) neighbor** command, wait several minutes before attempting to use the command again. This is not a critical system error, but you might experience a delay in using the CLI.

**Options**    **none**—Display standard information about all OSPF neighbors for all routing instances.

**brief | detail | extensive**—(Optional) Display the specified level of output.

**area *area-id***—(Optional) Display information about the OSPF neighbors for the specified area.

**instance (all | *instance-name*)**—(Optional) Display all OSPF interfaces for all routing instances or under the named routing instance.

**interface *interface-name***—(Optional) Display information about OSPF neighbors for the specified logical interface.

**logical-system** (*all* | *logical-system-name*)—(Optional) Perform this operation on all logical systems or on a particular logical system.

**neighbor**—(Optional) Display information about the specified OSPF neighbor.

**realm** (*ipv4-multicast* | *ipv4-unicast* | *ipv6-multicast*)—(OSPFv3 only) (Optional) Display information about the OSPF neighbors for the specified OSPFv3 realm, or address family. Use the **realm** option to specify an address family for OSPFv3 other than IPv6 unicast, which is the default.

**Required Privilege Level** view

**Related Documentation** • [clear \(ospf | ospf3\) neighbor on page 94](#)

**List of Sample Output** [show ospf neighbor brief on page 113](#)  
[show ospf neighbor detail on page 113](#)  
[show ospf neighbor extensive on page 114](#)  
[show ospf3 neighbor detail on page 115](#)  
[show ospf neighbor area area-id on page 115](#)  
[show ospf neighbor interface interface-name on page 115](#)  
[show ospf3 neighbor instance all \(OSPFv3 Multiple Family Address Support Enabled\) on page 115](#)

**Output Fields** [Table 11 on page 111](#) lists the output fields for the **show (ospf | ospf3) neighbor** command. Output fields are listed in the approximate order in which they appear.

**Table 11: show (ospf | ospf3) neighbor Output Fields**

Field Name	Field Description	Level of Output
<b>Address</b>	Address of the neighbor.	All levels
<b>Interface</b>	Interface through which the neighbor is reachable.	All levels

Table 11: show (ospf | ospf3) neighbor Output Fields (*continued*)

Field Name	Field Description	Level of Output
<b>State</b>	<p>State of the neighbor:</p> <ul style="list-style-type: none"> <li>• <b>Attempt</b>—Valid only for neighbors attached to nonbroadcast networks. It indicates that no recent information has been received from the neighbor, but that a more concerted effort must be made to contact the neighbor.</li> <li>• <b>Down</b>—Initial state of a neighbor conversation. It indicates that no recent information has been received from the neighbor. Hello packets might continue to be sent to neighbors in the <b>Down</b> state, although at a reduced frequency.</li> <li>• <b>Exchange</b>—Routing device is describing its entire link-state database by sending database description packets to the neighbor. Each packet has a sequence number and is explicitly acknowledged.</li> <li>• <b>ExStart</b>—First step in creating an adjacency between the two neighboring routing devices. The goal of this step is to determine which routing device is the master, and to determine the initial sequence number.</li> <li>• <b>Full</b>—Neighboring routing devices are fully adjacent. These adjacencies appear in router link and network link advertisements.</li> <li>• <b>Init</b>—A hello packet has recently been sent by the neighbor. However, bidirectional communication has not yet been established with the neighbor. This state might occur, for example, because the routing device itself did not appear in the neighbor's hello packet.</li> <li>• <b>Loading</b>—Link-state request packets are sent to the neighbor to acquire more recent advertisements that have been discovered (but not yet received) in the <b>Exchange</b> state.</li> <li>• <b>2Way</b>—Communication between the two routing devices is bidirectional. This state has been ensured by the operation of the Hello Protocol. This is the most advanced state short of beginning adjacency establishment. The (backup) designated router is selected from the set of neighbors in state <b>2Way</b> or greater.</li> </ul>	All levels
<b>ID</b>	Router ID of the neighbor.	All levels
<b>Pri</b>	Priority of the neighbor to become the designated router.	All levels
<b>Dead</b>	Number of seconds until the neighbor becomes unreachable.	All levels
<b>Link state acknowledgment list</b>	Number of link-state acknowledgments received.	<b>extensive</b>
<b>Link state retransmission list</b>	<p>Total number of link-state advertisements retransmitted. For <b>extensive</b> output only, the following information is also displayed:</p> <ul style="list-style-type: none"> <li>• <b>Type</b>—Type of link advertisement: <b>ASBR</b>, <b>Sum</b>, <b>Extern</b>, <b>Network</b>, <b>NSSA</b>, <b>OpaqArea</b>, <b>Router</b>, or <b>Summary</b>.</li> <li>• <b>LSA ID</b>—LSA identifier included in the advertisement. An asterisk preceding the identifier marks database entries that originated from the local routing device.</li> <li>• <b>Adv rtr</b>—Address of the routing device that sent the advertisement.</li> <li>• <b>Seq</b>—Link sequence number of the advertisement.</li> </ul>	<b>detail extensive</b>

Table 11: show (ospf | ospf3) neighbor Output Fields (*continued*)

Field Name	Field Description	Level of Output
<b>Neighbor-address</b>	(OSPFv3 only) If the neighbor uses virtual links, the <b>Neighbor-address</b> is the site-local, local, or global address. If the neighbor uses a physical interface, the <b>Neighbor-address</b> is an IPv6 link-local address.	<b>detail extensive</b>
<b>area</b>	Area that the neighbor is in.	<b>detail extensive</b>
<b>OSPF3-Intf-Index</b>	(OSPFv3 only) Displays the OSPFv3 interface index.	<b>detail extensive</b>
<b>opt</b>	Option bits received in the hello packets from the neighbor.	<b>detail extensive</b>
<b>DR or DR-ID</b>	Address of the designated router.	<b>detail extensive</b>
<b>BDR or BDR-ID</b>	Address of the backup designated router.	<b>detail extensive</b>
<b>Up</b>	Length of time since the neighbor came up.	<b>detail extensive</b>
<b>adjacent</b>	Length of time since the adjacency with the neighbor was established.	<b>detail extensive</b>

## Sample Output

### show ospf neighbor brief

```

user@host> show ospf neighbor brief
  Address      Intf      State      ID          Pri  Dead
192.168.254.225 fxp3.0    2Way       10.250.240.32 128  36
192.168.254.230 fxp3.0    Full       10.250.240.8  128  38
192.168.254.229 fxp3.0    Full       10.250.240.35 128  33
10.1.1.129      fxp2.0    Full       10.250.240.12 128  37
10.1.1.131      fxp2.0    Full       10.250.240.11 128  38
10.1.2.1        fxp1.0    Full       10.250.240.9  128  32
10.1.2.81       fxp0.0    Full       10.250.240.10 128  33

```

### show ospf neighbor detail

```

user@host> show ospf neighbor detail
  Address      Interface      State      ID          Pri  Dead
10.5.1.2      ge-1/2/0.1     Full       10.5.1.2    128  37
area 0.0.0.1, opt 0x42, DR 10.5.1.2, BDR 10.5.1.1
Up 06:09:28, adjacent 05:17:36
Link state acknowledgment list: 3 entries

Link state retransmission list: 9 entries

10.5.10.2      ge-1/2/0.10     ExStart    10.5.1.38   128  34
area 0.0.0.1, opt 0x42, DR 10.5.10.2, BDR 10.5.10.1
Up 06:09:28
master, seq 0xac1530f8, rexmit DBD in 3 sec
rexmit LSREQ in 0 sec
10.5.11.2      ge-1/2/0.11     Full       10.5.1.42   128  38
area 0.0.0.1, opt 0x42, DR 10.5.11.2, BDR 10.5.11.1
Up 06:09:28, adjacent 05:26:46
Link state retransmission list: 1 entries

```

```

10.5.12.2      ge-1/2/0.12      ExStart  10.5.1.46      128    33
area 0.0.0.1, opt 0x42, DR 10.5.12.2, BDR 10.5.12.1
Up 06:09:28
master, seq 0xac188a68, rexmit DBD in 2 sec
rexmit LSREQ in 0 sec

```

### show ospf neighbor extensive

```

user@host> show ospf neighbor extensive
Address      Interface      State      ID      Pri  Dead
10.5.1.2     ge-1/2/0.1    Full      10.5.1.2  128  33
area 0.0.0.1, opt 0x42, DR 10.5.1.2, BDR 10.5.1.1
Up 06:09:42, adjacent 05:17:50
Link state retransmission list:

  Type      LSA ID      Adv rtr      Seq
Summary    10.8.56.0   172.25.27.82 0x8000004d
Router     10.5.1.94   10.5.1.94    0x8000005c
Network    10.5.24.2   10.5.1.94    0x80000036
Summary    10.8.57.0   172.25.27.82 0x80000024
Extern     1.10.90.0   10.8.1.2     0x80000041
Extern     1.4.109.0   10.6.1.2     0x80000041
Router     10.5.1.190  10.5.1.190   0x8000005f
Network    10.5.48.2   10.5.1.190   0x8000003d
Summary    10.8.58.0   172.25.27.82 0x8000004d
Extern     1.10.91.0   10.8.1.2     0x80000041
Extern     1.4.110.0   10.6.1.2     0x80000041
Router     10.5.1.18   10.5.1.18    0x8000005f
Network    10.5.5.2    10.5.1.18    0x80000033
Summary    10.8.59.0   172.25.27.82 0x8000003a
Summary    10.8.62.0   172.25.27.82 0x80000025

10.5.10.2    ge-1/2/0.10   ExStart  10.5.1.38      128    38
area 0.0.0.1, opt 0x42, DR 10.5.10.2, BDR 10.5.10.1
Up 06:09:42
master, seq 0xac1530f8, rexmit DBD in 2 sec
rexmit LSREQ in 0 sec

10.5.11.2    ge-1/2/0.11   Full      10.5.1.42      128    33
area 0.0.0.1, opt 0x42, DR 10.5.11.2, BDR 10.5.11.1
Up 06:09:42, adjacent 05:27:00
Link state retransmission list:

  Type      LSA ID      Adv rtr      Seq
Summary    10.8.58.0   172.25.27.82 0x8000004d

```



Extern	1.10.91.0	10.8.1.2	0x80000041
Extern	1.1.247.0	10.5.1.2	0x8000003f
Extern	1.4.110.0	10.6.1.2	0x80000041
Router	10.5.1.18	10.5.1.18	0x8000005f
Network	10.5.5.2	10.5.1.18	0x80000033
Summary	10.8.59.0	172.25.27.82	0x8000003a

### show ospf3 neighbor detail

```
user@host> show ospf3 neighbor detail
ID          Interface          State    Pri    Dead
10.255.71.13 fe-0/0/2.0         Full     128    30
Neighbor-address fe80::290:69ff:fe9b:e002
Area 0.0.0.0, opt 0x13, OSPF3-Intf-Index 2
DR-ID 10.255.71.13, BDR-ID 10.255.71.12
Up 02:51:43, adjacent 02:51:43
```

### show ospf neighbor area area-id

```
user@host > show ospf neighbor area 1.1.1.1
Address      Interface          State    ID          Pri    Dead
192.168.37.47 so-0/0/0.0         Full     10.255.245.4 128    33
Area 1.1.1.1
192.168.37.55 so-1/0/0.0         Full     10.255.245.5 128    37
Area 1.1.1.1
```

