



Junos[®] OS for EX Series Ethernet Switches

OSPF for EX9200 Switches

Release
12.3



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Junos® OS for EX Series Ethernet Switches OSPF for EX9200 Switches

Release 12.3

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Documentation and Release Notes

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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

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

- EX Series

Using the Examples in This Manual

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

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

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

Merging a Full Example

To merge a full example, follow these steps:

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

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

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

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

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

Merging a Snippet

To merge a snippet, follow these steps:

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

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

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

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


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

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

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

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

Documentation Conventions

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

Table 1: Notice Icons

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

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

Table 2: Text and Syntax Conventions

Convention	Description	Examples
Bold text like this	Represents text that you type.	To enter configuration mode, type the configure command: user@host> configure
Fixed-width text like this	Represents output that appears on the terminal screen.	user@host> show chassis alarms No alarms currently active

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

Convention	Description	Examples
<i>Italic text like this</i>	<ul style="list-style-type: none"> Introduces or emphasizes important new terms. Identifies book names. Identifies RFC and Internet draft titles. 	<ul style="list-style-type: none"> A policy <i>term</i> is a named structure that defines match conditions and actions. <i>Junos OS System Basics Configuration Guide</i> RFC 1997, <i>BGP Communities Attribute</i>
<i>Italic text like this</i>	Represents variables (options for which you substitute a value) in commands or configuration statements.	Configure the machine's domain name: [edit] root@# set system domain-name <i>domain-name</i>
Text like this	Represents names of configuration statements, commands, files, and directories; configuration hierarchy levels; or labels on routing platform components.	<ul style="list-style-type: none"> To configure a stub area, include the stub statement at the [edit protocols ospf area area-id] hierarchy level. The console port is labeled CONSOLE.
< > (angle brackets)	Enclose optional keywords or variables.	stub <default-metric <i>metric</i> >;
(pipe symbol)	Indicates a choice between the mutually exclusive keywords or variables on either side of the symbol. The set of choices is often enclosed in parentheses for clarity.	broadcast multicast (<i>string1</i> <i>string2</i> <i>string3</i>)
# (pound sign)	Indicates a comment specified on the same line as the configuration statement to which it applies.	rsvp { # Required for dynamic MPLS only
[] (square brackets)	Enclose a variable for which you can substitute one or more values.	community name members [<i>community-ids</i>]
Indentation and braces ({ })	Identify a level in the configuration hierarchy.	[edit] routing-options { static { route default { nexthop <i>address</i> ; retain; } } }
;(semicolon)	Identifies a leaf statement at a configuration hierarchy level.	
J-Web GUI Conventions		
Bold text like this	Represents J-Web graphical user interface (GUI) items you click or select.	<ul style="list-style-type: none"> In the Logical Interfaces box, select All Interfaces. To cancel the configuration, click Cancel.
> (bold right angle bracket)	Separates levels in a hierarchy of J-Web selections.	In the configuration editor hierarchy, select Protocols>Ospf .

Documentation Feedback

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

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

Requesting Technical Support

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

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

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- Find product documentation: <http://www.juniper.net/techpubs/>
- Find solutions and answer questions using our Knowledge Base: <http://kb.juniper.net/>
- Download the latest versions of software and review release notes: <http://www.juniper.net/customers/csc/software/>
- Search technical bulletins for relevant hardware and software notifications: <https://www.juniper.net/alerts/>

- Join and participate in the Juniper Networks Community Forum:
<http://www.juniper.net/company/communities/>
- Open a case online in the CSC Case Management tool: <http://www.juniper.net/cm/>

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

Opening a Case with JTAC

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

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

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

PART 1

Overview

- [Feature Support on page 3](#)

CHAPTER 1

Feature Support

- [EX Series Switch Software Features Overview on page 3](#)

EX Series Switch Software Features Overview

This topic lists the Juniper Networks EX Series Ethernet Switches software features, the Juniper Networks Junos operating system (Junos OS) release in which they were introduced, and the first Junos OS release for each switch.



NOTE: For Virtual Chassis features, see [EX Series Virtual Chassis Software Features Overview](#).

- [Table 3 on page 4](#)—First Junos OS Release for Each EX Series Switch
- [Table 4 on page 5](#)—Access Control Features
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- [Table 35 on page 43](#)—VPN Features on EX9200 Switches

The Junos OS release for software features on a switch cannot be earlier than the first Junos OS release for that switch.

Table 3: First Junos OS Release for Each EX Series Switch

Switch	Junos OS Release
EX2200 switches*	Junos OS Release 10.1R1 *EX2200-C models: Junos OS Release 11.3R1
EX3200 switches	Junos OS Release 9.0R1
EX3300 switches	Junos OS Release 11.3R1
EX4200 switches	Junos OS Release 9.0R1
EX4500 switches*	Junos OS Release 10.2R1* *EX4500-C models: Junos OS Release 10.3R2
EX4550 switches	Junos OS Release 12.2R1
EX6200 switch	Junos OS Release 11.3R2
EX8208 switches	Junos OS Release 9.4R1
EX8216 switches	Junos OS Release 9.5R1

Table 3: First Junos OS Release for Each EX Series Switch (*continued*)

Switch	Junos OS Release
EX9200 switches	Junos OS Release 12.3R2

Table 4: Access Control Features on Switches by Junos OS Release

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
802.1X authentication (port-based, multiple supplicant)	10.1R1	9.0R2	11.3R1	12.1R1	12.2R1	11.3R2	10.2R1	Not supported
802.1X authentication with authentication bypass	10.1R1	9.0R2	11.3R1	12.1R1	12.2R1	11.3R2	10.2R1	Not supported
802.1X authentication with VLAN assignment, VoIP VLAN support	10.1R1	9.0R1	11.3R1	12.1R1	12.2R1	11.3R2	10.3R1	Not supported
802.1X user-based dynamic firewall filters	10.1R1	9.0R2	11.3R1	12.1R1	12.2R1	11.3R2	10.3R1	Not supported
802.1X user-based dynamic firewall filters on multiple-suppliant ports	10.1R1	9.5R2	11.3R1	12.1R1	12.2R1	11.3R2	10.3R1	Not supported
802.1X per-user statistics	10.1R1	9.2R1	11.3R1	12.1R1	12.2R1	11.3R1	10.3R1	Not supported
Authentication fallback	11.3R1	10.3R1	12.3R1	12.1R1	12.2R1	11.3R2	Not supported	Not supported
Captive portal authentication for Layer 3 interfaces	11.3R1	10.1R1	Not supported	12.1R1	12.2R1	Not supported	Not supported	Not supported
Captive portal authentication for Layer 2 interfaces	11.3R1	10.3R1	12.3R1	12.1R1	12.2R1	11.3R2	Not supported	Not supported
Energy Efficient Ethernet (EEE)	12.2R1 (EX2200 -C models only)	Not supported	12.2R1	Not supported	Not supported	12.2R1	12.2R1	Not supported

Table 4: Access Control Features on Switches by Junos OS Release (*continued*)

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
Infranet Controller (IC) as an external captive-portal server	12.2R1	12.2R1	12.2R1	12.2R1	12.2R1	Not supported	Not supported	Not supported
MAC RADIUS authentication	10.1R1	9.3R2	11.3R1	10.2R1	12.2R1	11.3R2	10.3R1	Not supported
NetBIOS snooping	11.3R5	11.1R1	11.3R5	Not supported	Not supported	11.3R5	11.1R1	Not supported
Server fail fallback	10.1R1	9.3R2	11.3R1	10.2R1	12.2R1	Not supported	10.2R1	Not supported
TACACS+	10.1R1	9.0R2	11.3R1	10.2R1	12.2R1	11.3R2	9.4R1	12.3R2

Table 5: Administration Features on Switches by Junos OS Release

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
System logging (syslog) over IPv4	10.1R1	9.0R2	11.3R1	10.2R1	12.2R1	Not supported	9.4R1	12.3R2
System logging (syslog) over IPv6	10.3R1	9.3R2	11.3R1	10.4R1	12.2R1	11.3R2	10.1R1	12.3R2
System snapshot	Not supported	10.0R1	Not supported	10.2R1	12.2R1	Not supported	10.0R1	12.3R2

Table 6: Class-of-Service (CoS) Features on Switches by Junos OS Release

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
Class of service (CoS)—Class-based queuing with prioritization, Layer 2 and Layer 3 classification, rewrite, and queuing; strict priority queuing on egress	10.1R1	9.0R2	11.3R1	10.2R1	12.2R1	11.3R2	9.4R1	See Table 7 on page 8 for a list of EX9200 CoS features
CoS—DSCP, IEEE 802.1p, and IP precedence packet rewrites on routed VLAN interfaces (RVIs)	Not supported	9.5R1	11.3R1	10.2R1	12.2R1	11.3R2	9.4R1	
CoS—Interface-specific classifiers on routed VLAN interfaces (RVIs)	Not supported	9.4R1	11.3R1	11.3R1	12.2R1	Not supported	10.2R1	
CoS—Multidestination	—	—	—	—	—	Not supported	9.5R1	
CoS—Per-interface classification	Not supported	9.3R1	11.3R1	10.2R1	12.2R1	11.3R2	10.2R1	
CoS support on link aggregation groups (LAGs)	10.1R1	9.2R1	11.3R1	10.2R1	12.2R1	Not supported	9.4R1	
CoS support on routed VLAN interfaces (RVIs)	10.3R1	9.4R1	11.3R1	10.4R1	12.2R1	Not supported	9.4R1	
DSCP setting on ingress interface	Not supported	Not supported	Not supported	Not supported	Not supported	Not supported	12.3R1	
Flexible CoS—outer 802.1p marking	Not supported	9.6R1	12.3R1	12.1R1	12.2R1	Not supported	Not supported	
Interface-specific CoS rewrite rules	10.3R1	9.4R1	Not supported	11.2R1	12.2R1	Not supported	10.2R1	
Junos EZQoS for CoS	10.1R1	9.3R2	11.3R1	10.2R1	12.2R1	11.3R2	9.4R1	
Port shaping and queue shaping	10.1R1	9.3R2	11.3R1	10.2R1	12.2R1	11.3R2	10.1R1	

Table 6: Class-of-Service (CoS) Features on Switches by Junos OS Release (*continued*)

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
Re-marking of bridged packets	11.2R1	9.4R1	Not supported	10.2R1	12.2R1	11.3R2	10.2R1	
Shaped-deficit weighted round-robin (SDWRR)	10.1R1	9.0R2	11.3R1	10.2R1	12.2R1	11.3R2	9.4R1	
Single-rate two-color marking	10.1R1	9.0R2	11.3R1	10.2R1	12.2R1	11.3R2	9.4R1	

Table 7: Class-of-Service (CoS) Features on EX9200 Switches by Junos OS Release

Feature	Junos OS Release
Assigning forwarding class and DSCP value for Routing Engine generated traffic	12.3R2
BA classification for VPLS based on IEEE 802.1p bits	12.3R2
Classification—Associate packets with CoS servicing levels. Types of classification: <ul style="list-style-type: none"> • Behavior aggregate (BA)—Operates on packets as they enter the switch • Multifield classification—Examines multiple fields in packets. • Fixed classification—Associate a forwarding class with a packet regardless of packet contents. 	12.3R2
Classification and DSCP marking of distributed protocol handler traffic	12.3R2
Classification of control-plane traffic	12.3R2
CoS classification and rewrite for IRB and Layer 2 interfaces and for other Layer 3 interfaces. Port-level queuing, scheduling, and shaping are supported.	12.3R2
Egress GRE classification based on DSCP	12.3R2
IEEE 802.1p inheritance push and swap from transparent tags configuration	12.3R2
Elevated packet drops during oversubscription	12.3R2
Layer 2 policers for the ingress and egress interfaces. Policer types: <ul style="list-style-type: none"> • Single-rate two-color • Single-rate three-color (color-blind and color-aware) • Two-rate three-color (color-blind and color-aware) 	12.3R2
Independent values for DSCP and EXP bits	12.3R2
Apply CoS schedulers on ingress interfaces	12.3R2

Table 7: Class-of-Service (CoS) Features on EX9200 Switches by Junos OS Release (*continued*)

Feature	Junos OS Release
Ingress DSCP bits for multicast traffic over Layer 3 VPNs	12.3R2
Layer 2 traffic policing	12.3R2
Policer support for aggregated Ethernet bundles (link aggregation groups, or LAGs)	12.3R2
Queuing support for logical tunnel interfaces	12.3R2
Rate-limit and excess rate or excess priority option	12.3R2
Re-marking of MVPN GRE encapsulation DCSP at ASBR	12.3R2
Scheduling	12.3R2
Set IPv6 DSCP and MPLS EXP independently	
Set IPv6 DiffServ code point (DSCP) and MPLS EXP independently	12.3R2
Support for Layer 2 policers at the VLAN level	12.3R2
Support for applying a transmit rate limit to logical interfaces on Type 1, 2, or 3 Multiservices PICs	12.3R2
Support for configuring ToS rewrite rules so that DCSP bits of GRE packets are consistent with service providers' CoS policy	12.3R2
Support for copying the TOS bits to the outer IP header on GRE tunnel traffic sent by the Routing Engine	12.3R2
Support for setting the forwarding class and DSCP value for traffic generated by the Routing Engine	12.3R2
Unified command to display all CoS statistics	12.3R2

Table 8: Converged Networks (LAN and SAN) Features on Switches by Junos OS Release

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
Data Center Bridging Capability Exchange protocol (DCBX)	Not supported	Not supported	Not supported	11.3R1	12.2R1	Not supported	Not supported	Not supported
DCBX application protocol TLV exchange	Not supported	Not supported	Not supported	12.1R1	12.2R1	Not supported	Not supported	Not supported

NOTE: The EX4500 switch models that support Fibre Channel over Ethernet features must be Converged Enhanced Ethernet (CEE) capable. The CEE-capable EX4500 switch models have a “-C” in the hardware model number. See EX4500 Switch Models.

Table 8: Converged Networks (LAN and SAN) Features on Switches by Junos OS Release (*continued*)

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
FIP snooping	Not supported	Not supported	Not supported	10.4R1	12.2R1	Not supported	Not supported	Not supported
Priority-based flow control (PFC)	Not supported	Not supported	Not supported	10.4R1	12.2R1	Not supported	Not supported	Not supported

Table 9: Device Security Features on Switches by Junos OS Release

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
Automatic recovery for port error disable conditions	10.1R1	9.6R1	11.3R1	10.2R1	12.2R1	11.3R2	10.0R1	Not supported
Storm control (broadcast and unicast)	10.1R1	9.1R1	11.3R1	10.2R1	12.2R1	11.3R2	9.4R1	Not supported
Storm control (multicast)	10.3R2	10.3R2	Not supported	10.3R2	12.2R1	11.3R2	10.3R2	Not supported
Unknown Layer 2 unicast forwarding	10.1R1	9.3R2	11.3R1	10.2R1	12.2R1	Not supported	10.0R1	12.3R2

Table 10: High Availability and Resiliency Features on Switches by Junos OS Release

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
NOTE: For complete lists of Virtual Chassis features, see EX Series Virtual Chassis Software Features Overview.								See Table 11 on page 13 for a list of EX9200 HA features.
Graceful protocol restart for BGP	–	9.0R2	Not supported	–	–	11.3R2	9.4R1	
Graceful protocol restart for IS-IS	–	9.3R2	Not supported	–	–	11.3R2	9.4R1	
Graceful protocol restart for OSPF	–	9.0R2	Not supported	–	–	11.3R2	9.4R1	
Graceful protocol restart for RSVP and LDP	Not supported	Not supported	Not supported	Not supported	Not supported	Not supported	12.3R1	
GRES for ARP entries, forwarding database, and Layer 3 protocols	–	9.2R1 (Virtual Chassis only)	11.3R1	11.2R1 (Virtual Chassis only)	12.2R1 (Virtual Chassis only)	11.3R2	9.4R1	
GRES for IGMP snooping	–	11.3R1 (Virtual Chassis only)	12.1R1 (Virtual Chassis only)	11.4R1 (Virtual Chassis only)	12.2R1 (Virtual Chassis only)	Not supported	11.3R1	
GRES for LACP	Not supported	11.3R1	Not supported	11.3R1	12.2R1	Not supported	11.3R1	
GRES for Layer 2 and Layer 3 VPN LSPs	Not supported	Not supported	Not supported	Not supported	Not supported	Not supported	12.3R1	
GRES for port security (DHCP snooping, DAI, and IP source guard)	–	9.2R1 (Virtual Chassis only)	Not supported	–	–	11.3R2	9.6R1	
LACP support for dual-homing applications in data centers	10.1R1	10.0R1	Not supported	10.2R1	12.2R1	Not supported	10.0R1	
Link Aggregation Control Protocol (LACP)	10.1R1	9.0R2	11.3R1	10.2R1	12.2R1	11.3R2	9.4R1	
Link aggregation groups (LAGs)	10.1R1	9.0R2	11.3R1	10.2R1	12.2R1	11.3R2	9.4R1	
	–					11.3R2	11.1R1	

Table 10: High Availability and Resiliency Features on Switches by Junos OS Release (*continued*)

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
Nonstop active routing (NSR) for BGP, IS-IS, IGMP with BFD, and RIP		11.1R1 (Virtual Chassis only)	12.1R1 (Virtual Chassis only)	11.3R1 (Virtual Chassis only)	12.2R1 (Virtual Chassis only)			
Nonstop active routing (NSR) for IPv6 IS-IS, RIPng, and OSPFv3 with BFD	–	12.2R1 (Virtual Chassis only)	12.2R1 (Virtual Chassis only)	12.2R1 (Virtual Chassis only)	12.2R1 (Virtual Chassis only)	Not supported	11.2R1	
Nonstop active routing (NSR) for OSPFv2	–	11.1R1	12.1R1 (Virtual Chassis only)	11.2R1 (Virtual Chassis only)	12.2R1 (Virtual Chassis only)	11.3R2	10.4R1	
Nonstop active routing (NSR) for Protocol Independent Multicast (PIM)	Not supported	12.2R1 (Virtual Chassis only)	12.2R1 (Virtual Chassis only)	12.2R1 (Virtual Chassis only)	12.2R1 (Virtual Chassis only)	Not supported	11.4R2	
Nonstop active routing (NSR) for RSVP and LDP	Not supported	Not supported	Not supported	Not supported	Not supported	Not supported	12.3R1	
Nonstop bridging (NSB) for LAGs and LACP	–	11.4R1 (Virtual Chassis only)	12.2R1 (Virtual Chassis only)	11.4R1 (Virtual Chassis only)	12.2R1 (Virtual Chassis only)	12.1R1	11.3R1	
Nonstop bridging (NSB) for LLDP and LLDP-MED	–	11.3R1 (Virtual Chassis only)	12.2R1 (Virtual Chassis only)	Not supported	Not supported	Not supported	11.3R1	
Nonstop bridging (NSB) for spanning-tree protocols	–	11.3R1 (Virtual Chassis only)	12.2R1 (Virtual Chassis only)	12.1R1 (Virtual Chassis only)	12.2R1 (Virtual Chassis only)	12.1R1	11.3R1	
Nonstop software upgrade (NSSU)	–	12.1R1 (Virtual Chassis only)	12.2R1 (Virtual Chassis only)	12.1R1 (Virtual Chassis only)	12.1R1 (Virtual Chassis only)	12.2R1	10.4R1	
Power budget management	–	–	Not supported	–	–	11.3R2	10.2R1	
	Not supported	Not supported	Not supported	Not supported	Not supported	Not supported	11.4R1	

