



OSPFv3 Commands



Note

- Starting with Cisco IOS XR Release 6.6.25, all commands applicable for the Cisco NCS 5500 Series Router are also supported on the Cisco NCS 560 Series Routers.
- Starting with Cisco IOS XR Release 6.3.2, all commands applicable for the Cisco NCS 5500 Series Router are also supported on the Cisco NCS 540 Series Router.
- References to releases before Cisco IOS XR Release 6.3.2 apply to only the Cisco NCS 5500 Series Router.
- Cisco IOS XR Software Release 7.0.1 specific updates are not applicable for the following variants of Cisco NCS 540 Series Routers:
 - N540-28Z4C-SYS-A
 - N540-28Z4C-SYS-D
 - N540X-16Z4G8Q2C-A
 - N540X-16Z4G8Q2C-D
 - N540X-16Z8Q2C-D
 - N540-12Z20G-SYS-A
 - N540-12Z20G-SYS-D
 - N540X-12Z16G-SYS-A
 - N540X-12Z16G-SYS-D

This module describes the commands used to configure and monitor the IP Version 6 (IPv6) Open Shortest Path First Version 3 (OSPFv3) routing protocol.

For detailed information about OSPFv3 concepts, configuration tasks, and examples, see the Implementing OSPF on Cisco NCS 5000 Series Routers module in the *Routing Configuration Guide for Cisco NCS 5000 Series Routers*.



Note Currently, only default VRF is supported. VPNv4, VPNv6 and VPN routing and forwarding (VRF) address families will be supported in a future release.

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address-family (OSPFv3)

To enter address family configuration mode for Open Shortest Path First Version 3 (OSPFv3), use the **address-family** command in the router ospfv3 configuration mode. To disable address family configuration mode, use the **no** form of this command.

```
address-family ipv6 [unicast]
no address-family ipv6 [unicast]
```

Syntax Description	
ipv6	Specifies IP Version 6 (IPv6) address prefixes.
unicast	(Optional) Specifies unicast address prefixes.

Command Default	
	An address family is not specified.

Command Modes	
	Router ospfv3 configuration

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines	
	No specific guidelines impact the use of this command.

Task ID	Task ID	Operations
	ospf	read, write

Examples	
	The following example shows how to configure the OSPFv3 router process with IPv6 unicast address prefixes:

```
RP/0/RP0/CPU0:router(config)# router ospfv3 1
RP/0/RP0/CPU0:router(config-ospfv3)# address-family ipv6 unicast
```

area (OSPFv3)

To configure an Open Shortest Path First Version 3 (OSPFv3) area, use the **area** command in an appropriate configuration mode. To remove an OSPFv3 area, use the **no** form of this command.

```
area area-id
no area area-id
```

Syntax Description	<i>area-id</i> Identifier of an OSPFv3 area. The <i>area-id</i> argument can be specified as either a decimal value or as an IPv4 address.
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Command Default	No OSPFv3 areas are defined.
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Command Modes	Router OSPFv3 configuration
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Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines	An area must be explicitly configured with the area command.
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Use the **area** command to place the router in area configuration mode (prompt: config-router-ar), from which you can configure area-specific settings. Commands configured under this mode (such as the **interface** command) are automatically bound to that area.



Note	To remove the specified OSPFv3 area from the router ospfv3 configuration, use the no area area-id command. The no area area-id command removes the OSPFv3 area including all OSPFv3 area options, and all the OSPFv3 interfaces and interface options that are configured under the area.
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Task ID	Task ID	Operations
	ospf	read, write

Examples

The following example shows how to configure area 0 for OSPFv3 process 1. The tenGigE 0/1/0/1 interface also is configured:

```
RP/0/RP0/CPU0:router(config)# router ospfv3 1
RP/0/RP0/CPU0:router(config-ospfv3)# area 0
RP/0/RP0/CPU0:router(config-ospfv3-ar)# interface tenGigE 0/1/0/1
```

authentication (OSPFv3)

To enable plain text, Message Digest 5 (MD5) authentication, or null authentication for an Open Shortest Path First Version 3 (OSPFv3) interface, use the **authentication** command in an appropriate configuration mode. To remove such authentication, use the **no** form of this command.

authentication {**ipsec spi spi-value** {**md5** | **sha1**} [{**clear** | **password**}] *password* | **disable**}
no authentication

Syntax Description		
ipsec	Specifies IP Security (IPSec).	IPSec supported only for OSPFv3.
spi spi-value	Specifies a security policy index (SPI) value. Range is 256 to 4294967295.	
md5	Enables Message Digest 5 (MD5) authentication.	
sha1	Enables SHA1 authentication.	
clear	(Optional) Specifies that the key be unencrypted.	
password	(Optional) Specifies that the key be encrypted using a two-way algorithm.	
<i>password</i>	Any contiguous string that can be entered from the keyboard.	
disable	Disables authentication for OSPFv3 packets.	

Command Default If this command is not specified in interface configuration mode, then the interface adopts the authentication parameter specified by the area.
 If this command is not specified in area configuration mode, then the interface adopts the authentication parameter specified for the process.
 If this command is not specified at any level, then the interface does not use authentication.

Command Modes Interface configuration
 Area configuration
 Router configuration
 Virtual-link configuration

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines Use the **authentication** command to specify an authentication type for the interface, which overrides the authentication specified for the area to which this interface belongs. If this command is not included in the configuration file, the authentication configured in the area to which the interface belongs is assumed (as specified by the area **authentication** command).

The authentication type and password must be the same for all OSPFv3 interfaces that are to communicate with each other through OSPFv3.



- Note**
- If OSPFv3 is configured along with IPsec authentication, then it is likely that adjacencies may flap on a Route Processor Fail Over (RPFO) even when NSR and/or Graceful Restart is enabled.

Task ID	Task ID	Operations
	ospf	read, write

Examples

The following example shows how to enable MD5 authentication:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# router ospfv3 201
RP/0/RP0/CPU0:router(config-ospfv3)# router-id 10.1.1.1
RP/0/RP0/CPU0:router(config-ospfv3)# authentication ipsec spi 500 md5
1234567890abcdef1234567890abcdef
```

auto-cost (OSPFv3)

To control how the Open Shortest Path First Version 3 (OSPFv3) protocol calculates default metrics for an interface, use the **auto-cost** command in an appropriate configuration mode. To set link cost based only on the interface type, use the **disable** form of this command. To re-enable OSPFv3 metric calculation for an interface according to the bandwidth of the interface, use the **no** form of this command.

auto-cost [{reference-bandwidth *mbps* | **disable**}]
no auto-cost [{reference-bandwidth *mbps* | **disable**}]

Syntax Description	reference-bandwidth <i>mbps</i> (Optional) Sets the rate in Mbps (bandwidth). Range is 1 to 4294967.
	disable (Optional) Sets the link cost based only on the interface type.

Command Default *mbps* : 100 Mbps

Command Modes Router ospfv3 configuration

Command History	Release Modification
	Release 6.0 This command was introduced.

Usage Guidelines

By default OSPFv3 calculates the OSPFv3 metric for an interface according to the bandwidth of the interface. The **no auto-cost disable** form of this command reenables OSPFv3 metric calculation for an interface according to the bandwidth of the interface.

To set link cost based only on the interface type, use the **disable** keyword.

If you have multiple links with high bandwidth, you might want to use a larger number to differentiate the cost on those links.

Recommended usage of cost configuration for all OSPFv3 configured interfaces is to be consistent: Either explicitly configure link costs (by using the **cost** command) or choose an appropriate default (by using the **auto-cost** command).

The value set by the **cost** command overrides the cost resulting from the **auto-cost** command.

Task ID	Task ID Operations
	ospf read, write

Examples The following example shows how to set the reference value for the auto cost to 64:

```
RP/0/RP0/CPU0:router(config)# router ospfv3 1
RP/0/RP0/CPU0:router(config-ospfv3)# auto-cost reference-bandwidth 64
```


capability vrf-lite (OSPFv3)

To ignore DN bit in LSAs received from peers in the given VRF and to disable automatic ABR status in that VRF, use the **capability vrf-lite** command in OSPFv3 VRF configuration mode. To disable ignoring the DN bit in LSAs and to re-enable automatic ABR status in the VRF, use the **no** form of this command.



Note This feature is not supported.

capability vrf-lite
no capability vrf-lite

This command has no keywords or arguments.

Command Default

Disabled.

Command Modes

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

Use the **capability vrf-lite** command when routers (sometimes called multi-vrf CE routers) are directly connected through interfaces associated with a VRF, but without being connected to other PEs through the MPLS/VPN BGP Backbone.

When OSPFv3 is enabled in a VRF, the router is always an ABR. With the **capability vrf-lite** command enabled, the router becomes an ABR only if it is connected to area 0 (backbone area), and there are other (non-backbone) areas enabled on this router in the given VRF.



Note Routes may be re-introduced to the VPN backbone when this command is used.

Task ID

Task ID	Operation
ospf	read, write

This example shows how to enable VRF-lite capability for OSPFv3 instance *1* under VRF *vrf1*:

```
RP/0/RP0/CPU0:router#configure
RP/0/RP0/CPU0:router(config)#router ospfv3 1
RP/0/RP0/CPU0:router(config-ospfv3)#vrf vrf1
RP/0/RP0/CPU0:router(config-ospfv3-vrf)#capability vrf-lite
```

clear ospfv3 process

To reset an Open Shortest Path First Version 3 (OSPFv3) router process without removing and reconfiguring it, use the **clear ospfv3 process** command in XR EXEC mode.

clear ospfv3 [*process-name*] **process**

Syntax Description	<i>process-name</i> (Optional) Name that uniquely identifies an OSPFv3 routing process. The process name is defined by the router ospfv3 command. If this argument is included, only the specified routing process is affected. Otherwise, all OSPFv3 processes are reset.
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Command Default	No default behavior or value
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Command Modes	XR EXEC mode
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Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines	When the OSPFv3 router process is reset, OSPFv3 releases all resources allocated, cleans up the internal database, uninstalls routes, and resets all OSPFv3 adjacencies.
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Note	The clear ospfv3 process command might clear the router ID configuration if the OSPF router ID is not explicitly configured through the router-id (OSPFv3) , on page 68 command.
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Task ID	Task ID	Operations
	ospf	read, write

Examples

The following example shows how to reset all OSPFv3 processes:

```
RP/0/RP0/CPU0:router# clear ospfv3 process
```

The following example shows how to reset the OSPFv3 process 1:

```
RP/0/RP0/CPU0:router# clear ospfv3 1 process
```

clear ospfv3 redistribution

To flush all the Type 5 and Type 7 link-state advertisements (LSAs) originated by an Open Shortest Path First Version 3 (OSPFv3) process, use the **clear ospfv3 redistribution** command in XR EXEC mode.

clear ospfv3 [*process-name*] **redistribution**

Syntax Description	<i>process-name</i> (Optional) Name that uniquely identifies an OSPFv3 routing process. The process name is defined by the router ospfv3 command. If this argument is included, only the specified routing process is affected. Otherwise, all OSPFv3 processes are reset.				
Command Default	No default behavior or value				
Command Modes	XR EXEC mode				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 6.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 6.0	This command was introduced.
Release	Modification				
Release 6.0	This command was introduced.				
Usage Guidelines	Use the clear ospfv3 redistribution command to cause the routing table to be read again. OSPFv3 regenerates and sends Type 5 and Type 7 link-state advertisements (LSAs) to its neighbors. If an unexpected route has appeared in the OSPFv3 redistribution, using this command corrects the issue.				



Note Use of this command can cause a significant number of LSAs to flood the network. We recommend that you use this command with caution.

Task ID	Task ID	Operations
	ospf	read, write

Examples

The following example shows how to clear all OSPFv3 redistributed routes from other protocols:

```
RP/0/RP0/CPU0:router# clear ospfv3 redistribution
```

clear ospfv3 routes

To clear the Open Shortest Path First Version 3 (OSPFv3) internal route table, use the **clear ospfv3 routes** command in XR EXEC mode.

```
clear ospfv3 [process-name] routes
```

Syntax Description	<i>process-name</i> (Optional) Name that uniquely identifies an OSPFv3 routing process. The process name is defined by the router ospfv3 command. If this argument is included, only the specified routing process is affected. Otherwise, all OSPFv3 processes are reset.
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Command Default	No default behavior or value
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Command Modes	XR EXEC mode
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Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines	Use the clear ospfv3 routes command to force the internal route table to be repopulated by causing recalculation of the shortest path first (SPF) routing table. When the OSPFv3 routing table is cleared, OSPFv3 routes in the global routing table are also recalculated.
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Task ID	Task ID	Operations
	ospf	read, write

Examples	The following example shows how to clear all OSPFv3 routes from the OSPFv3 routing table and recomputes valid routes:
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```
RP/0/RP0/CPU0:router# clear ospfv3 routes
```

clear ospfv3 statistics

To clear the Open Shortest Path First Version 3 (OSPFv3) statistical counters, use the **clear ospfv3 statistics** command in XR EXEC mode.

```
clear ospfv3 [process-name] statistics [neighbor [type interface-path-id] [router-id]]
```

Syntax Description

<i>process-name</i>	(Optional) Name that uniquely identifies an OSPFv3 routing process. The process name is defined by the router ospfv3 command. If this argument is included, only the specified routing process is affected.
neighbor	(Optional) Clears counters for the specified neighbor only.
<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or virtual interface. Note Use the show interfaces command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
<i>router-id</i>	(Optional) Specified router ID. This argument must be in 32-bit dotted-decimal notation, similar to an IPv4 address. This argument clears the counters of the specified neighbor only.

Command Default

No default behavior or value

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

Use the **clear ospfv3 statistics** command to reset statistics so that subsequent changes are easily observed.

Task ID

Task ID	Operations
ospf	read, write

Examples

The following example shows how to clear the OSPFv3 statistical counters of all neighbors on tenGigE interface 0/2/0/0:

```
RP/0/RP0/CPU0:router# clear ospfv3 statistics neighbor tenGigE 0/2/0/0
```

cost (OSPFv3)

To explicitly specify the cost of the interface (network) for OSPF path calculations, use the **cost** command in an appropriate configuration mode. To remove the cost, use the **no** form of this command.

cost *cost*
no **cost**

Syntax Description

cost Unsigned integer value expressed as the link-state metric. Range is 1 to 65535.

Command Default

If this command is not specified in interface configuration mode, then the interface adopts the cost parameter specified by the area.

If this command is not specified in area configuration mode, then the interface adopts the cost parameter specified for the process.

If this command is not specified at any level, then the cost is based on the interface bandwidth, as specified by the **auto-cost** command.

Command Modes

Interface configuration

Area configuration

Router OSPFv3 configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

The link-state metric is advertised as the link cost in the router link advertisement.

In general, the path cost is calculated using the following formula:

$$10^8 / \text{bandwidth}$$

The value set by the **cost** command overrides the cost resulting from the **auto-cost** command.

Task ID

Task ID	Operations
ospf	read, write

Examples

The following example shows how to set the cost value to 65 for tenGigE interface 0/1/0/1:

```
RP/0/RP0/CPU0:router(config)# router ospfv3 201
RP/0/RP0/CPU0:router(config-ospfv3)# area 0
RP/0/RP0/CPU0:router(config-ospfv3-ar)# interface tenGigE 0/1/0/1
RP/0/RP0/CPU0:router(config-ospfv3-ar-if)# cost 65
```

database-filter all out (OSPFv3)

To filter outgoing link-state advertisements (LSAs) to an Open Shortest Path First Version 3 (OSPFv3) interface, use the **database-filter all out** command in an appropriate configuration mode. To restore the forwarding of LSAs to the interface, use the **no** form of this command.

database-filter all out
no database-filter all out

Syntax Description	This command has no keywords or arguments.				
Command Default	<p>If this command is not specified in interface configuration mode, then the interface adopts the database filter parameter specified for the area.</p> <p>If this command is not specified in area configuration mode, then the interface adopts the database filter parameter specified for the process.</p> <p>If this command is not specified in router ospfv3 configuration mode, then the database filter is disabled and all outgoing LSAs are flooded to the interface.</p>				
Command Modes	<p>Interface configuration</p> <p>Area configuration</p> <p>Router OSPFv3 configuration</p>				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 6.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 6.0	This command was introduced.
Release	Modification				
Release 6.0	This command was introduced.				
Usage Guidelines	Use the database-filter all out command to perform the same function that the neighbor command (with the database-filter keyword) performs on a neighbor basis.				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>ospf</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	ospf	read, write
Task ID	Operations				
ospf	read, write				

Examples

The following example shows how to prevent flooding of OSPFv3 LSAs to neighbors reachable through tenGigE interface 0/2/0/3:

```
RP/0/RP0/CPU0:router(config)# router ospfv3 1
RP/0/RP0/CPU0:router(config-ospfv3)# area 0
RP/0/RP0/CPU0:router(config-ospfv3-ar)# interface tenGigE 0/2/0/3
RP/0/RP0/CPU0:router(config-ospfv3-ar-if)# database-filter all out
```

dead-interval (OSPFv3)

To set the interval after which a neighbor is declared dead when no hello packets are observed, use the **dead-interval** command in an appropriate configuration mode. To return to the default time, use the **no** form of this command.

dead-interval *seconds*
no dead-interval

Syntax Description	<i>seconds</i> Unsigned integer that specifies the interval (in seconds). The value must be the same for all nodes on the same network link. Range is 1 to 65535.				
Command Default	<p>If this command is not specified in interface configuration mode, then the interface adopts the dead interval parameter specified for the area.</p> <p>If this command is not specified in area configuration mode, then the interface adopts the dead interval parameter specified for the process.</p> <p>If this command is not specified in router ospfv3 configuration mode, then the dead interval is four times the interval set by the hello-interval (OSPFv3) command.</p>				
Command Modes	<p>Interface configuration</p> <p>Area configuration</p> <p>Router OSPFv3 configuration</p> <p>Virtual-link configuration</p>				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 6.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 6.0	This command was introduced.
Release	Modification				
Release 6.0	This command was introduced.				
Usage Guidelines	<p>Two Open Shortest Path First Version 3 (OSPFv3) routers do not become adjacent if their dead interval values differ.</p> <p>If the hello interval is configured, the dead interval value must be larger than the hello interval value. The dead interval value is usually configured four times larger than the hello interval value.</p>				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>ospf</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	ospf	read, write
Task ID	Operations				
ospf	read, write				
Examples	<p>The following example shows how to set the OSPFv3 dead interval on tenGigE interface 0/2/0/3 to 40 seconds:</p> <pre>RP/0/RP0/CPU0:router (config) # router ospfv3 1 RP/0/RP0/CPU0:router (config-ospfv3) # area 0</pre>				


```
RP/0/RP0/CPU0:router(config-ospfv3-ar)# interface tenGigE 0/2/0/3
RP/0/RP0/CPU0:router(config-ospfv3-ar-if)# dead-interval 40
```

default-cost (OSPFv3)

To specify a cost for the default summary route sent into a stub area or not-so-stubby area (NSSA) for Open Shortest Path First Version 3 (OSPFv3) packets, use the **default-cost** command in area configuration mode. To remove the assigned default route cost, use the **no** form of this command.

default-cost *cost*
no default-cost

Syntax Description	<i>cost</i> Cost for the default summary route used for a stub or NSSA area. The acceptable value is a 24-bit number ranging from 1 to 16777214.				
Command Default	<i>cost</i> : 1				
Command Modes	Area configuration				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 6.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 6.0	This command was introduced.
Release	Modification				
Release 6.0	This command was introduced.				
Usage Guidelines	<p>Use the default-cost command only on an Area Border Router (ABR) attached to a stub or an NSSA area.</p> <p>In all routers and access servers attached to the stub area, the area should be configured as a stub area using the stub (OSPFv3) command in the area configuration submenu. Use the default-cost command only on an ABR attached to the stub area. The default-cost command provides the metric for the summary default route generated by the ABR into the stub area.</p>				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>ospf</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	ospf	read, write
Task ID	Operations				
ospf	read, write				
Examples	<p>The following example shows how to assign a cost of 20 to the default route sent into area 10.15.0.0:</p> <pre>RP/0/RP0/CPU0:router (config) # router ospfv3 201 RP/0/RP0/CPU0:router (config-ospfv3) # area 10.15.0.0 RP/0/RP0/CPU0:router (config-ospfv3-ar) # stub RP/0/RP0/CPU0:router (config-ospfv3-ar) # default-cost 20 RP/0/RP0/CPU0:router (config-ospfv3-ar) # interface tenGigE 0/3/0/1</pre>				

default-information originate (OSPFv3)

To generate a default external route into an Open Shortest Path First Version 3 (OSPFv3) routing domain, use the **default-information originate** command in router ospfv3 configuration mode. To disable this feature, use the **no** form of this command.

```
default-information originate [route-policy policy-name] [always] [metric metric-value] [metric-type
type-value] [tag tag-value]
no default-information originate [route-policy policy-name] [always] [metric metric-value]
[metric-type type-value] [tag tag-value]
```

Syntax Description

route-policy <i>policy-name</i>	(Optional) Specifies the route policy to apply to default information origination.
always	(Optional) Always advertises the default route regardless of whether the software has a default route.
metric <i>metric-value</i>	(Optional) Specifies a metric used for generating the default route. The default metric value is 1. The value used is specific to the protocol.
metric-type <i>type-value</i>	(Optional) Specifies an external link type associated with the default route advertised into the OSPFv3 routing domain. It can be one of the following values: 1—Type 1 external route 2—Type 2 external route
tag <i>tag-value</i>	(Optional) 32-bit dotted-decimal value attached to each external route. This is not used by the OSPFv3 protocol itself. It may be used to communicate information between autonomous system boundary routers (ASBRs). If a tag is not specified, then zero (0) is used.