### show ospf neighbor interface interface-name

```
user@host > show ospf neighbor interface so-0/0/0.0
Address      Interface          State    ID          Pri    Dead
192.168.37.47 so-0/0/0.0         Full     10.255.245.4 128    37
Area 0.0.0.0
192.168.37.47 so-0/0/0.0         Full     10.255.245.4 128    33
Area 1.1.1.1
192.168.37.47 so-0/0/0.0         Full     10.255.245.4 128    32
Area 2.2.2.2
```

### show ospf3 neighbor instance all (OSPFv3 Multiple Family Address Support Enabled)

```
user @host > show ospf3 neighbor instance all
Instance: ina
Realm: ipv6-unicast
ID          Interface          State    Pri    Dead
100.1.1.1   fe-0/0/2.0         Full     128    37
Neighbor-address fe80::217:cb00:c87c:8c03
Instance: inb
Realm: ipv4-unicast
ID          Interface          State    Pri    Dead
100.1.2.1   fe-0/0/2.1         Full     128    33
Neighbor-address fe80::217:cb00:c97c:8c03
```

## show (ospf | ospf3) overview

---

<b>List of Syntax</b>	<a href="#">Syntax on page 116</a> <a href="#">Syntax (EX Series Switch and QFX Series) on page 116</a>
<b>Syntax</b>	<code>show (ospf   ospf3) overview</code> <code>&lt;brief   extensive&gt;</code> <code>&lt;instance <i>instance-name</i>&gt;</code> <code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code> <code>&lt;realm (ipv4-multicast   ipv4-unicast   ipv6-multicast)&gt;</code>
<b>Syntax (EX Series Switch and QFX Series)</b>	<code>show (ospf   ospf3) overview</code> <code>&lt;brief   extensive&gt;</code> <code>&lt;instance <i>instance-name</i>&gt;</code>
<b>Release Information</b>	Command introduced in Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches. <b>realm</b> option introduced in Junos OS Release 9.2. Database protection introduced in Junos 10.2. Command introduced in Junos OS Release 11.3 for the QFX Series.
<b>Description</b>	Display Open Shortest Path First (OSPF) overview information.
<b>Options</b>	<b>none</b> —Display standard information about all OSPF neighbors for all routing instances.  <b>brief   extensive</b> —(Optional) Display the specified level of output.  <b>instance <i>instance-name</i></b> —(Optional) Display all OSPF interfaces under the named 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>realm (ipv4-multicast   ipv4-unicast   ipv6-multicast)</b> —(Optional) (OSPFv3 only) Display information about the specified OSPFv3 realm, or address family. Use the <b>realm</b> option to specify an address family for OSPFv3 other than IPv6 unicast, which is the default.
<b>Required Privilege Level</b>	view
<b>List of Sample Output</b>	<a href="#">show ospf overview on page 118</a> <a href="#">show ospf overview (With Database Protection) on page 119</a> <a href="#">show ospf3 overview (With Database Protection) on page 119</a> <a href="#">show ospf overview extensive on page 119</a>
<b>Output Fields</b>	<a href="#">Table 12 on page 117</a> lists the output fields for the <b>show ospf overview</b> command. Output fields are listed in the approximate order in which they appear.

Table 12: show ospf overview Output Fields

Field name	Field Description	Level of Output
<b>Instance</b>	OSPF routing instance.	All levels
<b>Router ID</b>	Router ID of the routing device.	All levels
<b>Route table index</b>	Route table index.	All levels
<b>Configured overload</b>	Overload capability is enabled. If the overload timer is also configured, display the time that remains before it is set to expire. This field is not displayed after the timer expires.	All levels
<b>Topology</b>	Topology identifier.	All levels
<b>Prefix export count</b>	Number of prefixes exported into OSPF.	All levels
<b>Full SPF runs</b>	Number of complete Shortest Path First calculations.	All levels
<b>SPF delay</b>	Delay before performing consecutive Shortest Path First calculations.	All levels
<b>SPF holddown</b>	Delay before performing additional Shortest Path First (SPF) calculations after the maximum number of consecutive SPF calculations is reached.	All levels
<b>SPF rapid runs</b>	Maximum number of Shortest Path First calculations that can be performed in succession before the hold-down timer begins.	All levels
<b>LSA refresh time</b>	Refresh period for link-state advertisement (in minutes).	All levels
<b>Database protection state</b>	Current state of database protection.	All levels
<b>Warning threshold</b>	Threshold at which a warning message is logged (percentage of maximum LSA count).	All levels
<b>Non self-generated LSAs</b>	Number of LSAs whose router ID is not equal to the local router ID: <b>Current</b> , <b>Warning</b> (threshold), and <b>Allowed</b> .	All levels
<b>Ignore time</b>	How long the database has been in the ignore state.	All levels
<b>Reset time</b>	How long the database must stay out of the ignore or isolated state before it returns to normal operations.	All levels
<b>Ignore count</b>	Number of times the database has been in the ignore state: <b>Current</b> and <b>Allowed</b> .	All levels
<b>Restart</b>	Graceful restart capability: <b>enabled</b> or <b>disabled</b> .	All levels
<b>Restart duration</b>	Time period for complete reacquisition of OSPF neighbors.	All levels
<b>Restart grace period</b>	Time period for which the neighbors should consider the restarting routing device as part of the topology.	All levels

Table 12: show ospf overview Output Fields (*continued*)

Field name	Field Description	Level of Output
Graceful restart helper mode	(OSPFv2) Standard graceful restart helper capability (based on RFC 3623): <b>enabled</b> or <b>disabled</b> .	All levels
Restart-signaling helper mode	(OSPFv2) Restart signaling-based graceful restart helper capability (based on RFC 4811, RFC 4812, and RFC 4813): <b>enabled</b> or <b>disabled</b> .	All levels
Helper mode	(OSPFv3) Graceful restart helper capability: <b>enabled</b> or <b>disabled</b> .	All levels
Trace options	OSPF-specific trace options.	<b>extensive</b>
Trace file	Name of the file to receive the output of the tracing operation.	<b>extensive</b>
Area	Area number. Area 0.0.0.0 is the backbone area.	All levels
Stub type	Stub type of area: <b>Normal Stub</b> , <b>Not Stub</b> , or <b>Not so Stubby Stub</b> .	All levels
Authentication Type	Type of authentication: <b>None</b> , <b>Password</b> , or <b>MD5</b> .  <b>NOTE:</b> The <b>Authentication Type</b> field refers to the authentication configured at the <code>[edit protocols ospf area area-id]</code> level. Any authentication configured for an interface in this area will not affect the value of this field.	All levels
Area border routers	Number of area border routers.	All levels
Neighbors	Number of autonomous system boundary routers.	All levels

## Sample Output

### show ospf overview

```

user@host> show ospf overview
Instance: master
  Router ID: 10.255.245.6
  Route table index: 0
  Configured overload, expires in 118 seconds
  LSA refresh time: 50 minutes
  Restart: Enabled
    Restart duration: 20 sec
    Restart grace period: 40 sec
    Helper mode: enabled
  Area: 0.0.0.0
    Stub type: Not Stub
    Authentication Type: None
    Area border routers: 0, AS boundary routers: 0
    Neighbors
      Up (in full state): 0
  Topology: default (ID 0)
  Prefix export count: 0
  Full SPF runs: 1
  SPF delay: 0.200000 sec, SPF holddown: 5 sec, SPF rapid runs: 3

```

**show ospf overview (With Database Protection)**

```

user@host> show ospf overview
Instance: master
  Router ID: 10.255.112.218
  Route table index: 0
  LSA refresh time: 50 minutes
  Traffic engineering
  Restart: Enabled
    Restart duration: 180 sec
    Restart grace period: 210 sec
    Graceful restart helper mode: Enabled
    Restart-signaling helper mode: Enabled
  Database protection state: Normal
    Warning threshold: 70 percent
    Non self-generated LSAs: Current 582, Warning 700, Allowed 1000
    Ignore time: 30, Reset time: 60
    Ignore count: Current 0, Allowed 1
  Area: 0.0.0.0
    Stub type: Not Stub
    Authentication Type: None
    Area border routers: 0, AS boundary routers: 0
  Neighbors
    Up (in full state): 160
  Topology: default (ID 0)
    Prefix export count: 0
    Full SPF runs: 70
    SPF delay: 0.200000 sec, SPF holddown: 5 sec, SPF rapid runs: 3
    Backup SPF: Not Needed

```

**show ospf3 overview (With Database Protection)**

```

user@host> show ospf3 overview
Instance: master
  Router ID: 10.255.112.128
  Route table index: 0
  LSA refresh time: 50 minutes
  Database protection state: Normal
    Warning threshold: 80 percent
    Non self-generated LSAs: Current 3, Warning 8, Allowed 10
    Ignore time: 30, Reset time: 60
    Ignore count: Current 0, Allowed 2
  Area: 0.0.0.0
    Stub type: Not Stub
    Area border routers: 0, AS boundary routers: 0
  Neighbors
    Up (in full state): 1
  Topology: default (ID 0)
    Prefix export count: 0
    Full SPF runs: 7
    SPF delay: 0.200000 sec, SPF holddown: 5 sec, SPF rapid runs: 3
    Backup SPF: Not Needed

```

**show ospf overview extensive**

```

user@host> show ospf overview extensive
Instance: master
  Router ID: 1.1.1.103
  Route table index: 0
  Full SPF runs: 13, SPF delay: 0.200000 sec
  LSA refresh time: 50 minutes

```

```
Restart: Disabled
Trace options: lsa
Trace file: /var/log/ospf size 131072 files 10
Area: 0.0.0.0
  Stub type: Not Stub
  Authentication Type: None
  Area border routers: 0, AS boundary routers: 0
  Neighbors
    Up (in full state): 1
```

## show (ospf | ospf3) route

**List of Syntax**    [Syntax on page 121](#)  
                          [Syntax \(EX Series Switch and QFX Series\) on page 121](#)

**Syntax**    show (ospf | ospf3) route  
                  <brief | detail | extensive>  
                  <abr | asbr | extern | inter | intra>  
                  <destination>  
                  <instance (default | ipv4-multicast | *instance-name*)>  
                  <logical-system (default | ipv4-multicast | *logical-system-name*)>  
                  <network>  
                  <no-backup-coverage>  
                  <realm (ipv4-multicast | ipv4-unicast | ipv6-multicast)>  
                  <router>  
                  <topology (default | ipv4-multicast | *topology-name*)>  
                  <transit>

**Syntax (EX Series Switch and QFX Series)**    show (ospf | ospf3) route  
                  <brief | detail | extensive>  
                  <abr | asbr | extern | inter | intra>  
                  <destination>  
                  <instance *instance-name*>  
                  <network>  
                  <no-backup-coverage>  
                  <router>  
                  <topology (default | ipv4-multicast | *topology-name*)>  
                  <transit>

**Release Information**    Command introduced before Junos OS Release 7.4.  
                                  Command introduced in Junos OS Release 9.0 for EX Series switches.  
                                  **topology** option introduced in Junos OS Release 9.0.  
                                  **realm** option introduced in Junos OS Release 9.2.  
                                  Command introduced in Junos OS Release 11.3 for the QFX Series.