Table 10: High Availability and Resiliency Features on Switches by Junos OS Release (*continued*)

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
Virtual Router—Network Time Protocol (NTP), system logging, Simple Network Management Protocol (SNMP), RADIUS, and TACACS support in a virtual router								
Virtual Router Redundancy Protocol (VRRP)	12.3R1	9.0R2	12.1R1	10.2R1	12.2R1	11.3R2	9.4R1	
Virtual Router Redundancy Protocol (VRRP)—Support for multiple VRRP owners per physical interface	12.3R1	12.3R1	12.3R1	12.3R1	12.3R1	Not supported	12.3R1	
Virtual Router Redundancy Protocol (VRRP) for IPv6 (except authentication type and authentication key)	Not supported	10.2R1	12.3R1	11.2R1	12.2R1	12.1R1	10.1R1	

Table 11: High Availability and Resiliency Features on EX9200 Switches by Junos OS Release

Feature	Junos OS Release
Graceful Routing Engine switchover (GRES)	12.3R2
Nonstop active routing (NSR) support for Protocol Independent Multicast (PIM) for IPv4 and IPv6	12.3R2
Nonstop active routing (NSR) support for VPLS and for LDP-based VPLS	12.3R2
Nonstop active routing (NSR) support for LDP OAM features	12.3R2
Nonstop active routing (NSR) support for Layer 2 VPNs	12.3R2
Virtual Router Redundancy Protocol version 3 (VRRPv3)	12.3R2

Table 12: Interfaces Features on Switches by Junos OS Release

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
Digital optical monitoring (DOM)	Not supported	10.0R1	11.3R1	Not supported	Not supported	Not supported	10.0R1	See Table 13 on page 15 for a list of EX9200 interfaces features.
Interface ranges	10.1R1	10.0R1	11.3R1	10.2R	12.2R1	11.3R2	10.1R1	
IPv4 over generic routing encapsulation (GRE) tunnels—encapsulation support	Not supported	12.1R1	Not supported	Not supported	Not supported	Not supported	12.1R1	
IPv4 over generic routing encapsulation (GRE) tunnels—decapsulation support	Not supported	12.1R1	Not supported	Not supported	Not supported	Not supported	12.3R1	
IPv6 over generic routing encapsulation (GRE) tunnels using IPv4 transport—encapsulation support	Not supported	12.1R1	Not supported	Not supported	Not supported	Not supported	12.1R1	
IPv6 over generic routing encapsulation (GRE) tunnels using IPv4 transport—decapsulation support	Not supported	12.1R1	Not supported	Not supported	Not supported	Not supported	Not supported	
IP directed broadcast	Not supported	9.4R1	12.3R1	10.2R1	12.2R1	11.3R2	9.4R1	
Time domain reflectometry (TDR)	10.1R1	9.0R2	11.3R1	Not supported	Not supported	11.3R2	9.4R1	
Unicast reverse-path forwarding (RPF)	Not supported	9.3R2	12.3R1	11.2R1	12.2R1	11.3R2	10.1R1	
VLAN-tagged Layer 3 subinterfaces	Not supported	9.2R1	Not supported	11.2R1	12.2R1	11.3R2	9.4R1	

Table 13: Interfaces Features on EX9200 Switches by Junos OS Release

Feature	Junos OS Release
ICMP redirect	12.3R2
Clear MAC address information	12.3R2
IPv6 subnet support on loopback interfaces	12.3R2
IPv6 support for unnumbered Ethernet interfaces	12.3R2
Multichassis link aggregation (MC-LAG)	12.3R2
Nonstop active routing (NSR) support for Bidirectional Forwarding Detection (BFD)	12.3R2
Protection against distributed denial-of-service (DDOS) attacks	12.3R2
Software support for IPv4 to IPv6 transition	12.3R2
Static mapping for port forwarding	12.3R2
Support for active monitoring on logical systems	12.3R2
Support for VRF in Routing Engine-based sampling	12.3R2
Support for integrated routing and bridging (IRB) MAC synchronization in MC-LAG for aggregated Ethernet	12.3R2
Targeted broadcast for virtual routing and forwarding (VRF) instances	12.3R2
Trunk interface enhancements: <ul style="list-style-type: none"> • Configure a single logical trunk interface to support a list of VLANs or to accept packets with no VLAN tag. • Configure multiple logical trunk interfaces on a single physical interface. 	12.3R2
Unicast reverse-path forwarding (RPF) loose mode, with ability to discard packets with source addresses pointing to the discard interface	12.3R2
Unnumbered Ethernet—Configure IPv4 processing on interfaces without assigning explicit IP addresses to the interfaces.	12.3R2
VLAN rewrite operations on incoming and outgoing frames	12.3R2

Table 14: IP Address Management Features on Switches by Junos OS Release

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
DHCP server and relay with option 82 for Layer 2 VLANs	10.1R1	9.3R2	11.3R1	10.2R1	12.2R1	11.3R2	9.4R1	See Table 15 on page 16 for a list of EX9200 IP address management features.
DHCP server and relay with option 82 for Layer 3 interfaces	10.1R1	9.0R1	11.3R1	10.2R1	12.2R1	11.3R2	9.4R1	
DNS for IPv6	Not supported	9.3R2	Not supported	Not supported	Not supported	Not supported	Not supported	
Local DHCP server	10.1R1	9.3R2	11.3R1	12.1R1	12.2R1	11.3R2	9.4R1	
Virtual router aware DHCP (VR-aware DHCP)	Not supported	12.1R1	Not supported	Not supported	Not supported	Not supported	12.1R1	
Virtual router aware DHCPv6 (VR-aware DHCPv6)	Not supported	Not supported	Not supported	12.3R1	12.3R1	12.3R1	Not supported	
Static addresses	10.1R1	9.0R2	11.3R1	10.2R1	12.2R1	Not supported	9.4R1	

Table 15: IP Address Management Features on EX9200 Switches by Junos OS Release

Feature	Junos OS Release
DHCP server and relay	12.3R2
DHCPv6 local server	12.3R2
DHCPv6 support	12.3R2
Distinguishing DHCP duplicate clients by subinterface	12.3R2
Dynamic reconfiguration of extended DHCP and DHCPv6 local server clients	12.3R2
Dynamic IPv6 filters	12.3R2
Expression support for dynamic profiles	12.3R2
Extended DHCP relay proxy	12.3R2
Optional disabling of automatic ARP table population	12.3R2

Table 15: IP Address Management Features on EX9200 Switches by Junos OS Release (*continued*)

Feature	Junos OS Release
IPv6 address assignment pools	12.3R2
Overriding DHCP settings on specific interfaces	12.3R2
Per-interface DHCP tracing operations	12.3R2
S-VLAN-based shaping for dynamic profiles	12.3R2
Sending a DHCP relay and relay proxy release message	12.3R2
Specifying the DHCP source address used for IP packets	12.3R2
Support for MAC address validation	12.3R2
Support for address pool threshold traps	12.3R2
Address assignment pools	12.3R2
Per-interface DHCP lease limits	12.3R2

Table 16: IPv6 Features on Switches by Junos OS Release

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
NOTE: A separate software license is required for IPv6. See Understanding Software Licenses for EX Series Switches.								
Application identification (APPID) for IPv6 packets	Not supported	Not supported	Not supported	Not supported	Not supported	Not supported	Not supported	12.3R2
BFD for IPv6	Not supported	12.3R1	Not supported	12.3R1	12.3R1	Not supported	12.3R1	12.3R2 (also for static routes)
BGP for IPv6	Not supported	9.4R1	12.3R1	11.1R1	12.2R1	12.1R1	10.1R1	12.3R2
IPv6 CoS (multifield classification and rewrite)	Not supported	10.2R1	12.3R1	12.1R1	12.2R1	12.1R1	10.4R1	12.3R2
IPv6 management	10.3R1	9.3R2	11.3R1	10.4R1	12.2R1	Not supported	10.1R1	12.3R2

Table 16: IPv6 Features on Switches by Junos OS Release (*continued*)

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
IPv6 multicast protocols (PIM, MLDv1/v2)	Not supported	10.1R1	12.3R1	11.2R1	12.2R1	12.1R1	10.2R1	12.3R2
IPv6 neighbor redirect compliance with RFC 4861	12.3R1	12.3R1	12.3R1	12.3R1	12.3R1	12.3R1	12.3R1	12.3R2
IPv6 path MTU discovery	10.3R1	9.3R1	12.3R1	10.4R1	12.2R1	Not supported	10.2R1	12.3R2
IS-IS for IPv6	Not supported	9.4R1	Not supported	11.2R1	12.2R1	12.1R1	10.1R1	12.3R2
MBGP for IPv6	Not supported	9.3R1	12.3R1	Not supported	Not supported	12.1R1	10.1R1	12.3R2
OSPFv3	Not supported	9.3R1	12.3R1	11.1R1	12.2R1	12.1R1	10.1R1	12.3R2
RFC 4291 Compliance	12.3R1	12.3R1	12.3R1	12.3R1	12.3R1	12.3R1	12.3R1	12.3R2
RIPng	Not supported	9.3R1	12.3R1	11.1R1	12.2R1	12.1R1	10.1R1	12.3R2
VRRPv3 (RFC 5798 Compliance, ability to send SNMP traps)	Not supported	12.3R1	Not supported	12.3R1	12.3R1	Not supported	12.3R1	12.3R2

Table 17: Layer 2 Network Protocols Features on Switches by Junos OS Release

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
802.1Q VLAN tagging	10.1R1	9.0R2	11.3R1	10.2R1	12.2R1	11.3R2	9.4R1	12.3R2
Edge virtual bridging (EVB) support with virtual Ethernet port aggregator (VEPA)	Not supported	Not supported	Not supported	12.1R1	12.2R1	Not supported	12.1R1	Not supported
Ethernet ring protection switching (ERPS, G.8032/Y.1344)	12.1R1	12.1R1	12.3R1	12.3R1	12.3R1	Not supported	12.3R1	12.3R2

Table 17: Layer 2 Network Protocols Features on Switches by Junos OS Release (*continued*)

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
Layer 2 protocol tunneling (L2PT)	11.1R1	10.0R1	12.3R1	11.2R1	12.2R1	12.1R1	Not supported	12.3R2
Link Layer Discovery Protocol (LLDP)	10.1R1	9.0R2	11.3R1	10.2R1	12.2R1	11.3R2	9.4R1	12.3R2
Link Layer Discovery Protocol—Media Endpoint Discovery (LLDP-MED) with voice over IP (VoIP) integration	10.1R1	9.0R2	11.3R1	Not supported	Not supported	Not supported	Not supported	Not supported
MAC-based VLANs	10.1R1	9.0R2	11.3R1	10.2R1	12.2R1	11.3R2	9.4R1	12.3R2
Multiple VLAN Registration Protocol (MVRP, IEEE 802.1ak)	11.3R1	10.0R1	12.3R1	11.2R1	12.2R1	12.1R1	10.0R1	12.3R2
Private VLANs (PVLANS)	11.1R1	9.3R2	12.1R1	11.2R1	12.2R1	11.3R2	10.1R1	Not supported
Private VLANs (PVLANS) support across switches	11.1R1	10.4R1	12.1R1	11.2R1	12.2R1	11.3R2	11.2R1	Not supported
Proxy ARP—Restricted	10.1R1	10.0R1	11.3R1	10.2R1	12.2R1	Not supported	10.0R1	12.3R2
Proxy ARP—Unrestricted	10.1R1	9.6R1	11.3R1	10.2R1	12.2R1	12.1R1	10.0R1	12.3R2
Proxy ARP per VLAN	10.1R1	10.1R1	Not supported	10.2R1	12.2R1	Not supported	10.1R1	
Q-in-Q tunneling	11.1R1	9.3R2	11.4R1	11.2R1	12.2R1	12.1R1	11.1R1	12.3R2
Q-in-Q VLAN extended support for multiple S-VLANs per access interface, firewall-filter-based VLAN assignment, and routed VLAN interfaces (RVIs)	Not supported	9.6R1	12.3R1	11.2R1	12.2R1	12.1R1	11.1R1	12.3R2

Table 17: Layer 2 Network Protocols Features on Switches by Junos OS Release (*continued*)

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
Redundant trunk groups	10.1R1	9.0R2	11.3R1	11.2R1	12.2R1	11.3R2	9.4R1	Not supported
Routed VLAN interfaces (RVIs)—Also known as integrated routing and bridging (IRB) interfaces	10.1R1	9.0R2	11.3R1	10.2R1	12.2R1	11.3R2	9.4R1	12.3R2
VLAN ID translation	11.1R1	10.0R1	Not supported	11.2R1	12.2R1	Not supported	11.1R1	
VLAN ranges	10.1R1	9.2R1	11.3R1	10.2R1	12.2R1	11.3R2	9.4R1	12.3R2

Table 18: Layer 2 Networking Features on EX9200 Switches by Junos OS Release

Feature	Junos OS Release
VLANs and virtual switching	12.3R2
DHCP support for integrated routing and bridging (IRB)	12.3R2
MC-LAG support for IGMP snooping in IRB	12.3R2
Hash-key load-balancing support for Layer 3 and Layer 4 fields	12.3R2
IP multicast over Layer 2 trunk port support	12.3R2
Integrated routing and bridging (IRB)	12.3R2
Layer 2 Ethernet OAM: <ul style="list-style-type: none"> Distributed periodic packet management process (ppmd) for improved scaling Graceful Routing Engine switchover (GRES) Remote defect indication (RDI) Configuration of action profiles 	12.3R2
Layer 2 address learning in logical systems	12.3R2
Layer 2 forwarding support for bridging and VPLS	12.3R2
Layer 2 policer statistics MIB	12.3R2
Firewall filter match conditions for Layer 2 bridging and VPLS	12.3R2
Next-hop groups using either IP addresses or Layer 2 addresses for the next hop	12.3R2

Table 18: Layer 2 Networking Features on EX9200 Switches by Junos OS Release (*continued*)

Feature	Junos OS Release
Unicast reverse-path forwarding (RPF) loose mode, with ability to discard packets with source addresses pointing to the discard interface	12.3R2
Spanning-tree protocols support for Layer 2 bridging and VPLS	12.3R2
VLAN rewrite operations on incoming and outgoing frames	12.3R2
STP root guard (root protection)	12.3R2
Support for Layer 2 and Layer 2.5 features: <ul style="list-style-type: none"> Extensive set of Layer 2 label-manipulation capabilities, Q-in-Q support MC-LAG active / standby and MC-LAG active / active xSTP protocol support Integrated Routing and Bridging (IRB) interface support IGMP snooping for multichassis link aggregation group (MC-LAG) interfaces Configurable label block sizes for VPLS Connectivity fault management process flooding to interfaces based on mesh groups Layer 2 address learning in logical systems Virtual switch support, providing virtual Layer 2 switch instances with separate Layer 2 learning domains, isolated 4K VLAN ID spaces, and STP instances Ethernet Ring Protocol (ERP) for multiple ring instances on the same physical ring Transit and bypass static label-switched paths (LSPs) Layer 2 Gigabit Ethernet logical interface policing Static LSP statistics Multiple VLAN Registration Protocol (MVRP)-IEEE 802.1ak-2007 	12.3R2
VPLS root protection topology change-action control	12.3R2

Table 19: Layer 3 Protocols Features on Switches by Junos OS Release

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
Bidirectional Forwarding Detection (BFD)	11.3R1	9.0R2	12.1R1	10.2R1	12.2R1	12.1R1	9.4R1	See Table 20 on page 23 for a list of EX9200 Layer 3 protocols features.
Border Gateway Protocol (BGP)	Not supported	9.0R2	12.1R1	11.1R1	12.2R1	11.3R2	9.4R1	

Table 19: Layer 3 Protocols Features on Switches by Junos OS Release (*continued*)

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
Multiprotocol Border Gateway Protocol (MBGP)	Not supported	9.3R1	12.3R1	11.2R1	12.2R1	12.1R1	9.4R1	
A separate software license is required for BGP and MBGP. See Understanding Software Licenses for EX Series Switches.								
Distributed periodic packet management (PPM) with BFD	Not supported	10.4R1	Not supported	Not supported	Not supported	12.1R1	10.4R1	
Distributed periodic packet management (PPM) with LACP	Not supported	10.2R1	Not supported	11.1R1	12.2R1	11.3R2	10.2R1	
Filter-based forwarding	Not supported	9.4R1	12.3R1	11.2R1	12.2R1	11.3R2	9.6R1	
Filter-based forwarding over IPv6	Not supported	10.1R1	Not supported	Not supported	Not supported	Not supported	10.3R1	
Intermediate System-to-Intermediate System (IS-IS)	Not supported	9.0R2	Not supported	11.1R1	12.2R1	11.3R2	9.4R1	
A separate software license is required for IS-IS. See Understanding Software Licenses for EX Series Switches.								
IPv6 Layer 3 multicast protocols	Not supported	10.1R1	Not supported	Not supported	Not supported	Not supported	10.2R1	
Jumbo frames on routed VLAN interfaces (RVIs)	Not supported	9.4R1	11.3R1	10.2R1	12.2R1	Not supported	9.4R1	
OSPF Multitopology Routing (MT-OSPF)	Not supported	9.5R1	Not supported	Not supported	Not supported	Not supported	Not supported	
See the <i>Junos OS Routing Protocols Configuration Guide</i> .								
OSPFv2	11.1R1	9.0R2	11.4R1	10.2R1	12.2R1	11.3R2	9.4R1	
OSPFv3 IPsec support	Not supported	10.3R1	Not supported	Not supported	Not supported	Not supported	Not supported	

Table 19: Layer 3 Protocols Features on Switches by Junos OS Release (*continued*)

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
Routing Information Protocol version 1 (RIPv1) and RIPv2	10.1R1	9.0R2	11.3R1	10.2R1	12.2R1	11.3R2	9.4R1	
Static routes	10.1R1	9.0R2	11.3R1	10.2R1	12.2R1	11.3R2	9.4R1	
Virtual routing and forwarding (VRF) with IPv4—Virtual routing instances	12.3R1	9.2R1	12.3R1	11.1R1	12.2R1	11.3R2	9.6R1	
VRF with IPv4—Virtual routing instances for PIM and IGMP	Not supported	10.0R1	Not supported	11.1R1	12.2R1	11.3R2	10.0R1	
VRF with IPv4—Virtual routing instances for IGMP snooping	Not supported	11.4R1	Not supported	12.1R1	12.2R1	Not supported	11.3R1	
VRF with IPv6—Virtual routing instances for multicast traffic	Not supported	10.1R1	Not supported	Not supported	Not supported	Not supported	10.1R1	
VRF with IPv6—Virtual routing instances for unicast traffic	Not supported	10.1R1	12.3R1	Not supported	Not supported	Not supported	10.1R1	

Table 20: Layer 3 Protocols Features on EX9200 Switches by Junos OS Release

Feature	Junos OS Release
Accumulated IGP attribute for BGP	12.3R2
Advertisement of the best external BGP path to internal peers	12.3R2
Alias support for local autonomous system numbers for BGP	12.3R2
BFD liveness detection	12.3R2
BFD protocol support for OSPFv3	12.3R2
BGP remote next-hop support for single-hop EBGP peers	12.3R2
BGP support for 4-byte autonomous system numbers	12.3R2