Command Default

A default external route into an OSPFv3 routing domain is not generated.

metric-value : 1

type-value : Type 2

tag-value: 0

Command Modes

Router ospfv3 configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

Whenever you use the **redistribute** or **default-information** command to redistribute routes into an OSPFv3 routing domain, the software automatically becomes an ASBR. However, an ASBR does not, by default, generate a default route into the OSPFv3 routing domain. The software still must have a default route for itself before it generates one, except when you have specified the **always** keyword.

The **default-information originate** route-policy attach point conditionally injects the default route 0.0.0.0/0 into the OSPF link-state database, and is done by evaluating the attached policy. If any routes specified in the policy exist in the global RIB, then the default route is inserted into the link-state database. If there is no match condition specified in the policy, the policy passes and the default route is generated into the link-state database.

For information about the default-information originate attach point, see the *OSPF v3 Policy Attach Points* section in the *Implementing Routing Policy* chapter in *Routing Configuration Guide for Cisco NCS 5000 Series Routers*.

When you use the **default-information originate** command for the OSPFv3 process, the default network must reside in the routing table.

For information about routing policies, see the *Routing Policy Commands* chapter in the *Routing Command Reference for Cisco NCS 5000 Series Routers*.

Task ID	Task ID	Operations
	ospf	read, write

Examples

The following example shows how to specify a metric of 100 for the default route redistributed into the OSPFv3 routing domain and an external metric type of Type 1:

```
RP/0/RP0/CPU0:router(config)#router ospfv3 109
RP/0/RP0/CPU0:router(config-ospfv3)#default-information originate metric 100 metric-type 1
```

default-metric (OSPFv3)

To set default metric values for routes redistributed from another protocol into Open Shortest Path First Version 3 (OSPFv3), use the **default-metric** command in an appropriate configuration mode. To return to the default state, use the **no** form of this command.

default-metric *value*
no default-metric *value*

Syntax Description	<i>value</i> Default metric value appropriate for the specified routing protocol.
---------------------------	-----------------------------------------------------------------------------------

Command Default	Built-in, automatic metric translations, as appropriate for each routing protocol
------------------------	-----------------------------------------------------------------------------------

Command Modes	Router OSPFv3 configuration
----------------------	-----------------------------

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines	Use the default-metric command with the redistribute command to cause the current routing protocol to use the same metric value for all redistributed routes. A default metric helps solve the problem of redistributing routes with incompatible metrics. Whenever metrics do not convert, use a default metric to provide a reasonable substitute and enable the redistribution to proceed.
-------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

The default-metric value configured in OSPF configuration does not apply to connected routes that are redistributed to OSPF using the **redistribute connected** command. To set a non-default metric for connected routes, configure OSPF with the **redistribute connected metric** *metric-value* command.

Task ID	Task ID	Operations
	ospf	read, write

Examples

The following example shows how to configure a router with both the Intermediate System-to-Intermediate System (IS-IS) and the OSPFv3 routing protocols. The OSPFv3 routing protocol advertises IS-IS derived routes and assigns the routes a metric of 10:

```
RP/0/RP0/CPU0:router(config)# router ospfv3 1
RP/0/RP0/CPU0:router(config-ospfv3)# default-metric 10
RP/0/RP0/CPU0:router(config-ospfv3)# redistribute isis IS-IS_isp
```

demand-circuit (OSPFv3)

To configure the Open Shortest Path First Version 3 (OSPFv3) router process to treat the interface as an OSPFv3 demand circuit, use the **demand-circuit** command in an appropriate configuration mode. To remove the demand circuit designation from the interface, use the **no** form of this command.

demand-circuit [**disable**]
no demand-circuit

Syntax Description	disable (Optional) Disables the demand circuit configuration that may have been specified at a higher level in the configuration.				
Command Default	<p>If this command is not specified in interface configuration mode, then the interface adopts the demand circuit parameter specified for the area.</p> <p>If this command is not specified in area configuration mode, then the interface adopts the demand circuit parameter specified for the process.</p> <p>If this command is not specified at any level, then the interface is not a demand circuit.</p>				
Command Modes	<p>Interface configuration</p> <p>Area configuration</p> <p>Router OSPFv3 configuration</p> <p>Virtual-link configuration</p>				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 6.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 6.0	This command was introduced.
Release	Modification				
Release 6.0	This command was introduced.				
Usage Guidelines	On point-to-point interfaces, only one end of the demand circuit must be configured with the demand-circuit command. Periodic hello messages are suppressed and periodic refreshes of link-state advertisements (LSAs) do not flood the demand circuit. This command allows the underlying data link layer to be closed when the topology is stable. In point-to-multipoint topology, only the multipoint end must be configured with this command.				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>ospf</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	ospf	read, write
Task ID	Operations				
ospf	read, write				
Examples	<p>The following example shows how to configure tenGigE interface 0/3/0/1 as an on-demand circuit:</p> <pre>RP/0/RP0/CPU0:router(config)# router ospfv3 1 RP/0/RP0/CPU0:router(config-ospfv3)# area 0 RP/0/RP0/CPU0:router(config-ospfv3)# interface tenGigE 0/3/0/1</pre>				

```
RP/0/RP0/CPU0:router(config-ospfv3-if)# demand-circuit
```

distance ospfv3

To define the Open Shortest Path First Version 3 (OSPFv3) route administrative distances based on route type, use the **distance ospfv3** command in router ospfv3 configuration mode. To restore the default value, use the **no** form of this command.

```
distance ospfv3 {intra-area | inter-area | external} distance
no distance ospfv3
```

Syntax Description	intra-area inter-area external	Type of area. It can be one of the following values: intra-area —All routes within an area. inter-area —All routes from one area to another area. external —All routes from other routing domains, learned by redistribution.
	<i>distance</i>	The route administrative distance.

Command Default *distance* : 110

Command Modes Router ospfv3 configuration

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines You must specify one of the keywords.

Use the **distance ospfv3** command to perform the same function as the **distance** command used with an access list. However, the **distance ospfv3** command sets a distance for an entire group of routes, rather than a specific route that passes an access list.

A common reason to use the **distance ospfv3** command is when you have multiple OSPFv3 processes with mutual redistribution, and you want to prefer internal routes from one over external routes from the other.

Task ID	Task ID	Operations
	ospf	read, write

Examples The following example shows how to change the external distance to 200, making it less reliable:

```
RP/0/RP0/CPU0:router(config)# router ospfv3 1
RP/0/RP0/CPU0:router(config-ospfv3)# redistribute ospfv3 2
RP/0/RP0/CPU0:router(config-ospfv3)# distance ospfv3 external 200
RP/0/RP0/CPU0:router(config-ospfv3)# exit
RP/0/RP0/CPU0:router(config)# router ospfv3 2
RP/0/RP0/CPU0:router(config-ospfv3)# redistribute ospfv3 1
```



```
RP/0/RP0/CPU0:router(config-ospfv3)# distance ospfv3 external 200
```

distribute-list prefix-list in

To filter the routes that Open Shortest Path First Version 3 (OSPFv3) installs in the Routing Information Base (RIB), use the **distribute-list prefix-list in** command in an appropriate configuration mode. To remove the filter, use the **no** form of this command.

distribute-list prefix-list *prefix-list-name* **in**
no distribute-list prefix-list *prefix-list-name* **in**

Syntax Description	<i>prefix-list-name</i> IP Version 6 (IPv6) prefix list name. The list defines which IPv6 prefixes are installed in the RIB.
Command Default	All routes learned by OSPFv3 are installed in the RIB.
Command Modes	Interface configuration Router OSPFv3 configuration
Usage Guidelines	Use the distribute-list prefix-list command to limit the routes that OSPFv3 installs in the RIB of your router. This command does not affect the information sent to other OSPFv3 routers or the routes that these routers compute and install.



Note Because the other OSPFv3 routers are not aware of any omissions in the RIB, they may send traffic addressed to the missing prefixes. If no other provision has been made for these prefixes, the packets are dropped.

When this command is specified in router ospfv3 configuration mode, the filter applies to all routes computed by OSPFv3.

When this command is specified in interface configuration mode, the filter applies only to routes that forward outgoing traffic over that interface.

Task ID	Task ID	Operations
	ospf	read, write

Examples

The following example shows how to prevent OSPFv3 from installing any routes that have 2001:e624 as the first 32 bits of the address. OSPFv3 is also prevented from installing routes to 2002::/16 that use tenGigE interface 0/2/0/0 as the next-hop interface:

```
RP/0/RP0/CPU0:router(config)# ipv6 prefix-list preflist1
RP/0/RP0/CPU0:router(config-ipv6-px)# deny 2001:e624::/32 le 128
RP/0/RP0/CPU0:router(config-ipv6-px)# permit ::/0 le 128
!
RP/0/RP0/CPU0:router(config)# ipv6 prefix-list preflist2
RP/0/RP0/CPU0:router(config-ipv6-px)# deny 2002::/16
RP/0/RP0/CPU0:router(config-ipv6-px)# permit ::/0 le 128
```

```
!  
RP/0/RP0/CPU0:router(config)# router ospfv3 1  
RP/0/RP0/CPU0:router(config-ospfv3)# distribute-list prefix-list preflist1 in  
RP/0/RP0/CPU0:router(config-ospfv3)# area 1  
RP/0/RP0/CPU0:router(config-ospfv3-ar)# interface tenGigE 0/2/0/0  
RP/0/RP0/CPU0:router(config-ospfv3-ar-if)# distribute-list prefix-list preflist2 in
```

distribute-list prefix-list out

To filter the routes redistributed into Open Shortest Path First Version 3 (OSPFv3) from other routing protocols, use the **distribute-list prefix-list out** command in an appropriate configuration mode. To remove the filter, use the **no** form of this command.

distribute-list prefix-list *prefix-list-name* **out** [*protocol* [*process-id*]]
no distribute-list prefix-list *prefix-list-name* **out** [*protocol* [*process-id*]]

Syntax Description

<i>prefix-list-name</i>	IP Version 6 (IPv6) prefix list name. The list defines which IPv6 prefixes are installed in the RIB.
<i>protocol</i>	(Optional) Source protocol from which routes are being redistributed. It can be one of the following keywords: bgp , isis , ospfv3 , static , and connected . The static keyword is used to redistribute IPv6 static routes. The connected keyword refers to routes that are established automatically because IPv6 is enabled on an interface. For routing protocols such as OSPFv3 and Intermediate System-to-Intermediate System (IS-IS), these routes are redistributed as external to the autonomous system.
<i>process-id</i>	(Optional) For the bgp keyword, an autonomous system number has the following ranges: <ul style="list-style-type: none"> • Range for 2-byte Autonomous system numbers (ASNs) is 1 to 65535. • Range for 4-byte Autonomous system numbers (ASNs) in asplain format is 1 to 4294967295. • Range for 4-byte Autonomous system numbers (ASNs) in asdot format is 1.0 to 65535.65535. For the isis keyword, an optional argument that defines a meaningful name for a routing process. You can specify only one IS-IS process for each router. Creating a name for a routing process means that you use names when configuring routing. For the ospfv3 keyword, an appropriate OSPFv3 process name from which routes are to be redistributed. The value takes the form of a string. A decimal number can be entered, but it is stored internally as a string.

Command Default

All routes from protocols specified in the [redistribute \(OSPFv3\), on page 62](#) command are redistributed into OSPFv3.

Command Modes

Router OSPFv3 configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

Routes may be redistributed into OSPFv3 from several other routing protocols or from other OSPFv3 processes. These routes are then communicated to other OSPFv3 routes through Type 5 (External) or Type 7 not-so-stubby area (NSSA) link-state advertisements (LSAs). Use the **distribute-list prefix-list out** command to control

redistribution by matching redistributed routes against an IPv6 prefix list. Only routes permitted by the prefix list are redistributed into OSPFv3.

Each protocol being redistributed into OSPFv3 can have a separate prefix list. In addition, a prefix list can be defined that applies to all protocols.

Task ID	Task ID	Operations
	ospf	read, write

Examples

The following example shows how to prevent OSPFv3 from redistributing routes that have 2001:e624 as the first 32 bits of the address. In addition, routes with a prefix beginning with 2064 are not redistributed from Border Gateway Protocol (BGP) autonomous system 1, and only those routes are redistributed from BGP autonomous system 5.

```
RP/0/RP0/CPU0:router(config)# ipv6 prefix-list p1
RP/0/RP0/CPU0:router(config-ipv6-px)# deny 2001:e624::/32 le 128
RP/0/RP0/CPU0:router(config-ipv6-px)# permit ::/0 le 128
!
RP/0/RP0/CPU0:router(config)# ipv6 prefix-list p2
RP/0/RP0/CPU0:router(config-ipv6-px)# deny 2064::/16 le 128
RP/0/RP0/CPU0:router(config-ipv6-px)# permit ::/0 le 128
!
RP/0/RP0/CPU0:router(config)# ipv6 prefix-list p3
RP/0/RP0/CPU0:router(config-ipv6-px)# permit 2064::/16 le 128
!
RP/0/RP0/CPU0:router(config)# router ospfv3 1
RP/0/RP0/CPU0:router(config-ospfv3)# redistribute bgp 1
RP/0/RP0/CPU0:router(config-ospfv3)# redistribute bgp 5
RP/0/RP0/CPU0:router(config-ospfv3)# distribute-list prefix-list p1 out
RP/0/RP0/CPU0:router(config-ospfv3)# distribute-list prefix-list p2 out bgp 1
RP/0/RP0/CPU0:router(config-ospfv3)# distribute-list prefix-list p3 out bgp 5
```

domain-id (OSPFv3)

To specify the Open Shortest Path First Version 3 (OSPFv3) VPN routing and forwarding (VRF) domain ID, use the **domain-id** command in VRF configuration mode. To remove the OSPFv3 VRF domain ID, use the **no** form of this command.

domain-id [secondary] type [{0005 | 0105 | 0205}] value *domain-id_value*
no domain-id [secondary] type [{0005 | 0105 | 0205}] value *domain-id_value*

Syntax Description	
secondary	(Optional) OSPFv3 secondary domain ID.
type	Primary OSPFv3 domain ID in hexadecimal format. <ul style="list-style-type: none"> • 0005 —Type 0x0005 • 0105 —Type 0x0105 • 0205—Type 0x0205
value	OSPF domain ID value in hexadecimal format.
<i>domain-id_value</i>	OSPF domain ID extended community value as a 6 byte hexadecimal number.

Command Default No domain ID is specified.

Command Modes VRF configuration

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines If no value is specified for the domain ID, the default is Null (all zeros) primary domain ID. One or more secondary domain IDs can be specified.

Task ID	Task ID	Operation
	ospf	read, write

This example shows how to specify a domain ID with type *0105* and value *AABBCCDDEEFF*:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# router ospf 1
RP/0/RP0/CPU0:router(config-ospf)# vrf vrf_1
RP/0/RP0/CPU0:router(config-ospf-vrf)# domain-id type 0105 value AABBCCDDEEFF
```

encryption

To encrypt and authenticate Open Shortest Path First Version 3 (OSPFv3) packets, use the **encryption** command in an appropriate configuration mode. To remove the encryption, use the **no** form of this command.

```
encryption {disable | ipsec spi spi-value esp {3des | aes [{192 | 256}] | des | null [{clear | password}]
encrypt-password} [authentication {md5 | sha1} [{clear | password}] auth-password}]
no encryption
```

Syntax Description		
disable		Disables OSPFv3 packet encryption.
ipsec spi		Specifies IPsec ESP encryption and authentication with the Security Parameter Index (SPI) value. IPsec supported only for OSPFv3.
<i>spi-value</i>		SPI value. Range is 256 to 4294967295.
esp		Specifies Encryption Service Payload (ESP) encryption parameters.
3des		Specifies the triple DES algorithm.
aes		Specifies the Advanced Encryption Standard (AES) algorithm.
192		(Optional) Specifies the 192-bit AES algorithm
256		(Optional) Specifies the 256-bit AES algorithm
des		Specifies the Data Encryption Standard (DES) algorithm.
null		Specifies no AES algorithm.
md5		Enables Message Digest 5 (MD5) authentication.
sha1		Enables SHA1 authentication.
clear		Specifies that the key be unencrypted.
password		Specifies that the key be encrypted using a two-way algorithm.
<i>encrypt-password</i>		Any contiguous string that can be entered from the keyboard as the encryption password.
<i>auth-password</i>		Any contiguous string that can be entered from the keyboard as the authentication password.

Command Default No default behavior or values.

Command Modes Interface configuration
Router OSPFv3 configuration

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines Use the **encryption** command to encrypt and authenticate OSPFv3 packets.



- Note**
- IPsec is supported only for Open Shortest Path First version 3 (OSPFv3).
 - If OSPFv3 is configured along with IPsec authentication, then it is likely that adjacencies may flap on a Route Processor Fail Over (RPFO) even when NSR and/or Graceful Restart is enabled.

Task ID	Task ID	Operations
	ospf	read, write

Examples

The following example shows how to encrypt and authenticate OSPFv3 packets:

```
RP/0/RP0/CPU0:router(config)#router ospfv3 1
RP/0/RP0/CPU0:router(config-ospfv3)#encryption ipsec spi 256 esp 3des clear
```


flood-reduction (OSPFv3)

To suppress the unnecessary flooding of link-state advertisements (LSAs) in stable topologies, use the **flood-reduction** command in an appropriate configuration mode. To disable this feature, use the **no** form of this command.

flood-reduction [**disable**]
no flood-reduction

Syntax Description	<p>disable (Optional) Turns off this functionality at a specific level.</p> <p>Note The disable keyword is not available in router ospfv3 configuration mode.</p>				
Command Default	<p>If this command is not specified in interface configuration mode, then the interface adopts the flood reduction parameter specified by area.</p> <p>If this command is not specified in area configuration mode, then the interface adopts the flood reduction parameter specified for the process.</p> <p>If this command is not specified at any level, then flood reduction is disabled.</p>				
Command Modes	<p>Interface configuration</p> <p>Area configuration</p> <p>Router OSPFv3 configuration</p>				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 6.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 6.0	This command was introduced.
Release	Modification				
Release 6.0	This command was introduced.				
Usage Guidelines	<p>All routers that support Open Shortest Path First Version 3 (OSPFv3) demand circuits are compatible with routers supporting flooding reduction.</p>				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>ospf</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	ospf	read, write
Task ID	Operations				
ospf	read, write				

Examples

The following example shows how to reduce the flooding of unnecessary LSAs for area 0:

```
RP/0/RP0/CPU0:router(config)# router ospfv3 1
RP/0/RP0/CPU0:router(config-ospfv3)# area 0
RP/0/RP0/CPU0:router(config-ospfv3-ar)# interface tenGigE 0/1/0/3
RP/0/RP0/CPU0:router(config-ospfv3-ar-if)# flood-reduction
```

graceful-restart (OSPFv3)

To enable graceful restart, use the **graceful-restart** command in an appropriate configuration mode. To disable this feature, use the **no** form of this command.