**Description**    Display the entries in the Open Shortest Path First (OSPF) routing table.

**Options**    **none**—Display standard information about all entries in the OSPF routing table for all routing instances and all topologies.

**destination**—Display routes to the specified IP address (with optional destination prefix length).

**brief | detail | extensive**—(Optional) Display the specified level of output.

**abr**—(Optional) Display routes to area border routers.

**asbr**—(Optional) Display routes to autonomous system border routers.

**extern**—(Optional) Display external routes.

**inter**—(Optional) Display interarea routes.

**intra**—(Optional) Display intra-area routes.

**instance** (**default** | **ipv4-multicast** | *instance-name*)—(Optional) Display entries for the default routing instance, the IPv4 multicast routing instance, or for the specified routing instance.

**logical-system** (**default** | **ipv4-multicast** | *logical-system-name*)—(Optional) Perform this operation on the default logical system, the IPv4 multicast logical system, or on a particular logical system.

**network**—(Optional) Display routes to networks.

**no-backup-coverage**—(Optional) Display routes with no backup coverage.

**realm** (**ipv4-multicast** | **ipv4-unicast** | **ipv6-multicast**)—(OSPFv3 only) (Optional) Display entries in the routing table for the specified OSPFv3 realm, or address family. Use the **realm** option to specify an address family for OSPFv3 other than IPv6 unicast, which is the default.

**router**—(Optional) Display routes to all routers.

**topology** (**default** | **ipv4-multicast** | *topology-name*)—(OSPFv2 only) (Optional) Display routes for the default OSPF topology, IPv4 multicast topology, or for a particular topology.

**transit**—(Optional) (OSPFv3 only) Display OSPFv3 routes to pseudonodes.

**Required Privilege Level**

view

**List of Sample Output**

[show ospf route on page 124](#)  
[show ospf route detail on page 124](#)  
[show ospf3 route on page 124](#)  
[show ospf3 route detail on page 125](#)  
[show ospf route topology voice on page 125](#)

**Output Fields**

[Table 13 on page 122](#) list the output fields for the **show (ospf | ospf3) route** command. Output fields are listed in the approximate order in which they appear.

**Table 13: show (ospf | ospf3) route Output Fields**

Field Name	Field Description	Output Level
<b>Topology</b>	Name of the topology.	All levels
<b>Prefix</b>	Destination of the route.	All levels



Table 13: show (ospf | ospf3) route Output Fields (*continued*)

Field Name	Field Description	Output Level
<b>Path type</b>	How the route was learned: <ul style="list-style-type: none"> <li>• <b>Inter</b>—Interarea route</li> <li>• <b>Ext1</b>—External type 1 route</li> <li>• <b>Ext2</b>—External type 2 route</li> <li>• <b>Intra</b>—Intra-area route</li> </ul>	All levels
<b>Route type</b>	The type of routing device from which the route was learned: <ul style="list-style-type: none"> <li>• <b>AS BR</b>—Route to AS border router.</li> <li>• <b>Area BR</b>—Route to area border router.</li> <li>• <b>Area/AS BR</b>—Route to router that is both an <b>Area BR</b> and <b>AS BR</b>.</li> <li>• <b>Network</b>—Network router.</li> <li>• <b>Router</b>—Route to a router that is neither an <b>Area BR</b> nor an <b>AS BR</b>.</li> <li>• <b>Transit</b>—(OSPFv3 only) Route to a pseudonode representing a transit network, LAN, or nonbroadcast multiaccess (NBMA) link.</li> <li>• <b>Discard</b>—Route to a summary discard.</li> </ul>	All levels
<b>NH Type</b>	Next-hop type: <b>LSP</b> or <b>IP</b> .	All levels
<b>Metric</b>	Route's metric value.	All levels
<b>NH-interface</b>	(OSPFv3 only) Interface through which the route's next hop is reachable.	All levels
<b>NH-addr</b>	(OSPFv3 only) IPv6 address of the next hop.	All levels
<b>NextHop Interface</b>	(OSPFv2 only) Interface through which the route's next hop is reachable.	All levels
<b>Nexthop addr/label</b>	(OSPFv2 only) If the <b>NH Type</b> is <b>IP</b> , then it is the address of the next hop. If the <b>NH Type</b> is <b>LSP</b> , then it is the name of the label-switched path.	All levels
<b>Area</b>	Area ID of the route.	detail
<b>Origin</b>	Router from which the route was learned.	detail
<b>Type 7</b>	Route was learned through a not-so-stubby area (NSSA) link-state advertisement (LSA).	detail
<b>P-bit</b>	Route was learned through NSSA LSA and the propagate bit was set.	detail
<b>Fwd NZ</b>	Forwarding address is nonzero. <b>Fwd NZ</b> is only displayed if the route is learned through an NSSA LSA.	detail

Table 13: show (ospf | ospf3) route Output Fields (*continued*)

Field Name	Field Description	Output Level
<b>optional-capability</b>	Optional capabilities propagated in the router LSA. This field is in the output for intra-area router routes only (when <b>Route Type</b> is <b>Area BR</b> , <b>AS BR</b> , <b>Area/AS BR</b> , or <b>Router</b> ), not for interarea router routes or network routes. Three bits in this field are defined as follows: <ul style="list-style-type: none"> <li>• <b>0x4 (V)</b>—Routing device is at the end of a virtual active link.</li> <li>• <b>0x2 (E)</b>—Routing device is an autonomous system boundary router.</li> <li>• <b>0x1 (B)</b>—Routing device is an area border router.</li> </ul>	<b>detail</b>
<b>priority</b>	The priority assigned to the prefix: <ul style="list-style-type: none"> <li>• <b>high</b></li> <li>• <b>medium</b></li> <li>• <b>low</b></li> </ul> <p><b>NOTE:</b> The <b>priority</b> field applies only to routes of type <b>Network</b>.</p>	<b>detail</b>

## Sample Output

### show ospf route

```

user@host> show ospf route
Prefix          Path   Route   NH   Metric  NextHop      Nexthop
                Type   Type    Type                Interface    addr/label
10.255.71.12     Intra Router  IP    1       fe-0/0/2.0   192.16.22.86
10.255.71.13/32  Intra Network IP    0       lo0.0
192.168.222.84/30 Intra Network LSP   1       fe-0/0/2.0   1sp-ab

```

### show ospf route detail

```

user@host> show ospf route detail
Topology default Route Table:

Prefix          Path   Route   NH   Metric  NextHop      Nexthop
                Type   Type    Type                Interface    addr/label
10.255.14.174    Inter AS BR  IP    210     t1-3/0/1.0
area 0.0.0.2, origin 10.255.14.185
10.255.14.178    Intra Router  IP    200     t3-3/1/3.0
area 0.0.0.2, origin 10.255.14.178, optional-capability 0x0
10.210.1.0/30    Intra Network IP    10      t3-3/1/2.0
area 0.0.0.2, origin 10.255.14.172, priority medium
100.1.1.1/32     Inter Network IP    210     t1-3/0/1.0
area 0.0.0.2, origin 10.255.14.185, priority low
112.3.1.0/24     Ext2 Network IP    0       t1-3/0/1.0
area 0.0.0.0, origin 10.255.14.174, priority high
200.3.3.0/30     Inter Network IP    220     t1-3/0/1.0
area 0.0.0.2, origin 10.255.14.185, priority high

```

### show ospf3 route

```

user@host> show ospf3 route
Prefix          Path   Route   NH   Metric  NextHop      Nexthop
                Type   Type    Type                Interface    addr/label

```

```

10.255.71.13      Intra Router IP 1
NH-interface fe-0/0/2.0, NH-addr fe80::290:69ff:fe9b:e002
10.255.71.13;0.0.0.2
10.255.245.1      Intra Router IP 40 fxp1.1 192.168.36.17

area 0.0.0.0, origin 10.255.245.1 optional-capability 0x0,
10.255.245.3      Intra AS BR IP 1 fxp2.3 192.168.36.34

area 0.0.0.0, origin 10.255.245.3 optional-capability 0x0,
10.255.245.1/32   Intra Network IP 40 fxp1.1 192.168.36.17

area 0.0.0.0, origin 10.255.245.1, priority high
10.255.245.2/32   Intra Network IP 0 lo0.0
area 0.0.0.0, origin 10.255.245.2, priority medium
10.255.245.3/32   Intra Network IP 1 fxp2.3 192.168.36.34

area 0.0.0.0, origin 10.255.245.3, priority low
Intra Transit IP 1
NH-interface fe-0/0/2.0
192::168:222:84/126 Intra Network IP 1
NH-interface fe-0/0/2.0
abcd::71:12/128   Intra Network IP 0
NH-interface lo0.0
abcd::71:13/128   Intra Network LSP 1
NH-interface fe-0/0/2.0, NH-addr lsp-cd

```

#### show ospf3 route detail

```

user@host> show ospf3 route detail
Prefix Path Route NH Metric
        type type type
10.255.14.174 Intra Area/AS BR IP 110
NH-interface so-1/2/2.0
Area 0.0.0.0, Origin 10.255.14.174, Optional-capability 0x3
10.255.14.178 Intra Router IP 200
NH-interface t3-3/1/3.0
Area 0.0.0.0, Origin 10.255.14.178, Optional-capability 0x0
10.255.14.185;0.0.0.2 Intra Transit IP 200
NH-interface t1-3/0/1.0
NH-interface so-1/2/2.0
Area 0.0.0.0, Origin 10.255.14.185
1000:1:1::1/128 Inter Network IP 110
NH-interface so-1/2/2.0
Area 0.0.0.0, Origin 10.255.14.174, Priority low
1001:2:1::/48 Ext1 Network IP 110
NH-interface so-1/2/2.0
Area 0.0.0.0, Origin 10.255.14.174, Fwd NZ, Priority medium
1002:1:7::/48 Ext2 Network IP 0
NH-interface so-1/2/2.0
Area 0.0.0.0, Origin 10.255.14.174, Fwd NZ, Priority low
1002:3:4::/48 Ext2 Network IP 0
NH-interface so-1/2/2.0
Area 0.0.0.0, Origin 10.255.14.174, Fwd NZ, Priority high
abcd::10:255:14:172/128 Intra Network IP 0
NH-interface lo0.0
Area 0.0.0.0, Origin 10.255.14.172, Priority low

```

#### show ospf route topology voice

```

user@host show ospf route topology voice

```

## Topology voice Route Table:

Prefix	Path Type	Route Type	NH Type	Metric	NextHop Interface	Nexthop addr/label
10.255.8.2	Intra	Router	IP	1	so-0/2/0.0	
10.255.8.3	Intra	Router	IP	2	so-0/2/0.0	
10.255.8.1/32	Intra	Network	IP	0	lo0.0	
10.255.8.2/32	Intra	Network	IP	1	so-0/2/0.0	
10.255.8.3/32	Intra	Network	IP	2	so-0/2/0.0	
192.168.8.0/29	Intra	Network	IP	2	so-0/2/0.0	
192.168.8.44/30	Intra	Network	IP	2	so-0/2/0.0	
192.168.8.46/32	Intra	Network	IP	1	so-0/2/0.0	
192.168.8.48/30	Intra	Network	IP	1	so-0/2/1.0	
192.168.8.52/30	Intra	Network	IP	2	so-0/2/0.0	
192.168.9.44/30	Intra	Network	IP	1	so-0/2/0.0	
192.168.9.45/32	Intra	Network	IP	2	so-0/2/0.0	