Table 20: Layer 3 Protocols Features on EX9200 Switches by Junos OS Release (*continued*)

Feature	Junos OS Release
BGP support for MDT-SAFI updates without a route target	12.3R2
Behavior change for BGP-independent autonomous system (AS) domains	12.3R2
Bidirectional Forwarding Detection (BFD) hold-down timer	12.3R2
Distributed periodic packet management support for aggregate interfaces	12.3R2
Egress filtering PIMv4/v6 join messages	12.3R2
For internal BGP (IBGP), advertise multiple paths to a destination	12.3R2
Frequent BGP keepalive messages and short BGP hold time	12.3R2
Hitless authentication key rollover for IS-IS	12.3R2
Hub-and-spoke support for multiprotocol BGP-based multicast VPNs with PIM-SSM GRE S-PMSI transport	12.3R2
IPv4 subnet support on loopback interfaces	12.3R2
IS-IS hold-down timer for subsequent SPF calculations	12.3R2
Keepalive support for GRE interfaces	12.3R2
Multitopology routing (MTR)	12.3R2
Nonstop active routing (NSR) support for the Routing Information Protocol (RIP) and RIP next generation (RIPng)	12.3R2
Nonstop active routing (NSR) support	12.3R2
OSPF graceful restart enhancement	12.3R2
OSPF hold-down timer for subsequent SPF calculations	12.3R2
Only the system log notes failure to add routes	12.3R2
Origin validation for BGP	12.3R2
PIM join suppression support	12.3R2
Priority assignment for prefixes in OSPF import policies	12.3R2
Reduction in flooding of self-originated OSPF LSAs	12.3R2
Support for BFD over multihop static routes	12.3R2

Table 20: Layer 3 Protocols Features on EX9200 Switches by Junos OS Release (*continued*)

Feature	Junos OS Release
Support for BFD on logical switches	12.3R2
Support for IPSec authentication for OSPFv2	12.3R2
Support for OSPF database protection for OSPF and OSPFv3	12.3R2
Support for OSPF export and import policies for network-summary LSAs	12.3R2
Support for alternate loop-free routes for IS-IS and OSPF	12.3R2
Support for clearing the VPN tag	12.3R2
Support for disabling the attribute set messages on independent AS domains for BGP loop detection	12.3R2
Support for disabling traps for passive OSPFv2 interfaces	12.3R2
Support for display of flood next-hop branch overflow condition	12.3R2
Support for dropping and ignoring path attributes during BGP neighbor updates	12.3R2
Support for the algorithm that determines the single best path to skip the step that evaluates an AS path	12.3R2
Support for limiting the number of prefixes accepted from a BGP peer	12.3R2
Support for multiarea adjacency in OSPFv2	12.3R2
Support for multiple address families in OSPFv3	12.3R2
Support for route leaking when the switch is in overload mode	12.3R2
Support for route-filter-based BGP outbound route filtering	12.3R2
Support for the BGP Monitoring Protocol	12.3R2
Support to hold down BGP peering sessions after a nonstop active routing (NSR) switchover Timer to delay MED updates for routes advertised by BGP groups or peers configured with the metric-out igp statement Virtual Router Redundancy Protocol (VRRP)	12.3R2
Timer to delay MED updates for routes advertised by BGP groups or peers configured with the metric-out igp statement	12.3R2
Virtual Router Redundancy Protocol (VRRP)	12.3R2

Table 21: Logical Systems Features on EX9200 Switches by Junos OS Release

Feature	Junos OS Release
A separate software license is required for logical systems. See Understanding Software Licenses for EX Series Switches.	
Layer 2 address learning in logical systems	12.3R2
	12.3R2

Table 22: MPLS Features on Switches by Junos OS Release

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
A separate software license is required for MPLS. See Understanding Software Licenses for EX Series Switches.								
Aggregated Ethernet interfaces (LAGs) on circuit cross-connects (CCCs)	Not supported	Not supported	Not supported	12.2R1	12.2R1	Not supported	11.1R1	See Table 23 on page 28 for a list of EX9200 MPLS features
BFD for an LDP-based LSP	Not supported	Not supported	Not supported	Not supported	Not supported	Not supported	12.2R1	
BFD for an RSVP-based LSP	Not supported	Not supported	Not supported	Not supported	Not supported	Not supported	12.2R1	
CCC between 2 interfaces in the same switch	Not supported	Not supported	Not supported	12.2R1	12.2R1	Not supported	11.1R1	
Interior gateway protocol (IGP) IS-IS and OSPF shortcuts	Not supported	Not supported	Not supported	12.2R1	12.2R1	Not supported	11.1R1	
IP over MPLS	Not supported	10.1R1	Not supported	12.2R1	12.2R1	Not supported	11.1R1	
IPv6 over MPLS label-switched paths (LSPs)	Not supported	Not supported	Not supported	12.2R1	12.2R1	Not supported	12.1R1	
LDP-based MPLS	Not supported	Not supported	Not supported	12.2R1	12.2R1	Not supported	11.1R1	
LDP tunneling (LDP over RSVP)	Not supported	Not supported	Not supported	12.2R1	12.2R1	Not supported	11.1R1	

Table 22: MPLS Features on Switches by Junos OS Release (*continued*)

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
MPLS-based circuit cross-connects (CCC)	Not supported	9.5R1	Not supported	12.2R1	12.2R1	Not supported	11.1R1	
MPLS label-switched router (LSR) support	Not supported	Not supported	Not supported	12.2R1	12.2R1	Not supported	11.1R1	
MPLS Layer 2 CCC on Ethernet-encapsulated interfaces (RFC 6624)	Not supported	9.5R1	Not supported	12.2R1	12.2R1	Not supported	11.1R1	
MPLS Layer 2 CCC on VLAN-encapsulated interfaces (RFC 4905)	Not supported	Not supported	Not supported	12.2R1	12.2R1	Not supported	11.1R1	
MPLS Layer 2 VLAN CCC on Ethernet-encapsulated interfaces (RFC 6624)	Not supported	9.5R1	Not supported	12.2R1	12.2R1	Not supported	11.3R1	
MPLS Layer 2 VLAN CCC on VLAN-encapsulated interfaces (RFC 4905)	Not supported	Not supported	Not supported	12.2R1	12.2R1	Not supported	11.3R1	
MPLS Layer 2 VPN over CCC	Not supported	Not supported	Not supported	12.2R1	12.2R1	Not supported	11.1R1	
MPLS Layer 2 VPN over VLAN CCC	Not supported	Not supported	Not supported	12.2R1	12.2R1	Not supported	11.3R1	
MPLS OAM-LSP ping	Not supported	Not supported	Not supported	Not supported	Not supported	Not supported	11.1R1	
MPLS over untagged Layer 3 interfaces	Not supported	Not supported	Not supported	12.2R1	12.2R1	Not supported	11.1R1	
MPLS with class of service (CoS)	Not supported	Not supported	Not supported	Not supported	Not supported	Not supported	12.1R1	
MPLS Layer 3 VPNs	Not supported	Not supported	Not supported	12.2R1	12.2R1	Not supported	11.1R1	

Table 22: MPLS Features on Switches by Junos OS Release (*continued*)

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
MPLS with RSVP-based label-switched paths (LSPs)	Not supported	9.5R1	Not supported	12.2R1	12.2R1	Not supported	11.1R1	
Layer 3 subinterfaces as MPLS core interfaces	Not supported	Not supported	Not supported	12.2R1 See “Note” on page 28	12.2R1 See “Note” on page 28	Not supported	12.1R1	
Routed VLAN interfaces (RVIs) as MPLS core interfaces	Not supported	Not supported	Not supported	Not supported	Not supported	Not supported	12.1R1	
Path maximum transmission unit (MTU) and unicast reverse-path forwarding (RPF) checks for VPNs	Not supported	Not supported	Not supported	12.2R1	12.2R1	Not supported	11.1R1	
Resource Reservation Protocol—traffic engineering (RSVP-TE)	Not supported	Not supported	Not supported	12.2R1	12.2R1	Not supported	11.1R1	
Standby secondary path protection	Not supported	12.1R1	Not supported	12.2R1	12.2R1	Not supported	11.1R1	
Static label-switched paths (LSPs)	Not supported	Not supported	Not supported	12.2R1	12.2R1	Not supported	12.1R1	



NOTE: For EX4500 and EX4550 switches to support Layer 3 subinterfaces as MPLS core interfaces, the peer switch that the Layer 3 subinterfaces connect to, must be an EX8200 switch.

Table 23: MPLS Features on EX9200 Switches by Junos OS Release

Feature	Junos OS Release
A separate software license is required for MPLS. See Understanding Software Licenses for EX Series Switches.	
Bypass static LSPs	12.3R2

Table 23: MPLS Features on EX9200 Switches by Junos OS Release (*continued*)

Feature	Junos OS Release
LDP LSP action based on a BFD failure event	12.3R2
LDP downstream on demand	12.3R2
LDP, BGP, and VPLS interworking	12.3R2
P2MP LSP traceroute	12.3R2
Static LSP: <ul style="list-style-type: none"> • Revert timer • Statistics • Traceoptions • At the ingress switch • At the transit switch 	12.3R2
Statistics for P2MP LSPs	12.3R2

Table 24: Multicast Features on Switches by Junos OS Release

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
IGMP (Internet Group Management Protocol) version 1 (IGMPv1) and IGMPv2	11.1R1	9.0R2	12.1R1	10.2R1	12.2R1	11.3R2	9.4R1	See Table 25 on page 31 for a list of EX9200 multicast features
IGMP filtering	11.3R1	9.5R1	12.3R1	11.3R1	11.3R1	11.3R1	9.5R1	
IGMP snooping with routed VLAN interfaces (RVIs)	10.1R1	9.2R1	12.1R1	10.2R1	12.2R1	Not supported	9.4R1	
IGMPv3	11.1R1	9.3R2	12.1R1	10.2R1	12.2R1	11.3R2	9.6R1	
IGMPv1 and IGMPv2 snooping	10.1R1	9.1R1	11.3R1	10.2R1	12.2R1	11.3R2	9.4R1	
IGMPv3 snooping	10.1R1	9.6R1	11.3R1	10.2R1	12.2R1	11.3R2	9.6R1	
Multicast Listener Discovery version 1 and 2 (MLDv1 and MLDv2)	Not supported	10.1R1	Not supported	11.2R1	12.2R1	12.1R1	10.2R1	
Multicast Listener Discovery version 1 (MLDv1) snooping (MLDv1 snooping)	12.1R1	12.1R1	12.1R1	12.1R1	12.2R1	12.1R1	12.1R1	
Multicast Listener Discovery version 2 (MLDv2) snooping (MLDv2 snooping)	12.1R1	12.1R1	12.1R1	12.1R1	12.2R1	12.1R1	12.1R1	
Multicast Source Discovery Protocol (MSDP)	Not supported	9.4R1	12.3R1	10.2R1	12.2R1	12.1R1	9.4R1	
See the Junos OS Multicast Protocols Configuration Guide .								
Multicast VLAN registration (MVR)	11.3R1	9.6R1	12.1R1	Not supported	Not supported	Not supported	Not supported	
Protocol Independent Multicast dense mode (PIM DM)	11.1R1	9.2R1	12.1R1	11.2R1	12.2R1	11.3R2	9.4R1	
See the Junos OS Multicast Protocols Configuration Guide .								

Table 24: Multicast Features on Switches by Junos OS Release (*continued*)

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
Protocol Independent Multicast sparse mode (PIM SM)	11.1R1	9.0R2	12.1R1	10.2R1	12.2R1	11.3R2	9.4R1	
See the Junos OS Multicast Protocols Configuration Guide .								
Protocol Independent Multicast source-specific multicast (PIM SSM)	11.1R1	9.3R1	12.1R1	10.2R1	12.2R1	11.3R2	9.4R1	
See the Junos OS Multicast Protocols Configuration Guide .								
Single-source multicast	Not supported	9.0R2	Not supported	Not supported	Not supported	Not supported	9.4R1	

Table 25: Multicast Features on EX9200 Switches by Junos OS Release

Feature	Junos OS Release
BFD for PIM—IPv6	12.3R2
BFD support for ECMP LSPs signaled using LDP	12.3R2
Bidirectional PIM (RFC 5015)	12.3R2
Control of PIM resources for multicast VPNs	12.3R2
Disable PIM for IPv6 only	12.3R2
Dynamic reuse of data multicast distribution tree (MDT) group addresses	12.3R2
Flexible configuration for IGMP or MLD static-join	12.3R2
IGMPv3 and MLDv2 full support	12.3R2
IGMP and MLD enhancements— <ul style="list-style-type: none"> • immediate-leave (IGMP and MLD) • promiscuous-mode (IGMP only) 	12.3R2
IGMP and PIM support for unnumbered interfaces	12.3R2
IGMP join and leave recording for system or for specific interfaces	12.3R2

Table 25: Multicast Features on EX9200 Switches by Junos OS Release (*continued*)

Feature	Junos OS Release
IGMP and MLD source or group access lists and MLD join and leave recording	12.3R2
IGMP and MLD support for dynamic interfaces	12.3R2
Independently configurable loopback addresses for VRF VPNs	12.3R2
Internet multicast using ingress replication provider tunnels	12.3R2
Software support for configuring accept any-source multicast (ASM) join messages (*G) for group addresses	12.3R2
Software support for configuring a provider network to operate in source-specific multicast (SSM) mode	12.3R2
LDP signaling for point-to-multipoint LSPs in next-generation MBGP multicast VPNs	12.3R2
Load-balancing PIM join messages on multicast VPNs	12.3R2
Multicast flow maps	12.3R2
Nonstop active routing (NSR) PIM for Draft-Rosen VPNs	12.3R2
PIM automatic make-before-break (MBB) join load balancing	12.3R2
PIM join load balancing	12.3R2
Source-specific multicast (SSM)-map definition for different groups to different sources	12.3R2
Support for filtering unwanted PIM neighbors	12.3R2
Support for multicast output interface (OIF) mapping	12.3R2
Translation of PIM join/prune messages to IGMP or MLD report/leave messages	12.3R2
Turn off spanning-tree interface state in multicast snooping	12.3R2

Table 26: Network Management and Monitoring Features on Switches by Junos OS Release

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
802.1ag Ethernet OAM connectivity fault management (CFM)	11.2R1	10.2R1	12.3R1	12.2R1	12.2R1	Not supported	11.4R1	See Table 27 on page 34 for a list of EX9200 network management and monitoring features.
Ethernet frame delay measurement (ETH-DM, Y.1731)	Not supported	11.4R1 (EX4200 only)	Not supported	11.4R1	12.2R1	Not supported	11.4R1	
Ethernet OAM link fault management (LFM—also known as Ethernet in the First Mile, EFM)	11.1R1	9.4R1	12.2R1	12.2R1	12.2R1	Not supported	10.0R1	
Port mirroring	10.1R1	9.0R2	11.3R1	10.2R1	12.2R1	11.3R2	9.4R1	
Port mirroring enhancements <ul style="list-style-type: none"> Layer 3 interface support Multiple VLAN support 	Not supported	9.5R1	Not supported	Not supported	Not supported	Not supported	9.5R1	
Port mirroring enhancements <ul style="list-style-type: none"> For remote port mirroring, ingress and egress options on VLAN member interfaces on the intermediate (transit) switch to avoid flooding mirrored traffic to those interfaces 	Not supported	10.0R1	Not supported	Not supported	Not supported	Not supported	Not supported	
Port mirroring support for multiple analyzers per session	Not supported	Not supported	Not supported	11.2R1	12.2R1	Not supported	Not supported	
Real-time performance monitoring (RPM)	10.1R1	9.3R2	12.2R1	10.2R1	12.2R1	12.1R1	10.1R1	
	Not supported	10.3R1	12.2R1	10.2R1	12.2R1	12.1R1	10.3R1	

Table 26: Network Management and Monitoring Features on Switches by Junos OS Release (*continued*)

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
Real-time performance monitoring (RPM)—hardware timestamps with routed VLAN interfaces (RVIs)								
Real-time performance monitoring (RPM)—client and server on same interface	10.3R1	10.3R1	12.2R1	11.1R1	12.2R1	Not supported	10.3R1	
Routing Engine Software Development Kit (SDK)	Not supported	12.2R1	12.2R1 (EX4200 only)	12.2R1	12.2R1	Not supported	12.2R1	
RMON	10.1R1	9.0R2	11.3R1	10.2R1	12.2R1	11.3R2	9.4R1	
sFlow monitoring technology	11.1R1	9.3R2	12.1R1	11.2R1	12.2R1	12.1R1	10.0R1	
sFlow monitoring technology—Persistent IP addresses for agent IDs and use in datagrams	11.1R1	10.2R1	Not supported	Not supported	Not supported	12.1R1	10.2R1	
Simple Network Management Protocol version 1 (SNMPv1), SNMPv2, and SNMPv3	10.1R1	9.0R2	11.3R1	10.2R1	12.2R1	11.3R2	9.4R1	
Uplink failure detection	11.1R1	11.1R1	12.1R2	11.1R1	12.2R1	Not supported	12.1R1	

Table 27: Network Management and Monitoring Features on EX9200 Switches by Junos OS Release

Feature	Junos OS Release
Junos OS XML API and scripting—NETCONF Java toolkit for rapid development of Java applications to manage devices running Junos OS	12.3R2

Table 27: Network Management and Monitoring Features on EX9200 Switches by Junos OS Release (*continued*)

Feature	Junos OS Release
Junos OS XML API and scripting—NETCONF Perl client installation—Supports loading prerequisites from Comprehensive Perl Archive Network (CPAN) global repository	12.3R2
Junos OS XML API and scripting—NETCONF tracing operations	12.3R2
Junos OS XML API and scripting: <ul style="list-style-type: none"> • Dedicated directory for user script library • Global variable provided to Junos OS automation scripts • References to a correlating event in a policy action • Trigger a policy based on the event count • Unique filenames for uploaded files • Upload files created by event scripts • XML schemata for Junos OS XML operational tag elements • jcs:open() extension function support for routing instances 	12.3R2
Configuration options to filter out interfaces from SNMP Get and GetNext operations	12.3R2
Enhanced SNMP support for logical switches and routing instances	12.3R2
Generating SNMP traps when MAC address table is full	12.3R2
Junos OS MIB support for VPLS	12.3R2
MIB support for VRF route entries	12.3R2
Proxy SNMP agent	12.3R2
SNMP MIB support for OSPFv3	12.3R2
SNMP poll and trap support for DHCP leases	12.3R2
SNMP support for the DHCP bindings table	12.3R2
SNMP support for the authd daemon and for radius-acc-server-mib and radius-auth-server-mib	12.3R2
SNMP support for spanning-tree protocols	12.3R2
Support for Internet draft draft-ietf-bfd-mib-02.txt—MIB for BFD liveness detection	12.3R2
Support for MIB objects in accounting profiles	12.3R2
Support for an enterprise-specific event MIB (mib-jnx-event.txt)	12.3R2
Support for sending traps over routing instances	12.3R2

Table 27: Network Management and Monitoring Features on EX9200 Switches by Junos OS Release (*continued*)