```
graceful-restart [{helper disable | interval interval | lifetime lifetime}]
no graceful-restart [{helper disable | interval interval | lifetime lifetime}]
```

Syntax Description

helper disable	(Optional) Disables the routers helper support level.
interval <i>interval</i>	(Optional) Specifies the minimum interval between graceful restarts. Range is 90 to 3600 seconds.
lifetime <i>lifetime</i>	(Optional) Specifies the maximum route lifetime following a restart. Range is 90 to 3600 seconds.

Command Default

No default behavior or values.

Command Modes

Router OSPFv3 configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
ospf	read, write

Examples

The following example shows how to enable the Graceful Restart feature with a minimum interval between restarts of 300 seconds:

```
RP/0/RP0/CPU0:router(config)# router ospfv3 1
RP/0/RP0/CPU0:router(config-ospfv3)# graceful-restart interval 300
```

hello-interval (OSPFv3)

To specify the interval between hello packets that Open Shortest Path First Version 3 (OSPFv3) sends on an interface, use the **hello-interval** command in an appropriate configuration mode. To return to the default time, use the **no** form of this command.


hello-interval *seconds*
no hello-interval

Syntax Description	<i>seconds</i> Interval (in seconds). The value must be the same for all nodes on a specific network.				
Command Default	<p>If this command is not specified in interface configuration mode, then the interface adopts the hello interval parameter specified by area.</p> <p>If this command is not specified in area configuration mode, then the interface adopts the hello interval parameter specified for the process.</p> <p>If this command is not specified at any level, then the hello interval is 10 seconds (broadcast) or 30 seconds (non-broadcast).</p>				
Command Modes	<p>Interface configuration</p> <p>Area configuration</p> <p>Router OSPFv3 configuration</p> <p>Virtual-link configuration</p>				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 6.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 6.0	This command was introduced.
Release	Modification				
Release 6.0	This command was introduced.				
Usage Guidelines	The hello interval value is advertised in the hello packets. The shorter the hello interval, the faster topological changes are detected, but more routing traffic ensues. This value must be the same for all routers and access servers on a specific network.				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>ospf</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	ospf	read, write
Task ID	Operations				
ospf	read, write				
Examples	<p>The following example shows how to set the interval between hello packets to 15 seconds on GigabitEthernet interface 0/3/0/2:</p> <pre>RP/0/RP0/CPU0:router(config)# router ospfv3 1 RP/0/RP0/CPU0:router(config-ospfv3)# area 0 RP/0/RP0/CPU0:router(config-ospfv3-ar)# interface GigabitEthernet 0/3/0/2 RP/0/RP0/CPU0:router(config-ospfv3-ar-if)# hello-interval 15</pre>				

instance (OSPFv3)

To set the 8-bit instance ID used in Open Shortest Path First Version 3 (OSPFv3) packets sent on an interface, use the **instance** command in an appropriate configuration mode. To remove the instance ID, use the **no** form of this command.

```
instance instance-id
no instance instance-id
```

Syntax Description	<i>instance-id</i> Instance identifier sent in OSPFv3 packets. Range is 0 to 255. The same value must be used by all the communicating OSPFv3 routers on a link.				
Command Default	<p>If this command is not specified in interface configuration mode, then the interface adopts the instance parameter specified by the area.</p> <p>If this command is not specified in area configuration mode, then the interface adopts the instance parameter specified for the process.</p> <p>If this command is not specified at any level, then the instance is 0.</p>				
Command Modes	<p>Interface configuration</p> <p>Area configuration</p> <p>Router OSPFv3 configuration</p>				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 6.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 6.0	This command was introduced.
Release	Modification				
Release 6.0	This command was introduced.				
Usage Guidelines	<p>The OSPFv3 routing protocol allows multiple unrelated OSPFv3 processes to share a link by using an 8-bit “instance” value to demultiplex the protocol packets. Each OSPFv3 process sets its configured instance value in the OSPFv3 packets that it sends, and ignores received packets with instance values from other OSPFv3 processes.</p>				
	<p> Note The <i>instance-id</i> argument should not be confused with the <i>process-name</i> argument that is specified by the router ospfv3 command. The former is an 8-bit integer that is sent to other routers as part of the OSPFv3 protocol, and the latter is a 1- to 40-character ASCII string that is significant only within a given router. The instance ID value is also unrelated to the router ID that is specified by the router-id command, which is a 32-bit integer value that uniquely identifies a router within an OSPFv3 routing domain.</p>				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>ospf</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	ospf	read, write
Task ID	Operations				
ospf	read, write				

Examples

The following example shows how to set the instance value for tenGigE interface 0/3/0/1 to 42:

```
RP/0/RP0/CPU0:router(config)# router ospfv3 1  
RP/0/RP0/CPU0:router(config-ospfv3)# area 0  
RP/0/RP0/CPU0:router(config-ospfv3-ar)# interface tenGigE 0/3/0/1  
RP/0/RP0/CPU0:router(config-ospfv3-ar-if)# instance 42
```

interface (OSPFv3)

To define the interfaces on which Open Shortest Path First Version 3 (OSPFv3) runs, use the **interface** command in an appropriate configuration mode. To disable OSPFv3 routing for an interface, use the **no** form of this command.

```
interface type interface-path-id
no interface type interface-path-id
```

Syntax Description	<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
	<i>interface-path-id</i>	Physical interface or virtual interface.
	Note	Use the show interfaces command to see a list of all interfaces currently configured on the router.
		For more information about the syntax for the router, use the question mark (?) online help function.

Command Default An interface is not defined.

Command Modes Area configuration

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines Use the **interface** command to associate a specific interface with an OSPFv3 area. The interface remains associated with the area even when the IPv6 address of the interface changes.

Similar to IPv4 address behavior for the **interface** command, all configured IPv6 addresses are advertised on an interface after the interface is associated to the OSPF routing process. The only difference is, IPv6 addresses can have multiple primary addresses.

This command places the router in interface configuration mode (prompt: config-router-ar-if), from which you can configure interface-specific settings. Commands configured under this mode (such as the **cost** command) are automatically bound to that interface.

Task ID	Task ID	Operations
	ospf	read, write

Examples

The following example shows how to define two interfaces that belong to area 1. The cost value for packets on tenGigE interface 0/3/0/1 is set at 40; the cost value for tenGigE interface 0/3/0/2 is 65:

```
RP/0/RP0/CPU0:router(config)# router ospfv3 1
RP/0/RP0/CPU0:router(config-ospfv3)# area 1
```

```
RP/0/RP0/CPU0:router(config-ospfv3-ar)# interface tenGigE 0/3/0/1  
RP/0/RP0/CPU0:router(config-ospfv3-ar-if)# cost 40  
RP/0/RP0/CPU0:router(config-ospfv3-ar-if)# exit  
RP/0/RP0/CPU0:router(config-ospfv3-ar)# interface tenGigE 0/3/0/2  
RP/0/RP0/CPU0:router(config-ospfv3-ar-if)# cost 65  
RP/0/RP0/CPU0:router(config-ospfv3-ar-if)# exit
```


log adjacency changes (OSPFv3)

To change the default syslog messages for Open Shortest Path First Version 3 (OSPFv3) neighbor state changes, use the **log adjacency changes** command in an appropriate configuration mode. To suppress all adjacency change messages, use the **disable** keyword.

log adjacency changes [{detail | disable}]

Syntax Description	<p>detail (Optional) Provides all (DOWN, INIT, 2WAY, EXSTART, EXCHANGE, LOADING, FULL) adjacency state changes.</p> <p>disable (Optional) Disables the neighbor state change messages.</p>				
Command Default	Neighbor state change messages are enabled.				
Command Modes	Router OSPFv3 configuration				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 6.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 6.0	This command was introduced.
Release	Modification				
Release 6.0	This command was introduced.				
Usage Guidelines	By default, you are notified of OSPFv3 neighbor changes without explicitly configuring the log adjacency changes command. The syslog messages that are sent provide a high-level view of changes to the state of the OSPFv3 peer relationship.				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>ospf</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	ospf	read, write
Task ID	Operations				
ospf	read, write				

Examples

The following example shows how to disable neighbor state change messages:

```
RP/0/RP0/CPU0:router(config)# router ospfv3 1
RP/0/RP0/CPU0:router(config-ospfv3)# log adjacency changes disable
```

The following example shows how to re-enable syslog messages for any OSPFv3 neighbor state changes:

```
RP/0/RP0/CPU0:router(config)# router ospfv3 1
RP/0/RP0/CPU0:router(config-ospfv3)# log adjacency changes
```

maximum interfaces (OSPFv3)

To control the maximum number of interfaces that can be configured under an Open Shortest Path First Version 3 (OSPFv3) process, use the **maximum interfaces** command in an appropriate configuration mode. To remove the **maximum interfaces** command from the configuration file and restore the system to its default condition with respect to the routing protocol, use the **no** form of this command.

maximum interfaces *number-interfaces*
no maximum interfaces

Syntax Description	<i>number-interfaces</i> Maximum number of interfaces that can be configured for this OSPFv3 process. Range is 1 to 1024. Range is 1 to 4294967295.
---------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------

Command Default	If the command is not specified, the default is 1024.
------------------------	-------------------------------------------------------

Command Modes	Router OSPFv3 configuration
----------------------	-----------------------------

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines	No specific guidelines impact the use of this command.
-------------------------	--------------------------------------------------------

Task ID	Task ID	Operations
	ospf	read, write

Examples

This example shows how to allow a maximum of 500 interfaces in an OSPFv3 process:

```
RP/0/RP0/CPU0:router(config)# router ospfv3 1
RP/0/RP0/CPU0:router(config-ospfv3)# maximum interfaces 500
```

This example shows how to allow a maximum of 1500 interfaces in an OSPFv3 process:

```
RP/0/RP0/CPU0:router(config)# router ospfv3 1
RP/0/RP0/CPU0:router(config-ospfv3)# maximum interfaces 1500
```

maximum paths (OSPFv3)

To control the maximum number of parallel routes that the Open Shortest Path First Version 3 (OSPFv3) can support, use the **maximum paths** command in an appropriate configuration mode. To remove the **maximum paths** command from the configuration file and restore the system to its default condition with respect to the routing protocol, use the **no** form of this command.

maximum paths *maximum-routes-number*
no maximum paths

Syntax Description	<i>maximum-routes-number</i>	Maximum number of parallel routes that OSPFv3 can install in a routing table. Range is 1 to 32.
	Note	The maximum number of paths that can be configured is 32.

Command Default 32 paths

Command Modes Router OSPFv3 configuration

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines When the maximum number of parallel routes is reduced, all existing paths are pruned and paths reinstalled at the new maximum number. During this route-reduction period, you may experience some packet loss for a few seconds. This may impact route traffic.

Task ID	Task ID	Operations
	ospf	read, write

Examples

The following example shows how to allow a maximum of two paths to a destination:

```
RP/0/RP0/CPU0:router(config)# router ospfv3 1
RP/0/RP0/CPU0:router(config-ospfv3)# maximum paths 2
```

maximum redistributed-prefixes (OSPFv3)

To limit the number of prefixes redistributed into Open Shortest Path First Version 3 (OSPFv3) or to generate a warning when the number of prefixes redistributed into OSPFv3 reaches a maximum, use the **maximum redistributed-prefixes** command in an appropriate configuration mode. To remove the values, use the **no** form of this command.

maximum redistributed-prefixes *limit* [*threshold*] [**warning-only**]
no maximum redistributed-prefixes

Syntax Description

<i>limit</i>	Maximum number of IP Version 6 (IPv6) prefixes that are allowed to be redistributed into OSPFv3, or, if the warning-only keyword is present, sets the number of prefixes allowed to be redistributed into OSPFv3 before the system logs a warning message. Range is 1 to 4294967295.
Note	If the warning-only keyword is also configured, this value does not limit redistribution; it is simply the number of redistributed prefixes that, when reached, causes a warning message to be logged.
<i>threshold</i>	(Optional) Percentage of the value set for the maximum number of redistributed prefixes that, when reached, causes a warning message to be logged.
warning-only	(Optional) Causes a warning to be logged when the number of routes defined by the <i>limit</i> argument have been redistributed. Additional redistribution is not prevented.

Command Default

limit : 10240
threshold : 75 percent

Command Modes

Router OSPFv3 configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

If someone mistakenly injects a large number of IPv6 routes into OSPFv3, perhaps by redistributing Border Gateway Protocol (BGP) into OSPFv3, the network can be severely flooded. Limiting the number of redistributed routes prevents this potential problem.

When the **maximum redistributed-prefixes** command is configured, if the number of redistributed routes reaches the maximum value configured, no more routes are redistributed (unless the **warning-only** keyword is configured).

The redistribution limit applies only to external IPv6 prefixes. Default routes and summarized routes are not limited.

The limit is tracked separately for each not-so-stubby-area (NSSA) because redistribution to NSSAs is done independently for each NSSA and independently of all other regular areas.

Select a maximum value based on your knowledge of how many prefixes are redistributed on the router to the OSPFv3 process.

Task ID	Task ID	Operations
	ospf	read, write

Examples

This example shows how to set a maximum of 2000 prefixes that can be redistributed into OSPFv3 process 1. If the number of prefixes redistributed reaches 75 percent of 2000 (1500 prefixes), a warning message is logged. Another warning is logged if the limit is reached and no more routes are redistributed.

```
RP/0/RP0/CPU0:router(config)# router ospfv3 1  
RP/0/RP0/CPU0:router(config-ospfv3)# redistribute bgp 2406  
RP/0/RP0/CPU0:router(config-ospfv3)# maximum redistributed-prefixes 2000
```

mtu-ignore (OSPFv3)

To prevent the Open Shortest Path First Version 3 (OSPFv3) router process from checking whether neighbors are using the same maximum transmission unit (MTU) on a common interface when exchanging database descriptor (DBD) packets, use the **mtu-ignore** command in an appropriate configuration mode. To return to the default state, use the **no** form of this command.

mtu-ignore [**disable**]

no mtu-ignore

Syntax Description

disable (Optional) Disables the attribute in instances in which it is specified at a higher level in the configuration.

Note The **disable** keyword is not available in router ospfv3 configuration mode.

Command Default

If this command is not specified in interface configuration mode, then the interface adopts the MTU ignore parameter specified by the area.

If this command is not specified in area configuration mode, then the interface adopts the MTU ignore parameter specified for the process.

If this command is not specified at any level, then OSPFv3 checks the MTU received from neighbors when exchanging DBD packets.

Command Modes

Interface configuration

Area configuration

Router OSPFv3 configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

Use the **mtu-ignore** command to check whether OSPFv3 neighbors are using the same MTU on a common interface. This check is performed when neighbors exchange DBD packets. If the receiving MTU in the DBD packet is higher than the MTU configured on the incoming interface, OSPF adjacency is not established.

Task ID

Task ID	Operations
ospf	read, write

Examples

The following example shows how to disable MTU mismatch detection on received DBD packets on tenGigE interface 0/1/0/3:

```
RP/0/RP0/CPU0:router(config)# router ospfv3 1
RP/0/RP0/CPU0:router(config-ospfv3)# area 0
```

```
RP/0/RP0/CPU0:router(config-ospfv3-ar)# interface tenGigE 0/1/0/3  
RP/0/RP0/CPU0:router(config-ospfv3-ar-if)# mtu-ignore
```

neighbor (OSPFv3)

To configure Open Shortest Path First Version 3 (OSPFv3) routers interconnecting to nonbroadcast networks, use the **neighbor** command in interface configuration mode. To remove a configuration, use the **no** form of this command.

neighbor *ipv6-address* [**priority** *number*] [**poll-interval** *seconds*] [**cost** *number*] [**database-filter all out**]

no neighbor *ipv6-address* [**priority** *number*] [**poll-interval** *seconds*] [**cost** *number*] [**database-filter all out**]

Syntax Description

<i>ipv6-address</i>	Link- local IP Version 6 (IPv6) address of the neighbor. This argument must be in the form documented in RFC 2373, in which the address is specified in hexadecimal using 16-bit values between colons.
priority <i>number</i>	(Optional) Specifies an 8-bit number indicating the router priority value of the nonbroadcast neighbor associated with the IP address specified. The priority keyword does not apply to point-to-multipoint interfaces.
poll-interval <i>seconds</i>	(Optional) Specifies an unsigned integer value (in seconds) reflecting the poll interval. RFC 1247 recommends that this value be much larger than the hello interval. The poll-interval keyword does not apply to point-to-multipoint interfaces.
cost <i>number</i>	(Optional) Assigns a cost to the neighbor, in the form of an integer from 1 to 65535. Neighbors with no specific cost configured assume the cost of the interface, based on the cost command. On point-to-multipoint interfaces, cost <i>number</i> is the only keyword and argument combination that works. The cost keyword does not apply to nonbroadcast multiaccess (NBMA) networks.
database-filter all out	(Optional) Filters outgoing link-state advertisements (LSAs) to an OSPFv3 neighbor.

Command Default

No configuration is specified.

priority *number* : 0

poll-interval *seconds* : 120 seconds (2 minutes)

Command Modes

Interface configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

One neighbor entry must be included in the software configuration for each known nonbroadcast network neighbor. The neighbor address must be the IPv6 link-local address of the interface.

If a neighboring router has become inactive (hello packets have not been seen for the router dead interval period), it may still be necessary to send hello packets to the dead neighbor. These hello packets are sent at a reduced rate called the poll interval.

When the router starts up, it sends only hello packets to those routers with nonzero priority; that is, routers that are eligible to become designated routers (DRs) and backup designated routers (BDRs). After the DR and BDR are selected, the DR and BDR then start sending hello packets to all neighbors to form adjacencies.

Task ID	Task ID	Operations
	ospf	read, write

Examples

The following example shows how to declare a router at address fe80::3203:a0ff:fe9d:f3fe on a nonbroadcast network:

```
RP/0/RP0/CPU0:router(config)# router ospfv3 1
RP/0/RP0/CPU0:router(config-ospfv3)# area 0
RP/0/RP0/CPU0:router(config-ospfv3-ar)# interface tenGigE 0/2/0/0
RP/0/RP0/CPU0:router(config-ospfv3-ar)# network non-broadcast
RP/0/RP0/CPU0:router(config-ospfv3-ar-if)# neighbor fe80::3203:a0ff:fe9d:f3fe
```

network (OSPFv3)

To configure the Open Shortest Path First Version 3 (OSPFv3) network type to a type other than the default for a given medium, use the **network** command in an appropriate configuration mode. To return to the default value, use the **no** form of this command.

```
network {broadcast | non-broadcast | {point-to-multipoint [non-broadcast] | point-to-point}}
no network
```

Syntax Description		
broadcast		Sets the network type to broadcast.
non-broadcast		Sets the network type to nonbroadcast multiaccess (NBMA).
point-to-multipoint		Sets the network type to point-to-multipoint.
[non-broadcast]		(Optional) Sets the point-to-multipoint network to be nonbroadcast. If you use the non-broadcast keyword, the neighbor command is required.
point-to-point		Sets the network type to point-to-point.

Command Default	
	If this command is not specified in interface configuration mode, then the interface adopts the network parameter specified by the area.
	If this command is not specified in area configuration mode, then the interface adopts the network parameter specified for the process.
	If this command is not specified at any level, then the OSPFv3 network type is the default of the given medium.

Command Modes	
	Interface configuration
	Area configuration
	Router OSPFv3 configuration

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines	
	Use the network command to configure broadcast networks as NBMA networks when, for example, routers in your network do not support multicast addressing.
	Most times, it is assumed that when you configure NBMA networks as either broadcast or nonbroadcast, there are virtual circuits from every router to every router or fully meshed network. However, there are other configurations where this assumption is not true; for example, a partially meshed network. In these cases, you can configure the OSPFv3 network type as a point-to-multipoint network. Routing between two routers that are not directly connected goes through the router that has virtual circuits to both routers. You need not configure neighbors when using this command.
	If the network command is issued on an interface that does not allow it, this command is ignored.
	OSPFv3 has two features related to point-to-multipoint networks. One feature applies to broadcast networks and the other feature applies to nonbroadcast networks:

- On point-to-multipoint, broadcast networks, you can use the **neighbor** command, and you must specify a cost to that neighbor.
- On point-to-multipoint, nonbroadcast networks, you must use the **neighbor** command to identify neighbors. Assigning a cost to a neighbor is optional.

Task ID	Task ID	Operations
	ospf	read, write

Examples

The following example shows how to configure an Ethernet interface as point-to-point:

```
RP/0/RP0/CPU0:router(config)# router ospfv3 1
RP/0/RP0/CPU0:router(config-ospfv3)# area 0
RP/0/RP0/CPU0:router(config-ospfv3-ar)# interface tenGigE 0/1/0/3
RP/0/RP0/CPU0:router(config-ospfv3-ar-if)# network point-to-point
```

nssa (OSPFv3)

To configure an area as a not-so-stubby area (NSSA), use the **nssa** command in area configuration mode. To remove the NSSA distinction from the area, use the **no** form of this command.