## show (ospf | ospf3) statistics

<b>List of Syntax</b>	<a href="#">Syntax on page 127</a> <a href="#">Syntax (EX Series Switch and QFX Series) on page 127</a>
<b>Syntax</b>	<pre>show (ospf   ospf3) statistics &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt; &lt;realm (ipv4-multicast   ipv4-unicast   ipv6-multicast)&gt;</pre>
<b>Syntax (EX Series Switch and QFX Series)</b>	<pre>show (ospf   ospf3) statistics &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><b>realm</b> option introduced in Junos OS Release 9.2.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>
<b>Description</b>	Display OSPF statistics.
<b>Options</b>	<p><b>none</b>—Display OSPF statistics for all routing instances.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display all statistics 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> <p><b>realm (ipv4-multicast   ipv4-unicast   ipv6-multicast)</b>—(Optional) (OSPFv3 only) Display all statistics for the specified OSPFv3 realm, or address family. Use the <b>realm</b> option to specify an address family for OSPFv3 other than IPv6 unicast, which is the default.</p>
<b>Required Privilege Level</b>	view
<b>Related Documentation</b>	<ul style="list-style-type: none"> <li>• <a href="#">clear (ospf   ospf3) statistics on page 96</a></li> </ul>
<b>List of Sample Output</b>	<a href="#">show ospf statistics on page 129</a> <a href="#">show ospf statistics logical-system all on page 129</a> <a href="#">show ospf3 statistics on page 130</a>
<b>Output Fields</b>	<p><a href="#">Table 14 on page 127</a> lists the output fields for the <b>show (ospf   ospf3) statistics</b> command. Output fields are listed in the approximate order in which they appear.</p>

**Table 14: show (ospf | ospf3) statistics Output Fields**

Field Name	Field Description
Packet type	Type of OSPF packet.
Total Sent/Total Received	Total number of packets sent and received.

Table 14: show (ospf | ospf3) statistics Output Fields (*continued*)

Field Name	Field Description
<b>Last 5 seconds Sent/Last 5 seconds Received</b>	Total number of packets sent and received in the last 5 seconds.
<b>DBDs retransmitted</b>	Total number of database description packets retransmitted, and number retransmitted in the last 5 seconds.
<b>LSAs flooded</b>	Total number of link-state advertisements flooded, and number flooded in the last 5 seconds.
<b>LSAs flooded high-prio</b>	<p>Total number of high priority link-state advertisements flooded, and number flooded in the last 5 seconds.</p> <p>A link-state advertisement is deemed a high priority if it has changed since it was last sent.</p>
<b>LSAs retransmitted</b>	Total number of link-state advertisements retransmitted, and number retransmitted in the last 5 seconds.
<b>LSAs transmitted to nbr</b>	Total number of link-state advertisements transmitted to a neighbor, and number transmitted in the last 5 seconds.
<b>LSAs requested</b>	Total number of link-state advertisements requested by neighboring devices, and number requested in the last 5 seconds.
<b>LSAs acknowledged</b>	Total number of link-state advertisements acknowledged, and number acknowledged in the last 5 seconds.
<b>Flood queue depth</b>	Total number of entries in the extended queue.
<b>Total rexmit entries</b>	Total number of retransmission entries waiting to be sent from the OSPF routing instance.
<b>db summaries</b>	Total number of database description summaries waiting to be sent from the OSPF routing instance.
<b>lsreq entries</b>	Total number of link-state request entries waiting to be sent from the OSPF routing instance.
<b>Receive errors</b>	<p>Number and type of receive errors. Some sample receive errors include:</p> <ul style="list-style-type: none"> <li>• <b>mtu mismatches</b></li> <li>• <b>no interface found</b></li> <li>• <b>no virtual link found</b></li> <li>• <b>nssa mismatches</b></li> <li>• <b>stub area mismatches</b></li> <li>• <b>subnet mismatches</b></li> </ul> <p>If there are no receive errors, the output displays <b>none</b>.</p>

## Sample Output

### show ospf statistics

```

user@host> show ospf statistics
Packet type          Total
                   Sent      Received
Hello                 31         14
  DbD                  9         10
  LSReq                2          2
LSUpdate              8         16
  LSAck               9          9
                   Sent      Received
Last 5 seconds
Hello                 2          2
  DbD                  0          0
  LSReq                0          0
LSUpdate              0          0
  LSAck               0          0

DBDs retransmitted   :          3, last 5 seconds :          0
LSAs flooded         :         12, last 5 seconds :          0
LSAs flooded high-prio :          0, last 5 seconds :          0
LSAs retransmitted   :          0, last 5 seconds :          0
LSAs transmitted to nbr:          3, last 5 seconds :          0
LSAs requested       :          5, last 5 seconds :          0
LSAs acknowledged   :         19, last 5 seconds :          0

Flood queue depth    :          0
Total rexmit entries :          0
db summaries         :          0
lsreq entries        :          0

Receive errors:
  862 no interface found
  115923 no virtual link found

```

### show ospf statistics logical-system all

```

user@host> show ospf statistics logical-system all
logical-system: C
OSPF instance is not running
-----

logical-system: B
Packet type          Total
                   Sent      Received
Hello              313740      313653
  DbD                3          2
  LSReq              1          1
LSUpdate            2752      1825
  LSAck             1821      2747
                   Sent      Received
Last 5 seconds
Hello                1          0
  DbD                 0          0
  LSReq               0          0
LSUpdate             0          0
  LSAck              0          0

DBDs retransmitted   :          0, last 5 seconds :          0
LSAs flooded         :        2741, last 5 seconds :          0
LSAs flooded high-prio :         10, last 5 seconds :          0
LSAs retransmitted   :          0, last 5 seconds :          0
LSAs transmitted to nbr:          2, last 5 seconds :          0
LSAs requested       :          1, last 5 seconds :          0
LSAs acknowledged   :       1831, last 5 seconds :          0

Flood queue depth    :          0
Total rexmit entries :          0
db summaries         :          0
lsreq entries        :          0

Receive errors:

```

```

None
-----

logical-system: A

Packet type          Total          Last 5 seconds
                   Sent      Received      Sent      Received
    Hello           313698      313695         0         0
      DbD              2         3         0         0
    LSReq              1         1         0         0
  LSUpdate           1825      2752         0         0
    LSAck            2747      1821         0         0

DBDs retransmitted   :           0, last 5 seconds :           0
LSAs flooded         :          1825, last 5 seconds :           0
LSAs flooded high-prio :          10, last 5 seconds :           0
LSAs retransmitted   :           0, last 5 seconds :           0
LSAs transmitted to nbr:           1, last 5 seconds :           0
LSAs requested        :           2, last 5 seconds :           0
LSAs acknowledged    :          2748, last 5 seconds :           0

Flood queue depth    :           0
Total rexmit entries :           0
db summaries         :           0
lsreq entries        :           0

Receive errors:
None
-----

```

### show ospf3 statistics

```

user@host> show ospf3 statistics

Packet type          Total          Last 5 seconds
                   Sent      Received      Sent      Received
    Hello              0         0         0         0
      DbD              0         0         0         0
    LSReq              0         0         0         0
  LSUpdate            0         0         0         0
    LSAck             0         0         0         0

DBDs retransmitted   :           0, last 5 seconds :           0
LSAs flooded         :           0, last 5 seconds :           0
LSAs flooded high-prio :           0, last 5 seconds :           0
LSAs retransmitted   :           0, last 5 seconds :           0
LSAs transmitted to nbr:           0, last 5 seconds :           0
LSAs requested        :           0, last 5 seconds :           0
LSAs acknowledged    :           0, last 5 seconds :           0

Flood queue depth    :           0
Total rexmit entries :           0
db summaries         :           0
lsreq entries        :           0

Receive errors:
None

```



## show ospf database

**List of Syntax**    [Syntax on page 131](#)  
                           [Syntax \(EX Series Switches and QFX Series\) on page 131](#)

**Syntax**    show ospf database  
                   <brief | detail | extensive | summary>  
                   <advertising-router (*address* | self)>  
                   <area *area-id*>  
                   <asbrsummary>  
                   <external>  
                   <instance *instance-name*>  
                   <link-local>  
                   <logical-system (all | *logical-system-name*)>  
                   <lsa-id *lsa-id*>  
                   <netsummary>  
                   <network>  
                   <nssa>  
                   <opaque-area>  
                   <router>

**Syntax (EX Series Switches and QFX Series)**    show ospf database  
   <brief | detail | extensive | summary>  
   <advertising-router (*address* | self)>  
   <area *area-id*>  
   <asbrsummary>  
   <external>  
   <instance *instance-name*>  
   <link-local>  
   <lsa-id *lsa-id*>  
   <netsummary>  
   <network>  
   <nssa>  
   <opaque-area>  
   <router>

**Release Information**    Command introduced before Junos OS Release 7.4.  
                                   Command introduced in Junos OS Release 9.0 for EX Series switches.  
                                   **advertising-router self (*address* | self)** option introduced in Junos OS Release 9.5.  
                                   **advertising-router self (*address* | self)** option introduced in Junos OS Release 9.5 for EX Series switches.  
                                   Command introduced in Junos OS Release 11.3 for the QFX Series.

**Description**    Display the entries in the OSPF version 2 (OSPFv2) link-state database, which contains data about link-state advertisement (LSA) packets.

**Options**    **none**—Display standard information about entries in the OSPFv2 link-state database for all routing instances.

**brief | detail | extensive | summary**—(Optional) Display the specified level of output.

**advertising-router (*address* | self)**—(Optional) Display the LSAs advertised either by a particular routing device or by this routing device.

**area *area-id***—(Optional) Display the LSAs in a particular area.

**asbrsummary**—(Optional) Display summary AS boundary router LSA entries.

**external**—(Optional) Display external LSAs.

**instance *instance-name***—(Optional) Display all OSPF database information under the named routing instance.

**link-local**—(Optional) Display information about link-local LSAs.

**logical-system (all | *logical-system-name*)**—(Optional) Perform this operation on all logical systems or on a particular logical system.

**lsa-id *lsa-id***—(Optional) Display the LSA with the specified LSA identifier.

**netsummary**—(Optional) Display summary network LSAs.

**network**—(Optional) Display information about network LSAs.

**nssa**—(Optional) Display information about not-so-stubby area (NSSA) LSAs.

**opaque-area**—(Optional) Display opaque area-scope LSAs.

**router**—(Optional) Display information about router LSAs.

**Required Privilege Level**

view

**Related Documentation**

- [clear \(ospf | ospf3\) database on page 90](#)

**List of Sample Output**

[show ospf database on page 134](#)  
[show ospf database brief on page 134](#)  
[show ospf database detail on page 134](#)  
[show ospf database extensive on page 136](#)  
[show ospf database summary on page 138](#)

**Output Fields**

[Table 15 on page 132](#) describes the output fields for the **show ospf database** command. Output fields are listed in the approximate order in which they appear.