Feature	Junos OS Release
Support for adding lists of clients to the SNMP community	12.3R2
Support for the enterprise-specific Packet Forwarding Engine MIB (mib-jnx-pfe.txt)	12.3R2
Support for the pimNeighborLoss trap	12.3R2
Support for trap spoofing	12.3R2
IEEE 802.3ah link fault management (LFM) for Ethernet OAM (also known as Ethernet in the First Mile, or EFM)	12.3R2
Port mirroring of Layer 2 VLAN and VPLS traffic	12.3R2
Fast update filters for dynamic profiles	12.3R2
Flow aggregation to multiple collectors	12.3R2
IPv6 flow aggregation templates	12.3R2
Inline flow monitoring	12.3R2

Table 28: Power over Ethernet (PoE) Features on Switches by Junos OS Release

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
Link Layer Discovery Protocol (LLDP) with granular Power over Ethernet (PoE) management	12.2R1	12.2R1 (EX4200-24PX and EX4200-48PX switch models only)	12.2R1	Not supported	Not supported	12.2R1	12.2R1	Not supported
NOTE: EX4200 switches must be running PoE controller software firmware version 4.04 or later to support the Link Layer Discovery Protocol (LLDP) with granular Power over Ethernet (PoE) management feature. See show chassis firmware detail and request system firmware upgrade poe to check or upgrade this firmware.								Not supported
Power over Ethernet (PoE)	10.1R1	9.0R2	11.3R1	–	–	11.3R2	11.2R1	Not supported
Power over Ethernet Plus (PoE+)	10.3R1	Not supported	11.3R1	–	–	11.3R2	11.2R1	Not supported

Table 28: Power over Ethernet (PoE) Features on Switches by Junos OS Release (*continued*)

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
Power over Ethernet (PoE) power management mode	10.1R1	9.3R2	11.3R1	—	—	11.3R2	11.2R1	Not supported

Table 29: Port Security Features on Switches by Junos OS Release

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
Automatic recovery for port error disable conditions	10.1R1	9.6R1	11.3R1	10.2R1	12.2R1	11.3R2	10.0R1	Not supported
DHCP option 82	10.1R1	9.3R2	11.3R1	10.2R1	12.2R1	Not supported	9.4R1	12.3R2
DHCP snooping	10.1R1	9.0R2	11.3R1	12.1R1	12.2R1	11.3R2	10.3R1	Not supported
Dynamic ARP inspection (DAI)	10.1R1	9.0R2	11.3R1	12.1R1	12.2R1	11.3R2	10.3R1	Not supported
IP source guard	10.1R1	9.2R1	11.3R1	12.1R1	12.2R1	11.3R2	10.3R1	Not supported
Layer 3 virtual private network (VPN) for IPv4 (RFC 2547 and 4364)	Not supported	Not supported	Not supported	12.2R1	12.2R1	Not supported	11.1R1	12.3R2
Layer 3 virtual private network (VPN) for IPv6 through IPv4 MPLS	Not supported	Not supported	Not supported	12.2R1	12.2R1	Not supported	11.1R1	12.3R2
MAC limiting	10.1R1	9.0R2	11.3R1	10.2R1	12.2R1	11.3R2	9.4R1	12.3R2
MAC address limit per port	10.1R1	9.0R1	11.3R1	10.2R1	12.2R1	11.3R2	10.3R1	12.3R2
MAC limiting per port and per VLAN (VLAN membership MAC limit)	12.3R1	12.3R1	12.3R1	12.3R1	12.3R1	12.3R1	12.3R1	12.3R2
MAC move limiting	10.1R1	9.0R2	11.3R1	Not supported	Not supported	11.3R2	Not supported	Not supported

Table 29: Port Security Features on Switches by Junos OS Release (*continued*)

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
Persistent MAC learning (sticky MAC)	11.4R1	11.4R1	12.3R1	11.4R1	12.2R1	11.4R1	11.4R1	Not supported
Persistent storage for DHCP snooping	10.1R1	9.4R1	11.3R1	12.1R1	12.2R1	11.3R2	10.3R1	Not supported
Self-signed digital certificates for enabling SSL services	11.1R1	11.1R1	Not supported	11.1R1	12.2R1	12.1R1	11.1R1	Not supported
Static ARP support	10.1R1	9.0R2	11.3R1	10.2R1	12.2R1	11.3R2	9.4R1	Not supported

Table 30: Routing Policy and Packet Filtering Features on Switches by Junos OS Release

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
Dynamic allocation of TCAM memory to firewall filters	10.1R1	10.0R1	11.3R1	10.2R1	12.2R1	Not supported	10.3R1	See Table 31 on page 39 for a list of EX9200 routing policy and firewall filter features
Firewall filters and rate limiting	10.1R1	9.0R2	11.3R1	10.2R1	12.2R1	11.3R2	9.4R1	
For a list of supported firewall filter match conditions and actions, see Platform Support for Firewall Filter Match Conditions, Actions, and Action Modifiers on EX Series Switches.								
Firewall filters on LAGs	10.1R1	9.0R2	11.3R1	10.2R1	12.2R1	Not supported	10.0R1	
Firewall filters on the loopback interface	10.1R1	9.2R1	11.3R1	11.1R1	12.2R1	12.1R1	9.6R1	
For a list of supported firewall filter match conditions and actions on a loopback interface, see Support for Match Conditions and Actions for Loopback Firewall Filters on Switches.								
Firewall filters on the management interface	11.3R1	10.4R1	Not supported	10.4R1	12.2R1	12.1R1	10.4R1	

Table 30: Routing Policy and Packet Filtering Features on Switches by Junos OS Release (*continued*)

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
Firewall filters on the virtual management interface	–	10.4R1 (EX4200 Virtual Chassis only)	Not supported	–	–	–	–	–
Firewall filters with IPv6	11.3R1	10.1R1	12.3R1	12.1R1	12.2R1	12.1R1	10.3R1	
Policing	10.1R1	9.0R2	11.3R1	10.2R1	12.2R1	11.3R2	9.4R1	

Table 31: Routing Policy and Firewall Filters on EX9200 Switches by Junos OS Release

Feature	Junos OS Release
Access and access-internal routes	12.3R2
Extension of numeric-range match conditions in firewall filters	12.3R2
Aggregate policer support for different family address types configured on the same interface	12.3R2
Authentication for BFD (MD5/SHA1)	12.3R2
BGP multipath link-bandwidth attribute	12.3R2
DHCP state persistence for DHCP relay agent	12.3R2
Dynamic configuration support for routing policies	12.3R2
Extended DHCP relay agent	12.3R2
Filter-based forwarding to a specific outgoing interface or destination IP address	12.3R2
Firewall filters within logical systems	12.3R2
IEEE 802.1p priority match conditions for Layer 2 VPN firewall filters	12.3R2
Filter-based forwarding to a specific outgoing interface or destination IP address	12.3R2
Layer 2 Gigabit Ethernet logical interface extended policing support	12.3R2
Layer 2 support for firewall filter match conditions	12.3R2
Load balancing of VPLS traffic	12.3R2
Option 60 support for extended DHCP relay agents	12.3R2

Table 31: Routing Policy and Firewall Filters on EX9200 Switches by Junos OS Release (*continued*)

Feature	Junos OS Release
Policers on physical interfaces	12.3R2
Firewall filters feature support	12.3R2
Support for policers that limit traffic on logical interfaces in ingress or egress directions	12.3R2
Support for policers that rate-limit based on a percentage of physical port speed on an interface	12.3R2
Support for the discard action for tricolor marking policers applied to firewall filters	12.3R2
Support for the prefix-list match condition for firewall filters for the VPLS protocol family	12.3R2
Support for enhanced policer statistics	12.3R2
Support for MAC address validation	12.3R2

Table 32: Spanning-Tree Protocols Features on Switches by Junos OS Release

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
BPDU protection for spanning-tree protocols	10.1R1	9.1R1	11.3R1	10.2R1	12.2R1	11.3R2	9.4R1	12.3R2
BPDU filter	12.2R1	12.2R1	12.2R1	12.2R1	12.2R1	12.2R1	12.2R1	12.3R2
Distributed periodic packet management (PPM) for Spanning Tree Protocols	Not supported	12.3R1	Not supported	Not supported	Not supported	Not supported	12.3R1	12.3R2
Loop protection for spanning-tree protocols	10.1R1	9.1R1	11.3R1	10.2R1	12.2R1	11.3R2	9.4R1	12.3R2
Root protection for spanning-tree protocols	10.1R1	9.1R1	11.3R1	10.2R1	12.2R1	11.3R2	9.4R1	12.3R2
Spanning tree: <ul style="list-style-type: none"> RSTP and VSTP concurrent configuration 	Not supported	10.2R1	12.3R1	10.2R1	12.2R1	11.3R2	10.2R1	

Table 32: Spanning-Tree Protocols Features on Switches by Junos OS Release (*continued*)

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
Spanning tree:	10.1R1	9.0R2	11.3R1	10.2R1	12.2R1	11.3R2	9.4R1	12.3R2
<ul style="list-style-type: none"> Spanning Tree Protocol (STP) Rapid Spanning Tree Protocol (RSTP) Multiple Spanning Tree Protocol (MSTP) 								
Spanning tree:	10.1R1	9.4R1	11.3R1	10.2R1	12.2R1	11.3R2	9.6R1	12.3R2
<ul style="list-style-type: none"> VLAN Spanning Tree Protocol (VSTP) 								

Table 33: System Management Features on Switches by Junos OS Release

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
Autoinstallation of configuration files	10.1R1	9.4R1	11.3R1	10.2R1	12.2R1	11.3R2	Not supported	
Automatic software download	10.1R1	9.6R1	11.3R1	10.2R1	12.2R1	11.3R2	9.6R1	
Automatic repair of corrupted partition when booting from alternate partition	12.3R1	12.3R1	12.3R1	12.3R1	12.3R1	12.3R1	12.3R1	
Configuration rollback	10.1R1	9.0R2	11.3R1	10.2R1	12.2R1	11.3R2	9.4R1	
Zero Touch Provisioning (EZ Touchless Provisioning using DHCP)	12.2R1	12.2R1	12.2R1	12.2R1	12.2R1	Not supported	12.2R1	Not supported
J-Web interface, for switch configuration and management	10.1R1 (12.1R1 for EX2200-C switches)	9.0R2	12.1R1	10.2R1	12.2R1	12.1R1	9.4R1	Not supported
Junos Space Service Now support	12.3R1	12.3R1	12.3R1	12.3R1	12.3R1	12.3R1	12.3R1	Not supported

Table 33: System Management Features on Switches by Junos OS Release (*continued*)

Feature	EX2200	EX3200, EX4200	EX3300	EX4500	EX4550	EX6200	EX8200	EX9200
LCD panel management support	–	9.0R1	11.3R1	10.2R1	12.2R1	11.3R1	9.4R1	–
Online insertion and removal (OIR) of uplink modules	–	10.0R1	–	11.1R1	12.2R1	–	–	–

Table 34: User Interface and Configuration Features on EX9200 Switches by Junos OS Release

Feature	Junos OS Release
Device-initiated SSH connection (outbound SSH)	12.3R2
Dynamic IPv6 filters	12.3R2
Dynamic configuration of the switch advertisement protocol	12.3R2
Dynamic profiles support by extended DHCP local server and extended DHCP relay agent	12.3R2
Enhanced IPv6 statistics	12.3R2
Extended DHCP local server	12.3R2
IGMP dynamic profiles	12.3R2
Extended DHCP local server	12.3R2
Protection for device configuration	12.3R2
RADIUS MSCHAPv2 protocol support for administrator authentication, password aging, and update	12.3R2
Limit configuration command output	12.3R2
Remote tracing	12.3R2
Support for CLI edit mode wildcard range	12.3R2
Support for configuring ARP aging time for a logical interface	12.3R2
Support for configuring a proxy server for downloading licenses	12.3R2
Support for configuring time-based user access	12.3R2
Support for logical router system administrators	12.3R2

Table 35: VPN Features on EX9200 Switches by Junos OS Release

Feature	Junos OS Release
Aggregated Ethernet interfaces for VPLS routing instances	12.3R2
BGP autodiscovery for LDP VPLS (FEC 129)	12.3R2
Clearing MAC addresses for better convergence	12.3R2
Configurable label block sizes for VPLS	12.3R2
Disable TTL propagation behavior for the routes in a VRF routing instance	12.3R2
EXP-based traffic classification for VPLS	12.3R2
Enhanced show interface command for Layer 3 VPN functionality	12.3R2
Expanded interface support for the vrf-table-label statement	12.3R2
Extranet next-generation MVPN GRE tunnels for Layer 3 VPNs	12.3R2
GRE tunnels for Layer 3 VPNs Ignore MTU mismatch on Layer 2 circuits Integrated routing and bridging support for inter-AS VPLS between BGP-signaled VPLS and LDP-signaled VPLS LDP-based VPLS Label allocation and substitution policy	12.3R2
Ignore MTU mismatch on Layer 2 circuits	12.3R2
Integrated routing and bridging support for inter-AS VPLS between BGP-signaled VPLS and LDP-signaled VPLS	12.3R2
LDP-based VPLS	12.3R2
Label allocation and substitution policy	12.3R2
Layer 2 VPN multihoming	12.3R2
Layer 3 VPN BGP routes and labels	12.3R2
Layer 3 VPN localization	12.3R2
Load balancing and IP header filtering for Layer 3 VPNs	12.3R2
Local switching support for the ignore-encapsulation-mismatch statement	12.3R2
Multipath load balancing for EBGp and IBGP VPNs	12.3R2
Multiple logical trunk interfaces per physical interface	12.3R2
Multiprotocol BGP-based multicast VPN	12.3R2
NTP support for IPv4 VRF and IPv6 VRF	12.3R2

Table 35: VPN Features on EX9200 Switches by Junos OS Release (*continued*)

Feature	Junos OS Release
Nonstop active routing support for Layer 3 VPNs	12.3R2
PIM source-specific multicast (PIM-SSM) provider tunnel support added to Multiprotocol BGP-based multicast VPNs	12.3R2
Point-to-multipoint LSP support for VPLS	12.3R2
Point-to-multipoint LSP support for multicast VPNs	12.3R2
Proxy BGP route target filtering	12.3R2
Static VPLS	12.3R2
Static route target filtering	12.3R2
Support for autorp, BSR, PIM dense mode and mtrace for next-generation multicast VPNs	12.3R2
VLAN range for Layer 2 VPN	12.3R2
VPLS automatic site ID	12.3R2
VPLS automatic site ID for nonstop active routing	12.3R2
VPLS ping	12.3R2
VPLS trunk interfaces	12.3R2
eBGP and iBGP load-balancing support for MVPN and PIM	12.3R2

**Related
Documentation**

- EX Series Virtual Chassis Software Features Overview
- EX2200 Switches Hardware Overview
- EX3200 Switches Hardware Overview
- EX3300 Switches Hardware Overview
- EX4200 Switches Hardware Overview
- EX4500 Switches Hardware Overview
- EX4550 Switches Hardware Overview
- EX6210 Switch Hardware Overview
- EX8208 Switch Hardware Overview
- EX8216 Switch Hardware Overview
- EX9208 Switch Hardware Overview
- Line Card Model and Version Compatibility in an EX6200 Switch

- Line Card Model and Version Compatibility in an EX8200 Switch
- Line Card Model and Version Compatibility in an EX9200 Switch
- XRE200 External Routing Engine Hardware Overview
- Layer 3 Protocols Supported on EX Series Switches
- Layer 3 Protocols Not Supported on EX Series Switches

PART 2

Configuration

- [Configuration Statements on page 49](#)

CHAPTER 2

Configuration Statements

- [\[edit protocols ospf\] Hierarchy Level on page 49](#)
- [\[edit protocols ospf3\] Hierarchy Level on page 53](#)

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

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

```
protocols {
  ospf {
    disable;
    area area-id {
      ... the area subhierarchy appears after the main [edit protocols ospf] hierarchy ...
    }
    backup-spf-options {
      disable;
      downstream-paths-only;
      no-install;
    }
    database-protection {
      ignore-count number;
      ignore-time seconds;
      maximum-lsa number;
      reset-time seconds;
      warning-only;
      warning-threshold percent;
    }
    export [ policy-names ];
    external-preference preference;
    graceful-restart {
      disable;
      helper-disable <both | restart-signaling | standard>;
      no-strict-lsa-checking;
      notify-duration seconds;
      restart-duration seconds;
    }
    import [ policy-names ];
    lsa-refresh-interval;
    no-nssa-abr;
    no-rfc-1583;
    overload <timeout seconds>;
```

```

    preference preference;
    prefix-export-limit number;
    reference-bandwidth reference-bandwidth;
    rib-group group-name;
    spf-options {
        delay milliseconds;
        holddown milliseconds;
        rapid-runs number;
    }
    topology (default | ipv4-multicast | name) {
        backup-spf-options {
            disable;
            downstream-paths-only;
            no-install;
        }
        overload;
        prefix-export-limit number;
        spf-options {
            delay milliseconds;
            holddown milliseconds;
            rapid-runs number;
        }
        topology-id number;
    }
    traceoptions {
        file filename <files number> <size maximum-file-size> <world-readable |
            no-world-readable>;
        flag flag <flag-modifier> <disable>;
    }
    traffic-engineering {
        advertise-unnumbered-interfaces;
        credibility-protocol-preference;
        ignore-lsp-metrics;
        multicast-rpf-routes;
        no-topology;
        shortcuts <lsp-metric-into-summary>;
    }
}

ospf {
    area area-id {
        area-range ip-prefix </prefix-length> <exact> <override-metric metric> <restrict>;
        context-identifier identifier
        interface interface-name {
            ... the interface subhierarchy appears after the main [edit ospf area area-id] hierarchy
            level ...
        }
        label-switched-path name {
            disable;
            metric metric;
            topology (name | default | ipv4-multicast) {
                disable;
                metric metric;
            }
        }
    }
    network-summary-export [ policy-names ];
}

```

```

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

area area-id {
  interface interface-name {
    disable;
    authentication {
      md5 key-id key key-string <start-time YYYY-MM-DD.hh:mm>;
      simple-password key-string;
    }
    bandwidth-based-metrics {
      bandwidth value metric number;
    }
  }
}

```

```
bfd-liveness-detection {
  authentication {
    algorithm (keyed-md5 | keyed-sha-1 | meticulous-keyed-md5 |
      meticulous-keyed-sha-1 | simple-password);
    key-chain key-chain-name;
    loose-check;
  }
  detection-time {
    threshold milliseconds;
  }
  full-neighbors-only;
  minimum-interval milliseconds;
  minimum-receive-interval milliseconds;
  multiplier number;
  no-adaptation;
  transmit-interval {
    minimum-interval milliseconds;
    threshold milliseconds;
  }
  version (1 | automatic);
}
dead-interval seconds;
demand-circuit;
dynamic-neighbors;
flood-reduction;
hello-interval seconds;
interface-type (nbma | p2mp | p2p);
ipsec-sa sa-name;
ldp-synchronization {
  disable;
  hold-time seconds;
}
(link-protection | node-link-protection);
metric metric;
neighbor address <eligible>;
no-eligible-backup;
no-interface-state-traps;
no-neighbor-down-notification;
passive {
  traffic-engineering {
    remote-node-id address;
  }
}
poll-interval seconds;
priority number;
retransmit-interval seconds;
secondary;
te-metric metric;
topology (name | default | ipv4-multicast) {
  disable;
  bandwidth-based-metrics {
    bandwidth value;
    metric number;
  }
  metric metric;
}
```



```

        transit-delay seconds;
    }
}
}