```
nssa [no-redistribution] [default-information-originate [{metric metric-value | metric-type
type-value}] [no-summary]
no nssa
```

Syntax Description		
no-redistribution	(Optional) Imports routes into the normal areas, but not into the NSSA area, by the redistribute command when the router is an NSSA area border router (ABR).	
default-information-originate	(Optional) Generates a Type 7 default into the NSSA area. This keyword takes effect only on an NSSA ABR or NSSA autonomous system boundary router (ASBR).	
metric <i>metric-value</i>	(Optional) Specifies a metric used for generating the default route. If you do not specify a default route metric value using the nssa and defaultmetric commands, the default metric value is 10. The value used is specific to the protocol.	
metric-type <i>type-value</i>	(Optional) Specifies an external link type associated with the default route advertised into the Open Shortest Path First Version 3 (OSPFv3) routing domain. It can be one of the following values: 1—Type 1 external route 2—Type 2 external route	
no-summary	(Optional) Prevents an (ABR) from sending summary link advertisements into the NSSA area.	

Command Default No NSSA area is defined.
If you do not specify a value using the **default-metric** command, the default metric value is 10.
The default *type-value* is Type 2 external route.

Command Modes Area configuration

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines A default route need not be defined in an NSSA ABR when the **nssa** command is configured. However, if this command is configured on an NSSA ASBR, then a default route must be defined.



Note NSSA cannot be configured for area 0 (backbone area).

Task ID	Task ID	Operations
	ospf	read, write

Examples

The following example shows how to configure area 1 as an NSSA area:

```
RP/0/RP0/CPU0:router(config)# router ospfv3 1  
RP/0/RP0/CPU0:router(config-ospfv3)# router-id 10.18.1.1  
RP/0/RP0/CPU0:router(config-ospfv3)# area 1  
RP/0/RP0/CPU0:router(config-ospfv3-ar)# nssa
```

ospfv3 name-lookup

To configure Open Shortest Path First Version 3 (OSPFv3) to look up Domain Name System (DNS) names, use the **ospfv3 name-lookup** command in XR Config mode. To disable this function, use the **no** form of this command.

ospfv3 name-lookup
no ospfv3 name-lookup

Syntax Description This command has no arguments or keywords.

Command Default Routers are displayed by router ID or neighbor ID.

Command Modes XR Config mode

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines Use the **ospfv3 name-lookup** command to simplify the task of searching for a router. Routers are displayed by name rather than by router ID or neighbor ID.

Task ID	Task ID	Operations
	ospf	read, write

Examples

The following example shows how to configure OSPFv3 to look up DNS names for use in all OSPFv3 **show** command displays:

```
RP/0/RP0/CPU0:router(config)# ospfv3 name-lookup
```

packet-size (OSPFv3)

To configure the size of Open Shortest Path First Version 3 (OSPFv3) packets up to the size specified by the maximum transmission unit (MTU), use the **packet-size** command in an appropriate configuration mode. To disable this function and reestablish the default packet size, use the **no** form of this command.

packet-size *bytes*
no packet-size

Syntax Description	<i>bytes</i> Size in bytes. Range is 256 to 10000 bytes.
---------------------------	----------------------------------------------------------

Command Default	If not specified, the default packet size is 1500 bytes.
------------------------	----------------------------------------------------------

Command Modes	Router OSPFv3 configuration Area configuration Interface configuration
----------------------	------------------------------------------------------------------------------

Command History	Release Modification
	Release 6.0 This command was introduced.

Usage Guidelines	Use the packet-size command to customize the size of OSPFv3 packets. The OSPFv3 protocol compares the packet size and the MTU size and uses the lower packet size value.
-------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Task ID	Task ID Operations
	ospf read, write

Examples

The following example shows how to configure the packet size:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# router ospf osp3
RP/0/RP0/CPU0:router(config-ospfv3)# packet-size 3500
```

passive (OSPFv3)

To suppress the sending of Open Shortest Path First Version 3 (OSPFv3) packets on an interface, use the **passive** command in an appropriate configuration mode. To remove the passive configuration, use the **no** form of this command.

passive [**disable**]
no passive

Syntax Description	disable (Optional) Sends OSPFv3 updates.
	Note The disable keyword is not available in router ospfv3 configuration mode.

Command Default	<p>If this command is not specified in interface configuration mode, then the interface adopts the passive parameter specified by the area.</p> <p>If this command is not specified in area configuration mode, then the interface adopts the passive parameter specified for the process.</p> <p>If this command is not specified at any level, then the passive parameter is disabled and OSPFv3 updates are sent on the interface.</p>
------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Command Modes	<p>Interface configuration</p> <p>Area configuration</p> <p>Router OSPFv3 configuration</p>
----------------------	---------------------------------------------------------------------------------------------

Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 6.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 6.0	This command was introduced.
Release	Modification				
Release 6.0	This command was introduced.				

Usage Guidelines	OSPF routing information is neither sent nor received through the specified router interface. The specified interface address appears as a stub network in the OSPF domain.
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Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>ospf</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	ospf	read, write
Task ID	Operations				
ospf	read, write				

Examples	<p>The following example shows that OSPFv3 updates run over tenGigE interface 0/3/0/0, 0/2/0/0, and 0/2/0/2. All other interfaces suppress sending OSPFv3 updates because they are in passive mode.</p>
-----------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

```
RP/0/RP0/CPU0:router (config) # router ospfv3 1
RP/0/RP0/CPU0:router (config-ospfv3) # router-id 10.0.0.206
RP/0/RP0/CPU0:router (config-ospfv3) # passive
RP/0/RP0/CPU0:router (config-ospfv3) # area 0
```



```
RP/0/RP0/CPU0:router(config-ospfv3-ar)# interface tenGigE 0/3/0/0
RP/0/RP0/CPU0:router(config-ospfv3-ar-if)# passive disable
RP/0/RP0/CPU0:router(config-ospfv3-ar-if)# exit
RP/0/RP0/CPU0:router(config-ospfv3-ar)# interface tenGigE 0/3/0/1
RP/0/RP0/CPU0:router(config-ospfv3-ar-if)# exit
RP/0/RP0/CPU0:router(config-ospfv3-ar)# exit
RP/0/RP0/CPU0:router(config-ospfv3)# area 1
RP/0/RP0/CPU0:router(config-ospfv3-ar)# passive disable
RP/0/RP0/CPU0:router(config-ospfv3-ar)# interface tenGigE 0/2/0/0
RP/0/RP0/CPU0:router(config-ospfv3-ar-if)# exit
RP/0/RP0/CPU0:router(config-ospfv3-ar)# interface tenGigE 0/2/0/1
RP/0/RP0/CPU0:router(config-ospfv3-ar-if)# passive
RP/0/RP0/CPU0:router(config-ospfv3-ar-if)# exit
RP/0/RP0/CPU0:router(config-ospfv3-ar)# interface tenGigE 0/2/0/2
RP/0/RP0/CPU0:router(config-ospfv3-ar-if)# exit
```

priority (OSPFv3)

To set the router priority for an interface, which helps determine the designated router for an Open Shortest Path First Version 3 (OSPFv3) link, use the **priority** command in an appropriate configuration mode. To return to the default value, use the **no** form of this command.

priority *value*
no priority

Syntax Description	<i>value</i> 8-bit unsigned integer indicating the router priority value. Range is 0 to 255.				
Command Default	<p>If this command is not specified in interface configuration mode, then the interface adopts the priority parameter specified by the area.</p> <p>If this command is not specified in area configuration mode, then the interface adopts the priority parameter specified by the process.</p> <p>If this command is not specified at any level, then the default priority is 1.</p>				
Command Modes	<p>Interface configuration</p> <p>Area configuration</p> <p>Router OSPFv3 configuration</p>				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 6.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 6.0	This command was introduced.
Release	Modification				
Release 6.0	This command was introduced.				
Usage Guidelines	When two routers attached to a network both attempt to become the designated router, the one with the higher router priority takes precedence. If there is a tie, the router with the higher router ID takes precedence. A router with a router priority set to zero is ineligible to become the designated router or backup designated router. Router priority is configured only for interfaces to broadcast and nonbroadcast multiaccess (NBMA) networks.				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>ospf</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	ospf	read, write
Task ID	Operations				
ospf	read, write				
Examples	<p>The following example shows how to set the router priority value to 4 on tenGigE interface 0/1/0/1:</p> <pre>RP/0/RP0/CPU0:router(config)# router ospfv3 1 RP/0/RP0/CPU0:router(config-ospfv3)# area 0 RP/0/RP0/CPU0:router(config-ospfv3-ar)# interface tenGigE 0/1/0/1 RP/0/RP0/CPU0:router(config-ospfv3-ar-if)# priority 4</pre>				

protocol shutdown (OSPFv3)

To disable an instance of the Open Shortest Path First protocol, version 3 (OSPFv3), so that it cannot form an adjacency on any interface, use the **protocol shutdown** command in the ospfv3 configuration mode. To re-enable the OSPF protocol, use the **no** form of this command.

protocol shutdown
no protocol shutdown

Command Default

None

Command Modes

ospfv3 configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

Use the **protocol shutdown** command to disable the OSPFv3 protocol for a specific routing instance without removing any existing OSPF configuration parameters.

The OSPFv3 protocol continues to run on the router and you can use the current OSPFv3 configuration, but OSPFv3 does not form any adjacencies on any interface.

This command is similar to performing the **no router ospf** command.

Task ID

Task ID	Operations
ospf	read, write

Examples

This example shows how to disable the OSPFv3:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# router ospfv3 100
RP/0/RP0/CPU0:router(config-ospfv3)# protocol shutdown
```

range (OSPFv3)

To consolidate and summarize routes at an area boundary for Open Shortest Path First Version 3 (OSPFv3), use the **range** command in area configuration mode. To restore the default values, use the **no** form of this command.

range *ipv6-prefix/prefix-length* [{**advertise** | **not-advertise**}] [**cost** *number*]

no range *ipv6-prefix/prefix-length* [{**advertise** | **not-advertise**}] [**cost** *number*]

Syntax Description	
<i>ipv6-prefix</i>	Summary prefix designated for a range of IP Version 6 (IPv6) prefixes. This argument must be in the form documented in RFC 2373, in which the address is specified in hexadecimal using 16-bit values between colons.
<i>/ prefix-length</i>	Length of the IPv6 prefix. A decimal value that indicates how many of the high-order contiguous bits of the address compose the prefix (the network portion of the address). A slash must precede the decimal value.
advertise	(Optional) Sets the address range status to advertise and generates a Type 3 summary link-state advertisement (LSA).
not-advertise	(Optional) Sets the address range status to DoNotAdvertise. The Type 3 summary LSA is suppressed and the component networks remain hidden from other networks.
cost <i>number</i>	(Optional) Specifies a cost for the range. Range is 1 to 16777214.

Command Default Routes are not consolidated and summarized for an area.

Command Modes Area configuration

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines Use the **range** command only with Area Border Routers (ABRs). It is used to consolidate or summarize routes for an area. The result is that a single summary route is advertised to other areas by the ABR. Routing information is condensed at area boundaries. External to the area, a single route is advertised for each address range. This process is called *route summarization*.

You can use the **range** command to configure multiple ranges. Thus, OSPFv3 can summarize addresses for many different sets of address ranges.

Task ID	Task ID	Operations
	ospf	read, write

Examples

The following example shows how to specify one summary route to be advertised by the ABR to other areas for all IPv6 prefixes within the range defined by summary prefix 4004:f000::/32:

```
RP/0/RP0/CPU0:router(config)# router ospfv3 201  
RP/0/RP0/CPU0:router(config-ospfv3)# area 0  
RP/0/RP0/CPU0:router(config-ospfv3-ar)# range 4004:f000::/32
```

redistribute (OSPFv3)

To redistribute routes from one routing domain into Open Shortest Path First Version 3 (OSPFv3), use the **redistribute** command in an appropriate configuration mode. To remove the **redistribute** command from the configuration file and restore the system to its default condition in which the software does not redistribute routes, use the **no** form of this command.

Border Gateway Protocol (BGP)

redistribute bgp *process-id* [**metric** *metric-value*] [**metric-type** {1|2}] [**policy** *policy-name*] [**tag** *tag-value*]

no redistribute bgp *process-id* [**metric** *metric-value*] [**metric-type** {1|2}] [**policy** *policy-name*] [**tag** *tag-value*]

Local Interface Routes

redistribute connected [**metric** *metric-value*] [**metric-type** {1|2}] [**policy** *policy-name*] [**tag** *tag-value*]

no redistribute connected [**metric** *metric-value*] [**metric-type** {1|2}] [**policy** *policy-name*] [**tag** *tag-value*]

Intermediate System-to-Intermediate System (IS-IS)

redistribute isis *process-id* [{**level-1** | **level-2** | **level-1-2**}] [**metric** *metric-value*] [**metric-type** {1|2}] [**policy** *policy-name*] [**tag** *tag-value*]

no redistribute isis *process-id* [{**level-1** | **level-2** | **level-1-2**}] [**metric** *metric-value*] [**metric-type** {1|2}] [**policy** *policy-name*] [**tag** *tag-value*]

Open Shortest Path First Version 3 (OSPFv3)

redistribute ospfv3 *process-id* **match**{**external** | 1 | 2 | **internal** | **nssa-external** | [{1|2}]} [**metric** *metric-value*] [**metric-type** {1|2}] [**policy** *policy-name*] [**tag** *tag-value*]

no redistribute ospfv3 *process-id* [{**match** | {**external** | **internal** | **nssa-external**}}] [**metric** *metric-value*] [**metric-type** {1|2}] [**policy** *policy-name*] [**tag** *tag-value*]

Static

redistribute static [**metric** *metric-value*] [**metric-type** {1|2}] [**policy** *policy-name*] [**tag** *tag-value*]

no redistribute static [**metric** *metric-value*] [**metric-type** {1|2}] [**policy** *policy-name*] [**tag** *tag-value*]

Syntax Description

bgp	Distributes routes from the BGP protocol.
------------	-------------------------------------------

<i>process-id</i>	<p>For the bgp keyword, an autonomous system number has the following ranges:</p> <ul style="list-style-type: none"> • Range for 2-byte Autonomous system numbers (ASNs) is 1 to 65535. • Range for 4-byte Autonomous system numbers (ASNs) in asplain format is 1 to 4294967295. • Range for 4-byte Autonomous system numbers (ASNs) in asdot format is 1.0 to 65535.65535. <p>For the isis keyword, an IS-IS instance name from which routes are to be redistributed. The value takes the form of a string. A decimal number can be entered, but it is stored internally as a string.</p> <p>For the ospf keyword, an OSPF instance name from which routes are to be redistributed. The value takes the form of a string. A decimal number can be entered, but it is stored internally as a string.</p>
metric <i>metric-value</i>	(Optional) Specifies the metric used for the redistributed route. Range is 1 to 16777214. Use a value consistent with the destination protocol.
metric-type { 1 2 }	<p>(Optional) Specifies the external link type associated with the route advertised into the OSPF routing domain. It can be one of two values:</p> <ul style="list-style-type: none"> • 1—Type 1 external route • 2—Type 2 external route <p>If no metric-type is specified, the default is Type 2 external routes.</p>
tag <i>tag-value</i>	(Optional) Specifies the 32-bit dotted-decimal value attached to each external route. This value is not used by the OSPF protocol itself, but is carried in the External LSAs. Range is 0 to 4294967295.
policy <i>policy-name</i>	(Optional) Specifies the identifier of a configured policy. A policy is used to filter the importation of routes from this source routing protocol to OSPF.
connected	Distributes routes that are established automatically by virtue of having enabled IP on an interface.
isis	Distributes routes from the IS-IS protocol.
level-1	(Optional) Redistributes Level 1 routes into other IP routing protocols independently.
level-1-2	(Optional) Redistributes both Level 1 and Level 2 routes into other IP routing protocols.
level-2	(Optional) Redistributes Level 2 routes into other IP routing protocols independently.
ospf	Distributes routes from the OSPF protocol.

match { **internal** | **external** [**1** | **2**] | **nssa-external** [**1** | **2**] }

(Optional) Specifies the criteria by which OSPF routes are redistributed into other routing domains. It can be one or more of the following:

- **internal**—Routes that are internal to a specific autonomous system (intra- and inter-area OSPF routes).
- **external** [**1** | **2**]—Routes that are external to the autonomous system, but are imported into OSPF as Type 1 or Type 2 external routes.
- **nssa-external** [**1** | **2**]—Routes that are external to the autonomous system, but are imported into OSPF as Type 1 or Type 2 not-so-stubby area (NSSA) external routes.

For the **external** and **nssa-external** options, if a type is not specified, then both Type 1 and Type 2 are assumed.

If no match is specified, the default is no filtering.

static Redistributes IP static routes.

Command Default

Route redistribution is disabled.

metric *metric-value*: Default is 20 for routes from all protocols except BGP routes, in which the default is 1.

metric-type *type-value*: Type 2 external route

All routes from the OSPFv3 routing protocol are redistributed.

tag *tag-value*: If no value is specified, the remote autonomous system number is used for routes from Border Gateway Protocol (BGP); for other protocols, the default is 0.

Command Modes

Router OSPFv3 configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines



Note When redistributing routes (into OSPF) using both command keywords for setting or matching of attributes and a route policy, the routes are run through the route policy first, followed by the keyword matching and setting.

Disabling or changing the arguments of any keyword does not affect the state of other keywords.

In general, route redistribution from Level 1 to Level 2 is automatic. You might want to use this command to better control which Level 1 routes can be redistributed into Level 2.

The redistribution of Level 2 routes into Level 1 is called *route leaking*. Route leaking is disabled by default. That is, Level 2 routes are not automatically included in Level 1 link-state protocols. If you want to leak Level 2 routes into Level 1, you must enable that behavior by using this command.

Redistribution from Level 1 into Level 1 and from Level 2 into Level 2 is not allowed.

A router receiving a link-state packet with an internal metric considers the cost of the route from itself to the redistributing router plus the advertised cost to reach the destination. An external metric considers only the advertised metric to reach the destination.

Redistributed routing information should always be filtered by the **distribute-list prefix-list out** command. Use of this command ensures that only those routes intended by the administrator are passed along to the receiving routing protocol.

OSPFv3 Considerations

Whenever you use the **redistribute** or the **default-information** command to redistribute routes into an OSPFv3 routing domain, the router automatically becomes an ASBR. However, an ASBR does not, by default, generate a default route into the OSPFv3 routing domain.

When routes are redistributed between OSPFv3 processes, no OSPFv3 metrics are preserved.

When routes are redistributed into OSPF and no metric is specified with the **metric** keyword, OSPF uses 20 as the default metric for routes from all protocols except BGP routes, which get a metric of 1. Furthermore, when the router redistributes from one OSPFv3 process to another OSPFv3 process on the same router, and if no default metric is specified, the metrics in one process are carried to the redistributing process.

BGP Considerations

The only connected routes affected by this command are the routes not specified by the **network** (BGP) command.

Task ID	Task ID	Operations
	ospf	read, write

Examples

The following example shows how to cause static routes to be redistributed into an OSPFv3 domain:

```
RP/0/RP0/CPU0:router(config)# router ospfv3 109
RP/0/RP0/CPU0:router(config-ospfv3)# redistribute isis level-1
```

retransmit-interval (OSPFv3)

To specify the time between link-state advertisement (LSA) retransmissions for adjacencies belonging to the Open Shortest Path First Version 3 (OSPFv3) interface, use the **retransmit-interval** command in an appropriate configuration mode. To return to the default value, use the **no** form of this command.

retransmit-interval *seconds*
no retransmit-interval

Syntax Description	<i>seconds</i> Time (in seconds) between retransmissions. It must be greater than the expected round-trip delay between any two routers on the attached network. Range is 1 to 65535 seconds.				
Command Default	<p>If this command is not specified in interface configuration mode, then the interface adopts the retransmit interval parameter specified by the area.</p> <p>If this command is not specified in area configuration mode, then the interface adopts the retransmit interval parameter specified by the process.</p> <p>If this command is not specified at any level, then the default retransmit interval is 5 seconds.</p>				
Command Modes	<p>Interface configuration</p> <p>Area configuration</p> <p>Router OSPFv3 configuration</p> <p>Virtual-link configuration</p>				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 6.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 6.0	This command was introduced.
Release	Modification				
Release 6.0	This command was introduced.				
Usage Guidelines	<p>When a router sends an LSA to its neighbor, it keeps the LSA until it receives the acknowledgment message. If the router receives no acknowledgment, it resends the LSA.</p> <p>The setting of this parameter should be conservative, or needless retransmission results. The value should be larger for serial lines and virtual links.</p>				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>ospf</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	ospf	read, write
Task ID	Operations				
ospf	read, write				
Examples	<p>The following example shows how to set the retransmit interval value to 8 seconds while in interface configuration mode:</p> <pre>RP/0/RP0/CPU0:router(config)# router ospfv3 1 RP/0/RP0/CPU0:router(config-ospfv3)# area 0 RP/0/RP0/CPU0:router(config-ospfv3-ar)# interface tenGigE 0/2/0/0</pre>				