**Table 15: show ospf database Output Fields**

Field Name	Field Description	Level of Output
<b>area</b>	Area number. Area 0.0.0.0 is the backbone area.	All levels
<b>Type</b>	Type of link advertisement: <b>ASBRSum</b> , <b>Extern</b> , <b>Network</b> , <b>NSSA</b> , <b>OpaqArea</b> , <b>Router</b> , or <b>Summary</b> .	All levels
<b>ID</b>	LSA identifier included in the advertisement. An asterisk preceding the identifier marks database entries that originated from the local routing device.	All levels
<b>Adv Rtr</b>	Address of the routing device that sent the advertisement.	All levels

Table 15: show ospf database Output Fields (*continued*)

Field Name	Field Description	Level of Output
<b>Seq</b>	Link sequence number of the advertisement.	All levels
<b>Age</b>	Time elapsed since the LSA was originated, in seconds.	All levels
<b>Opt</b>	Optional OSPF capabilities associated with the LSA.	All levels
<b>Cksum</b>	Checksum value of the LSA.	All levels
<b>Len</b>	Length of the advertisement, in bytes.	All levels
<b>Router</b>	Router link-state advertisement information: <ul style="list-style-type: none"> <li>• <b>bits</b>—Flags describing the routing device that generated the LSP.</li> <li>• <b>link count</b>—Number of links in the advertisement.</li> <li>• <b>id</b>—ID of a routing device or subnet on the link.</li> <li>• <b>data</b>—For stub networks, the subnet mask. Otherwise, the IP address of the routing device that generated the LSP.</li> <li>• <b>type</b>—Type of link. It can be <b>PointToPoint</b>, <b>Transit</b>, <b>Stub</b>, or <b>Virtual</b>.</li> <li>• <b>TOS count</b>—Number of type-of-service (ToS) entries in the advertisement.</li> <li>• <b>TOS 0 metric</b>—Metric for ToS 0.</li> <li>• <b>TOS</b>—Type-of-service (ToS) value.</li> <li>• <b>metric</b>—Metric for the ToS.</li> </ul>	<b>detail extensive</b>
<b>Network</b>	Network link-state advertisement information: <ul style="list-style-type: none"> <li>• <b>mask</b>—Network mask.</li> <li>• <b>attached router</b>—ID of the attached neighbor.</li> </ul>	<b>detail extensive</b>
<b>Summary</b>	Summary link-state advertisement information: <ul style="list-style-type: none"> <li>• <b>mask</b>—Network mask.</li> <li>• <b>TOS</b>—Type-of-service (ToS) value.</li> <li>• <b>metric</b>—Metric for the ToS.</li> </ul>	<b>detail extensive</b>
<b>Gen timer</b>	How long until the LSA is regenerated.	<b>extensive</b>
<b>Aging timer</b>	How long until the LSA expires.	<b>extensive</b>
<b>Installed <i>hh:mm:ss</i> ago</b>	How long ago the route was installed.	<b>extensive</b>
<b>expires in <i>hh:mm:ss</i></b>	How long until the route expires.	<b>extensive</b>
<b>sent <i>hh:mm:ss</i> ago</b>	How long ago the LSA was sent.	<b>extensive</b>
<b>Last changed <i>hh:mm:ss</i> ago</b>	How long ago the route was changed.	<b>extensive</b>

Table 15: show ospf database Output Fields (*continued*)

Field Name	Field Description	Level of Output
<b>Change count</b>	Number of times the route has changed.	<b>extensive</b>
<b>Ours</b>	Indicates that this is a local advertisement.	<b>extensive</b>
<b>Router LSAs</b>	Number of router link-state advertisements in the link-state database.	<b>summary</b>
<b>Network LSAs</b>	Number of network link-state advertisements in the link-state database.	<b>summary</b>
<b>Summary LSAs</b>	Number of summary link-state advertisements in the link-state database.	<b>summary</b>
<b>NSSA LSAs</b>	Number of not-so-stubby area link-state advertisements in the link-state database.	<b>summary</b>

## Sample Output

### show ospf database

```

user@host> show ospf database
OSPF link state database, Area 0.0.0.1
  Type      ID          Adv Rtr      Seq          Age  Opt  Cksum  Len
Router     10.255.70.103  10.255.70.103 0x80000002   215  0x20 0x4112  48
Router     *10.255.71.242 10.255.71.242 0x80000002   214  0x20 0x11b1  48
Summary    *23.1.1.0      10.255.71.242 0x80000002   172  0x20 0x6d72  28
Summary    *24.1.1.0      10.255.71.242 0x80000002   177  0x20 0x607e  28
NSSA       *33.1.1.1      10.255.71.242 0x80000002   217  0x28 0x73bd  36

      OSPF link state database, Area 0.0.0.2
  Type      ID          Adv Rtr      Seq          Age  Opt  Cksum  Len
Router     10.255.71.52  10.255.71.52  0x80000004   174  0x20 0xd021  36
Router     *10.255.71.242 10.255.71.242 0x80000003   173  0x20 0xe191  36
Network    *23.1.1.1      10.255.71.242 0x80000002   173  0x20 0x9c76  32
Summary    *12.1.1.0      10.255.71.242 0x80000001   217  0x20 0xfeec  28
Summary    *24.1.1.0      10.255.71.242 0x80000002   177  0x20 0x607e  28
NSSA       *33.1.1.1      10.255.71.242 0x80000001   222  0x28 0xe047  36

      OSPF link state database, Area 0.0.0.3
  Type      ID          Adv Rtr      Seq          Age  Opt  Cksum  Len
Router     10.255.71.238 10.255.71.238 0x80000003   179  0x20 0x3942  36
Router     *10.255.71.242 10.255.71.242 0x80000003   177  0x20 0xf37d  36
Network    *24.1.1.1      10.255.71.242 0x80000002   177  0x20 0xc591  32
Summary    *12.1.1.0      10.255.71.242 0x80000001   217  0x20 0xfeec  28
Summary    *23.1.1.0      10.255.71.242 0x80000002   172  0x20 0x6d72  28
NSSA       *33.1.1.1      10.255.71.242 0x80000001   222  0x28 0xeb3b  36

```

### show ospf database brief

The output for the **show ospf database brief** command is identical to that for the **show ospf database** command. For sample output, see [show ospf database on page 134](#).

### show ospf database detail

```
user@host> show ospf database detail
```

```

OSPF link state database, Area 0.0.0.1
Type      ID          Adv Rtr      Seq      Age  Opt  Cksum  Len
Router    10.255.70.103  10.255.70.103  0x80000002  261  0x20 0x4112  48
  bits 0x0, link count 2
  id 10.255.71.242, data 12.1.1.1, Type PointToPoint (1)
  TOS count 0, TOS 0 metric 1
  id 12.1.1.0, data 255.255.255.0, Type Stub (3)
  TOS count 0, TOS 0 metric 1
Router    *10.255.71.242  10.255.71.242  0x80000002  260  0x20 0x11b1  48
  bits 0x3, link count 2
  id 10.255.70.103, data 12.1.1.2, Type PointToPoint (1)
  TOS count 0, TOS 0 metric 1
  id 12.1.1.0, data 255.255.255.0, Type Stub (3)
  TOS count 0, TOS 0 metric 1
Summary  *23.1.1.0      10.255.71.242  0x80000002  218  0x20 0x6d72  28
  mask 255.255.255.0
  TOS 0x0, metric 1
Summary  *24.1.1.0      10.255.71.242  0x80000002  223  0x20 0x607e  28
  mask 255.255.255.0
  TOS 0x0, metric 1
NSSA     *33.1.1.1      10.255.71.242  0x80000002  263  0x28 0x73bd  36
  mask 255.255.255.255
  Type 2, TOS 0x0, metric 0, fwd addr 12.1.1.2, tag 0.0.0.0

```

```

OSPF link state database, Area 0.0.0.2
Type      ID          Adv Rtr      Seq      Age  Opt  Cksum  Len
Router    10.255.71.52   10.255.71.52   0x80000004  220  0x20 0xd021  36
  bits 0x0, link count 1
  id 23.1.1.1, data 23.1.1.2, Type Transit (2)
  TOS count 0, TOS 0 metric 1
Router    *10.255.71.242  10.255.71.242  0x80000003  219  0x20 0xe191  36
  bits 0x3, link count 1
  id 23.1.1.1, data 23.1.1.1, Type Transit (2)
  TOS count 0, TOS 0 metric 1
Network  *23.1.1.1      10.255.71.242  0x80000002  219  0x20 0x9c76  32
  mask 255.255.255.0
  attached router 10.255.71.242
  attached router 10.255.71.52
Summary  *12.1.1.0      10.255.71.242  0x80000001  263  0x20 0xfeec  28
  mask 255.255.255.0
  TOS 0x0, metric 1
Summary  *24.1.1.0      10.255.71.242  0x80000002  223  0x20 0x607e  28
  mask 255.255.255.0
  TOS 0x0, metric 1
NSSA     *33.1.1.1      10.255.71.242  0x80000001  268  0x28 0xe047  36
  mask 255.255.255.255
  Type 2, TOS 0x0, metric 0, fwd addr 23.1.1.1, tag 0.0.0.0

```

```

OSPF link state database, Area 0.0.0.3
Type      ID          Adv Rtr      Seq      Age  Opt  Cksum  Len
Router    10.255.71.238  10.255.71.238  0x80000003  225  0x20 0x3942  36
  bits 0x0, link count 1
  id 24.1.1.1, data 24.1.1.2, Type Transit (2)
  TOS count 0, TOS 0 metric 1
Router    *10.255.71.242  10.255.71.242  0x80000003  223  0x20 0xf37d  36
  bits 0x3, link count 1
  id 24.1.1.1, data 24.1.1.1, Type Transit (2)
  TOS count 0, TOS 0 metric 1
Network  *24.1.1.1      10.255.71.242  0x80000002  223  0x20 0xc591  32
  mask 255.255.255.0
  attached router 10.255.71.242

```

```

    attached router 10.255.71.238
Summary *12.1.1.0          10.255.71.242    0x80000001    263    0x20 0xfeec    28
    mask 255.255.255.0
    TOS 0x0, metric 1
Summary *23.1.1.0          10.255.71.242    0x80000002    218    0x20 0x6d72    28
    mask 255.255.255.0
    TOS 0x0, metric 1
NSSA  *33.1.1.1           10.255.71.242    0x80000001    268    0x28 0xeb3b    36
    mask 255.255.255.255
    Type 2, TOS 0x0, metric 0, fwd addr 24.1.1.1, tag 0.0.0.0