```

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

[edit protocols ospf3] Hierarchy Level

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

```

protocols {
  ospf3 {
    disable;
    area area-id {
      ... the area subhierarchy appears after the main [edit protocols ospf3] hierarchy ...
    }
    backup-spf-options {
      disable;
      downstream-paths-only;
      no-install;
    }
    database-protection {
      ignore-count number;
      ignore-time seconds;
      maximum-lsa number;
      reset-time seconds;
      warning-only;
      warning-threshold percent;
    }
    export [ policy-names ];
    external-preference preference;
    graceful-restart {
      disable;
      helper-disable;
      no-strict-lsa-checking;
      notify-duration seconds;
      restart-duration seconds;
    }
    import [ policy-names ];
    lsa-refresh-interval;
    no-nssa-abr;
    no-rfc-1583;
    overload <timeout seconds>;
    preference preference;
    prefix-export-limit number;
    realm (ipv4-multicast | ipv4-unicast | ipv6-multicast | ipv6-unicast) {
      ... the realm subhierarchies appear after the main [edit protocols ospf3] hierarchy ...
    }
    reference-bandwidth reference-bandwidth;
    rib-group group-name;
  }
}

```

```

spf-options {
    delay milliseconds;
    holddown milliseconds;
    no-ignore-our-externals;
    rapid-runs number;
}
traceoptions {
    file filename <files number> <size maximum-file-size> <world-readable |
    no-world-readable>;
    flag flag <flag-modifier> <disable>;
}
traffic-engineering {
    ignore-lsp-metrics;
    shortcuts <lsp-metric-into-summary>;
}
}

ospf3 {
    area area-id {
        area-range ip-prefix </prefix-length> <exact> <override-metric metric> <restrict>;
        inter-area-prefix-export [ policy-names ];
        inter-area-prefix-import [ policy-names ];
        interface interface-name {
            ... the interface subhierarchy appears after the main [edit ospf3 area area-id]
               hierarchy level ...
        }
        nssa {
            area-range ip-prefix </prefix-length> <exact> <override-metric metric> <restrict>;
            default-lsa {
                default-metric metric;
                metric-type type;
                type-7;
            }
            (summaries | no-summaries);
        }
        stub <default-metric metric> <summaries | no-summaries>;
        virtual-link neighbor-id router-id transit-area area-id {
            disable;
            dead-interval seconds;
            demand-circuit;
            flood-reduction;
            hello-interval seconds;
            ipsec-sa sa-name;
            retransmit-interval seconds;
            transit-delay seconds;
        }
    }
}

area area-id {
    interface interface-name {
        disable;
        bandwidth-based-metrics {
            bandwidth value metric number;
        }
        bfd-liveness-detection {
            authentication {

```

```

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

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

```

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

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

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

**Related
Documentation**

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

area

Syntax	<pre> area <i>area-id</i> { interface <i>interface-name</i> { passive; topology (ipv4-multicast <i>name</i>) { disable; } } virtual-link neighbor-id <i>router-id</i> transit-area <i>area-id</i> { topology (ipv4-multicast <i>name</i>) { disable; } } } </pre>
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> protocols (ospf ospf3)],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 realm (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)],</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)],</p> <p>[edit protocols (ospf ospf3)],</p> <p>[edit protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf ospf3)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast)]</p>
Release Information	<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 realm statement introduced in Junos OS Release 9.2.</p> <p>Support for the realm 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>
Description	<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 area statements to configure the routing device as an area border router. An area border router does not automatically summarize routes between areas. Use the area-range 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 virtual-link statement.</p> <p>To specify that the routing device is directly connected to the OSPF backbone, include the area 0.0.0.0 statement.</p> <p>All routing devices on the backbone must be contiguous. If they are not, use the virtual-link 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.

Options	area-id —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 0.0.0.0 is reserved for the OSPF backbone area.
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• OSPF Areas and Router Functionality Overview• Understanding Multiple Address Families for OSPFv3• virtual-link on page 119

area-range

Syntax	area-range <i>network/mask-length</i> <exact> <override-metric <i>metric</i> > <restrict>;
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> protocols (ospf ospf3) area <i>area-id</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols (ospf ospf3) area <i>area-id</i> nssa],</p> <p>[edit logical-systems <i>logical-system-name</i> realm (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) 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) area <i>area-id</i> nssa],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> realm (ipv4-unicast ipv4-multicast ipv6-multicast) area <i>area-id</i>],</p> <p>[edit protocols (ospf ospf3) area <i>area-id</i>],</p> <p>[edit protocols (ospf ospf3) area <i>area-id</i> nssa],</p> <p>[edit protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast) area <i>area-id</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf ospf3) area <i>area-id</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf ospf3) area <i>area-id</i> nssa],</p> <p>[edit routing-instances <i>routing-instance-name</i> realm (ipv4-unicast ipv4-multicast ipv6-multicast) area <i>area-id</i>]</p>
Release Information	<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 realm statement introduced in Junos OS Release 9.2.</p> <p>Support for the realm 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>
Description	<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 area-range 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 area-range statements. All external routes learned within the area that do not fall into one of the prefixes are advertised individually to other areas.</p>
Default	By default, area border routing devices do not summarize routes being sent from one area to other areas, but rather send all routes explicitly.
Options	<p>exact—(Optional) Summarization of a route is advertised only when an exact match is made with the configured summary range.</p> <p>mask-length—Number of significant bits in the network mask.</p> <p>network—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

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

Related Documentation	<ul style="list-style-type: none">• Example: Summarizing Ranges of Routes in OSPF Link-State Advertisements
------------------------------	---

bandwidth-based-metrics

Syntax	<pre>bandwidth-based-metrics { bandwidth <i>value</i>; metric <i>number</i>; }</pre>
Hierarchy Level	<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>
Release Information	<p>Statement introduced in Junos OS Release 9.5.</p> <p>Statement introduced in Junos OS Release 9.5 for EX Series switches.</p>
Description	<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>
Options	<p>bandwidth <i>value</i>—Specify the bandwidth threshold in bits per second.</p> <p>Range: 9600 through 1,000,000,000,000,000</p> <p>metric <i>number</i>—Specify a metric value to associate with a specific bandwidth value.</p> <p>Range: 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.

Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Example: Dynamically Adjusting OSPF Interface Metrics Based on Bandwidth• metric on page 88• Example: Dynamically Adjusting OSPF Interface Metrics Based on Bandwidth

bfd-liveness-detection (Protocols OSPF)

Syntax `bfd-liveness-detection {`
 `authentication {`
 `algorithm` *algorithm-name*;
 `key-chain` *key-chain-name*;
 `loose-check`;
 `}`
 `detection-time {`
 `threshold` *milliseconds*;
 `}`
 `full-neighbors-only`
 `minimum-interval` *milliseconds*;
 `minimum-receive-interval` *milliseconds*;
 `multiplier` *number*;
 `no-adaptation`;
 `transmit-interval {`
 `minimum-interval` *milliseconds*;
 `threshold` *milliseconds*;
 `}`
 `version` (1 | automatic);
`}`

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

Release Information Statement introduced before Junos OS Release 7.4.
 Statement introduced in Junos OS Release 9.0 for EX Series switches.
detection-time threshold and **transmit-interval threshold** options added in Junos OS Release 8.2.
 Support for logical systems introduced in Junos OS Release 8.3.
no-adaptation option introduced in Junos OS Release 9.0.
no-adaptation option introduced in Junos OS Release 9.0 for EX Series switches.
 Support for OSPFv3 introduced in Junos OS Release 9.3.
 Support for OSPFv3 introduced in Junos OS Release 9.3 for EX Series switches.
full-neighbors-only option introduced in Junos OS Release 9.5.
full-neighbors-only option introduced in Junos OS Release 9.5 for EX Series switches.

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**

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

dead-interval

Syntax	<code>dead-interval seconds;</code>
Hierarchy Level	<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> interface <i>interface-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols (ospf ospf3) area <i>area-id</i> virtual-link],</p> <p>[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>],</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> 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> virtual-link],</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> interface <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> interface <i>interface-name</i>],</p> <p>[edit protocols (ospf ospf3) area <i>area-id</i> virtual-link],</p> <p>[edit protocols ospf3 realm (ipv4-unicast ipv4-multicast 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> interface <i>interface-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf ospf3) area <i>area-id</i> virtual-link],</p> <p>[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>]</p>
Release Information	<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 realm statement introduced in Junos OS Release 9.2.</p> <p>Support for the realm statement introduced in Junos OS Release 9.2 for EX Series switches.</p>
Description	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.
Options	<p>seconds—Interval to wait.</p> <p>Range: 1 through 65,535 seconds</p> <p>Default: Four times the hello interval—40 seconds (broadcast and point-to-point networks); 120 seconds (nonbroadcast multiple access (NBMA) networks)</p>
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> Example: Configuring OSPF Timers Configuring RSVP and OSPF for LMP Peer Interfaces

- [hello-interval on page 78](#)

default-lsa

Syntax	<pre>default-lsa { default-metric <i>metric</i>; metric-type <i>type</i>; type-7; }</pre>
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> protocols (ospf ospf3) area <i>area-id</i> nssa],</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],</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],</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> nssa],</p> <p>[edit protocols (ospf ospf3) area <i>area-id</i> nssa],</p> <p>[edit protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast) area <i>area-id</i> nssa],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf ospf3) area <i>area-id</i> nssa],</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]</p>
Release Information	<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 realm statement introduced in Junos OS Release 9.2.</p> <p>Support for the realm statement introduced in Junos OS Release 9.2 for EX Series switches.</p>
Description	<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>
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • OSPF Areas and Router Functionality Overview • Example: Configuring OSPF Not-So-Stubby Areas • nssa on page 93 • stub on page 110

default-metric

Syntax	<code>default-metric <i>metric</i>;</code>
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> protocols (ospf ospf3) area area-id nssa default-lsa],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols (ospf ospf3) area area-id stub],</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 default-lsa],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast) area <i>area-id</i> stub],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (ospf ospf3) area area-id nssa default-lsa],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (ospf ospf3) area area-id stub],</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> nssa default-lsa],</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> stub],</p> <p>[edit protocols (ospf ospf3) area area-id nssa default-lsa],</p> <p>[edit protocols (ospf ospf3) area area-id stub],</p> <p>[edit protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast) area <i>area-id</i> nssa default-lsa],</p> <p>[edit protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast) area <i>area-id</i> stub],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf ospf3) area area-id nssa default-lsa],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf ospf3) area area-id stub],</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 default-lsa],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast) area <i>area-id</i> stub]</p>
Release Information	<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 realm statement introduced in Junos OS Release 9.2.</p> <p>Support for the realm statement introduced in Junos OS Release 9.2 for EX Series switches.</p>
Description	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.
Options	<p><i>metric</i>—Metric value.</p> <p>Range: 1 through 16,777,215</p>
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • OSPF Areas and Router Functionality Overview • nssa on page 93

- [stub on page 110](#)

disable (OSPF)

Syntax	disable;
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> protocols (ospf ospf3)],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols (ospf ospf3) area <i>area-id</i> interface <i>interface-name</i>],</p> <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) virtual-link],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast)],</p> <p>[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>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (ospf ospf3)],</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> 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) virtual-link],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instances</i> protocols ospf3 realm (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 realm (ipv4-unicast ipv4-multicast ipv6-multicast) area <i>area-id</i> interface <i>interface-name</i>],</p> <p>[edit protocols (ospf ospf3)],</p> <p>[edit protocols (ospf ospf3) area <i>area-id</i> interface <i>interface-name</i>],</p> <p>[edit protocols (ospf ospf3) virtual-link],</p> <p>[edit protocols ospf area <i>area-id</i> peer-interface <i>interface-name</i>],</p> <p>[edit protocols ospf area <i>area-id</i> virtual-link neighbor-id <i>router-id</i> transit-area <i>area-id</i>],</p> <p>[edit protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast)],</p> <p>[edit protocols ospf3 realm (ipv4-unicast ipv4-multicast 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)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf ospf3) area <i>area-id</i> interface <i>interface-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf ospf3) virtual-link],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast)],</p> <p>[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>]</p>
Release Information	<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 realm statement introduced in Junos OS Release 9.2.</p> <p>Support for the realm 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>
Description	<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.

Default	The configured object is enabled (operational) unless explicitly disabled.
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • OSPF Configuration Overview • Configuring RSVP and OSPF for LMP Peer Interfaces

domain-id

Syntax	<code>domain-id <i>domain-id</i>;</code>
Hierarchy Level	<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>
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Specify a domain ID for a route. The domain ID identifies the OSPF domain from which the route originated.
Options	<p><i>domain-id</i>—You can specify either an IP address or an IP address and a local identifier using the following format: <i>ip-address:local-identifier</i>. If you do not specify a local identifier with the IP address, the identifier is assumed to have a value of 0.</p> <p>Default: 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>
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Configuring Routing Between PE and CE Routers in Layer 3 VPNs

domain-vpn-tag

Syntax	<code>domain-vpn-tag <i>number</i>;</code>
Hierarchy Level	[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (ospf ospf3)], [edit routing-instances <i>routing-instance-name</i> protocols (ospf ospf3)]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches.
Description	Set a virtual private network (VPN) tag for OSPFv2 external routes generated by the provider edge (PE) routing device.
Options	<i>number</i> —VPN tag.
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> Configuring Routing Between PE and CE Routers in Layer 3 VPNs

export (Protocols OSPF)

Syntax	<code>export [<i>policy-names</i>];</code>
Hierarchy Level	<code>[edit logical-systems <i>logical-system-name</i> protocols (ospf ospf3)],</code> <code>[edit logical-systems <i>logical-system-name</i> protocols ospf3 realm (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> (ospf ospf3)],</code> <code>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> 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 <i>routing-instance-name</i> protocols (ospf ospf3)],</code> <code>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 realm (ipv4-unicast </code> <code> ipv4-multicast ipv6-multicast)]</code>
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 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. Statement introduced in Junos OS Release 11.3 for the QFX Series.
Description	Apply one or more policies to routes being exported from the routing table into OSPF.
Options	<i>policy-names</i> —Name of one or more policies.
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Understanding OSPF Routing Policy• Import and Export Policies for Network Summaries Overview• import on page 80• Routing Policy Configuration Guide

external-preference (Protocols OSPF)

Syntax	<code>external-preference <i>preference</i>;</code>
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> protocols (ospf ospf3)],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 realm (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)],</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)],</p> <p>[edit protocols (ospf ospf3)],</p> <p>[edit protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf ospf3)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast)]</p>
Release Information	<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 realm statement introduced in Junos OS Release 9.2.</p> <p>Support for the realm 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>
Description	Set the route preference for OSPF external routes.
Options	<p><i>preference</i>—Preference value.</p> <p>Range: 0 through 4,294,967,295 ($2^{32} - 1$)</p> <p>Default: 150</p>
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> Example: Controlling OSPF Route Preferences preference on page 99

graceful-restart (Protocols OSPF)

Syntax	<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>
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> protocols (ospf ospf3)],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (ospf ospf3)],</p> <p>[edit protocols (ospf ospf3)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf]</p>
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Support for the no-strict-lsa-checking 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 standard, restart-signaling, and both options introduced in Junos OS Release 11.4.</p> <p>Statement introduced in Junos OS Release 12.1 for the QFX Series.</p>
Description	<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>
Options	<p>disable—Disable graceful restart for OSPF.</p> <p>helper-disable (standard restart-signaling both)—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 standard, restart-signaling, and both options are only supported for OSPFv2. Specify standard to disable helper mode for standard graceful restart (based on RFC 3623). Specify restart-signaling to disable helper mode for restart signaling-based graceful restart (based on RFC 4811, RFC 4812, and RFC 4813). Specify both 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>Default: Helper mode is enabled by default. For OSPFv2, both standard and restart-signaling based helper modes are enabled by default.</p> <p>no-strict-lsa-checking—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

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

Syntax	<code>hello-interval seconds;</code>
Hierarchy Level	<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> interface interface-name],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols (ospf ospf3) area <i>area-id</i> virtual-link],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast) area <i>area-id</i> interface interface-name],</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> interface interface-name],</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> virtual-link],</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> interface interface-name],</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> interface interface-name],</p> <p>[edit protocols (ospf ospf3) area <i>area-id</i> virtual-link],</p> <p>[edit protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast) area <i>area-id</i> interface interface-name],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf ospf3) area <i>area-id</i> interface interface-name],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf ospf3) area <i>area-id</i> virtual-link],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast) area <i>area-id</i> interface interface-name]</p>
Release Information	<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 realm statement introduced in Junos OS Release 9.2.</p> <p>Support for the realm statement introduced in Junos OS Release 9.2 for EX Series switches.</p>
Description	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.
Options	<p>seconds—Time between hello packets, in seconds.</p> <p>Range: 1 through 255 seconds</p> <p>Default: 10 seconds (broadcast and point-to-point networks); 30 seconds (nonbroadcast multiple access [NBMA] networks)</p>
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> Example: Configuring OSPF Timers Configuring RSVP and OSPF for LMP Peer Interfaces dead-interval on page 67

ignore-lsp-metrics

Syntax	ignore-lsp-metrics;
Hierarchy Level	[edit logical-systems <i>logical-system-name</i> protocols ospf traffic-engineering shortcuts], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf traffic-engineering shortcuts], [edit protocols ospf traffic-engineering], [edit routing-instances <i>routing-instance-name</i> protocols ospf traffic-engineering shortcuts]
Release Information	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.
Description	Ignore RSVP LSP metrics in OSPF traffic engineering shortcut calculations.
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> Example: Enabling OSPF Traffic Engineering Support

import (Protocols OSPF)