```
RP/0/RP0/CPU0:router(config-ospfv3-ar-if)# retransmit-interval 8
```

router-id (OSPFv3)

To configure a router ID for the Open Shortest Path First Version 3 (OSPFv3) routing process, use the **router-id** command in an appropriate configuration mode. To cause the software to use the default method of determining the router ID, use the **no** form of this command after clearing or restarting the OSPF process.

router-id *router-id*
no router-id *router-id*

Syntax Description	<i>router-id</i> 32-bit router ID value specified in four-part, dotted-decimal notation.
---------------------------	------------------------------------------------------------------------------------------

Command Default	If this command is not configured, the router ID is the highest IP address for an interface on the router, with any loopback interface taking precedence.
------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------

Command Modes	Router OSPFv3 configuration
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Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines	We recommend that you use the router-id command to explicitly specify a unique 32-bit numeric value for the router ID. This configuration ensures that OSPFv3 can function regardless of the interface address configuration. Clear the OSPF process using the clear ospf process command or restart the OSPF process for the no router-id command to take effect.
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In router OSPFv3 configuration mode, OSPF attempts to obtain a router ID in the following ways (in order of preference):

1. By default, when the OSPF process initializes, it checks if there is a router-id in the checkpointing database.
2. The 32-bit numeric value specified by the OSPF **router-id** command in router configuration mode. (This value can be any 32-bit value. It is not restricted to the IPv4 addresses assigned to interfaces on this router, and need not be a routable IPv4 address.)
3. A global router ID provided by the system (possibly, the first loopback address found at the boot time).

If the OSPFv3 process cannot obtain a router ID from any of these sources, the router issues the following error message:

```
%OSPFv3-4-NORTRID : OSPFv3 process 1 cannot run - configure a router ID for this process
```

At this point, OSPFv3 is effectively passive on all its interfaces. To run OSPFv3, make a router ID available by one of the methods described.

Task ID	Task ID	Operations
	ospf	read, write

Examples

The following example shows how to assign the IP address of 10.0.0.10 to the OSPFv3 process 109:

```
RP/0/RP0/CPU0:router(config)# router ospfv3 109  
RP/0/RP0/CPU0:router(config-ospfv3)# router-id 10.0.0.10
```

router ospfv3

To configure an Open Shortest Path First Version 3 (OSPFv3) routing process, use the **router ospfv3** command in XR Config mode. To terminate an OSPFv3 routing process, use the **no** form of this command.

router ospfv3 *process-name*
no router ospfv3 *process-name*

Syntax Description	<i>process-name</i> Name that uniquely identifies an OSPFv3 routing process. The process name is any alphanumeric string no longer than 40 characters.
---------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------

Command Default	No OSPFv3 routing process is defined.
------------------------	---------------------------------------

Command Modes	XR Config mode
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Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines	You can specify multiple OSPFv3 routing processes in each router. Up to 10 processes can be configured. The recommendation is not to exceed 4 OSPFv3 processes.
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Task ID	Task ID	Operations
	ospf	read, write

Examples	The following example shows how to instantiate an OSPFv3 routing process with a process name of 1:
-----------------	----------------------------------------------------------------------------------------------------

```
RP/0/RP0/CPU0:router(config)# router ospfv3 1
```

sham-link (OSPFv3)

To configure an Open Shortest Path First version 3 (OSPFv3) sham link between two provider edge routers on a non-default VRF, use the **sham-link** command in OSPFv3 router area sub-configuration mode. To terminate an OSPFv3 sham link, use the **no** form of this command.

sham-link *source-address destination-address*
no sham-link

Syntax Description	<i>source-address</i> IP address of the local (source) sham-link endpoint specified in four-part, dotted-decimal notation.				
	<i>destination-address</i> IP address of the remote (destination) sham-link endpoint specified in four-part, dotted-decimal notation.				
Command Default	No sham link is configured.				
Command Modes	OSPFv3 router area sub-configuration.				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 6.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 6.0	This command was introduced.
Release	Modification				
Release 6.0	This command was introduced.				
Usage Guidelines	Use the sham-link command to configure a point-to-point connection between two provider edge (PE) routers creating an interconnect between two VPN sites (VPN backbone). Sham links are configured on PE provider edge (PE) routers in a Multiprotocol Label Switching (MPLS) VPN backbone.				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>ospf</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	ospf	read, write
Task ID	Operations				
ospf	read, write				
Examples	<p>This example shows how to configure an OSPFv3 sham link:</p> <pre>RP/0/RP0/CPU0:router# configure RP/0/RP0/CPU0:router(config)# router ospfv3 ospfv3 RP/0/RP0/CPU0:router(config_ospfv3)# vrf 1 RP/0/RP0/CPU0:router(config_ospfv3_vrf)# area 1 RP/0/RP0/CPU0:router(config_ospfv3_vrf_ar)# sham-link 100::1 200::1 RP/0/RP0/CPU0:router(config_ospfv3_vrf_ar_sl)# cost 23</pre>				

show ospfv3

To display general information about Open Shortest Path First Version 3 (OSPFv3) routing processes, use the **show ospfv3** command in XR EXEC mode.

show ospfv3 [*process-name*] **sham-links**

Syntax Description	<i>process-name</i> (Optional) Name that uniquely identifies an OSPFv3 routing process. The process name is defined by the router ospfv3 command. If this argument is included, only information for the specified routing process is displayed.
	sham-links Displays OSPFv3 Sham-link information.

Command Default None

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines No specific guidelines impact the use of this command.

Task ID	Task ID	Operations
	ospf	read

Examples The following is a sample output from the **show ospfv3** command:

```
RP/0/RP0/CPU0:router# show ospfv3 1

Routing Process "ospfv3 test" with ID 3.3.3.3
It is an autonomous system boundary router
Redistributing External Routes from,
static
  Maximum number of redistributed prefixes 10240
  Threshold for warning message 75%
Initial SPF schedule delay 5000 msec
Minimum hold time between two consecutive SPFs 10000 msec
Maximum wait time between two consecutive SPFs 10000 msec
Initial LSA throttle delay 0 msec
Minimum hold time for LSA throttle 5000 msec
Maximum wait time for LSA throttle 5000 msec
Minimum LSA arrival 1000 msec
LSA group pacing timer 240 secs
Interface flood pacing timer 33 msec
Retransmission pacing timer 66 msec
Maximum number of configured interfaces 255
Number of external LSA 1. Checksum Sum 0x004468
Number of areas in this router is 1. 1 normal 0 stub 0 nssa
```



```

Area BACKBONE(0) (Inactive)
  Number of interfaces in this area is 1
  SPF algorithm executed 1 times
  Number of LSA 3. Checksum Sum 0x018109
  Number of DCbitless LSA 0
  Number of indication LSA 0
  Number of DoNotAge LSA 0
  Flood list length 0

```

The following is a sample output from the **show ospfv3** command when OSPFv3 graceful shutdown has been initiated but not yet completed:

```

RP/0/RP0/CPU0:router# show ospfv3 1

Routing Process "ospfv3 test" with ID 3.3.3.3 transitioning to OSPFV3_ADMIN_DOWN state

Routing Process "ospfv3 test" with ID 3.3.3.3
It is an autonomous system boundary router
Redistributing External Routes from,
static
  Maximum number of redistributed prefixes 10240
  Threshold for warning message 75%
Initial SPF schedule delay 5000 msec
Minimum hold time between two consecutive SPF's 10000 msec
Maximum wait time between two consecutive SPF's 10000 msec
Initial LSA throttle delay 0 msec
Minimum hold time for LSA throttle 5000 msec
Maximum wait time for LSA throttle 5000 msec
Minimum LSA arrival 1000 msec
LSA group pacing timer 240 secs
Interface flood pacing timer 33 msec
Retransmission pacing timer 66 msec
Maximum number of configured interfaces 255
Number of external LSA 1. Checksum Sum 0x004468
Number of areas in this router is 1. 1 normal 0 stub 0 nssa
Area BACKBONE(0) (Inactive)
  Number of interfaces in this area is 1
  SPF algorithm executed 1 times
  Number of LSA 3. Checksum Sum 0x018109
  Number of DCbitless LSA 0
  Number of indication LSA 0
  Number of DoNotAge LSA 0
  Flood list length 0

```

The following is a sample output from the **show ospfv3** command when OSPFv3 graceful shutdown is completed:

```

RP/0/RP0/CPU0:router# show ospfv3 1

Routing Process "ospfv3 test" with ID 3.3.3.3 in OSPFV3_ADMIN_DOWN state
%ROUTING-OSPFV3-6-GRACEFUL_SHUTDOWN : Shutdown Complete

Routing Process "ospfv3 test" with ID 3.3.3.3
It is an autonomous system boundary router
Redistributing External Routes from,
static
  Maximum number of redistributed prefixes 10240
  Threshold for warning message 75%
Initial SPF schedule delay 5000 msec
Minimum hold time between two consecutive SPF's 10000 msec
Maximum wait time between two consecutive SPF's 10000 msec

```

```

Initial LSA throttle delay 0 msec
Minimum hold time for LSA throttle 5000 msec
Maximum wait time for LSA throttle 5000 msec
Minimum LSA arrival 1000 msec
LSA group pacing timer 240 secs
Interface flood pacing timer 33 msec
Retransmission pacing timer 66 msec
Maximum number of configured interfaces 255
Number of external LSA 1. Checksum Sum 0x004468
Number of areas in this router is 1. 1 normal 0 stub 0 nssa
Area BACKBONE(0) (Inactive)
  Number of interfaces in this area is 1
  SPF algorithm executed 1 times
  Number of LSA 3. Checksum Sum 0x018109
  Number of DCbitless LSA 0
  Number of indication LSA 0
  Number of DoNotAge LSA 0
  Flood list length 0

```

This table describes the significant fields shown in the display.

Table 1: show ospfv3 Field Descriptions

Field	Description
Routing Process “ospfv3 test” with ID	OSPFv3 process name.
It is	Types are internal, area border, or autonomous system boundary.
Redistributing External Routes from	Lists of redistributed routes, by protocol.
Maximum number of redistributed prefixes	Number of redistributed prefixes
Threshold for warning message	Warning message threshold.
Initial SPF schedule delay	Delay time of SPF calculations.
Minimum hold time between two consecutive SPF	Minimum hold time between consecutive SPF.
Maximum wait time between two consecutive SPF	Maximum wait time between consecutive SPF.
Initial LSA throttle delay	Delay time of LSA throttle.
Maximum hold time for LSA throttle	After initial throttle delay, the LSA generation is backed off by hold interval.
Maximum wait time for LSA throttle	Maximum throttle delay for LSA generation.
Minimum LSA arrival	Minimum LSA arrival.
LSA group pacing timer	Configured LSA group pacing timer (in seconds).
Interface flood pacing timer	Flooding pacing interval.
Retransmission pacing timer	Retransmission pacing interval.
Maximum number of configured interfaces	Maximum number of configured interfaces.

Field	Description
Number of external LSA	Number of external LSAs.
Number of areas in this router is	Number of areas configured for the router.
Number of interfaces in this area is	Number of interfaces in the area.
SPF algorithm executed <i>n</i> times	Times SPF algorithm was executed.
Number of LSA	Number of LSAs.
Number of DCbitless LSA	Number of DCbitless LSAs.
Number of indication LSA	Number of indication LSAs.
Number of DoNotAge LSA	Number of do-not-age LSAs.
Flood list length	Flood list length.

This is sample output from the show ospfv3 vrf command that displays domain -id configuration:

```
RP/0/RP0/CPU0:router#show ospfv3 0 vrf V1
Mon May 10 14:52:31.332 CEST

Routing Process "ospfv3 0" with ID 100.0.0.2 VRF V1
It is an area border and autonomous system boundary router
Redistributing External Routes from,
  bgp 1
  Maximum number of redistributed prefixes 10240
  Threshold for warning message 75%
Primary Domain ID:
  0x0005:0xcafe00112233
Secondary Domain ID:
  0x0105:0xbeef00000001
  0x0205:0xbeef00000002
Initial SPF schedule delay 5000 msec
Minimum hold time between two consecutive SPF 10000 msec
Maximum wait time between two consecutive SPF 10000 msec
Initial LSA throttle delay 0 msec
Minimum hold time for LSA throttle 5000 msec
Maximum wait time for LSA throttle 5000 msec
Minimum LSA arrival 1000 msec
LSA group pacing timer 240 secs
Interface flood pacing timer 33 msec
Retransmission pacing timer 66 msec
Maximum number of configured interfaces 255
Maximum number of configured paths 16
Number of external LSA 2. Checksum Sum 0x015bb3
Number of areas in this router is 1. 1 normal 0 stub 0 nssa
Auto cost is enabled. Reference bandwidth 100
  Area BACKBONE(0)
    Number of interfaces in this area is 1
    SPF algorithm executed 2 times
    Number of LSA 4. Checksum Sum 0x02629d
    Number of DCbitless LSA 0
    Number of indication LSA 0
    Number of DoNotAge LSA 0
    Flood list length 0
```

This is sample output from the show ospfv3 vrf command that displays vrf-lite configuration:

```
RP/0/RP0/CPU0:router#show ospfv3 0 vrf V2
Mon May 10 18:01:38.654 CEST

Routing Process "ospfv3 0" with ID 2.2.2.2 VRF V2
VRF lite capability is enabled
Initial SPF schedule delay 5000 msec
Minimum hold time between two consecutive SPF's 10000 msec
Maximum wait time between two consecutive SPF's 10000 msec
Initial LSA throttle delay 0 msec
Minimum hold time for LSA throttle 5000 msec
Maximum wait time for LSA throttle 5000 msec
Minimum LSA arrival 1000 msec
LSA group pacing timer 240 secs
Interface flood pacing timer 33 msec
Retransmission pacing timer 66 msec
Maximum number of configured interfaces 255
Maximum number of configured paths 16
Number of external LSA 0. Checksum Sum 00000000
Number of areas in this router is 0. 0 normal 0 stub 0 nssa
Auto cost is enabled. Reference bandwidth 100
```

This is sample output from the show ospfv3 command to verify that (Non-stop routing (NSR) is enabled:

```
RP/0/RP0/CPU0:router#show ospfv3

Routing Process "ospfv3 100" with ID 3.3.3.3
NSR (Non-stop routing) is Enabled
It is an area border and autonomous system boundary router
Redistributing External Routes from,
  bgp 100
  Maximum number of redistributed prefixes 10240
  Threshold for warning message 75%
Initial SPF schedule delay 5000 msec
Minimum hold time between two consecutive SPF's 10000 msec
Maximum wait time between two consecutive SPF's 10000 msec
Initial LSA throttle delay 0 msec
Minimum hold time for LSA throttle 5000 msec
Maximum wait time for LSA throttle 5000 msec
Minimum LSA arrival 1000 msec
LSA group pacing timer 240 secs
Interface flood pacing timer 33 msec
Retransmission pacing timer 66 msec
Maximum number of configured interfaces 512
Maximum number of configured paths 16
Number of external LSA 0. Checksum Sum 00000000
Number of areas in this router is 15. 15 normal 0 stub 0 nssa
Auto cost is enabled. Reference bandwidth 100
```

The following is a sample output from the show ospfv3 command with sham-links keyword:

```
RP/0/RP0/CPU0:router# show ospfv3 vrf vrf1 sham-links

Sham Links for OSPFv3 100, VRF vrf1

Sham Link OSPF_SL1 to address 300::1 is up
Area 2, source address 100::1
IfIndex = 2
```

```
Run as demand circuit
DoNotAge LSA allowed., Cost of using 1
Transmit Delay is 1 sec, State POINT_TO_POINT,
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
  Hello due in 00:00:08
  Adjacency State FULL (Hello suppressed)
  Number of DBD retrans during last exchange 0
  Index 2/2, retransmission queue length 0, number of retransmission 0
  First 0(0)/0(0) Next 0(0)/0(0)
  Last retransmission scan length is 0, maximum is 0
  Last retransmission scan time is 0 msec, maximum is 0 msec
Sham Link OSPF_SL0 to address 200::1 is up
Area 2, source address 100::1
IfIndex = 2
  Run as demand circuit
  DoNotAge LSA allowed., Cost of using 1
  Transmit Delay is 1 sec, State POINT_TO_POINT,
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    Hello due in 00:00:01
    Adjacency State FULL (Hello suppressed)
    Number of DBD retrans during last exchange 0
    Index 3/3, retransmission queue length 0, number of retransmission 0
    First 0(0)/0(0) Next 0(0)/0(0)
    Last retransmission scan length is 0, maximum is 0
    Last retransmission scan time is 0 msec, maximum is 0 msec
```

show ospfv3 border-routers

To display the internal Open Shortest Path First Version 3 (OSPFv3) routing table entries to an area border router (ABR) and autonomous system boundary router (ASBR), use the **show ospfv3 border-routers** command in XR EXEC mode.

```
show ospfv3 [process-name] border-routers [router-id]
```

Syntax Description	
<i>process-name</i>	(Optional) Name that uniquely identifies an OSPFv3 routing process. The process name is defined by the router ospfv3 command. If this argument is included, only information for the specified routing process is displayed.
<i>router-id</i>	(Optional) 32-bit router ID value specified in four-part, dotted-decimal notation.

Command Default No default behavior or values

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines No specific guidelines impact the use of this command.

Task ID	Task ID	Operations
	ospf	read

Examples The following is sample output from the **show ospfv3 border-routers** command:

```
RP/0/RP0/CPU0:router# show ospfv3 border-routers

OSPFv3 1 Internal Routing Table
Codes: i - Intra-area route, I - Inter-area route
i 10.0.0.207 [1] via fe80::3034:30ff:fe33:3742, tenGigE 0/3/0/0, ABR/ASBR, Area 1, SPF 3
i 10.0.0.207 [10] via fe80::204:c0ff:fe22:73fe, Ethernet0/0/0/0, ABR/ASBR, Area 0, SPF 7
```

This table describes the significant fields shown in the display.

Table 2: show ospf border-routers Field Descriptions

Field	Description
i	Type of this route; i indicates an intra-area route, I an inter-area route.
10.0.0.207	Router ID of destination.

Field	Description
[1]	Cost of using this route.
fe80::3034:30ff:fe33:3742	Next-hop toward the destination.
tenGigE 0/3/0/0	Packets destined for fe80::3034:30ff:fe33:3742 are sent over tenGigE interface 3/0/0/0.
ABR/ASBR	Router type of the destination; it is either an area border router (ABR) or autonomous system boundary router (ASBR) or both.
Area 1	Area ID of the area from which this route is learned.
SPF 3	Internal number of the shortest path first (SPF) calculation that installs this route.

show ospfv3 database

To display lists of information related to the Open Shortest Path First Version 3 (OSPFv3) database for a specific router, use the **show ospfv3 database** command in XR EXEC mode.