```

### show ospf database extensive

```

user@host> show ospf database extensive
    OSPF link state database, Area 0.0.0.1
Type      ID          Adv Rtr      Seq      Age    Opt  Cksum  Len
Router    10.255.70.103    10.255.70.103  0x80000002  286    0x20 0x4112  48
    bits 0x0, link count 2
    id 10.255.71.242, data 12.1.1.1, Type PointToPoint (1)
    TOS count 0, TOS 0 metric 1
    id 12.1.1.0, data 255.255.255.0, Type Stub (3)
    TOS count 0, TOS 0 metric 1
    Aging timer 00:55:14
    Installed 00:04:43 ago, expires in 00:55:14
    Last changed 00:04:43 ago, Change count: 2
Router  *10.255.71.242    10.255.71.242    0x80000002    285    0x20 0x11b1  48
    bits 0x3, link count 2
    id 10.255.70.103, data 12.1.1.2, Type PointToPoint (1)
    TOS count 0, TOS 0 metric 1
    id 12.1.1.0, data 255.255.255.0, Type Stub (3)
    TOS count 0, TOS 0 metric 1
    Gen timer 00:45:15
    Aging timer 00:55:15
    Installed 00:04:45 ago, expires in 00:55:15, sent 00:04:43 ago
    Last changed 00:04:45 ago, Change count: 2, Ours
Summary *23.1.1.0          10.255.71.242    0x80000002    243    0x20 0x6d72    28
    mask 255.255.255.0
    TOS 0x0, metric 1
    Gen timer 00:45:57
    Aging timer 00:55:57
    Installed 00:04:03 ago, expires in 00:55:57, sent 00:04:01 ago
    Last changed 00:04:48 ago, Change count: 1, Ours
Summary *24.1.1.0          10.255.71.242    0x80000002    248    0x20 0x607e    28
    mask 255.255.255.0
    TOS 0x0, metric 1
    Gen timer 00:45:52
    Aging timer 00:55:52
    Installed 00:04:08 ago, expires in 00:55:52, sent 00:04:06 ago
    Last changed 00:04:48 ago, Change count: 1, Ours
NSSA  *33.1.1.1           10.255.71.242    0x80000002    288    0x28 0x73bd    36
    mask 255.255.255.255
    Type 2, TOS 0x0, metric 0, fwd addr 12.1.1.2, tag 0.0.0.0
    Gen timer 00:45:12
    Aging timer 00:55:12
    Installed 00:04:48 ago, expires in 00:55:12, sent 00:04:48 ago
    Last changed 00:04:48 ago, Change count: 2, Ours

    OSPF link state database, Area 0.0.0.2
Type      ID          Adv Rtr      Seq      Age    Opt  Cksum  Len
Router    10.255.71.52    10.255.71.52    0x80000004    245    0x20 0xd021  36
    bits 0x0, link count 1

```

```

id 23.1.1.1, data 23.1.1.2, Type Transit (2)
TOS count 0, TOS 0 metric 1
Aging timer 00:55:55
Installed 00:04:02 ago, expires in 00:55:55
Last changed 00:04:02 ago, Change count: 2
Router *10.255.71.242    10.255.71.242    0x80000003    244    0x20 0xe191    36
bits 0x3, link count 1
id 23.1.1.1, data 23.1.1.1, Type Transit (2)
TOS count 0, TOS 0 metric 1
Gen timer 00:45:56
Aging timer 00:55:56
Installed 00:04:04 ago, expires in 00:55:56, sent 00:04:02 ago
Last changed 00:04:04 ago, Change count: 2, Ours
Network *23.1.1.1      10.255.71.242    0x80000002    244    0x20 0x9c76    32
mask 255.255.255.0
attached router 10.255.71.242
attached router 10.255.71.52
Gen timer 00:45:56
Aging timer 00:55:56
Installed 00:04:04 ago, expires in 00:55:56, sent 00:04:02 ago
Last changed 00:04:04 ago, Change count: 1, Ours
Summary *12.1.1.0      10.255.71.242    0x80000001    288    0x20 0xfeec    28
mask 255.255.255.0
TOS 0x0, metric 1
Gen timer 00:45:12
Aging timer 00:55:12
Installed 00:04:48 ago, expires in 00:55:12, sent 00:04:04 ago
Last changed 00:04:48 ago, Change count: 1, Ours
Summary *24.1.1.0      10.255.71.242    0x80000002    248    0x20 0x607e    28
mask 255.255.255.0
TOS 0x0, metric 1
Gen timer 00:45:52
Aging timer 00:55:52
Installed 00:04:08 ago, expires in 00:55:52, sent 00:04:04 ago
Last changed 00:04:48 ago, Change count: 1, Ours
NSSA *33.1.1.1        10.255.71.242    0x80000001    293    0x28 0xe047    36
mask 255.255.255.255
Type 2, TOS 0x0, metric 0, fwd addr 23.1.1.1, tag 0.0.0.0
Gen timer 00:45:07
Aging timer 00:55:07
Installed 00:04:53 ago, expires in 00:55:07, sent 00:04:04 ago
Last changed 00:04:53 ago, Change count: 1, Ours

OSPF link state database, Area 0.0.0.3
Type      ID          Adv Rtr          Seq          Age  Opt  Cksum  Len
Router 10.255.71.238  10.255.71.238    0x80000003    250  0x20 0x3942  36
bits 0x0, link count 1
id 24.1.1.1, data 24.1.1.2, Type Transit (2)
TOS count 0, TOS 0 metric 1
Aging timer 00:55:50
Installed 00:04:07 ago, expires in 00:55:50
Last changed 00:04:07 ago, Change count: 2
Router *10.255.71.242  10.255.71.242    0x80000003    248  0x20 0xf37d  36
bits 0x3, link count 1
id 24.1.1.1, data 24.1.1.1, Type Transit (2)
TOS count 0, TOS 0 metric 1
Gen timer 00:45:52
Aging timer 00:55:52
Installed 00:04:08 ago, expires in 00:55:52, sent 00:04:06 ago
Last changed 00:04:08 ago, Change count: 2, Ours
Network *24.1.1.1      10.255.71.242    0x80000002    248  0x20 0xc591  32

```

```

mask 255.255.255.0
attached router 10.255.71.242
attached router 10.255.71.238
Gen timer 00:45:52
Aging timer 00:55:52
Installed 00:04:08 ago, expires in 00:55:52, sent 00:04:06 ago
Last changed 00:04:08 ago, Change count: 1, Ours
Summary *12.1.1.0      10.255.71.242    0x80000001    288  0x20 0xfeec  28
mask 255.255.255.0
TOS 0x0, metric 1
Gen timer 00:45:12
Aging timer 00:55:12
Installed 00:04:48 ago, expires in 00:55:12, sent 00:04:13 ago
Last changed 00:04:48 ago, Change count: 1, Ours
Summary *23.1.1.0      10.255.71.242    0x80000002    243  0x20 0x6d72  28
mask 255.255.255.0
TOS 0x0, metric 1
Gen timer 00:45:57
Aging timer 00:55:57
Installed 00:04:03 ago, expires in 00:55:57, sent 00:04:01 ago
Last changed 00:04:48 ago, Change count: 1, Ours
NSSA  *33.1.1.1        10.255.71.242    0x80000001    293  0x28 0xeb3b  36
mask 255.255.255.255
Type 2, TOS 0x0, metric 0, fwd addr 24.1.1.1, tag 0.0.0.0
Gen timer 00:45:07
Aging timer 00:55:07
Installed 00:04:53 ago, expires in 00:55:07, sent 00:04:13 ago
Last changed 00:04:53 ago, Change count: 1, Ours

```

#### show ospf database summary

```

user@host> show ospf database summary
Area 0.0.0.1:
  2 Router LSAs
  2 Summary LSAs
  1 NSSA LSAs
Area 0.0.0.2:
  2 Router LSAs
  1 Network LSAs
  2 Summary LSAs
  1 NSSA LSAs
Area 0.0.0.3:
  2 Router LSAs
  1 Network LSAs
  2 Summary LSAs
  1 NSSA LSAs
Externals:
Interface fe-2/2/1.0:
Interface ge-0/3/2.0:
Interface so-0/1/2.0:
Interface so-0/1/2.0:

```



## show ospf3 database

**List of Syntax**    [Syntax on page 139](#)  
                           [Syntax \(EX Series Switches and QFX Series\) on page 139](#)

**Syntax**    show ospf3 database  
                   <brief | detail | extensive | summary>  
                   <advertising-router (*address* | self)>  
                   <area *area-id*>  
                   <external>  
                   <instance *instance-name*>  
                   <inter-area-prefix>  
                   <inter-area-router>  
                   <intra-area-prefix>  
                   <link>  
                   <link-local>  
                   <logical-system (all | *logical-system-name*)>  
                   <lsa-id *lsa-id*>  
                   <network>  
                   <nssa>  
                   <realm (ipv4-multicast | ipv4-unicast | ipv6-multicast)>  
                   <router>

**Syntax (EX Series Switches and QFX Series)**    show ospf3 database  
   <brief | detail | extensive | summary>  
   <advertising-router (*address* | self)>  
   <area *area-id*>  
   <external>  
   <instance *instance-name*>  
   <inter-area-prefix>  
   <inter-area-router>  
   <intra-area-prefix>  
   <link>  
   <link-local>  
   <lsa-id *lsa-id*>  
   <network>  
   <nssa>  
   <router>

**Release Information**    Command introduced before Junos OS Release 7.4.  
                                   Command introduced in Junos OS Release 9.0 for EX Series switches.  
                                   **realm** option introduced in Junos OS Release 9.2.  
                                   **advertising-router (*address* | *self*)** option introduced in Junos Release 9.5.  
                                   **advertising-router (*address* | *self*)** option introduced in Junos OS Release 9.5 for EX Series switches.  
                                   Command introduced in Junos OS Release 11.3 for the QFX Series.

**Description**    Display the entries in the OSPF version 3 (OSPFv3) link-state database, which contains data about link-state advertisement (LSA) packets.

**Options**    **none**—Display standard information about all entries in the OSPFv3 link-state database.  
                   **brief | detail | extensive | summary**—(Optional) Display the specified level of output.

**advertising-router** (*address* | *self*)—(Optional) Display the LSAs advertised either by a particular routing device or by this routing device.

**area** *area-id*—(Optional) Display the LSAs in a particular area.

**external**—(Optional) Display external LSAs.

**instance** *instance-name*—(Optional) Display all OSPF database information under the named routing instance.

**inter-area-prefix**—(Optional) Display information about interarea-prefix LSAs.

**inter-area-router**—(Optional) Display information about interarea-router LSAs.

**intra-area-prefix**—(Optional) Display information about intra-area-prefix LSAs.

**link**—(Optional) Display information about link LSAs.

**link-local**—(Optional) Display information about link-local LSAs.

**logical-system** (*all* | *logical-system-name*)—(Optional) Perform this operation on all logical systems or on a particular logical system.

**lsa-id** *lsa-id*—(Optional) Display the LSA with the specified LSA identifier.

**network**—(Optional) Display information about network LSAs.

**nssa**—(Optional) Display information about not-so-stubby area (NSSA) LSAs.

**realm** (*ipv4-multicast* | *ipv4-unicast* | *ipv6-multicast*)—(Optional) Display information about the specified OSPFv3 realm, or address family. Use the **realm** option to specify an address family other than IPv6 unicast, which is the default.

**router**—(Optional) Display information about router LSAs.

**Required Privilege Level**

view

**Related Documentation**

- [clear \(ospf | ospf3\) database on page 90](#)

**List of Sample Output**

[show ospf3 database brief on page 145](#)  
[show ospf3 database extensive on page 145](#)  
[show ospf3 database summary on page 148](#)

**Output Fields**

[Table 16 on page 140](#) lists the output fields for the **show ospf3 database** command. Output fields are listed in the approximate order in which they appear.