Syntax	<code>import [<i>policy-names</i>];</code>
Hierarchy Level	<code>[edit logical-systems <i>logical-system-name</i> protocols (ospf ospf3)],</code> <code>[edit logical-systems <i>logical-system-name</i> protocols ospf3 realm (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> (ospf ospf3)],</code> <code>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> 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 <i>routing-instance-name</i> protocols (ospf ospf3)],</code> <code>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 realm (ipv4-unicast </code> <code> ipv4-multicast ipv6-multicast)]</code>
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 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. Statement introduced in Junos OS Release 11.3 for the QFX Series.
Description	Filter OSPF routes from being added to the routing table.
Options	<i>policy-names</i> —Name of one or more policies.
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Understanding OSPF Routing Policy• Import and Export Policies for Network Summaries Overview• export on page 74• Routing Policy Configuration Guide

inter-area-prefix-export

Syntax	<code>inter-area-prefix-export [<i>policy-names</i>];</code>
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 area <i>area-id</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf3 area <i>area-id</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf3 realm (ip4-unicast ipv4-multicast ipv6-multicast) area <i>area-id</i>],</p> <p>[edit protocols ospf3 area <i>area-id</i>],</p> <p>[edit protocols ospf3 realm (ip4-unicast ipv4-multicast ipv6-multicast) area <i>area-id</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 area <i>area-id</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 realm (ip4-unicast ipv4-multicast ipv6-multicast) area <i>area-id</i>]</p>
Release Information	<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 realm statement introduced in Junos OS Release 9.2.</p> <p>Support for the realm statement introduced in Junos OS Release 9.2 for EX Series switches.</p>
Description	Apply an export policy for OSPFv3 to specify which interarea prefix link-state advertisements (LSAs) are flooded into an area.
Options	<i>policy-name</i> —Name of a policy configured at the [edit policy-options policy-statement <i>policy-name</i> term <i>term-name</i>] hierarchy level.
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> Import and Export Policies for Network Summaries Overview inter-area-prefix-import on page 82 Routing Policy Configuration Guide

inter-area-prefix-import

Syntax	<code>inter-area-prefix-import [<i>policy-names</i>];</code>
Hierarchy Level	<code>[edit logical-systems <i>logical-system-name</i> protocols ospf3 <i>area area-id</i>],</code> <code>[edit logical-systems <i>logical-system-name</i> protocols ospf3 <i>realm</i> (ipv4-unicast </code> <code> ipv4-multicast ipv6-multicast) <i>area area-id</i>],</code> <code>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols</code> <code> ospf3 <i>area area-id</i>],</code> <code>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols</code> <code> ospf3 <i>realm</i> (ipv4-unicast ipv4-multicast ipv6-multicast) <i>area area-id</i>],</code> <code>[edit protocols ospf3 <i>area area-id</i>],</code> <code>[edit protocols ospf3 <i>realm</i> (ip4-unicast ipv4-multicast ipv6-multicast)], <i>area area-id</i>],</code> <code>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 <i>area area-id</i>],</code> <code>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 <i>realm</i> (ipv4-unicast </code> <code> ipv4-multicast ipv6-multicast) <i>area area-id</i>]</code>
Release Information	Statement introduced in Junos OS Release 9.1. Statement introduced in Junos OS Release 9.1 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.
Description	Apply an import policy for OSPFv3 to specify which routes learned from an area are used to generate interarea prefixes into other areas.
Options	<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.
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Import and Export Policies for Network Summaries Overview• inter-area-prefix-export on page 81• Routing Policy Configuration Guide

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*;
 transmit-interval *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)

Syntax	<code>interface-type (nbma p2mp p2p);</code>
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> protocols (ospf ospf3) area <i>area-id</i> interface <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> interface <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> interface <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> interface <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>
Release Information	<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 p2p only introduced in Junos OS Release 9.4. You cannot configure other interface types for OSPFv3.</p> <p>Support for OSPFv3 for interface type p2p only introduced in Junos OS Release 9.4 for EX Series switches.</p>
Description	<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 nbma 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>
Default	The software chooses the correct interface type based on the type of physical interface.
Options	<p>nbma (OSPFv2 only)—Nonbroadcast multiaccess (NBMA) interface.</p> <p>p2mp (OSPFv2 only)—Point-to-multipoint interface.</p> <p>p2p—Point-to-point interface.</p>
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>

- | | |
|------------------------------|---|
| Related Documentation | <ul style="list-style-type: none"> About OSPF Interfaces Example: Configuring an OSPFv2 Interface on a Nonbroadcast Multiaccess Network |
|------------------------------|---|

lsp-metric-into-summary

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

metric (Protocols OSPF Interface)

Syntax	<code>metric <i>metric</i>;</code>
Hierarchy Level	<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 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> routing-instances <i>routing-instance-name</i> protocols ospf area <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 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 (ipv4-multicast <i>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> 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 realm (ipv4-unicast ipv4-multicast ipv6-multicast) area <i>area-id</i> interface <i>interface-name</i>] </pre>
Release Information	<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 realm statement introduced in Junos OS Release 9.2.</p> <p>Support for the realm statement introduced in Junos OS Release 9.2 for EX Series switches.</p>
Description	<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>
Options	<p>metric—Cost of the route.</p> <p>Range: 1 through 65,535</p> <p>Default: 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 metric overrides the default behavior of using the reference-bandwidth value to calculate the cost of the route for that interface.</p>

Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Example: Controlling the Cost of Individual OSPF Network Segments• Example: Configuring OSPFv2 Sham Links• Example: Configuring Multitopology Routing Based on Applications• Example: Configuring Multitopology Routing Based on a Multicast Source• bandwidth-based-metrics on page 61• reference-bandwidth on page 103

metric-type

Syntax	<code>metric-type type;</code>
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> protocols (ospf ospf3) area <i>area-id</i> nssa default-lsa],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast)) area <i>area-id</i> nssadefault-lsa],</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 default-lsa],</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> nssa default-lsa],</p> <p>[edit protocols (ospf ospf3) area <i>area-id</i> nssa default-lsa],</p> <p>[edit protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast)) area <i>area-id</i> nssa default-lsa],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf ospf3) area <i>area-id</i> nssa default-lsa],</p> <p>[edit routing-instances <i>routing-instances</i> protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast)) area <i>area-id</i> nssa default-lsa]</p>
Release Information	<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 realm statement introduced in Junos OS Release 9.2.</p> <p>Support for the realm statement introduced in Junos OS Release 9.2 for EX Series switches.</p>
Description	<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"> • 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). • 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.
Options	type —Metric type: 1 or 2
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • OSPF Areas and Router Functionality Overview • Example: Configuring OSPF Not-So-Stubby Areas

no-nssa-abr

Syntax	no-nssa-abr;
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> protocols (ospf ospf3)],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 realm (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)],</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)],</p> <p>[edit protocols (ospf ospf3)],</p> <p>[edit protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf ospf3)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast)]</p>
Release Information	<p>Statement introduced in Junos OS Release 7.6.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Support for the realm statement introduced in Junos OS Release 9.2.</p> <p>Support for the realm 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>
Description	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).
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> Example: Configuring OSPF Not-So-Stubby Areas

no-rfc-1583

Syntax	no-rfc-1583;
Hierarchy Level	[edit logical-systems <i>logical-system-name</i> protocols (ospf ospf3)], [edit logical-systems <i>logical-system-name</i> protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast)], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (ospf ospf3)], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast)], [edit protocols (ospf ospf3)], [edit protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast)], [edit routing-instances <i>routing-instance-name</i> protocols (ospf ospf3)], [edit routing-instances <i>routing-instance-name</i> protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast)]
Release Information	Statement introduced in Junos OS Release 8.5. 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. Statement introduced in Junos OS Release 11.3 for the QFX Series.
Description	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.
Default	Compatibility with RFC 1583 is enabled by default.
Required Privilege Level	routing—To view this statement in the configuration. routing-control-level—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">Example: Disabling OSPFv2 Compatibility with RFC 1583

nssa

Syntax	<pre>nssa { area-range network/mask-length <restrict> <exact> <override-metric metric>; default-lsa { default-metric metric; metric-type type; type-7; } (no-summaries summaries); }</pre>
Hierarchy Level	<pre>[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)], [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)], [edit protocols (ospf ospf3) area area-id], [edit protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast)], [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)]</pre>
Release Information	<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 realm statement introduced in Junos OS Release 9.2.</p> <p>Support for the realm statement introduced in Junos OS Release 9.2 for EX Series switches.</p>
Description	<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>
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • OSPF Areas and Router Functionality Overview • Example: Configuring OSPF Not-So-Stubby Areas • stub on page 110


ospf

Syntax	<code>ospf { ... }</code>
Hierarchy Level	[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]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 11.3 for the QFX Series.
Description	Enable OSPF routing on the routing device. You must include the ospf statement to enable OSPF on the routing device.
Default	OSPF is disabled on the routing device.
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• OSPF Configuration Overview• [edit protocols ospf] Hierarchy Level on page 49

ospf3

Syntax	ospf3 { ... }
Hierarchy Level	[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]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 11.3 for the QFX Series.
Description	Enable OSPFv3 routing on the routing device. You must include the ospf3 statement to enable OSPFv3.
Default	OSPFv3 is disabled on the routing device.
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • OSPF Configuration Overview • [edit protocols ospf3] Hierarchy Level on page 53

overload (Protocols OSPF)

Syntax	<pre>overload { timeout <i>seconds</i>; }</pre>
Hierarchy Level	<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 ospf topology (default ipv4-multicast <i>name</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 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 <i>realm</i> (ipv4-unicast ipv4-multicast ipv6-multicast)], [edit protocols (<i>ospf</i> <i>ospf3</i>)], [edit protocols ospf topology (default ipv4-multicast <i>name</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 ospf topology (default ipv4-multicast <i>name</i>)], [edit routing-instances <i>routing-instance-name</i> protocols ospf3 <i>realm</i> (ipv4-unicast ipv4-multicast ipv6-multicast)],</pre>
Release Information	<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 realm statement introduced in Junos OS Release 9.2.</p> <p>Support for the realm 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>
Description	<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>NOTE: Traffic destined to directly attached interfaces continues to reach the routing device.</p> </div>
Options	<p>timeout <i>seconds</i>—(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 overload statement is deleted or a timeout is set.</p> <p>Range: 60 through 1800 seconds</p> <p>Default: 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	<ul style="list-style-type: none">• 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)

Syntax	<pre> passive { traffic-engineering { remote-node-id address; } } </pre>
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> protocols (ospf ospf3) area <i>area-id</i> interface <i>interface-name</i>],</p> <p>[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>],</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> interface <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-unicast ipv4-multicast ipv6-multicast) area <i>area-id</i> interface <i>interface-name</i>],</p> <p>[edit protocols (ospf ospf3) area <i>area-id</i> interface <i>interface-name</i>],</p> <p>[edit protocols ospf3 realm (ipv4-unicast ipv4-multicast 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> interface <i>interface-name</i>],</p> <p>[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>]</p>
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>traffic-engineering and remote-node-id address statements introduced in Junos OS Release 8.0.</p> <p>traffic-engineering and remote-node-id address 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 realm statement introduced in Junos OS Release 9.2.</p> <p>Support for the realm statement introduced in Junos OS Release 9.2 for EX Series switches.</p>
Description	<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 traffic-engineering 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 interface 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 disable statement. To prevent OSPF from running on an interface, include the passive statement. These three states are mutually exclusive.</p>
Required Privilege Level	<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 71](#)

preference (Protocols OSPF)

Syntax	<code>preference <i>preference</i>;</code>
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> protocols (ospf ospf3)],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 realm (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)],</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)],</p> <p>[edit protocols (ospf ospf3)],</p> <p>[edit protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf ospf3)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast)]</p>
Release Information	<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 realm statement introduced in Junos OS Release 9.2.</p> <p>Support for the realm 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>
Description	Set the route preference for OSPF internal routes.
Options	<p><i>preference</i>—Preference value.</p> <p>Range: 0 through 4,294,967,295 ($2^{32} - 1$)</p> <p>Default: 10</p>
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Example: Controlling OSPF Route Preferences • external-preference on page 75

prefix-export-limit (Protocols OSPF)

Syntax	<code>prefix-export-limit <i>number</i>;</code>
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> protocols (ospf ospf3)],</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 realm (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)],</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 realm (ipv4-unicast ipv4-multicast ipv6-multicast)],</p> <p>[edit protocols (ospf ospf3)],</p> <p>[edit protocols ospf topology (default ipv4-multicast <i>name</i>)],</p> <p>[edit protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf ospf3)],</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 realm (ipv4-unicast ipv4-multicast ipv6-multicast)]</p>
Release Information	<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 realm statement introduced in Junos OS Release 9.2.</p> <p>Support for the realm 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>
Description	Configure a limit to the number of prefixes exported into OSPF.
Options	<p><i>number</i>—Prefix limit.</p> <p>Range: 0 through 4,294,967,295 ($2^{32} - 1$)</p> <p>Default: None</p>
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • Example: Limiting the Number of Prefixes Exported to OSPF • Example: Configuring Multitopology Routing Based on Applications • Example: Configuring Multitopology Routing Based on a Multicast Source


priority (Protocols OSPF)

Syntax	<code>priority <i>number</i>;</code>
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> protocols (ospf ospf3) area <i>area-id</i> interface <i>interface-name</i>],</p> <p>[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>],</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> interface <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-unicast ipv4-multicast ipv6-multicast)] area <i>area-id</i> interface <i>interface-name</i>],</p> <p>[edit protocols (ospf ospf3) area <i>area-id</i> interface <i>interface-name</i>],</p> <p>[edit protocols ospf3 realm (ipv4-unicast ipv4-multicast 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> interface <i>interface-name</i>],</p> <p>[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>]</p>
Release Information	<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 realm statement introduced in Junos OS Release 9.2.</p> <p>Support for the realm statement introduced in Junos OS Release 9.2 for EX Series switches.</p>
Description	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.
Options	<p><i>number</i>—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>Range: 0 through 255</p> <p>Default: 128</p>
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • OSPF Designated Router Overview • Example: Controlling OSPF Designated Router Election

realm

Syntax	<pre>realm (ipv4-unicast ipv4-multicast ipv6-unicast) { area <i>area-id</i> { interface <i>interface-name</i>; } }</pre>
Hierarchy Level	[edit logical-systems <i>logical-system-name</i> protocols ospf3], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf3], [edit protocols ospf3], [edit routing-instances <i>routing-instance-name</i> protocols ospf3]
Release Information	Statement introduced in Junos OS Release 9.2. Statement introduced in Junos OS Release 9.2 for EX Series switches.
Description	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.
Options	<p>ipv4-unicast—Configure a realm for IPv4 unicast routes.</p> <p>ipv4-multicast—Configure a realm for IPv4 multicast routes.</p> <p>ipv6-multicast—Configure a realm for IPv6 multicast routes.</p> <p>The remaining statements are explained separately.</p>
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Example: Configuring Multiple Address Families for OSPFv3

reference-bandwidth (Protocols OSPF)

Syntax	<code>reference-bandwidth <i>reference-bandwidth</i>;</code>
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> protocols (ospf ospf3)],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 realm (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)],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast)],</p> <p>[edit protocols (ospf ospf3)],</p> <p>[edit protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf ospf3)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast)]</p>
Release Information	<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 realm statement introduced in Junos OS Release 9.2.</p> <p>Support for the realm 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>
Description	<p>Set the reference bandwidth used in calculating the default interface cost. The cost is calculated using the following formula:</p> $\text{cost} = \text{ref-bandwidth} / \text{bandwidth}$
Options	<p>reference-bandwidth—Reference bandwidth, in bits per second.</p> <p>Range: 9600 through 1,000,000,000,000 bits</p> <p>Default: 100 Mbps (100,000,000 bits)</p>
<div>  <p>NOTE: 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>	
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> Example: Controlling the Cost of Individual OSPF Network Segments metric on page 88

retransmit-interval (OSPF)

Syntax	<code>retransmit-interval seconds;</code>
Hierarchy Level	<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> interface <i>interface-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols (ospf ospf3) area <i>area-id</i> virtual-link],</p> <p>[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>],</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> 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> virtual-link],</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> interface <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> interface <i>interface-name</i>],</p> <p>[edit protocols (ospf ospf3) area <i>area-id</i> virtual-link],</p> <p>[edit protocols ospf3 realm (ipv4-unicast ipv4-multicast 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> interface <i>interface-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf ospf3) area <i>area-id</i> virtual-link],</p> <p>[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>]</p>
Release Information	<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 realm statement introduced in Junos OS Release 9.2.</p> <p>Support for the realm statement introduced in Junos OS Release 9.2 for EX Series switches.</p>
Description	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.
Options	<p>seconds—Interval to wait.</p> <p>Range: 1 through 65,535 seconds</p> <p>Default: 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 Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Example: Configuring OSPF Timers • Configuring RSVP and OSPF for LMP Peer Interfaces

rib-group (Protocols OSPF)

Syntax	<code>rib-group group-name;</code>
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> protocols (ospf ospf3)], [edit logical-systems <i>logical-system-name</i> protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast)], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (ospf ospf3)], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast)], [edit protocols (ospf ospf3)], [edit protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast)], [edit routing-instances <i>routing-instance-name</i> protocols (ospf ospf3)], [edit routing-instances <i>routing-instance-name</i> protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast)]</p>
Release Information	<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 realm statement introduced in Junos OS Release 9.2.</p> <p>Support for the realm 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>
Description	Install routes learned from OSPF routing instances into routing tables in the OSPF routing table group.
Options	group-name —Name of the routing table group.
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> • Example: Exporting Specific Routes from One Routing Table Into Another Routing Table • Example: Importing Direct and Static Routes Into a Routing Instance • Understanding Multiprotocol BGP • interface-routes • rib-group

route-type-community

Syntax	<code>route-type-community (iana vendor);</code>
Hierarchy Level	[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (ospf ospf3)], [edit routing-instances <i>routing-instance-name</i> protocols (ospf ospf3)]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Statement introduced in Junos OS Release 12.3 for ACX Series routers.
Description	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.
Options	iana —Encode a route type with the value 0x0306 . This is the default value. vendor —Encode the route type with the value 0x8000 .
Required Privilege Level	routing —To view this statement in the configuration. routing-control —To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">Configuring Routing Between PE and CE Routers in Layer 3 VPNs

shortcuts (Protocols OSPF)

Syntax	shortcuts { lsp-metric-into-summary; }
Hierarchy Level	[edit logical-systems <i>logical-system-name</i> protocols (ospf ospf3) traffic-engineering], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (ospf ospf3) traffic-engineering], [edit protocols (ospf ospf3) traffic-engineering], [edit routing-instances <i>routing-instance-name</i> protocols (ospf ospf3) traffic-engineering]
Release Information	Statement introduced before Junos OS Release 7.4. Statement introduced in Junos OS Release 9.0 for EX Series switches. Support for OSPFv3 (ospf3) introduced in Junos OS Release 9.4. Support for OSPFv3 (ospf3) introduced in Junos OS Release 9.4 for EX Series switches.
Description	Configure OSPF to use MPLS label-switched paths (LSPs) as shortcut next hops. By default, shortcut routes calculated through OSPFv2 are installed in the inet.3 routing table, and shortcut routes calculated through OSPFv3 are installed in the inet6.3 routing table.
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none"> Example: Enabling OSPF Traffic Engineering Support

spf-options (Protocols OSPF)

Syntax	<pre> spf-options { delay <i>milliseconds</i>; holddown <i>milliseconds</i>; rapid-runs <i>number</i>; } </pre>
Hierarchy Level	<pre> [edit logical-systems <i>logical-system-name</i> protocols (ospf ospf3)], [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 realm (ipv4-unicast ipv4-multicast ipv6-multicast)], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (ospf ospf3)], [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 realm (ipv4-unicast ipv4-multicast ipv6-multicast)], [edit protocols (ospf ospf3)], [edit protocols ospf topology (default ipv4-multicast <i>name</i>)], [edit protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast)], [edit routing-instances <i>routing-instance-name</i> protocols (ospf ospf3)], [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 realm (ipv4-unicast ipv4-multicast ipv6-multicast)] </pre>
Release Information	<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 realm statement introduced in Junos OS Release 9.2.</p> <p>Support for the realm 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>
Description	<p>Configure options for running the shortest-path-first (SPF) algorithm. You can configure the following:</p> <ul style="list-style-type: none"> • 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. • A hold-down interval after the SPF algorithm runs the maximum number of times. <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>