```

show ospfv3 [process-name [area-id]] database
show ospfv3 [process-name [area-id]] database[adv-router [router-id]]
show ospfv3 [process-name [area-id]] database [database-summary]
show ospfv3 [process-name [area-id]] database [external] [link-state-id]
show ospfv3 [process-name [area-id]] database [external] [link-state-id] [internal] [adv-router
[router-id]]
show ospfv3 [process-name [area-id]] database [external] [link-state-id] [internal] [self-originate]
show ospfv3 [process-name [area-id]] database [grace] [link-state-id] [adv-router [router-id]]
[internal] [self-originate]
show ospfv3 [process-name [area-id]] database [inter-area prefix] [link-state-id]
show ospfv3 [process-name [area-id]] vrf vrf-name database [link-state-id] [internal] [adv-router
[router-id]]
show ospfv3 [process-name [area-id]] database [inter-area prefix] [link-state-id] [internal]
[self-originate]
show ospfv3 [process-name [area-id]] database [inter-area router] [link-state-id]
show ospfv3 [process-name [area-id]] database [inter-area router] [link-state-id] [internal]
[adv-router [router-id]]
show ospfv3 [process-name [area-id]] database [inter-area router] [link-state-id] [internal]
[self-originate]
show ospfv3 [process-name [area-id]] database [link] [link-state-id]
show ospfv3 [process-name [area-id]] database [link] [link-state-id] [internal] [adv-router
[router-id]]
show ospfv3 [process-name [area-id]] database [link] [link-state-id] [internal] [self-originate]
show ospfv3 [process-name [area-id]] database [network] [link-state-id]
show ospfv3 [process-name [area-id]] database [network] [link-state-id] [internal] [adv-router
[router-id]]
show ospfv3 [process-name [area-id]] database [network] [link-state-id] [internal] [self-originate]
show ospfv3 [process-name [area-id]] database [nssa-external] [link-state-id]
show ospfv3 [process-name [area-id]] database [nssa-external] [link-state-id] [internal] [adv-router
[router-id]]
show ospfv3 [process-name [area-id]] database [nssa-external] [link-state-id] [internal]
[self-originate]
show ospfv3 [process-name [area-id]] database [prefix] [ref-lsa] [{router | network}] [link-state-id]
[internal] [adv-router [router-id]]
show ospfv3 [process-name [area-id]] database [prefix] [ref-lsa] [{router | network}] [link-state-id]
[internal] [self-originate]
show ospfv3 [process-name [area-id]] database [prefix] [link-state-id]
show ospfv3 [process-name [area-id]] database [prefix] [link-state-id] [internal] [adv-router
[router-id]]
show ospfv3 [process-name [area-id]] database [prefix] [link-state-id] [internal] [self-originate]
show ospfv3 [process-name [area-id]] database [router] [link-state-id]
show ospfv3 [process-name [area-id]] database [router] [adv-router [router-id]]
show ospfv3 [process-name [area-id]] database [router] [link-state-id] [internal] [self-originate]
show ospfv3 [process-name [area-id]] database [self-originate]

```



```
show ospfv3 [process-name [area-id]] database [unknown [{area | as | link}]] [link-state-id] [internal]
[adv-router [router-id]] [self-originate]
```

Syntax Description

<i>process-name</i>	(Optional) Name that uniquely identifies an OSPFv3 routing process. The process name is defined by the router ospfv3 command. If this argument is included, only information for the specified routing process is displayed.
<i>area-id</i>	(Optional) Area number used to define the particular area.
adv-router [<i>router-id</i>]	(Optional) Displays all link-state advertisements (LSAs) of the specified router.
asbr-summary	(Optional) Displays information only about the Autonomous System Boundary Router (ASBR) summary LSAs.
database-summary	(Optional) Displays how many of each type of LSA are in the database for each area and the total.
external	(Optional) Displays information only about external LSAs.
grace	(Optional) Displays information about the state for the graceful restart link.
internal	(Optional) Displays information only about internal LSAs.
self-originate	(Optional) Displays only self-originated LSAs (from the local router).
<i>link-state-id</i>	(Optional) LSA ID that uniquely identifies the LSA. For network LSAs and link LSAs, this ID is the interface ID of the link of the router originating the LSA.
inter-area prefix	(Optional) Displays information only about the interarea prefix LSAs.
inter-area router	(Optional) Displays information only about the interarea router LSAs.
link	(Optional) Displays information only about the link LSAs.
network	(Optional) Displays information only about the network LSAs.
nssa-external	(Optional) Displays information only about the not-so-stubby area (NSSA) external LSAs.
prefix	(Optional) Displays information only about the prefix LSAs.
ref-lsa	(Optional) Displays referenced LSA information.
router	(Optional) Displays information only about the router LSAs.
unknown	(Optional) Displays information only about unknown LSAs.
area	(Optional) Displays information only about the area LSAs.
as	(Optional) Displays information only about the autonomous system LSAs.

Command Default

No default behavior or values

Command Modes

XR EXEC mode

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines The various forms of this command deliver information about different OSPFv3 link-state advertisements.

Task ID	Task ID	Operations
	ospf	read

Examples The following is sample output from the **show ospfv3 database** command with no arguments or keywords:

```
RP/0/RP0/CPU0:router# show ospfv3 database

      OSPFv3 Router with ID (10.0.0.207) (Process ID 1)

      Router Link States (Area 0)

      ADV Router      Age      Seq#       Fragment ID  Link count  Bits
      0.0.0.1         163     0x80000039 0             2           None
      10.0.0.206      145     0x80000005 0             1           EB
      10.0.0.207      151     0x80000004 0             1           EB
      192.168.0.0     163     0x80000039 0             1           None

      Net Link States (Area 0)

      ADV Router      Age      Seq#       Link ID      Rtr count
      10.0.0.207      152     0x80000002 1             3
      192.168.0.0     163     0x80000039 1             2

      Inter Area Prefix Link States (Area 0)

      ADV Router      Age      Seq#       Prefix
      10.0.0.206      195     0x80000001 3002::/56
      10.0.0.207      197     0x80000001 3002::/56
      10.0.0.206      195     0x80000001 3002::206/128
      10.0.0.207      182     0x80000001 3002::206/128

      Inter Area Router Link States (Area 0)

      ADV Router      Age      Seq#       Link ID      Dest RtrID
      10.0.0.207      182     0x80000001 167772366    10.0.0.206
      10.0.0.206      182     0x80000001 167772367    10.0.0.207

      Link (Type-8) Link States (Area 0)

      ADV Router      Age      Seq#       Link ID      Interface
      0.0.0.1         163     0x80000039 1             Et0/0/0/0
      10.0.0.207      202     0x80000001 1             Et0/0/0/0
      10.0.0.206      200     0x80000001 2             Et0/0/0/0

      Intra Area Prefix Link States (Area 0)

      ADV Router      Age      Seq#       Link ID      Ref-lstype  Ref-LSID
      192.168.0.0     163     0x80000039 0             0x2002      1
      192.168.0.0     163     0x80000039 1             0x2001      0
```

```
10.0.0.207      157      0x80000001 1001      0x2002      1
```

This table describes the significant fields shown in the display.

Table 3: show ospfv3 database Field Descriptions

Field	Description
ADV Router	ID of advertising router.
Age	Link-state age.
Seq#	Link-state sequence number (detects old or duplicate LSAs).
Fragment ID	Router LSA fragment ID.
Link count	Number of links described.
Bits	B indicates that the router is an area border router. E indicates that the router is an autonomous system boundary router. V indicates that the router is a virtual link endpoint. W indicates that the router is a wildcard multicast receiver.
Link ID	Unique LSA ID.
Rtr count	Number of routers attached to the link.
Prefix	Prefix of the route being described.
Dest RtrID	Router ID of the router being described.
Interface	Link described by the LSA.
Ref-lstype	LSA type of the LSA being referenced.
Ref-LSID	LSA ID of the LSA being referenced.

The following is sample output from the **show ospfv3 database** command with the **external** keyword:

```
RP/0/RP0/CPU0:router# show ospfv3 database external
      OSPFv3 Router with ID (10.0.0.206) (Process ID 1)
          Type-5 AS External Link States

LS age: 189
LS Type: AS External Link
Link State ID: 0
Advertising Router: 10.0.0.206
LS Seq Number: 80000002
Checksum: 0xa303
Length: 36
Prefix Address: 2222::
Prefix Length: 56, Options: None
Metric Type: 2 (Larger than any link state path)
```

```
Metric: 20
External Route Tag: 0
```

This table describes the significant fields shown in the display.

Table 4: show ospfv3 database external Field Descriptions

Field	Description
OSPFv3 Router with ID	Router ID number.
Process ID	OSPFv3 process name.
LS age	Link-state age.
LS Type	Link-state type.
Link State ID	Link-state ID.
Advertising Router	ID of Advertising router.
LS Seq Number	Link-state sequence number (detects old or duplicate LSAs).
Checksum	LS checksum (Fletcher checksum of the complete contents of the LSA).
Length	Length (in bytes) of the LSA.
Prefix Address	IPv6 address prefix of the route being described.
Prefix Length	Length of the IPv6 address prefix.
Metric Type	External type.
Metric	Link-state metric.
External Route Tag	External route tag, a 32-bit field attached to each external route. This tag is not used by the OSPFv3 protocol itself.

The following is sample output from the **show ospfv3 database** command with the **inter-area prefix** keyword:

```
RP/0/RP0/CPU0:router# show ospfv3 database inter-area prefix
OSPFv3 Router with ID (10.0.0.206) (Process ID 1)
Inter Area Prefix Link States (Area 0)
LS age: 715
LS Type: Inter Area Prefix Links
Link State ID: 0
Advertising Router: 10.0.0.206
LS Seq Number: 80000002
Checksum: 0x3cb5
Length: 36
Metric: 1
Prefix Address: 3002::
Prefix Length: 56, Options: None
```

This table describes the significant fields shown in the display.

Table 5: show ospfv3 database inter-area prefix Field Descriptions

Field	Description
OSPFv3 Router with ID	Router ID number.
Process ID	OSPFv3 process name.
LS age	Link-state age.
LS Type	Link-state type.
Link State ID	Link-state ID.
Advertising Router	ID of advertising router.
LS Seq Number	Link-state sequence (detects old or duplicate LSAs).
Checksum	Link-state checksum (Fletcher checksum of the complete contents of the LSA).
Length	Length (in bytes) of the LSA.
Metric	Link-state metric.
Prefix Address	IPv6 prefix of the route being described.
Prefix Length	IPv6 prefix length of the route being described.
Options	LA indicates that the prefix is a local address. MC indicates the prefix is multicast capable. NU indicates that the prefix is not unicast capable. P indicates that the prefix should be propagated at a not-so-stubby area (NSSA) area border.

The following is sample output from the **show ospfv3 database** command with the **inter-area router** keyword:

```
RP/0/RP0/CPU0:router# show ospfv3 database inter-area router
      OSPFv3 Router with ID (10.0.0.206) (Process ID 1)
          Inter Area Router Link States (Area 0)
              LS age: 1522
              Options: (V6-Bit E-Bit R-bit DC-Bit)
              LS Type: Inter Area Router Links
              Link State ID: 167772366
              Advertising Router: 10.0.0.207
              LS Seq Number: 80000002
              Checksum: 0xcaae
              Length: 32
              Metric: 1
              Destination Router ID: 10.0.0.206
```

This table describes the significant fields shown in the display.

Table 6: show ospfv3 database inter-area routerField Descriptions

Field	Description
OSPFv3 Router with ID	Router ID number.
Process ID	OSPFv3 process name.
LS age	Link-state age.
Options	Type of service options (Type 0 only): DC—Supports demand circuits. E—Capable of processing external LSAs. MC—Forwards IP multicast. N—Supports Type 7 LSAs. R—Router is active. V6—Include in IPv6 routing calculations.
LS Type	Link-state type.
Link State ID	Link-state ID.
Advertising Router	ID of the advertising router.
LS Seq Number	Link-state sequence (detects old or duplicate LSAs).
Checksum	Link-state checksum (Fletcher checksum of the complete contents of the LSA.)
Length	Length (in bytes) of the LSAs.
Metric	Link-state metric.
Destination Router ID	Router ID of the router being described.

The following is sample output from the **show ospfv3 database** command with the **link** keyword:

```
RP/0/RP0/CPU0:router# show ospfv3 database link
      OSPFv3 Router with ID (10.0.0.206) (Process ID 1)
          Link (Type-8) Link States (Area 0)
      LS age: 620
      Options: (V6-Bit E-Bit R-bit DC-Bit)
      LS Type: Link-LSA (Interface: Ethernet0/0/0/0)
      Link State ID: 1 (Interface ID)
      Advertising Router: 10.0.0.207
      LS Seq Number: 80000003
      Checksum: 0x7235
      Length: 56
      Router Priority: 1
      Link Local Address: fe80::204:c0ff:fe22:73fe
      Number of Prefixes: 1
      Prefix Address: 7002::
      Prefix Length: 56, Options: None
```

This table describes the significant fields shown in the display.

Table 7: show ospfv3 database link Field Descriptions

Field	Description
OSPFv3 Router with ID	Router ID number.
Process ID	OSPFv3 process name.
LS age	Link-state age.
Options	Type of service options (Type 0 only): DC—Supports demand circuits.E—Capable of processing external LSAs.MC—Forwards IP multicast.N—Supports type-7 LSAs.R—Router is active.V6—Include in IPv6 routing calculations.
LS Type	Link-state type.
Link State ID	Link-state ID (Interface ID).
Advertising Router	ID of the advertising router.
LS Seq Number	Link-state sequence (detects old or duplicate LSAs).
Checksum	Link-state checksum (Fletcher checksum of the complete contents of the LSA).
Length	Length (in bytes) of the LSAs.
Router Priority	Interface priority of originating router.
Link Local Address	Link local address of the interface.
Number of Prefixes	Number of prefixes associated with the link.
Prefix Address and Length	List of prefixes associated with the link.
Options	LA indicates that the prefix is a local address. MC indicates that the prefix is multicast capable. NU indicates that the prefix is not unicast capable. P indicates that the prefix should be propagated at an NSSA area border.

The following is sample output from the **show ospfv3 database** command with the **network** keyword:

```
RP/0/RP0/CPU0:router# show ospfv3 database network
      OSPFv3 Router with ID (10.0.0.206) (Process ID 1)
          Net Link States (Area 0)
              LS age: 1915
              Options: (V6-Bit E-Bit R-bit DC-Bit)
              LS Type: Network Links
              Link State ID: 1 (Interface ID of Designated Router)
              Advertising Router: 10.0.0.207
              LS Seq Number: 80000004
```

```
Checksum: 0x4330
Length: 36
  Attached Router: 10.0.0.207
  Attached Router: 0.0.0.1
  Attached Router: 10.0.0.206
```

This table describes the significant fields shown in the display.

Table 8: show ospfv3 database network Field Descriptions

Field	Description
OSPFv3 Router with ID	Router ID number.
Process ID 1	OSPFv3 process name.
LS age	Link-state age.
Options	Type of service options (Type 0 only): DC—Supports demand circuits.E—Capable of processing external LSAs.MC—Forwards IP multicast.N—Supports Type 7 LSAs.R—Router is active.V6—Include in IPv6 routing calculations.
LS Type	Link-state type.
Link State ID	Link-state ID of the designated router.
Advertising Router	ID of the advertising router.
LS Seq Number	Link-state sequence (detects old or duplicate LSAs).
Checksum	Link-state checksum (Fletcher checksum of the complete contents of the LSA).
Length	Length (in bytes) of the LSA.
Attached Router	List of routers attached to the network, by router ID.

The following is sample output from the **show ospfv3 database** command with the **prefix** keyword:

```
RP/0/RP0/CPU0:router# show ospfv3 database prefix
      OSPFv3 Router with ID (10.0.0.206) (Process ID 1)
          Intra Area Prefix Link States (Area 1)
Routing Bit Set on this LSA
LS age: 356
LS Type: Intra-Area-Prefix-LSA
Link State ID: 0
Advertising Router: 10.0.0.206
LS Seq Number: 8000001e
Checksum: 0xcdaa
Length: 44
Referenced LSA Type: 2001
Referenced Link State ID: 0
Referenced Advertising Router: 10.0.0.206
```



```

Number of Prefixes: 1
Prefix Address: 8006::
Prefix Length: 56, Options: None, Metric: 1

```

This table describes the significant fields shown in the display.

Table 9: show ospfv3 database prefix Field Descriptions

Field	Description
OSPFv3 Router with ID	Router ID number.
Process ID 1	OSPFv3 process name.
LS age	Link-state age.
LS Type	Link-state type.
Link State ID	Link-state ID of the designated router.
Advertising Router	ID of the advertising router.
LS Seq Number	Link-state sequence (detects old or duplicate LSAs).
Checksum	Link-state checksum (Fletcher checksum of the complete contents of the LSA).
Length	Length (in bytes) of the LSA.
Referenced LSA Type	Router LSA or network LSA of the prefixes referenced.
Referenced Link State ID	Link-state ID of the router or network LSA.
Referenced Advertising Router	Advertising router of the referenced LSA.
Number of Prefixes	Number of prefixes listed in the LSA.
Prefix Address	Prefix associated with the router or network.
Prefix Length	Length of the prefix.
Options	LA indicates that the prefix is a local address. MC indicates that the prefix is multicast capable. NU indicates that the prefix is not unicast capable. P indicates the prefix should be propagated at an NSSA area border.
Metric	Cost of the prefix.

The following is sample output from the **show ospfv3 database** command with the **router** keyword:

```
RP/0/RP0/CPU0:router# show ospfv3 database router
```

```

OSPFv3 Router with ID (10.0.0.206) (Process ID 1)

Router Link States (Area 0)

```

```

LS age: 814
Options: (V6-Bit E-Bit R-bit)
LS Type: Router Links
Link State ID: 0
Advertising Router: 0.0.0.1
LS Seq Number: 8000003c
Checksum: 0x51ca
Length: 56
Number of Links: 2

    Link connected to: a Transit Network
    Link Metric: 10
    Local Interface ID: 1
      Neighbor (DR) Interface ID: 1
      Neighbor (DR) Router ID: 10.0.0.207

    Link connected to: a Transit Network
    Link Metric: 10
    Local Interface ID: 2
      Neighbor (DR) Interface ID: 1
      Neighbor (DR) Router ID: 10.0.0.0

```

This table describes the significant fields shown in the display.

Table 10: show ospfv3 database router Field Descriptions

Field	Description
OSPFv3 Router with ID	Router ID number.
Process ID 1	OSPFv3 process name.
LS age	Link-state age.
Options	Type of service options (Type 0 only): DC—Supports demand circuits.E—Capable of processing external LSAs.MC—Forwards IP multicast. N—Supports Type 7 LSAs.R—Router is active.V6—Include in IPv6 routing calculations.
LS Type	Link-state type.
Link State ID	Link-state ID of the designated router.
Advertising Router	ID of the advertising router.
LS Seq Number	Link-state sequence (detects old or duplicate LSAs).
Checksum	Link-state checksum (Fletcher checksum of the complete contents of the LSA).
Length	Length (in bytes) of the LSA.
Link connected to	The type of network to which this interface is connected. Values are: <ul style="list-style-type: none"> • Another Router (point-to-point). • A Transit Network. • A Virtual Link.

Field	Description
Link Metric	OSPF cost of using this link.
Local Interface ID	Number that uniquely identifies an interface on a router.

show ospfv3 flood-list

To display a list of Open Shortest Path First Version 3 (OSPFv3) link-state advertisements (LSAs) waiting to be flooded over an interface, use the **show ospfv3 flood-list** command in XR EXEC mode.

show ospfv3 [*process-name*] [*area-id*] **flood-list** [*type interface-path-id*]

Syntax Description	
<i>process-name</i>	(Optional) Name that uniquely identifies an OSPFv3 routing process. The process name is defined by the router ospfv3 command. If this argument is included, only information for the specified routing process is displayed.
<i>area-id</i>	(Optional) Area number used to define the particular area.
<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or virtual interface.
	<p>Note Use the show interfaces command to see a list of all interfaces currently configured on the router.</p> <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>

Command Default No default behavior or values

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines Use the **show ospfv3 flood-list** command to display OSPFv3 packet pacing.

Task ID	Task ID	Operations
	ospf	read

Examples

The following sample output from the **show ospfv3 flood-list** command shows three entries for the OSPFv3 1 process running over tenGigE interface 0/3/0/0:

```
RP/0/RP0/CPU0:router# show ospfv3 flood-list tenGigE 0/3/0/0

Flood Lists for OSPFv3 1

Interface tenGigE 0/3/0/0, Queue length 3
Link state retransmission due in 24 msec

Displaying 3 entries from flood list:
```

```

Type      LS ID      ADV RTR    Seq NO     Age  Checksum
  3       0.0.0.199  10.0.0.207 0x80000002 3600 0x00c924
  3       0.0.0.200  10.0.0.207 0x80000002 3600 0x008966
  4       10.0.0.206 10.0.0.207 0x80000008    0 0x001951

```

This table describes the significant fields shown in the display.

Table 11: show ospfv3 flood-list Field Descriptions

Field	Description
Interface	Interface for which information is displayed.
Queue length	Number of LSAs waiting to be flooded.
Link state retransmission due in	Length of time before next link-state transmission.
Type	Type of LSA.
LS ID	Link-state ID of the LSA.
ADV RTR	IP address of advertising router.
Seq NO	Sequence number of LSA.
Age	Age of LSA (in seconds).
Checksum	Checksum of LSA.

show ospfv3 interface

To display Open Shortest Path First Version 3 (OSPFv3) interface information, use the **show ospfv3 interface** command in XR EXEC mode.

show ospfv3 [*process-name*] [*area-id*] **interface** [*type interface-path-id*]

Syntax Description	
<i>process-name</i>	(Optional) Name that uniquely identifies an OSPFv3 routing process. The process name is defined by the router ospfv3 command. If this argument is included, only information for the specified routing process is displayed.
<i>area-id</i>	(Optional) Area number used to define the particular area.
<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or virtual interface.
	<p>Note Use the show interfaces command to see a list of all interfaces currently configured on the router.</p> <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>

Command Default No default behavior or values

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines Use the **show ospfv3 interface** command when the adjacency between two neighboring routers is not forming. Adjacency means that the routers synchronize their databases when they discover each other.

You can look at the output to check the physical link and line protocol status and to confirm that the network type and timer intervals match those of the neighboring routers.

Task ID	Task ID	Operations
	ospf	read

Examples The following is sample output from the **show ospfv3 interface** command when tenGigE interface 0/2 5/0/0 is specified:

```
RP/0/RP0/CPU0:router# show ospfv3 interface GigabitEthernet 0/
2
5
```

```

/
0
0
/0tenGigE/25/0/0 is up, line protocol is up up
Link Local address fe80::203213:a0ff1aff:fe9dfe14:f3fe3faa, Interface ID 2
Area 0, Process ID 1foo, Instance ID 0, Router ID 101.01.01.2061
Network Type BROADCAST, Cost: 101
BFD enabled, interval 300 msec, multiplier 5
Transmit Delay is 1 sec, State BDR, Priority 1
Designated Router (ID) 102.02.02.2072, local address
fe80::20421b:c0ff53ff:fe22fe74:73feeab6
Backup Designated router (ID) 101.01.01.2061, local address
fe80::203213:a0ff1aff:fe9dfe14:f3fe3faa
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:06
Index 0/21/1, flood queue length 0
Next 0(0)/0(0)/0(0)
Last flood scan length is 21, maximum is 92
Last flood scan time is 0 msec, maximum is 1 0 msec
Neighbor Count is 1, Adjacent neighbor count is 1
Adjacent with neighbor 102.02.02.207 2 (Designated Router)
Suppress hello for 0 neighbor(s)

```

This table describes the significant fields shown in the display.

Table 12: show ospfv3 interface Field Descriptions

Field	Description
tenGigE	Status of the physical link and operational status of the protocol.
Link Local Address	Interface link local address and interface ID.
Area	OSPFv3 area ID, process ID, instance ID, and router ID.
Transmit Delay	Transmit delay and interface state.
Designated Router	Designated router ID and respective interface IPv6 address.
Backup Designated router	Backup designated router ID and respective interface IPv6 address.
Timer intervals configured	Configuration of timer intervals.
Hello	Number of seconds until next hello packet is sent over this interface.
Index 0/2/1	Link, area and autonomous system flood indexes, and number of flood queue entries.
Next 0(0)/0(0)/0(0)	Next link, area and autonomous system flood information, data pointer, and index.
Last flood scan length	Length of last flood scan.
Last flood scan time	Time of last flood scan (in milliseconds).
Neighbor Count	Count of network neighbors and list of adjacent neighbors.

Field	Description
Suppress hello	Count of neighbors suppressing hello messages.

show ospfv3 message-queue

To display the information about the queue dispatch values, peak lengths, and limits, use the **show ospfv3 message-queue** command in XR EXEC mode.

show ospfv3 [*process-name*] **message-queue**

This command has no keywords or arguments.

Command Default	None
------------------------	------

Command Modes	XR EXEC mode
----------------------	--------------

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines	No specific guidelines impact the use of this command.
-------------------------	--------------------------------------------------------

Task ID	Task ID	Operation
	ospf	read

This is sample output from the **show ospfv3 message-queue** command:

```
RP/0/RP0/CPU0:router#show ospfv3 message-queue
Mon May 31 16:07:47.143 CEST
```

```
OSPFv3 Process 0
  Hello Thread Packet Input Queue:
    Current queue length:      0
    Peak queue length:        2
    Queue limit:               5000
    Packets received:         104091
    Packets processed:         104091
    Packets dropped:           0
    Processing quantum:        10
    Full quantum used:         0
    Pulses sent:               104089
    Pulses received:           104089
```

```
Router Thread Message Queue
  Current queue length:      0
  Peak queue length:        2
  Low queue limit:           8000
  Medium queuing limit:     9000
  High queuing limit:       9500
  Messages queued:          1472
  Messages deleted:         0
  Messages processed:       1472
  Low queue drops:          0
  Medium queue drops:       0
  High queue drops:         0
```

show ospfv3 message-queue

```
Processing quantum:      300
Full quantum used:      0
Pulses sent:            1484
Pulses received:        1484
```

show ospfv3 neighbor

To display Open Shortest Path First Version 3 (OSPFv3) neighbor information on an individual interface basis, use the **show ospfv3 neighbor** command in XR EXEC mode.

show ospfv3 [*process-name*] [*area-id*] **neighbor** [*type interface-path-id*] [*neighbor-id*] [**detail**]

Syntax Description	
<i>process-name</i>	(Optional) Name that uniquely identifies an OSPFv3 routing process. The process name is defined by the router ospfv3 command. If this argument is included, only information for the specified routing process is displayed.
<i>area-id</i>	(Optional) Area ID. If you do not specify an area, all areas are displayed.
<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or virtual interface.
	<p>Note Use the show interfaces command to see a list of all interfaces currently configured on the router.</p> <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>
<i>neighbor-id</i>	(Optional) Neighbor router ID.
detail	(Optional) Displays all neighbors given in detail (lists all neighbors).

Command Default No default behavior or values

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines Use the **show ospfv3 neighbor** command when the adjacency between two neighboring routers is not forming. Adjacency means that the routers synchronize their databases when they discover each other.

Task ID	Task ID	Operations
	ospf	read

Examples

The following is sample output from the **show ospfv3 neighbor** command showing two lines of summary information for each neighbor:

```
RP/0/RP0/CPU0:router# show ospfv3 neighbor
Neighbors for OSPFv3 1
```

```

Neighbor ID      Pri   State           Dead Time   Interface ID  Interface
10.0.0.207      1     FULL/ -         00:00:35   3             tenGigE 0/3/0/0
  Neighbor is up for 01:08:05
10.0.0.207      1     FULL/DR         00:00:35   2             Ethernet0/0/0/0
  Neighbor is up for 01:08:05

```

```
Total neighbor count: 2
```

This table describes the significant fields shown in the display.

Table 13: show ospfv3 neighbor Field Descriptions

Field	Description
ID	Neighbor router ID.
Pri	Router priority for designated router election. A router with a priority of 0 is never elected as the designated router or backup designated router.
State	OSPFv3 state.
Dead Time	Time (in hh:mm:ss) to elapse before OSPFv3 declares the neighbor dead.
Interface ID	Number that uniquely identifies an interface on a router.
Interface	Name of the interface that connects to this neighbor.
Neighbor is up	Time (in hh:mm:ss) that the OSPFv3 neighbor has been up.

The following is sample output showing summary information about the neighbor that matches the neighbor ID:

```

RP/0/RP0/CPU0:router# show ospfv3 neighbor 10.0.0.207

Neighbors for OSPFv3 1

Neighbor 10.0.0.207
  In the area 0 via interface Ethernet0/0/0/0
  Neighbor: interface-id 2, link-local address fe80::204:c0ff:fe22:73fe
  Neighbor priority is 1, State is FULL, 6 state changes
  DR is 10.0.0.207 BDR is 10.0.0.206
  Options is 0x13
  Dead timer due in 00:00:38
  Neighbor is up for 01:09:21
  Index 0/1/2, retransmission queue length 0, number of retransmission 1
  First 0(0)/0(0)/0(0) Next 0(0)/0(0)/0(0)
  Last retransmission scan length is 1, maximum is 1
  Last retransmission scan time is 0 msec, maximum is 0 msec

Neighbor 10.0.0.207
  In the area 1 via interface tenGigE 0/3/0/0
  Neighbor: interface-id 3, link-local address fe80::3034:30ff:fe33:3742
  Neighbor priority is 1, State is FULL, 6 state changes
  Options is 0x13
  Dead timer due in 00:00:38
  Neighbor is up for 01:09:21

```

```

Index 0/1/1, retransmission queue length 0, number of retransmission 1
First 0(0)/0(0)/0(0) Next 0(0)/0(0)/0(0)
Last retransmission scan length is 1, maximum is 1
Last retransmission scan time is 0 msec, maximum is 0 msec

```

Total neighbor count: 2

This table describes the significant fields shown in the display.

Table 14: show ospfv3 neighbor 10.0.0.207 Field Descriptions

Field	Description
Neighbor	Neighbor router ID.
In the area	Area and interface through which the OSPFv3 neighbor is known.
link-local address	Link local address of the interface.
Neighbor priority	Router priority of neighbor and neighbor state.
State	OSPFv3 state.
state changes	Number of state changes for this neighbor.
DR is	Neighbor ID of the designated router.
BDR is	Neighbor ID of the backup designated router.
Options	Hello packet options field contents (E-bit only; possible values are 0 and 2; 2 indicates that area is not a stub; 0 indicates that area is a stub).
Dead timer	Time (in hh:mm:ss) to elapse before OSPFv3 declares the neighbor dead.
Neighbor is up	Time (in hh:mm:ss) that OSPFv3 neighbor has been up.
Index	Index and the remaining lines of this command give detailed information about flooding information received from the neighbor.

The following sample output shows the neighbors that match the neighbor ID on the interface when the interface along with the neighbor ID is specified:

```

RP/0/RP0/CPU0:router# show ospfv3 neighbor tenGigE 0/3/0/1 10.0.0.207

Neighbors for OSPFv3 1

Neighbor 10.0.0.207
  In the area 0 via interface tenGigE 0/3/0/1
  Neighbor: interface-id 2, link-local address fe80::204:c0ff:fe22:73fe
  Neighbor priority is 1, State is FULL, 6 state changes
  DR is 10.0.0.207 BDR is 10.0.0.206
  Options is 0x13
  Dead timer due in 00:00:39
  Neighbor is up for 01:11:21
  Index 0/1/2, retransmission queue length 0, number of retransmission 1

```

show ospfv3 neighbor

```

First 0(0)/0(0)/0(0) Next 0(0)/0(0)/0(0)
Last retransmission scan length is 1, maximum is 1
Last retransmission scan time is 0 msec, maximum is 0 msec

```

```
Total neighbor count: 1
```

This table describes the significant fields shown in the display.

Table 15: show ospfv3 neighbor tenGigE 0/3/0/1 10.0.0.207 Field Descriptions

Field	Description
Neighbor	Neighbor router ID.
In the area	Area and interface through which the OSPFv3 neighbor is known.
link-local address	Link local address of the interface.
Neighbor priority	Router priority of neighbor and neighbor state.
State	OSPFv3 state.
state changes	Number of state changes for this neighbor.
DR is	Neighbor ID of the designated router.
BDR is	Neighbor ID of the backup designated router.
Options	Hello packet options field contents (E-bit only; possible values are 0 and 2; 2 indicates that area is not a stub; 0 indicates that area is a stub).
Dead timer	Time (in hh:mm:ss) to elapse before OSPFv3 declares the neighbor dead.
Neighbor is up	Time (in hh:mm:ss) that OSPFv3 neighbor has been up.
Index	Index and the remaining lines of this command give detailed information about flooding information received from the neighbor.

The following sample output shows all neighbors on the interface when the interface is specified:

```
RP/0/RP0/CPU0:router# show ospfv3 neighbor tenGigE 0/3/0/1
```

```
Neighbors for OSPFv3 1
```

```

Neighbor ID    Pri   State           Dead Time   Interface ID  Interface
10.0.0.207    1     FULL/DR         00:00:37   2             tenGigE 0/3/0/1
    Neighbor is up for 01:12:33

```

```
Total neighbor count: 1
```

This table describes the significant fields shown in the display.

Table 16: show ospfv3 neighbor tenGigE 0/3/0/1 Field Descriptions

Field	Description
Neighbor ID	Neighbor router ID.
Pri	Router priority for designated router election. A router with a priority of 0 is never elected as the designated router or backup designated router.
State	OSPF state.
Dead Time	Time (in hh:mm:ss) to elapse before OSPF declares the neighbor dead.
Interface ID	Number that uniquely identifies an interface on a router.
Interface	Name of the interface that connects to this neighbor.
Neighbor is up	Amount of time (in hh:mm:ss) that the OSPF neighbor has been up.

The following is sample output showing detailed neighbor information for tenGigE interface 0/3/0/1:

```
RP/0/RP0/CPU0:router# show ospfv3 neighbor tenGigE 0/3/0/1 detail

Neighbors for OSPFv3 1

Neighbor 10.0.0.207
  In the area 0 via interface tenGigE 0/3/0/1
  Neighbor: interface-id 2, link-local address fe80::204:c0ff:fe22:73fe
  Neighbor priority is 1, State is FULL, 6 state changes
  DR is 10.0.0.207 BDR is 10.0.0.206
  Options is 0x13
  Dead timer due in 00:00:39
  Neighbor is up for 01:13:40
  Index 0/1/2, retransmission queue length 0, number of retransmission 1
  First 0(0)/0(0)/0(0) Next 0(0)/0(0)/0(0)
  Last retransmission scan length is 1, maximum is 1
  Last retransmission scan time is 0 msec, maximum is 0 msec

Total neighbor count: 1
```

This table describes the significant fields shown in the display.

Table 17: show ospfv3 neighbor tenGigE 0/3/0/1 detail Field Descriptions

Field	Description
Neighbor	Neighbor router ID.
In the area	Area and interface through which the OSPFv3 neighbor is known.
link-local address	Link local address of the interface.

Field	Description
Neighbor priority	Router priority of neighbor and neighbor state.
State	OSPFv3 state.
state changes	Number of state changes for this neighbor.
DR is	Neighbor ID of the designated router.
BDR is	Neighbor ID of the backup designated router.
Options	Hello packet options field contents (E-bit only; possible values are 0 and 2; 2 indicates that area is not a stub; 0 indicates that area is a stub).
Dead timer	Time (in hh:mm:ss) to elapse before OSPFv3 declares the neighbor dead.
Neighbor is up	Time (in hh:mm:ss) that the OSPFv3 neighbor has been up.
Index	Index and the remaining lines of this command give detailed information about flooding information received from the neighbor.

The following is sample output showing neighbor information with BFD enabled for tenGigE interface 0/5/0/0:

```
RP/0/RP0/CPU0:router# show ospfv3 neighbor detail
Thu Sep 11 02:02:46.267 UTC

Neighbors for OSPFv3 foo

Neighbor 2.2.2.2
  In the area 0 via interface tenGigE 0/5/0/0      BFD enabled
  Neighbor: interface-id 2, link-local address fe80::21b:53ff:fe74:eab6
  Neighbor priority is 1, State is FULL, 6 state changes
  DR is 2.2.2.2 BDR is 1.1.1.1
  Options is 0x13
  Dead timer due in 00:00:32
  Neighbor is up for 00:06:16
  Index 1/1/1, retransmission queue length 0, number of retransmission 1
  First 0(0)/0(0)/0(0) Next 0(0)/0(0)/0(0)
  Last retransmission scan length is 1, maximum is 1
  Last retransmission scan time is 0 msec, maximum is 0 msec

Total neighbor count: 1
```


show ospfv3 request-list

To display the first ten link-state requests pending that the local router is making to the specified Open Shortest Path First Version 3 (OSPFv3) neighbor and interface, use the **show ospfv3 request-list** command in XR EXEC mode.

```
show ospfv3 [process-name] [area-id] request-list [type interface-path-id] [neighbor-id]
```

Syntax Description

<i>process-name</i>	(Optional) Name that uniquely identifies an OSPFv3 routing process. The process name is defined by the router ospfv3 command. If this argument is included, only information for the specified routing process is displayed.
<i>area-id</i>	(Optional) Area ID. If you do not specify an area, all areas are displayed.
<i>type</i>	(Optional) Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	(Optional) Physical interface or virtual interface.
Note	Use the show interfaces command to see a list of all interfaces currently configured on the router.
	For more information about the syntax for the router, use the question mark (?) online help function.
<i>neighbor-id</i>	(Optional) Router ID of the OSPFv3 neighbor. This argument must be in 32-bit dotted-decimal notation, similar to an IPv4 address.

Command Default

No default behavior or values

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

You might use this command when the databases of two neighboring routers are out of synchronization or if the adjacency is not forming between them. Adjacency means that the routers synchronize their databases when they discover each other.

You can look at the list to determine if one router is trying to request a particular database update. Entries that appear to be suspended in the list usually indicate that updates are not being delivered. One possible reason for this behavior is a maximum transmission unit (MTU) mismatch between the routers.

You might also look at this list to make sure it is not corrupted. The list should refer to database entries that actually exist.

Task ID	Task ID	Operations
	ospf	read

Examples

The following sample output shows request lists for neighbor 10.0.0.207 on the OSPFv3 1 process:

```
RP/0/RP0/CPU0:router# show ospfv3 1 request-list 10.0.0.207 tenGigE 0/3/0/0

Request Lists for OSPFv3 1

Neighbor 10.0.0.207, interface tenGigE 0/3/0/0 address fe80::3034:30ff:fe33:3742

Type  LS ID          ADV RTR          Seq NO          Age  Checksum
  1    192.168.58.17     192.168.58.17   0x80000012     12   0x0036f3
  2    192.168.58.68     192.168.58.17   0x80000012     12   0x00083f
```

This table describes the significant fields shown in the display.

Table 18: show ospfv3 request-list Field Descriptions

Field	Description
Neighbor	Router ID of the neighboring router.
interface	Name of the interface that connects to this neighbor.
address	IPv6 address of the neighbor.
Type	Type of link-state advertisement (LSA).
LS ID	Link-state ID of the LSA.
ADV RTR	Router ID of the advertising router.
Seq NO	Sequence number of the LSA.
Age	Age of the LSA (in seconds).
Checksum	Checksum of the LSA.

show ospfv3 retransmission-list

To display the first ten link-state entries in the retransmission list that the local router sends to the specified neighbor over the specified interface, use the **show ospfv3 retransmission-list** command in XR EXEC mode.

```
show ospfv3 [process-name ] [area-id] retransmission-list [type interface-path-id] [neighbor-id]
```

Syntax Description

<i>process-name</i>	(Optional) Name that uniquely identifies an Open Shortest Path First Version 3 (OSPFv3) routing process. The process name is defined by the router ospfv3 command. If this argument is included, only information for the specified routing process is displayed.
<i>area-id</i>	(Optional) Area ID. If you do not specify an area, all areas are displayed.
<i>type</i>	(Optional) Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	(Optional) Physical interface or virtual interface. Note Use the show interfaces command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
<i>neighbor-id</i>	(Optional) IP address of the OSPFv3 neighbor.

Command Default

No default behavior or values

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

You might use this command when the databases of two neighboring routers are out of synchronization or if the adjacency is not forming between them. Adjacency means that the routers synchronize their databases when they discover each other.

You can look at the list to determine if one router is trying to request a particular database update. Entries that appear to be suspended in the list usually indicate that updates are not being delivered. One possible reason for this behavior is a maximum transmission unit (MTU) mismatch between the routers.

You might also look at this list to make sure it is not corrupted. The list should refer to database entries that actually exist.

Task ID

Task ID	Operations
ospf	read

Examples

The following sample output shows the retransmission list for neighbor 10.0.124.4 on tenGigE interface 0/3/0/0:

```
RP/0/RP0/CPU0:router#show ospfv3 retransmission-list 10.0.124.4 tenGigE 0/3/0/0
Neighbor 10.0.124.4, interface tenGigE 0/3/0/0 address fe80::3034:30ff:fe33:3742
```

This table describes the significant fields shown in the display.

Table 19: show ospfv3 retransmission-list 10.0.124.4 tenGigE 0/3/0/0 Field Descriptions

Field	Description
Neighbor	Router ID of the neighboring router.
interface	Name of the interface that connects to this neighbor.
address	IPv6 address of the neighbor.

show ospfv3 routes

To display the Open Shortest Path First Version 3 (OSPFv3) route table, use the **show ospfv3 routes** command in XR EXEC mode.