**Table 16: show ospf3 database Output Fields**

Field Name	Field Description	Level of Output
OSPF link state database, area <i>area-number</i>	Entries in the link-state database for this area.	<b>brief detail extensive</b>

Table 16: show ospf3 database Output Fields (*continued*)

Field Name	Field Description	Level of Output
OSPF AS SCOPE link state database	Entries in the AS scope link-state database.	brief detail extensive
OSPF Link-Local link state database, interface <i>interface-name</i>	Entries in the link-local link-state database for this interface.	brief detail extensive
area	Area number. Area 0.0.0.0 is the backbone area.	All levels
Type	Type of link advertisement: <b>Extern</b> , <b>InterArPfx</b> , <b>InterArRtr</b> , <b>IntraArPrx</b> , <b>Link</b> , <b>Network</b> , <b>NSSA</b> , or <b>Router</b> .	brief detail extensive
ID	Link identifier included in the advertisement. An asterisk (*) preceding the identifier marks database entries that originated from the local routing device.	brief detail extensive
Adv Rtr	Address of the routing device that sent the advertisement.	brief detail extensive
Seq	Link sequence number of the advertisement.	brief detail extensive
Age	Time elapsed since the LSA was originated, in seconds.	brief detail extensive
Cksum	Checksum value of the LSA.	brief detail extensive
Len	Length of the advertisement, in bytes.	brief detail extensive
<b>Router (Router Link-State Advertisements)</b>		
bits	Flags describing the routing device that generated the LSP.	detail extensive
Options	Option bits carried in the router LSA.	detail extensive
<b>For Each Router Link</b>		
Type	Type of interface. The value of all other output fields describing a routing device interface depends on the interface's type: <ul style="list-style-type: none"> <li>• <b>PointToPoint (1)</b>—Point-to-point connection to another routing device.</li> <li>• <b>Transit (2)</b>—Connection to a transit network.</li> <li>• <b>Virtual (4)</b>—Virtual link.</li> </ul>	detail extensive
Loc-if-id	Local interface ID assigned to the interface that uniquely identifies the interface with the routing device.	detail extensive
Nbr-if-id	Interface ID of the neighbor's interface for this routing device link.	detail extensive
Nbr-rtr-id	Router ID of the neighbor routing device (for type 2 interfaces, the attached link's designated router).	detail extensive
Metric	Cost of the router link.	detail extensive

Table 16: show ospf3 database Output Fields (*continued*)

Field Name	Field Description	Level of Output
Gen timer	How long until the LSA is regenerated, in the format <i>hours:minutes:seconds</i> .	extensive
Aging timer	How long until the LSA expires, in the format <i>hours:minutes:seconds</i> .	extensive
Installed <i>nn:nn:nn</i> ago	How long ago the route was installed, in the format <i>hours:minutes:seconds</i> .	extensive
expires in <i>nn:nn:nn</i>	How long until the route expires, in the format <i>hours:minutes:seconds</i> .	extensive
sent <i>nn:nn:nn</i> ago	Time elapsed since the LSA was last transmitted or flooded to an adjacency or an interface, respectively, in the format <i>hours:minutes:seconds</i> .	extensive
Ours	Indicates that this is a local advertisement.	extensive
<b>Network (Network Link-State Advertisements)</b>		
Options	Option bits carried in the network LSA.	detail extensive
Attached Router	Router IDs of each of the routing devices attached to the link. Only routing devices that are fully adjacent to the designated router are listed. The designated router includes itself in this list.	detail extensive
<b>InterArPfx (Interarea-Prefix Link-State Advertisements)</b>		
Prefix	IPv6 address prefix.	detail extensive
Prefix-options	Option bit associated with the prefix.	detail extensive
Metric	Cost of this route. Expressed in the same units as the interface costs in the router LSAs. When the interarea-prefix LSA is describing a route to a range of addresses, the cost is set to the maximum cost to any reachable component of the address range.	detail extensive
Gen timer	How long until the LSA is regenerated, in the format <i>hours:minutes:seconds</i> .	extensive
Aging timer	How long until the LSA expires, in the format <i>hours:minutes:seconds</i> .	extensive
Installed <i>nn:nn:nn</i> ago	How long ago the route was installed, in the format <i>hours:minutes:seconds</i> .	extensive
expires in <i>nn:nn:nn</i>	How long until the route expires, in the format <i>hours:minutes:seconds</i> .	extensive
sent <i>nn:nn:nn</i> ago	Time elapsed since the LSA was last transmitted or flooded to an adjacency or an interface, respectively, in the format <i>hours:minutes:seconds</i> .	extensive
Ours	Indicates that this is a local advertisement.	extensive
<b>InterArRtr (Interarea-Router Link-State Advertisements)</b>		
Dest-router-id	Router ID of the routing device described by the LSA.	detail extensive

Table 16: show ospf3 database Output Fields (*continued*)

Field Name	Field Description	Level of Output
<b>options</b>	Optional capabilities supported by the routing device.	<b>detail extensive</b>
<b>Metric</b>	Cost of this route. Expressed in the same units as the interface costs in the router LSAs. When the interarea-prefix LSA is describing a route to a range of addresses, the cost is set to the maximum cost to any reachable component of the address range.	<b>detail extensive</b>
<b>Prefix</b>	IPv6 address prefix.	<b>extensive</b>
<b>Prefix-options</b>	Option bit associated with the prefix.	<b>extensive</b>
<b>Extern (External Link-State Advertisements)</b>		
<b>Prefix</b>	IPv6 address prefix.	<b>detail extensive</b>
<b>Prefix-options</b>	Option bit associated with the prefix.	<b>detail extensive</b>
<b>Metric</b>	Cost of the route, which depends on the value of <b>Type</b> .	<b>detail extensive</b>
<b>Type <i>n</i></b>	Type of external metric: <b>Type 1</b> or <b>Type 2</b> .	<b>detail extensive</b>
<b>Aging timer</b>	How long until the LSA expires, in the format <i>hours:minutes:seconds</i> .	<b>extensive</b>
<b>Installed <i>nn:nn:nn</i> ago</b>	How long ago the route was installed, in the format <i>hours:minutes:seconds</i> .	<b>extensive</b>
<b>expires in <i>nn:nn:nn</i></b>	How long until the route expires, in the format <i>hours:minutes:seconds</i> .	<b>extensive</b>
<b>sent <i>nn:nn:nn</i> ago</b>	Time elapsed since the LSA was last transmitted or flooded to an adjacency or an interface, respectively, in the format <i>hours:minutes:seconds</i> .	<b>extensive</b>
<b>Link (Link-State Advertisements)</b>		
<b>IPv6-Address</b>	IPv6 link-local address on the link for which this link LSA originated.	<b>detail extensive</b>
<b>Options</b>	Option bits carried in the link LSA.	<b>detail extensive</b>
<b>priority</b>	Router priority of the interface attaching the originating routing device to the link.	<b>detail extensive</b>
<b>Prefix-count</b>	Number of IPv6 address prefixes contained in the LSA. The rest of the link LSA contains a list of IPv6 prefixes to be associated with the link.	<b>detail extensive</b>
<b>Prefix</b>	IPv6 address prefix.	<b>detail extensive</b>
<b>Prefix-options</b>	Option bit associated with the prefix.	<b>detail extensive</b>
<b>Gen timer</b>	How long until the LSA is regenerated, in the format <i>hours:minutes:seconds</i> .	<b>extensive</b>

Table 16: show ospf3 database Output Fields (*continued*)

Field Name	Field Description	Level of Output
Aging timer	How long until the LSA expires, in the format <i>hours:minutes:seconds</i> .	extensive
Installed <i>nn:nn:nn</i> ago	How long ago the route was installed, in the format <i>hours:minutes:seconds</i> .	extensive
expires in <i>nn:nn:nn</i>	How long until the route expires, in the format <i>hours:minutes:seconds</i> .	extensive
sent <i>nn:nn:nn</i> ago	Time elapsed since the LSA was last transmitted or flooded to an adjacency or an interface, respectively, in the format <i>hours:minutes:seconds</i> .	extensive
Ours	Indicates that this is a local advertisement.	extensive
<b>IntraArPfx (Intra-Area-Prefix Link-State Advertisements)</b>		
Ref-lsa-type	LSA type of the referenced LSA. <ul style="list-style-type: none"> <li><b>Router</b>—Address prefixes are associated with a router LSA.</li> <li><b>Network</b>—Address prefixes are associated with a network LSA.</li> </ul>	detail extensive
Ref-lsa-id	Link-state ID of the referenced LSA.	detail extensive
Ref-router-id	Advertising router ID of the referenced LSA.	detail extensive
Prefix-count	Number of IPv6 address prefixes contained in the LSA. The rest of the link LSA contains a list of IPv6 prefixes to be associated with the link.	detail extensive
Prefix	IPv6 address prefix.	detail extensive
Prefix-options	Option bit associated with the prefix.	detail extensive
Metric	Cost of this prefix. Expressed in the same units as the interface costs in the router LSAs.	detail extensive
Gen timer	How long until the LSA is regenerated, in the format <i>hours:minutes:seconds</i> .	extensive
Aging timer	How long until the LSA expires, in the format <i>hours:minutes:seconds</i> .	extensive
Installed <i>hh:mm:ss</i> ago	How long ago the route was installed, in the format <i>hours:minutes:seconds</i> .	extensive
expires in <i>hh:mm:ss</i>	How long until the route expires, in the format <i>hours:minutes:seconds</i> .	extensive
sent <i>hh:mm:ss</i> ago	Time elapsed since the LSA was last transmitted or flooded to an adjacency or an interface, respectively, in the format <i>hours:minutes:seconds</i> .	extensive
<i>n</i> Router LSAs	Number of router LSAs in the link-state database.	summary
<i>n</i> Network LSAs	Number of network LSAs in the link-state database.	summary

Table 16: show ospf3 database Output Fields (*continued*)

Field Name	Field Description	Level of Output
<i>n</i> InterArPfx LSAs	Number of interarea-prefix LSAs in the link-state database.	summary
<i>n</i> InterArRtr LSAs	Number of interarea-router LSAs in the link-state database.	summary
<i>n</i> IntraArPfx LSAs	Number of intra-area-prefix LSAs in the link-state database.	summary
Externals	Display of the external LSA database.	summary
<i>n</i> Extern LSAs	Number of external LSAs in the link-state database.	summary
Interface <i>interface-name</i>	Name of the interface for which link-local LSA information is displayed.	summary
<i>n</i> Link LSAs	Number of link LSAs in the link-state database.	summary