Options	delay <i>milliseconds</i> —Time interval between the detection of a topology change and when the SPF algorithm runs. Range: 50 through 8000 milliseconds Default: 200 milliseconds
	holddown <i>milliseconds</i> —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. Range: 2000 through 20,000 milliseconds Default: 5000 milliseconds
	rapid-runs <i>number</i> —Maximum number of times the SPF algorithm can run in succession. After the maximum is reached, the hold down interval begins. Range: 1 through 10 Default: 3
Required Privilege Level	routing—To view this statement in the configuration. routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Example: Configuring SPF Algorithm Options for OSPF• Example: Configuring Multitopology Routing Based on Applications• Example: Configuring Multitopology Routing Based on a Multicast Source


stub

Syntax	stub <default-metric <i>metric</i> > <(no-summaries summaries)>;
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> protocols (ospf ospf3) area area-id],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 realm (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) area area-id],</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)],</p> <p>[edit protocols (ospf ospf3) area area-id],</p> <p>[edit protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf ospf3) area area-id],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast)]</p>
Release Information	<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 realm statement introduced in Junos OS Release 9.2.</p> <p>Support for the realm statement introduced in Junos OS Release 9.2 for EX Series switches.</p>
Description	<p>Specify that this area not be flooded with AS external link-state advertisements (LSAs). You must include the stub 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>
Options	<p>no-summaries—(Optional) Do not advertise routes into the stub area. If you include the default-metric option, only the default route is advertised.</p> <p>summaries—(Optional) Flood summary LSAs into the stub area.</p> <p>The remaining statement is explained separately.</p>
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • OSPF Areas and Router Functionality Overview • Example: Configuring OSPF Stub and Totally Stubby Areas • nssa on page 93

summaries

Syntax	(summaries no-summaries);
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> protocols (ospf ospf3) area area-id nssa],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 realm (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) area area-id nssa],</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 nssa</i>],</p> <p>[edit protocols (ospf ospf3) area area-id nssa],</p> <p>[edit protocols ospf3 realm (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) area area-id nssa],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast) area <i>area-id nssa</i>]</p>
Release Information	<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 realm statement introduced in Junos OS Release 9.2.</p> <p>Support for the realm statement introduced in Junos OS Release 9.2 for EX Series switches.</p>
Description	<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"> • summaries—Flood summary link-state advertisements (LSAs) into the NSSA. • no-summaries—Prevent area border routers from advertising summaries into an NSSA. If default-metric is configured for an NSSA, a Type 3 LSA is injected into the area by default.
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • OSPF Areas and Router Functionality Overview • Example: Configuring OSPF Not-So-Stubby Areas • nssa on page 93 • stub on page 110

traceoptions (Protocols OSPF)

Syntax	<pre>traceoptions { file <i>filename</i> <files <i>number</i>> <size <i>size</i>> <world-readable no-world-readable>; flag <i>flag</i> <flag-modifier> <disable>; }</pre>
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> protocols (ospf ospf3)],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols ospf3 realm (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)],</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)],</p> <p>[edit protocols (ospf ospf3)],</p> <p>[edit protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf ospf3)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast)]</p>
Release Information	<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 realm statement introduced in Junos OS Release 9.2.</p> <p>Support for the realm 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>
Description	<p>Configure OSPF protocol-level tracing options.</p> <p>To specify more than one tracing operation, include multiple flag statements.</p>
	<div>  <p>NOTE: The traceoptions statement is not supported on QFabric systems.</p> </div>
Default	The default OSPF protocol-level tracing options are those inherited from the routing protocols traceoptions statement included at the [edit routing-options] hierarchy level.
Options	<p>disable—(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 all.</p> <p>file <i>filename</i>—Name of the file to receive the output of the tracing operation. Enclose the name within quotation marks. All files are placed in the directory /var/log. We recommend that you place OSPF tracing output in the file ospf-log.</p> <p>files <i>number</i>—(Optional) Maximum number of trace files. When a trace file named trace-file reaches its maximum size, it is renamed trace-file.0, then trace-file.1, 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.

Required Privilege Level	routing and trace—To view this statement in the configuration. routing-control and trace-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Example: Tracing OSPF Protocol Traffic

traffic-engineering (OSPF)

Syntax	<pre> traffic-engineering { <advertise-unnumbered-interfaces>; <credibility-protocol-preference>; ignore-lsp-metrics; multicast-rpf-routes; no-topology; shortcuts { lsp-metric-into-summary; } } </pre>
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> protocols (ospf ospf3)],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols (ospf ospf3)],</p> <p>[edit protocols (ospf ospf3)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf ospf3)]</p>
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>multicast-rpf-routes option introduced in Junos OS Release 7.5.</p> <p>advertise-unnumbered-interfaces 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 (ospf3) introduced in Junos OS Release 9.4.</p> <p>Support for OSPFv3 (ospf3) introduced in Junos OS Release 9.4 for EX Series switches.</p> <p>credibility-protocol-preference statement introduced in Junos OS Release 9.4.</p> <p>credibility-protocol-preference 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>advertise-unnumbered-interfaces—(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>credibility-protocol-preference—(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,</p>

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.

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.

Required Privilege Level	routing—To view this statement in the configuration.
	routing-control—To add this statement to the configuration.
Related Documentation	<ul style="list-style-type: none">• Example: Enabling OSPF Traffic Engineering Support

transit-delay (OSPF)

Syntax	<code>transit-delay seconds;</code>
Hierarchy Level	<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> interface <i>interface-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols (ospf ospf3) area <i>area-id</i> virtual-link],</p> <p>[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>],</p> <p>[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>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols ospf area <i>area-id</i> virtual-link],</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> interface <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> interface <i>interface-name</i>],</p> <p>[edit protocols (ospf ospf3) area <i>area-id</i> virtual-link],</p> <p>[edit protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast)] area <i>area-id</i> interface <i>interface-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf area <i>area-id</i> interface <i>interface-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols ospf area <i>area-id</i> virtual-link],</p> <p>[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>]</p>
Release Information	<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 realm statement introduced in Junos OS Release 9.2.</p> <p>Support for the realm statement introduced in Junos OS Release 9.2 for EX Series switches.</p>
Description	<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>
Options	<p>seconds—Estimated time, in seconds.</p> <p>Range: 1 through 65,535 seconds</p> <p>Default: 1 second</p>
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> Example: Configuring OSPF Timers Configuring RSVP and OSPF for LMP Peer Interfaces

type-7

Syntax	type-7;
Hierarchy Level	<p>[edit logical-systems <i>logical-system-name</i> protocols (ospf ospf3) area <i>area-id</i> nssa default-lsa],</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 default-lsa],</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 default-lsa],</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 default-lsa],</p> <p>[edit protocols (ospf ospf3) area <i>area-id</i> nssa default-lsa],</p> <p>[edit protocols ospf3 realm (ipv4-unicast ipv4-multicast ipv6-multicast) area <i>area-id</i> nssa default-lsa],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols (ospf ospf3) area <i>area-id</i> nssa default-lsa],</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 default-lsa]</p>
Release Information	<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 realm statement introduced in Junos OS Release 9.2.</p> <p>Support for the realm statement introduced in Junos OS Release 9.2 for EX Series switches.</p>
Description	<p>Flood Type 7 default link-state advertisements (LSAs) if the no-summaries statement is configured.</p> <p>By default, when the no-summaries 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 type-7 statement. This statement enables NSSA ABRs to advertise a Type 7 default LSA into the NSSA if you have also included the no-summaries statement in the configuration.</p>
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • OSPF Areas and Router Functionality Overview • Example: Configuring OSPF Not-So-Stubby Areas • no-summaries on page 111

virtual-link

Syntax	<pre>virtual-link neighbor-id <i>router-id</i> transit-area <i>area-id</i> { disable; authentication key <key-id identifier>; 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>
Hierarchy Level	<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>
Release Information	<p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p>
Description	<p>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.</p>
Options	<p>neighbor-id <i>router-id</i>—IP address of the routing device at the remote end of the virtual link.</p> <p>transit-area <i>area-id</i>—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>
Required Privilege Level	<p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>
Related Documentation	<ul style="list-style-type: none"> • OSPF Areas and Router Functionality Overview • Example: Configuring OSPF Virtual Links

PART 3

Administration

- [Operational Commands on page 123](#)

CHAPTER 3

Operational Commands

clear (ospf | ospf3) database

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*, **area** *area-id*, **asbrsummary**, **external**, **inter-area-prefix**, **inter-area-router**, **intra-area-prefix**, **link-local**, **lsa-id** *lsa-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.
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.

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. You can also use the **purge** command with any of the options to discard rather than delete the specified LSA entries.



CAUTION: 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**)—(Optional) 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—(Optional) Discard summary network LSAs.

network—(Optional) Discard network LSAs.

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

opaque-area—(Optional) Discard opaque area-scope LSAs.

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—(Optional) Discard router LSAs.

purge—(Optional) 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.

Required Privilege Level

clear

Related Documentation

- [show ospf database on page 167](#)
- [show ospf3 database on page 176](#)

List of Sample Output [clear ospf database on page 126](#)

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

Syntax	clear (ospf ospf3) io-statistics <logical-system (all <i>logical-system-name</i>)>
Syntax (EX Series Switch and QFX Series)	clear (ospf ospf3) io-statistics
Release Information	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches. Command introduced in Junos OS Release 11.3 for the QFX Series.
Description	Clear Open Shortest Path First (OSPF) input and output statistics.
Options	none —Clear OSPF input and output statistics. logical-system (all <i>logical-system-name</i>) —(Optional) Perform this operation on all logical systems or on a particular logical system.
Required Privilege Level	clear
List of Sample Output	clear ospf io-statistics on page 127
Output Fields	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

Syntax	clear (ospf ospf3) neighbor <area <i>area-id</i> > <instance <i>instance-name</i> > <interface <i>interface-name</i> > <logical-system (all <i>logical-system-name</i>)> <neighbor> <realm (ipv4-multicast ipv4-unicast ipv6-multicast)>
Syntax (EX Series Switch and QFX Series)	clear (ospf ospf3) neighbor <area <i>area-id</i> > <instance <i>instance-name</i> > <interface <i>interface-name</i> > <neighbor>
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. Command introduced in Junos OS Release 11.3 for the QFX Series.
Description	Tear down Open Shortest Path First (OSPF) neighbor connections.
Options	none —Tear down OSPF connections with all neighbors for all routing instances. area <i>area-id</i> —(Optional) Tear down neighbor connections for the specified area only. instance <i>instance-name</i> —(Optional) Tear down neighbor connections for the specified routing instance only. interface <i>interface-name</i> —(Optional) Tear down neighbor connections for the specified interface only. logical-system (all <i>logical-system-name</i>) —(Optional) Perform this operation on all logical systems or on a particular logical system. neighbor —(Optional) Clear the state of the specified neighbor only. realm (ipv4-multicast ipv4-unicast ipv6-multicast) —(Optional) (OSPFv3 only) Clear the state of 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	clear
Related Documentation	<ul style="list-style-type: none">• show (ospf ospf3) neighbor on page 145
List of Sample Output	clear ospf neighbor on page 129
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

Syntax	clear (ospf ospf3) statistics <instance <i>instance-name</i> > <logical-system (all <i>logical-system-name</i>)> <realm (ipv4-multicast ipv4-unicast ipv6-multicast)>
Syntax (EX Series Switch and QFX Series)	clear (ospf ospf3) statistics <instance <i>instance-name</i> >
Release Information	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches. realm 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	none —Clear OSPF statistics. instance <i>instance-name</i> —(Optional) Clear statistics for the specified routing instance only. logical-system (all <i>logical-system-name</i>) —(Optional) Perform this operation on all logical systems or on a particular logical system. realm (ipv4-multicast ipv4-unicast ipv6-multicast) —(Optional) (OSPFv3 only) Clear statistics 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	clear
Related Documentation	<ul style="list-style-type: none">• show (ospf ospf3) statistics on page 163
List of Sample Output	clear ospf statistics on page 131
Output Fields	See show (ospf ospf3) statistics 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

Syntax	clear (ospf ospf3) overload <instance <i>instance-name</i> > <logical-system (all <i>logical-system-name</i>)>
Syntax (EX Series Switches)	clear (ospf ospf3) overload <instance <i>instance-name</i> >
Release Information	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches. Command introduced in Junos OS Release 11.3 for the QFX Series.
Description	Clear the Open Shortest Path First (OSPF) overload bit and rebuild link-state advertisements (LSAs).
Options	none —Clear the overload bit and rebuild LSAs for all routing instances. instance <i>instance-name</i> —(Optional) Clear the overload bit and rebuild LSAs for the specified routing instance only. logical-system (all <i>logical-system-name</i>) —(Optional) Perform this operation on all logical systems or on a particular logical system.
Required Privilege Level	clear
List of Sample Output	clear ospf overload on page 132
Output Fields	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

Syntax	<pre>show (ospf ospf3) interface <brief detail extensive> <area <i>area-id</i>> <interface-name> <instance <i>instance-name</i>> <logical-system (all <i>logical-system-name</i>)> <realm (ipv4-multicast ipv4-unicast ipv6-multicast)></pre>
Syntax (EX Series Switches and QFX Series)	<pre>show (ospf ospf3) interface <brief detail extensive> <area <i>area-id</i>> <interface-name> <instance <i>instance-name</i>></pre>
Release Information	<p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>area option introduced in Junos OS Release 9.2.</p> <p>area option introduced in Junos OS Release 9.2 for EX Series switches.</p> <p>realm option introduced in Junos OS Release 9.2.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>
Description	Display the status of OSPF interfaces.
Options	<p>none—Display standard information about the status of all OSPF interfaces for all routing instances</p> <p>brief detail extensive—(Optional) Display the specified level of output.</p> <p>area <i>area-id</i>—(Optional) Display information about the interfaces that belong to the specified area.</p> <p><i>interface-name</i>—(Optional) Display information for the specified interface.</p> <p>instance <i>instance-name</i>—(Optional) Display all OSPF interfaces under the named routing instance.</p> <p>logical-system (all <i>logical-system-name</i>)—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p>realm (ipv4-multicast ipv4-unicast ipv6-multicast)—(OSPFv3 only) (Optional) Display information about the interfaces 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.</p>
Required Privilege Level	view
List of Sample Output	<p>show ospf interface brief on page 136</p> <p>show ospf interface detail on page 136</p> <p>show ospf3 interface detail on page 136</p>

[show ospf interface detail \(When Multiarea Adjacency Is Configured\) on page 136](#)

[show ospf interface area area-id on page 137](#)

[show ospf interface extensive \(When Flooding Reduction Is Enabled\) on page 137](#)

[show ospf interface extensive \(When LDP Synchronization Is Configured\) on page 138](#)

Output Fields Table 36 on page 134 lists the output fields for the **show (ospf | ospf3) interface** command. Output fields are listed in the approximate order in which they appear.

Table 36: show (ospf | ospf3) interface Output Fields

Field Name	Field Description	Level of Output
Interface	Name of the interface running OSPF version 2 or OSPF version 3.	All levels
State	State of the interface: BDR , Down , DR , DRother , Loop , PtToPt , or Waiting .	All levels
Area	Number of the area that the interface is in.	All levels
DR ID	Address of the area's designated router.	All levels
BDR ID	Backup designated router for a particular subnet.	All levels
Nbrs	Number of neighbors on this interface.	All levels
Type	Type of interface: LAN , NBMA , P2MP , P2P , or Virtual .	detail extensive
Address	IP address of the neighbor.	detail extensive
Mask	Netmask of the neighbor.	detail extensive
Prefix-length	(OSPFv3) IPv6 prefix length, in bits.	detail extensive
OSPF3-Intf-Index	(OSPFv3) OSPF version 3 interface index.	detail extensive
MTU	Interface maximum transmission unit (MTU).	detail extensive
Cost	Interface cost (metric).	detail extensive
DR addr	Address of the designated router.	detail extensive
BDR addr	Address of the backup designated router.	detail extensive
Adj count	Number of adjacent neighbors.	detail extensive
Secondary	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.	detail extensive
Flood Reduction	Indicates that this interface is configured with flooding reduction. All self-originated LSAs from this interface are initially sent with the DoNotAge bit set. As a result, LSAs are refreshed only when a change occurs.	extensive

Table 36: show (ospf | ospf3) interface Output Fields (*continued*)

Field Name	Field Description	Level of Output
Priority	Router priority used in designated router (DR) election on this interface.	detail extensive
Flood list	List of link-state advertisements (LSAs) that might be about to flood this interface.	extensive
Ack list	Acknowledgment list. List of pending acknowledgments on this interface.	extensive
Descriptor list	List of packet descriptors.	extensive
Hello	Configured value for the hello timer.	detail extensive
Dead	Configured value for the dead timer.	detail extensive
Auth type	(OSPFv2) Authentication mechanism for sending and receiving OSPF protocol packets: <ul style="list-style-type: none"> • MD5—The MD5 mechanism is configured in accordance with RFC 2328. • None—No authentication method is configured. • Password—A simple password (RFC 2328) is configured. 	detail extensive
Topology	(Multiarea adjacency) Name of topology: default or name .	
LDP sync state	(OSPFv2 and LDP synchronization) Current state of LDP synchronization: in sync , in holddown , and not supported .	extensive
reason	(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.	extensive
config holdtime	(OSPFv2 and LDP synchronization) Configured value of the hold timer. If the state is not synchronized, and the hold time is not infinity, the remaining field displays the number of seconds that remain until the configured hold timer expires.	extensive
IPSec SA name	(OSPFv2) Name of the IPSec security association name.	detail extensive
Active key ID	(OSPFv2 and MD5) Number from 0 to 255 that uniquely identifies an MD5 key.	detail extensive
Start time	(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 Start time 1970 Jan 01 00:00:00 PST .	detail extensive
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

Interface	State	Area	DR ID	BDR ID	Nbrs
tl-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

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: 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

Interface	State	Area	DR ID	BDR ID	Nbrs
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

Interface	State	Area	DR ID	BDR ID	Nbrs
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

Syntax	show (ospf ospf3) io-statistics <logical-system (all <i>logical-system-name</i>)>
Syntax (EX Series Switch and QFX Series)	show (ospf ospf3) io-statistics
Release Information	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches. Command introduced in Junos OS Release 11.3 for the QFX Series.
Description	Display Open Shortest Path First (OSPF) input and output statistics.
Options	<p>none—Display OSPF input and output statistics.</p> <p>logical-system (all <i>logical-system-name</i>)—(Optional) Perform this operation on all logical systems or on a particular logical system.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> • clear (ospf ospf3) statistics on page 130
List of Sample Output	show ospf io-statistics on page 140
Output Fields	Table 37 on page 139 lists the output fields for the show ospf io-statistics command. Output fields are listed in the approximate order in which they appear.

Table 37: 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

Syntax	show (ospf ospf3) log <instance <i>instance-name</i> > <logical-system (all <i>logical-system-name</i>)> <realm (ipv4-multicast ipv4-unicast ipv6-multicast)> <topology <i>topology-name</i> >
Syntax (EX Series Switch and QFX Series)	show (ospf ospf3) log <instance <i>instance-name</i> > <topology <i>topology-name</i> >
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	<p>none—Display entries in the OSPF log of SPF calculations for all routing instances.</p> <p>instance <i>instance-name</i>—(Optional) Display entries for the specified routing instance.</p> <p>logical-system (all <i>logical-system-name</i>)—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p>topology <i>topology-name</i>—(Optional) (OSPFv2 only) Display entries for the specified topology.</p> <p>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.</p>
Required Privilege Level	view
List of Sample Output	show ospf log on page 143 show ospf log topology voice on page 143
Output Fields	Table 38 on page 141 lists the output fields for the show (ospf ospf3) log command. Output fields are listed in the approximate order in which they appear.