## Sample Output

### show ospf3 database brief

```

user@host> show ospf3 database brief
      OSPF3 link state database, area 0.0.0.0
  Type      ID          Adv Rtr      Seq          Age  Cksum  Len
  Router    0.0.0.1       10.255.4.85  0x80000003   885  0xa697  40
  Router    *0.0.0.1     10.255.4.93  0x80000002   953  0xc677  40
  InterArPfx *0.0.0.2       10.255.4.93  0x80000001   910  0xb96f  44
  InterArRtr *0.0.0.1       10.255.4.93  0x80000001   910  0xe159  32
  IntraArPfx *0.0.0.1       10.255.4.93  0x80000002   432  0x788f  72

      OSPF3 link state database, area 0.0.0.1
  Type      ID          Adv Rtr      Seq          Age  Cksum  Len
  Router    *0.0.0.1     10.255.4.93  0x80000003   916  0xea40  40
  Router    0.0.0.1       10.255.4.97  0x80000006   851  0xc95b  40
  Network   0.0.0.2       10.255.4.97  0x80000002   916  0x4598  32
  InterArPfx *0.0.0.1       10.255.4.93  0x80000002   117  0xa980  44
  InterArPfx *0.0.0.2       10.255.4.93  0x80000002    62  0xd47e  44
  NSSA      0.0.0.1       10.255.4.97  0x80000002   362  0x45ee  44
  IntraArPfx 0.0.0.1       10.255.4.97  0x80000006   851  0x2f77  52

      OSPF3 AS SCOPE link state database
  Type      ID          Adv Rtr      Seq          Age  Cksum  Len
  Extern    0.0.0.1       10.255.4.85  0x80000002    63  0x9b86  44
  Extern    *0.0.0.1     10.255.4.93  0x80000001   910  0x59c9  44

      OSPF3 Link-Local link state database, interface ge-1/3/0.0
  Type      ID          Adv Rtr      Seq          Age  Cksum  Len
  Link      *0.0.0.2       10.255.4.93  0x80000003   916  0x4dab  64

```

### show ospf3 database extensive

```

user@host> show ospf3 database extensive
      OSPF3 link state database, area 0.0.0.0
  Type      ID          Adv Rtr      Seq          Age  Cksum  Len
  Router    0.0.0.1       10.255.4.85  0x80000003  1028  0xa697  40

```

```

bits 0x2, Options 0x13
Type PointToPoint (1), Metric 10
  Loc-If-Id 2, Nbr-If-Id 3, Nbr-Rtr-Id 10.255.4.93
Aging timer 00:42:51
Installed 00:17:05 ago, expires in 00:42:52, sent 02:37:54 ago
Router *0.0.0.1 10.255.4.93 0x80000002 1096 0xc677 40
bits 0x3, Options 0x13
Type PointToPoint (1), Metric 10
  Loc-If-Id 3, Nbr-If-Id 2, Nbr-Rtr-Id 10.255.4.85
Gen timer 00:00:40
Aging timer 00:41:44
Installed 00:18:16 ago, expires in 00:41:44, sent 00:18:14 ago
Ours
InterArPfx *0.0.0.2 10.255.4.93 0x80000001 1053 0xb96f 44
Prefix feee::10:10:2:0/126
Prefix-options 0x0, Metric 10
Gen timer 00:17:02
Aging timer 00:42:26
Installed 00:17:33 ago, expires in 00:42:27, sent 00:17:31 ago
Ours
InterArPfx *0.0.0.3 10.255.4.93 0x80000001 1053 0x71d3 44
Prefix feee::10:255:4:97/128
Prefix-options 0x0, Metric 10
Gen timer 00:21:07
Aging timer 00:42:26
Installed 00:17:33 ago, expires in 00:42:27, sent 00:17:31 ago
Ours
InterArRtr *0.0.0.1 10.255.4.93 0x80000001 1053 0xe159 32
Dest-router-id 10.255.4.97, Options 0x19, Metric 10
Gen timer 00:29:18
Aging timer 00:42:26
Installed 00:17:33 ago, expires in 00:42:27, sent 00:17:31 ago
Ours
IntraArPfx 0.0.0.1 10.255.4.85 0x80000002 1028 0x2403 72
Ref-lsa-type Router, Ref-lsa-id 0.0.0.0, Ref-router-id 10.255.4.85
Prefix-count 2
Prefix feee::10:255:4:85/128
  Prefix-options 0x2, Metric 0
Prefix feee::10:10:1:0/126
  Prefix-options 0x0, Metric 10
Aging timer 00:42:51
Installed 00:17:05 ago, expires in 00:42:52, sent 02:37:54 ago
IntraArPfx *0.0.0.1 10.255.4.93 0x80000002 575 0x788f 72
Ref-lsa-type Router, Ref-lsa-id 0.0.0.0, Ref-router-id 10.255.4.93
Prefix-count 2
Prefix feee::10:255:4:93/128
  Prefix-options 0x2, Metric 0
Prefix feee::10:10:1:0/126
  Prefix-options 0x0, Metric 10
Gen timer 00:33:23
Aging timer 00:50:24
Installed 00:09:35 ago, expires in 00:50:25, sent 00:09:33 ago
OSPF3 link state database, area 0.0.0.1
Type ID Adv Rtr Seq Age Cksum Len
Router *0.0.0.1 10.255.4.93 0x80000003 1059 0xea40 40
bits 0x3, Options 0x19
Type Transit (2), Metric 10
  Loc-If-Id 2, Nbr-If-Id 2, Nbr-Rtr-Id 10.255.4.97
Gen timer 00:08:51
Aging timer 00:42:20
Installed 00:17:39 ago, expires in 00:42:21, sent 00:17:37 ago

```



```

Router      0.0.0.1          10.255.4.97      0x80000006   994  0xc95b  40
  bits 0x2, Options 0x19
  Type Transit (2), Metric 10
    Loc-If-Id 2, Nbr-If-Id 2, Nbr-Rtr-Id 10.255.4.97
  Aging timer 00:43:25
  Installed 00:16:31 ago, expires in 00:43:26, sent 02:37:54 ago
Network     0.0.0.2          10.255.4.97      0x80000002   1059 0x4598  32
  Options 0x11
  Attached router 10.255.4.97
  Attached router 10.255.4.93
  Aging timer 00:42:20
  Installed 00:17:36 ago, expires in 00:42:21, sent 02:37:54 ago
InterArPfx *0.0.0.1          10.255.4.93      0x80000002   260  0xa980  44
  Prefix feee::10:10:1:0/126
  Prefix-options 0x0, Metric 10
  Gen timer 00:45:39
  Aging timer 00:55:39
  Installed 00:04:20 ago, expires in 00:55:40, sent 00:04:18 ago
  Ours
InterArPfx *0.0.0.2          10.255.4.93      0x80000002   205  0xd47e  44
  Prefix feee::10:255:4:93/128
  Prefix-options 0x0, Metric 0
  Gen timer 00:46:35
  Aging timer 00:56:35
  Installed 00:03:25 ago, expires in 00:56:35, sent 00:03:23 ago
  Ours
InterArPfx *0.0.0.3          10.255.4.93      0x80000001   1089 0x9bbb  44
  Prefix feee::10:255:4:85/128
  Prefix-options 0x0, Metric 10
  Gen timer 00:04:46
  Aging timer 00:41:51
  Installed 00:18:09 ago, expires in 00:41:51, sent 00:17:43 ago
  Ours
NSSA        0.0.0.1          10.255.4.97      0x80000002   505  0x45ee  44
  Prefix feee::200:200:1:0/124
  Prefix-options 0x8, Metric 10, Type 2,
  Aging timer 00:51:35
  Installed 00:08:22 ago, expires in 00:51:35, sent 02:37:54 ago
IntraArPfx  0.0.0.1          10.255.4.97      0x80000006   994  0x2f77  52
  Ref-lsa-type Router, Ref-lsa-id 0.0.0.0, Ref-router-id 10.255.4.97
  Prefix-count 1
  Prefix feee::10:255:4:97/128
    Prefix-options 0x2, Metric 0
  Aging timer 00:43:25
  Installed 00:16:31 ago, expires in 00:43:26, sent 02:37:54 ago
IntraArPfx  0.0.0.3          10.255.4.97      0x80000002   1059 0x4446  52
  Ref-lsa-type Network, Ref-lsa-id 0.0.0.2, Ref-router-id 10.255.4.97
  Prefix-count 1
  Prefix feee::10:10:2:0/126
    Prefix-options 0x0, Metric 0
  Aging timer 00:42:20
  Installed 00:17:36 ago, expires in 00:42:21, sent 02:37:54 ago
  OSPF3 AS SCOPE link state database
  Type      ID              Adv Rtr          Seq            Age  Cksum  Len
Extern     0.0.0.1          10.255.4.85      0x80000002     206  0x9b86  44
  Prefix feee::100:100:1:0/124
  Prefix-options 0x0, Metric 20, Type 2,
  Aging timer 00:56:34
  Installed 00:03:23 ago, expires in 00:56:34, sent 02:37:54 ago
Extern     *0.0.0.1          10.255.4.93      0x80000001     1053 0x59c9  44
  Prefix feee::200:200:1:0/124

```

```

Prefix-options 0x0, Metric 10, Type 2,
Gen timer 00:25:12
Aging timer 00:42:26
Installed 00:17:33 ago, expires in 00:42:27, sent 00:17:31 ago

```

```

OSPF3 Link-Local link state database, interface ge-1/3/0.0
Type      ID          Adv Rtr      Seq          Age  Cksum  Len
Link      *0.0.0.2      10.255.4.93  0x80000003  1059 0x4dab  64
fe80::290:69ff:fe39:1cdb
Options 0x11, priority 128
Prefix-count 1
Prefix feee::10:10:2:0/126 Prefix-options 0x0
Gen timer 00:12:56
Aging timer 00:42:20
Installed 00:17:39 ago, expires in 00:42:21, sent 00:17:37 ago
Link      0.0.0.2      10.255.4.97  0x80000003  205  0xa87d  64
fe80::290:69ff:fe38:883e
Options 0x11, priority 128
Prefix-count 1
Prefix feee::10:10:2:0/126 Prefix-options 0x0
Aging timer 00:56:35
Installed 00:03:22 ago, expires in 00:56:35, sent 02:37:54 ago

```

```

OSPF3 Link-Local link state database, interface so-2/2/0.0
Type      ID          Adv Rtr      Seq          Age  Cksum  Len
Link      0.0.0.2      10.255.4.85  0x80000002  506  0x42bb  64
fe80::280:42ff:fe10:f169
Options 0x13, priority 128
Prefix-count 1
Prefix feee::10:10:1:0/126 Prefix-options 0x0
Aging timer 00:51:34
Installed 00:08:23 ago, expires in 00:51:34, sent 02:37:54 ago
Link      *0.0.0.3      10.255.4.93  0x80000002  505  0x6b7a  64
fe80::280:42ff:fe10:f177
Options 0x13, priority 128
Prefix-count 1
Prefix feee::10:10:1:0/126 Prefix-options 0x0
Gen timer 00:37:28
Aging timer 00:51:35
Installed 00:08:25 ago, expires in 00:51:35, sent 00:08:23 ago
Ours

```

### show ospf3 database summary

```

user@host> show ospf3 database summary
Area 0.0.0.0:
  2 Router LSAs
  1 InterArPfx LSAs
  1 InterArRtr LSAs
  1 IntraArPfx LSAs
Area 0.0.0.1:
  2 Router LSAs
  1 Network LSAs
  2 InterArPfx LSAs
  1 NSSA LSAs
  1 IntraArPfx LSAs
Externals:
  2 Extern LSAs
Interface ge-1/3/0.0:
  1 Link LSAs
Interface lo0.0:

```

Interface so-2/2/0.0:  
1 Link LSAs