Table 38: show (ospf | ospf3) log Output Fields

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

Table 38: 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

Syntax	<pre>show (ospf ospf3) neighbor <brief detail extensive> <area <i>area-id</i>> <instance (all <i>instance-name</i>)> <interface <i>interface-name</i>> <logical-system (all <i>logical-system-name</i>)> <neighbor> <realm (ipv4-multicast ipv4-unicast ipv6-multicast)></pre>
Syntax (EX Series Switches and QFX Series)	<pre>show (ospf ospf3) neighbor <brief detail extensive> <area <i>area-id</i>> <instance (all <i>instance-name</i>)> <interface <i>interface-name</i>> <neighbor></pre>
Release Information	<p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>instance all option introduced in Junos OS Release 9.1.</p> <p>instance all option introduced in Junos OS Release 9.1 for EX Series switches.</p> <p>area, interface, and realm options introduced in Junos OS Release 9.2.</p> <p>area and interface options introduced in Junos OS Release 9.2 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>
Description	<p>Display information about OSPF neighbors.</p> <p>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.</p>
Options	<p>none—Display standard information about all OSPF neighbors for all routing instances.</p> <p>brief detail extensive—(Optional) Display the specified level of output.</p> <p>area <i>area-id</i>—(Optional) Display information about the OSPF neighbors for the specified area.</p> <p>instance (all <i>instance-name</i>)—(Optional) Display all OSPF interfaces for all routing instances or under the named routing instance.</p> <p>interface <i>interface-name</i>—(Optional) Display information about OSPF neighbors for the specified logical interface.</p> <p>logical-system (all <i>logical-system-name</i>)—(Optional) Perform this operation on all logical systems or on a particular logical system.</p>

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 128](#)

List of Sample Output

- [show ospf neighbor brief on page 149](#)
- [show ospf neighbor detail on page 149](#)
- [show ospf neighbor extensive on page 149](#)
- [show ospf3 neighbor detail on page 150](#)
- [show ospf neighbor area area-id on page 150](#)
- [show ospf neighbor interface interface-name on page 150](#)
- [show ospf3 neighbor instance all \(OSPFv3 Multiple Family Address Support Enabled\) on page 151](#)

Output Fields [Table 39 on page 146](#) lists the output fields for the **show (ospf | ospf3) neighbor** command. Output fields are listed in the approximate order in which they appear.

Table 39: show (ospf | ospf3) neighbor Output Fields

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

Table 39: show (ospf | ospf3) neighbor Output Fields (*continued*)

Field Name	Field Description	Level of Output
State	<p>State of the neighbor:</p> <ul style="list-style-type: none"> • Attempt—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. • Down—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 Down state, although at a reduced frequency. • Exchange—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. • ExStart—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. • Full—Neighboring routing devices are fully adjacent. These adjacencies appear in router link and network link advertisements. • Init—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. • Loading—Link-state request packets are sent to the neighbor to acquire more recent advertisements that have been discovered (but not yet received) in the Exchange state. • 2Way—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 2Way or greater. 	All levels
ID	Router ID of the neighbor.	All levels
Pri	Priority of the neighbor to become the designated router.	All levels
Dead	Number of seconds until the neighbor becomes unreachable.	All levels
Link state acknowledgment list	Number of link-state acknowledgments received.	extensive
Link state retransmission list	<p>Total number of link-state advertisements retransmitted. For extensive output only, the following information is also displayed:</p> <ul style="list-style-type: none"> • Type—Type of link advertisement: ASBR, Sum, Extern, Network, NSSA, OpaqArea, Router, or Summary. • LSA ID—LSA identifier included in the advertisement. An asterisk preceding the identifier marks database entries that originated from the local routing device. • Adv rtr—Address of the routing device that sent the advertisement. • Seq—Link sequence number of the advertisement. 	detail extensive

Table 39: show (ospf | ospf3) neighbor Output Fields (*continued*)

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

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, retransmit DBD in 2 sec
retransmit 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

Syntax	show (ospf ospf3) overview <brief extensive> <instance <i>instance-name</i> > <logical-system (all <i>logical-system-name</i>)> <realm (ipv4-multicast ipv4-unicast ipv6-multicast)>
Syntax (EX Series Switch and QFX Series)	show (ospf ospf3) overview <brief extensive> <instance <i>instance-name</i> >
Release Information	Command introduced in 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. Database protection introduced in Junos 10.2. Command introduced in Junos OS Release 11.3 for the QFX Series.
Description	Display Open Shortest Path First (OSPF) overview information.
Options	<p>none—Display standard information about all OSPF neighbors for all routing instances.</p> <p>brief extensive—(Optional) Display the specified level of output.</p> <p>instance <i>instance-name</i>—(Optional) Display all OSPF interfaces under the named routing instance.</p> <p>logical-system (all <i>logical-system-name</i>)—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p>realm (ipv4-multicast ipv4-unicast ipv6-multicast)—(Optional) (OSPFv3 only) Display information about 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.</p>
Required Privilege Level	view
List of Sample Output	show ospf overview on page 155 show ospf overview (With Database Protection) on page 155 show ospf3 overview (With Database Protection) on page 155 show ospf overview extensive on page 156
Output Fields	Table 40 on page 152 lists the output fields for the show ospf overview command. Output fields are listed in the approximate order in which they appear.

Table 40: show ospf overview Output Fields

Field name	Field Description	Level of Output
Instance	OSPF routing instance.	All levels

Table 40: show ospf overview Output Fields (*continued*)

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

Table 40: 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): enabled or disabled .	All levels
Restart-signaling helper mode	(OSPFv2) Restart signaling-based graceful restart helper capability (based on RFC 4811, RFC 4812, and RFC 4813): enabled or disabled .	All levels
Helper mode	(OSPFv3) Graceful restart helper capability: enabled or disabled .	All levels
Trace options	OSPF-specific trace options.	extensive
Trace file	Name of the file to receive the output of the tracing operation.	extensive
Area	Area number. Area 0.0.0.0 is the backbone area.	All levels
Stub type	Stub type of area: Normal Stub , Not Stub , or Not so Stubby Stub .	All levels
Authentication Type	Type of authentication: None , Password , or MD5 . NOTE: The Authentication Type field refers to the authentication configured at the [edit protocols ospf area area-id] 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

Syntax	<pre>show (ospf ospf3) route <brief detail extensive> <abr asbr extern inter intra> <destination> <instance (default ipv4-multicast <i>instance-name</i>)> <logical-system (default ipv4-multicast <i>logical-system-name</i>)> <network> <no-backup-coverage> <realm (ipv4-multicast ipv4-unicast ipv6-multicast)> <router> <topology (default ipv4-multicast <i>topology-name</i>)> <transit></pre>
Syntax (EX Series Switch and QFX Series)	<pre>show (ospf ospf3) route <brief detail extensive> <abr asbr extern inter intra> <destination> <instance <i>instance-name</i> <network> <no-backup-coverage> <router> <topology (default ipv4-multicast <i>topology-name</i>)> <transit></pre>
Release Information	<p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>topology option introduced in Junos OS Release 9.0.</p> <p>realm option introduced in Junos OS Release 9.2.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>
Description	Display the entries in the Open Shortest Path First (OSPF) routing table.
Options	<p>none—Display standard information about all entries in the OSPF routing table for all routing instances and all topologies.</p> <p>destination—Display routes to the specified IP address (with optional destination prefix length).</p> <p>brief detail extensive—(Optional) Display the specified level of output.</p> <p>abr—(Optional) Display routes to area border routers.</p> <p>asbr—(Optional) Display routes to autonomous system border routers.</p> <p>extern—(Optional) Display external routes.</p> <p>inter—(Optional) Display interarea routes.</p> <p>intra—(Optional) Display intra-area routes.</p>

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 161](#)
[show ospf route detail on page 161](#)
[show ospf3 route on page 161](#)
[show ospf3 route detail on page 161](#)
[show ospf route topology voice on page 162](#)

Output Fields [Table 41 on page 158](#) list the output fields for the **show (ospf | ospf3) route** command. Output fields are listed in the approximate order in which they appear.

Table 41: show (ospf | ospf3) route Output Fields

Field Name	Field Description	Output Level
Topology	Name of the topology.	All levels
Prefix	Destination of the route.	All levels
Path type	How the route was learned: <ul style="list-style-type: none"> • Inter—Interarea route • Ext1—External type 1 route • Ext2—External type 2 route • Intra—Intra-area route 	All levels

Table 41: show (ospf | ospf3) route Output Fields (*continued*)

Field Name	Field Description	Output Level
Route type	The type of routing device from which the route was learned: <ul style="list-style-type: none"> • AS BR—Route to AS border router. • Area BR—Route to area border router. • Area/AS BR—Route to router that is both an Area BR and AS BR. • Network—Network router. • Router—Route to a router that is neither an Area BR nor an AS BR. • Transit—(OSPFv3 only) Route to a pseudonode representing a transit network, LAN, or nonbroadcast multiaccess (NBMA) link. • Discard—Route to a summary discard. 	All levels
NH Type	Next-hop type: LSP or IP .	All levels
Metric	Route's metric value.	All levels
NH-interface	(OSPFv3 only) Interface through which the route's next hop is reachable.	All levels
NH-addr	(OSPFv3 only) IPv6 address of the next hop.	All levels
NextHop Interface	(OSPFv2 only) Interface through which the route's next hop is reachable.	All levels
Nexthop addr/label	(OSPFv2 only) If the NH Type is IP , then it is the address of the next hop. If the NH Type is LSP , then it is the name of the label-switched path.	All levels
Area	Area ID of the route.	detail
Origin	Router from which the route was learned.	detail
Type 7	Route was learned through a not-so-stubby area (NSSA) link-state advertisement (LSA).	detail
P-bit	Route was learned through NSSA LSA and the propagate bit was set.	detail
Fwd NZ	Forwarding address is nonzero. Fwd NZ is only displayed if the route is learned through an NSSA LSA.	detail
optional-capability	Optional capabilities propagated in the router LSA. This field is in the output for intra-area router routes only (when Route Type is Area BR , AS BR , Area/AS BR , or Router), not for interarea router routes or network routes. Three bits in this field are defined as follows: <ul style="list-style-type: none"> • 0x4 (V)—Routing device is at the end of a virtual active link. • 0x2 (E)—Routing device is an autonomous system boundary router. • 0x1 (B)—Routing device is an area border router. 	detail

Table 41: show (ospf | ospf3) route Output Fields (*continued*)

Field Name	Field Description	Output Level
priority	The priority assigned to the prefix: <ul style="list-style-type: none">• high• medium• low <p>NOTE: The priority field applies only to routes of type Network.</p>	detail

Sample Output

show ospf route

```
user@host> show ospf route
```

Prefix	Path Type	Route Type	NH Type	Metric	NextHop Interface	Nexthop 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	lsp-ab

show ospf route detail

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

Topology default Route Table:

Prefix	Path Type	Route Type	NH Type	Metric	NextHop Interface	Nexthop 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 Type	Route Type	NH Type	Metric	NextHop Interface	Nexthop 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    Route    NH    Metric  NextHop    Nexthop
                Type    Type     Type
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

Syntax	show (ospf ospf3) statistics <instance <i>instance-name</i> > <logical-system (all <i>logical-system-name</i>)> <realm (ipv4-multicast ipv4-unicast ipv6-multicast)>
Syntax (EX Series Switch and QFX Series)	show (ospf ospf3) statistics <instance <i>instance-name</i> >
Release Information	Command introduced before Junos OS Release 7.4. Command introduced in Junos OS Release 9.0 for EX Series switches. realm option introduced in Junos OS Release 9.2. Command introduced in Junos OS Release 11.3 for the QFX Series.
Description	Display OSPF statistics.
Options	<p>none—Display OSPF statistics for all routing instances.</p> <p>instance <i>instance-name</i>—(Optional) Display all statistics for the specified routing instance.</p> <p>logical-system (all <i>logical-system-name</i>)—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p>realm (ipv4-multicast ipv4-unicast ipv6-multicast)—(Optional) (OSPFv3 only) Display all statistics 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.</p>
Required Privilege Level	view
Related Documentation	<ul style="list-style-type: none"> clear (ospf ospf3) statistics on page 130
List of Sample Output	show ospf statistics on page 165 show ospf statistics logical-system all on page 165 show ospf3 statistics on page 166
Output Fields	Table 42 on page 163 lists the output fields for the show (ospf ospf3) statistics command. Output fields are listed in the approximate order in which they appear.

Table 42: 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.
Last 5 seconds Sent/Last 5 seconds Received	Total number of packets sent and received in the last 5 seconds.

Table 42: show (ospf | ospf3) statistics Output Fields (*continued*)

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

                   Last 5 seconds
                   Sent      Received
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

                   Last 5 seconds
                   Sent      Received
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

Syntax	<pre>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></pre>
Syntax (EX Series Switches and QFX Series)	<pre>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></pre>
Release Information	<p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>advertising-router self (address self) option introduced in Junos OS Release 9.5.</p> <p>advertising-router self (address self) option introduced in Junos OS Release 9.5 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>
Description	Display the entries in the OSPF version 2 (OSPFv2) link-state database, which contains data about link-state advertisement (LSA) packets.
Options	<p>none—Display standard information about entries in the OSPFv2 link-state database for all routing instances.</p> <p>brief detail extensive summary—(Optional) Display the specified level of output.</p> <p>advertising-router (address self)—(Optional) Display the LSAs advertised either by a particular routing device or by this routing device.</p> <p>area area-id—(Optional) Display the LSAs in a particular area.</p>

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 124](#)

List of Sample Output

[show ospf database on page 171](#)
[show ospf database brief on page 171](#)
[show ospf database detail on page 171](#)
[show ospf database extensive on page 172](#)
[show ospf database summary on page 175](#)

Output Fields

[Table 43 on page 168](#) describes the output fields for the **show ospf database** command. Output fields are listed in the approximate order in which they appear.

Table 43: show ospf database Output Fields

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

Table 43: show ospf database Output Fields (*continued*)

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

Table 43: show ospf database Output Fields (*continued*)

Field Name	Field Description	Level of Output
Ours	Indicates that this is a local advertisement.	extensive
Router LSAs	Number of router link-state advertisements in the link-state database.	summary
Network LSAs	Number of network link-state advertisements in the link-state database.	summary
Summary LSAs	Number of summary link-state advertisements in the link-state database.	summary
NSSA LSAs	Number of not-so-stubby area link-state advertisements in the link-state database.	summary

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 171](#).

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

Syntax	<pre>show ospf3 database <brief detail extensive summary> <advertising-router (<i>address</i> self)> <area <i>area-id</i>> <external> <instance <i>instance-name</i>> <inter-area-prefix> <inter-area-router> <intra-area-prefix> <link> <link-local> <logical-system (all <i>logical-system-name</i>)> <lsa-id <i>lsa-id</i>> <network> <nssa> <realm (ipv4-multicast ipv4-unicast ipv6-multicast)> <router></pre>
Syntax (EX Series Switches and QFX Series)	<pre>show ospf3 database <brief detail extensive summary> <advertising-router (<i>address</i> self)> <area <i>area-id</i>> <external> <instance <i>instance-name</i>> <inter-area-prefix> <inter-area-router> <intra-area-prefix> <link> <link-local> <lsa-id <i>lsa-id</i>> <network> <nssa> <router></pre>
Release Information	<p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>realm option introduced in Junos OS Release 9.2.</p> <p>advertising-router (<i>address</i> <i>self</i>) option introduced in Junos Release 9.5.</p> <p>advertising-router (<i>address</i> <i>self</i>) option introduced in Junos OS Release 9.5 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>
Description	Display the entries in the OSPF version 3 (OSPFv3) link-state database, which contains data about link-state advertisement (LSA) packets.
Options	<p>none—Display standard information about all entries in the OSPFv3 link-state database.</p> <p>brief detail extensive summary—(Optional) Display the specified level of output.</p> <p>advertising-router (<i>address</i> <i>self</i>)—(Optional) Display the LSAs advertised either by a particular routing device or by this routing device.</p>

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 124](#)

List of Sample Output

[show ospf3 database brief on page 183](#)
[show ospf3 database extensive on page 183](#)
[show ospf3 database summary on page 186](#)

Output Fields

[Table 44 on page 177](#) lists the output fields for the **show ospf3 database** command. Output fields are listed in the approximate order in which they appear.

Table 44: 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.	brief detail extensive
OSPF AS SCOPE link state database	Entries in the AS scope link-state database.	brief detail extensive

Table 44: show ospf3 database Output Fields (*continued*)

Field Name	Field Description	Level of Output
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: Extern , InterArPfx , InterArRtr , IntraArPrx , Link , Network , NSSA , or Router .	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
Router (Router Link-State Advertisements)		
bits	Flags describing the routing device that generated the LSP.	detail extensive
Options	Option bits carried in the router LSA.	detail extensive
For Each Router Link		
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"> • PointToPoint (1)—Point-to-point connection to another routing device. • Transit (2)—Connection to a transit network. • Virtual (4)—Virtual link. 	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
Gen timer	How long until the LSA is regenerated, in the format <i>hours:minutes:seconds</i> .	extensive

Table 44: 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
Network (Network Link-State Advertisements)		
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
InterArPfx (Interarea-Prefix Link-State Advertisements)		
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
InterArRtr (Interarea-Router Link-State Advertisements)		
Dest-router-id	Router ID of the routing device described by the LSA.	detail extensive
options	Optional capabilities supported by the routing device.	detail extensive

Table 44: show ospf3 database Output Fields (*continued*)

Field Name	Field Description	Level of Output
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
Prefix	IPv6 address prefix.	extensive
Prefix-options	Option bit associated with the prefix.	extensive
Extern (External Link-State Advertisements)		
Prefix	IPv6 address prefix.	detail extensive
Prefix-options	Option bit associated with the prefix.	detail extensive
Metric	Cost of the route, which depends on the value of Type .	detail extensive
Type <i>n</i>	Type of external metric: Type 1 or Type 2 .	detail 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
Link (Link-State Advertisements)		
IPv6-Address	IPv6 link-local address on the link for which this link LSA originated.	detail extensive
Options	Option bits carried in the link LSA.	detail extensive
priority	Router priority of the interface attaching the originating routing device to the link.	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
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

Table 44: show ospf3 database Output Fields (*continued*)

Field Name	Field Description	Level of Output
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
IntraArPfx (Intra-Area-Prefix Link-State Advertisements)		
Ref-lsa-type	LSA type of the referenced LSA. <ul style="list-style-type: none"> Router—Address prefixes are associated with a router LSA. Network—Address prefixes are associated with a network LSA. 	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
<i>n</i> InterArPfx LSAs	Number of interarea-prefix LSAs in the link-state database.	summary

Table 44: show ospf3 database Output Fields (*continued*)

Field Name	Field Description	Level of Output
<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

```