```
show ospfv3 [process-name] routes [{external | connected}] [ipv6-prefix/prefix-length]
show ospfv3 [process-name] routes summary
```

Syntax Description	
<i>process-name</i>	(Optional) Name that uniquely identifies an OSPFv3 routing process. The process name is defined by the router ospf command. If this argument is included, only information for the specified routing process is displayed.
external	(Optional) Displays routes redistributed from other protocols.
connected	(Optional) Displays connected routes.
<i>ipv6-prefix</i>	(Optional) IP Version 6 (IPv6) prefix, which limits output to a specific route. This argument must be in the form documented in RFC 2373, in which the address is specified in hexadecimal using 16-bit values between colons.
<i>/ prefix-length</i>	(Optional) Length of the IPv6 prefix. A decimal value that indicates how many of the high-order contiguous bits of the address compose the prefix (the network portion of the address). A slash must precede the decimal value.
summary	Displays a summary of the route table.

Command Default No default behavior or values

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines Use the **show ospfv3 routes** command to display the OSPFv3 private routing table (which contains only routes calculated by OSPFv3). If there is something wrong with a route in the Routing Information Base (RIB), check the OSPFv3 copy of the route to determine if it matches the RIB contents. If it does not match, there is a synchronization problem between OSPFv3 and the RIB. If the routes match and the route is incorrect, OSPFv3 has made an error in its routing calculation.

Task ID	Task ID	Operations
	ospf	read

Examples The following sample output shows the route table for OSPFv3 process 1:

```

RP/0/RP0/CPU0:router# show ospfv3 1 routes

Route Table for OSPFv3 1 with ID 10.3.4.2

* 3000:11:22::/64, Inter, cost 21/0, area 1
  tenGigE 0/3/0/0, fe80::3034:30ff:fe33:3742
  10.0.0.207/200
* 3000:11:22:1::/64, Inter, cost 31/0, area 1
  tenGigE 0/3/0/0, fe80::3034:30ff:fe33:3742
  10.0.0.207/1
* 3333::/56, Ext2, cost 20/1, P:0 F:0
  tenGigE 0/3/0/0, fe80::3034:30ff:fe33:3742
  10.0.0.207/0
* 6050::/56, Ext2, cost 20/1, P:0 F:0
  tenGigE 0/3/0/0, fe80::3034:30ff:fe33:3742
  10.0.0.207/1
* 7002::/56, Intra, cost 10/0, area 0
  tenGigE 0/0/0/0, connected

* 3000:11:22::/64, Inter, cost 21/0, area 1
  tenGigE 0/3/0/0, fe80::3034:30ff:fe33:3742
  10.0.0.207/200

```

This table describes the significant fields shown in the display.

Table 20: show ospfv3 1 route Field Descriptions

Field	Description
3000:11:22::/64	Route prefix to the local router.
Inter	Prefix 3000:11:22::/64 is interarea.
cost 21/0	Sum of the link costs required to reach prefix 3000:11:22::/64. 0. In this example, 20 is the external cost.
tenGigE 0/3/0/0	Packets destined for prefix 3000:11:22::/64 are sent over the tenGigE 0/3/0/0 interface.
fe80::3034:30ff:fe33:3742	Next-hop router on the path to prefix 3000:11:22::/64.
10.0.0.207	Router 10.0.0.207 is the router that advertised this route.

show ospfv3 statistics rib-thread

To display RIB thread statistics, use the **show ospfv3 statistics rib-thread** command in XR EXEC mode.

```
show ospfv3 [process-name [area-id]] statistics rib-thread
```

Syntax Description	<i>process-name</i>	(Optional) Name that uniquely identifies an OSPF routing process. The process name is defined by the router ospfv3 command. If this argument is included, only information for the specified routing process is displayed.
	<i>area id</i>	(Optional) Area number used to define the particular area.
Command Default	None	
Command Modes	XR EXEC mode	
Command History	Release	Modification
	Release 6.0	This command was introduced.
Usage Guidelines	No specific guidelines impact the use of this command.	
Task ID	Task ID	Operation
	ospf	read

This is sample output from **show ospfv3 statistics rib-thread** command:

```
RP/0/RP0/CPU0:router#show ospfv3 0 statistics rib-thread
Mon May 10 17:48:29.011 CEST
OSPFv3 0 RIB thread statistics
Queue statistics:
  Last entry dequeue          10127056 msec ago (14:59:42.171)
  RIB thread active          NO
  Total RIB thread signals    30
  Current queue length        0
  Maximum queue length        2
  Total entries queued        31
  Total entries dequeued      31
  Maximum latency (msec)      5.000
  Average latency (msec)      0.323
Queue errors:
  Enqueue errors              0
  Dequeue errors              0
RIB batch statistics:
  Batches sent to RIB         31
  Batch all routes OK         31
  Batch some routes backup    0
RIB batch errors:
  Batches version mismatch    0
  Batches missing connection  0
```

show ospfv3 statistics rib-thread

```
Batches no table          0
Batch route table limit  0
Batch route errors       0
Batch errors              0
Route table limit        0
Route path errors        0
Route errors              0
Path table limit         0
Path errors              0
```


show ospfv3 summary-prefix

To display Open Shortest Path First Version 3 (OSPFv3) aggregated summary address information, use the **show ospfv3 summary-prefix** command in XR EXEC mode.

```
show ospfv3 [process-name] summary-prefix
```

Syntax Description	<i>process-name</i> (Optional) Name that uniquely identifies an OSPFv3 routing process. The process name is defined by the router ospfv3 command. If this argument is included, only information for the specified routing process is displayed.				
Command Default	No default behavior or values				
Command Modes	XR EXEC mode				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 6.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 6.0	This command was introduced.
Release	Modification				
Release 6.0	This command was introduced.				
Usage Guidelines	Use the show ospfv3 summary-prefix command if you configured summarization of external routes with the summary-prefix command and you want to display configured summary addresses.				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>ospf</td> <td>read</td> </tr> </tbody> </table>	Task ID	Operations	ospf	read
Task ID	Operations				
ospf	read				

Examples

The following sample output shows the summary prefix address for the OSPFv3 1 process:

```
RP/0/RP0/CPU0:router# show ospfv3 1 summary-prefix
OSPFv3 Process 1, Summary-prefix
4004:f000::/32 Metric 20, Type 2, Tag 0
```

This table describes the significant fields shown in the display.

Table 21: show ospfv3 1 summary-prefix Field Descriptions

Field	Description
4004:f000::/32	Summary prefix designated for a range of IPv6 prefixes. The length of the IPv6 prefix.
Metric	Metric used to advertise the summary routes.
Type	External link-state advertisements (LSAs) metric type.

Field	Description
Tag	Tag value that can be used as a “match” value for controlling redistribution through route maps.

show ospfv3 virtual-links

To display parameters and the current state of Open Shortest Path First Version 3 (OSPFv3) virtual links, use the **show ospfv3 virtual-links** command in XR EXEC mode.

```
show ospfv3 [process-name] virtual-links
```

Syntax Description	<i>process-name</i> (Optional) Name that uniquely identifies an OSPFv3 routing process. The process name is defined by the router ospfv3 command. If this argument is included, only information for the specified routing process is displayed.				
Command Default	No default behavior or values				
Command Modes	XR EXEC mode				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 6.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 6.0	This command was introduced.
Release	Modification				
Release 6.0	This command was introduced.				
Usage Guidelines	The information displayed in the show ospfv3 virtual-links command is useful in debugging OSPFv3 routing operations.				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>ospf</td> <td>read</td> </tr> </tbody> </table>	Task ID	Operations	ospf	read
Task ID	Operations				
ospf	read				

Examples

The following sample output shows the virtual links for the OSPFv3 1 process:

```
RP/0/RP0/CPU0:router# show ospfv3 1 virtual-links

Virtual Links for OSPFv3 1
Virtual Link to router 172.31.101.2 is up
  Interface ID 16, IPv6 address 3002::206
  Transit area 0.0.0.1, via interface tenGigE 0/3/0/0, Cost of using 11
  Transmit Delay is 5 sec, State POINT_TO_POINT,
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
  Hello due in 0:00:08
  Adjacency State FULL
```

This table describes the significant fields shown in the display.

Table 22: show ospfv3 virtual-links Field Descriptions

Field	Description
Virtual Link to router is up	Specifies the OSPFv3 neighbor, and if the link to that neighbor is up or down.

Field	Description
Interface ID	ID of the virtual link interface.
IPv6 address	IPv6 address of virtual link endpoint.
Transit area	Transit area through which the virtual link is formed.
via interface	Interface through which the virtual link is formed.
Cost	Cost of reaching the OSPF neighbor through the virtual link.
Transmit Delay	Transmit delay on the virtual link.
State POINT_TO_POINT	State of the OSPFv3 neighbor.
Timer intervals	Various timer intervals configured for the link.
Hello due in	When the next hello message is expected from the neighbor (in hh:mm:ss).
Adjacency State	Adjacency state between the neighbors.

show protocols (OSPFv3)

To display information about the Open Shortest Path First Version 3 (OSPFv3) process running on the router, use the **show protocols** command in XR EXEC mode.

```
show protocols [{afi-all | ipv4 | ipv6}] [{allprotocol}]
```

Syntax Description	
afi-all	(Optional) Specifies all address families.
ipv4	(Optional) Specifies an IPv4 address family.
ipv6	(Optional) Specifies an IPv6 address family.
all	(Optional) Specifies all protocols for a given address family.
<i>protocol</i>	(Optional) Specifies a routing protocol. For the IPv4 address family, the options are: <ul style="list-style-type: none"> • bgp • isis • ospf • rip For the IPv6 address family, the options are: <ul style="list-style-type: none"> • bgp • isis • ospfv3

Command Default The default address family is IPv4.

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines No specific guidelines impact the use of this command.

Task ID	Task ID	Operations
	ospf	read

Examples The following example is sample output from the **show protocols** command:

```
RP/0/RP0/CPU0:router# show protocols ipv6 ospfv3

Routing Protocol OSPFv3 1
Router Id:10.0.0.1
```

```
Distance:110
Redistribution:
  None
Area 0
  tenGigE 0/2/0/2
  Loopback1
```

This table describes the significant fields shown in the display.

Table 23: show protocols Field Descriptions

Field	Description
Router Id	Router ID of the OSPFv3 process.
Distance	Administrative distance for the protocol. This distance determines the priority the Routing Information Base (RIB) gives to the routes, as opposed to other protocols, for example, IS-IS.
Redistribution	Protocols from which this OSPFv3 process is redistributing routes.
Area	OSPFv3 areas defined in this process, followed by their associated interfaces.

snmp context (OSPFv3)

To specify an SNMP context for an OSPFv3 instance, use the **snmp context** command in router configuration mode or in VRF configuration mode. To remove the SNMP context, use the **no** form of this command.

snmp context *context_name*
no snmp context *context_name*

Syntax Description *context_name* Specifies name of the SNMP context for OSPFv3 instance.

Command Default SNMP context is not specified.

Command Modes Router OSPFv3 configuration
 VRF configuration

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes the proper task IDs. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The snmp-server commands need to be configured to perform SNMP request for the OSPF instance. Refer *SNMP Server Commands* module in *System Management Command Reference* for information on using the snmp-server commands.



Note To map an SNMP context with a protocol instance, topology or VRF entity, use the **snmp-server context mapping** command. However, the **feature** option of this command does not work with OSPFv3 protocol.

Task ID	Task ID	Operation
	ospf	read, write

This example shows how to configure an SNMP context *foo* for OSPFv3 instance *100*:

```
RP/0/RP0/CPU0:router#configure
RP/0/RP0/CPU0:router(config)#router ospfv3 100
RP/0/RP0/CPU0:router(config-ospf)#snmp context foo
```

This example shows how to configure **snmp-server** commands to be used with the **snmp context** command:

```
RP/0/RP0/CPU0:router(config)#snmp-server host 10.0.0.2 traps version 2c public udp-port
1620
RP/0/RP0/CPU0:router(config)#snmp-server community public RW
RP/0/RP0/CPU0:router(config)#snmp-server contact foo
RP/0/RP0/CPU0:router(config)#snmp-server community-map public context foo
```

This is a sample SNMP context configuration for OSPFv3 instance *100*:

```
snmp-server host 10.0.0.2 traps version 2c public udp-port 1620
snmp-server community public RW
snmp-server contact foo

snmp-server community-map public context foo

router ospfv3 100
  router-id 2.2.2.2
  bfd fast-detect
  nsf cisco
  snmp context foo
  area 0
    interface Loopback1
    !
  !
  area 1
    interface tenGigE 0/2/0/1
    demand-circuit enable
    !
    interface POS0/3/0/0
    !
    interface POS0/3/0/1
    !
  !
  !
  !
```


snmp trap (OSPFv3)

To enable SNMP trap for an OSPFv3 instance, use the **snmp trap** command in VRF configuration mode. To disable SNMP trap for the OSPFv3 instance, use the **no** form of this command.

snmp trap
no snmp trap

Syntax Description This command has no keywords or arguments.

Command Default Disabled.

Command Modes OSPFv3 VRF configuration

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines No specific guidelines impact the use of this command.

Task ID	Task ID	Operation
	ospf	read, write

This example shows how to enable SNMP trap for OSPFv3 instance *100* under VRF *vrf-1*:

```
RP/0/RP0/CPU0:router#configure
RP/0/RP0/CPU0:router(config)#router ospfv3 100
RP/0/RP0/CPU0:router(config-ospf)#vrf vrf-1
RP/0/RP0/CPU0:router(config-ospf-vrf)#snmp trap
```

snmp trap rate-limit (OSPFv3)

To control the number of traps that OSPFv3 sends by configuring window size and the maximum number of traps during that window, use the **snmp trap rate-limit** command in router OSPFv3 configuration mode or OSPFv3 VRF configuration mode. To disable configuring the window size and maximum number of traps during the window, use the **no** form of this command.

snmp trap rate-limit *window-size max-num-traps*
no snmp trap rate-limit *window-size max-num-traps*

Syntax Description	<i>window-size</i>	Specifies the trap rate limit sliding window size. The range is 2 to 60 windows.
	<i>max-num-traps</i>	Specifies the maximum number of traps sent in window time. The range is 0 to 300 traps.
Command Default	None	
Command Modes	Router OSPFv3 configuration OSPFv3 VRF configuration	
Command History	Release	Modification
	Release 6.0	This command was introduced.
Usage Guidelines	No specific guidelines impact the use of this command.	
Task ID	Task ID	Operation
	ospf	read, write

This example shows how to set the trap rate limit sliding window size to 50 and the maximum number of traps sent to 250 for OSPFv3 instance *100* under vrf *vrfl*:

```
RP/0/RP0/CPU0:router#configure
RP/0/RP0/CPU0:router(config)#router ospfv3 100
RP/0/RP0/CPU0:router(config-ospfv3)#vrf vrfl
RP/0/RP0/CPU0:router(config-ospfv3-vrf)#snmp trap rate-limit 50 250
```

spf prefix-priority (OSPFv3)

To prioritize OSPFv3 prefix installation into the global Routing Information Base (RIB) during Shortest Path First (SPF) run, use the **spf prefix-priority** command in XR Config mode or VRF configuration mode. To return to the system default value, use the **no** form of this command.

```
spf prefix-priority route-policy policy-name [disable]  
spf prefix-priority route-policy policy-name
```

Syntax Description	route-policy Specifies the route-policy to prioritize route installation.				
	<i>policy-name</i> Name of the route policy.				
	disable Disables SPF prefix priority				
Command Default	SPF prefix prioritization is disabled.				
Command Modes	XR Config mode VRF configuration				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 6.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 6.0	This command was introduced.
Release	Modification				
Release 6.0	This command was introduced.				
Usage Guidelines	No specific guidelines impact the use of this command.				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operation</th> </tr> </thead> <tbody> <tr> <td>ospf</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operation	ospf	read, write
Task ID	Operation				
ospf	read, write				

This example shows how to configure OSPFv3 SPF prefix prioritization:

```
RP/0/RP0/CPU0:router# configure  
RP/0/RP0/CPU0:router(config)# prefix-set ospf3-critical-prefixes  
RP/0/RP0/CPU0:router(config-pfx)# 66.0.0.0/16  
RP/0/RP0/CPU0:router(config-pfx)# end-set  
RP/0/RP0/CPU0:router(config)# route-policy ospf3-spf-priority  
RP/0/RP0/CPU0:router(config-rpl)# if destination in ospf-critical-prefixes then set  
spf-priority critical  
endif  
RP/0/RP0/CPU0:router(config-rpl)# end-policy  
RP/0/RP0/CPU0:router(config-rpl)# commit  
RP/0/RP0/CPU0:router(config-rpl)# exit  
RP/0/RP0/CPU0:router(config)# router ospfv3 1  
RP/0/RP0/CPU0:router(config-ospf)# router-id 66.0.0.1  
RP/0/RP0/CPU0:router(config-ospf)# spf prefix-priority route-policy ospf-spf-priority
```

stub (OSPFv3)

To define an area as a stub area for Open Shortest Path First Version 3 (OSPFv3), use the **stub** command in area configuration mode. To disable this function, use the **no** form of this command.

```
stub [no-summary]
no stub
```

Syntax Description	no-summary (Optional) Prevents an area border router (ABR) from sending summary link advertisements into the stub area. Areas with this option are known as <i>totally stubby</i> areas.
---------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Command Default No stub area is defined.

Command Modes Area configuration

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines You must configure the **stub** command on all routers in the stub area. Use the **default-cost area** command on the ABR of a stub area to specify the cost of the default route advertised into the stub area by the ABR.

Two stub area router configuration commands exist: the **stub** and **default-cost** commands. In all routers attached to the stub area, the area should be configured as a stub area using the **stub** command. Use the **default-cost** command only on an ABR attached to the stub area. The **default-cost** command provides the metric for the summary default route generated by the ABR into the stub area.

To further reduce the number of link-state advertisements (LSAs) sent into a stub area, you can configure the **no-summary** keyword on the ABR to prevent it from sending summary LSAs (LSA Type 3) into the stub area.

A stub area does not accept information about routes external to the autonomous system.

Task ID	Task ID	Operations
	ospf	read, write

Examples The following example shows how to create stub area 5 and specifies a cost of 20 for the default summary route sent into this stub area:

```
RP/0/RP0/CPU0:router(config)# router ospfv3 201
RP/0/RP0/CPU0:router(config-ospfv3)# area 5
RP/0/RP0/CPU0:router(config-ospfv3-ar)# stub
RP/0/RP0/CPU0:router(config-ospfv3-ar)# default-cost 20
```

stub-router

To modify self originated router LSAs when stub router is active, use the **stub-router** command in an appropriate configuration mode. To disable this function, use the **no** form of this command.

```

stub-router router-lsa [{r-bit | v6-bit | max-metric}] [always] [on-proc-migration interval]
[on-proc-restart interval] [on-switchover interval] [on-startup [{interval | wait-for-bgp}]]
[summary-lsa [metric]] [external-lsa [metric]] [include-stub]
stub-router router-lsa [{r-bit | v6-bit | max-metric}]

```

Syntax Description

router-lsa	Specifies that always originate router link-state advertisements (LSAs) with the stub-router.
r-bit	Router-LSAs are originated with R-bit clear (v6 bit set), which means the node does not act as a transit router. Directly connected networks (native to OSPF) are still reachable within the OSPF area.
v6-bit	Router-LSAs are originated with V6 bit clear (and also r-bit clear). That means the node is not willing to receive any ipv6 traffic. Other ospfv3 routers won't install any route to a node with v6-bit clear.
max-metric	Router-LSAs are originated with maximum metric. Unlike the r-bit and v6-bit mode, the router may still act as a transit node, if there is no alternate path.
always	Stub-router mode is activated unconditionally.
on-proc-migration	Stub-router mode is activated for the desired period of time, upon ospfv3 process migration.
on-proc-restart	Stub-router mode is activated for the desired period of time, upon ospfv3 process restart.
on-switchover	Stub-router mode is activated for the desired period of time, upon RP failover.
on-startup	Stub-router mode is activated (for configured time, or until BGP converges) upon router startup (boot).
wait-for-bgp	Stub-router mode is terminated upon BGP convergence in ipv6 unicast address family. This option could only be used in the global routing table, not in a non-default VRF. This option is only supported with the on-startup trigger when the router boots.
summary-lsa	<p>If enabled, summary LSAs are advertised with modified metric when stub-router is active. This configuration is applicable to max-metric mode.</p> <p>In r-bit mode, ABR/ASBR functionality is implicitly disabled and routers will not use this node as an ABR/ASBR, since it declares no transit capability (r-bit clear).</p> <p>If enabled and metric is not explicitly configured, the default metric for summary LSAs when stub-router active is 16711680 (0xFF0000).</p>

external-lsa	<p>If enabled, external LSAs are advertised with modified metric when stub-router is active. This configuration is applicable to max-metric mode.</p> <p>In r-bit mode, ABR/ASBR functionality is implicitly disabled and routers will not use this node as an ABR/ASBR, since it declares no transit capability (r-bit clear).</p> <p>If enabled and metric is not explicitly configured, the default metric for external LSAs when stub-router active is 16711680 (0xFF0000).</p>
include-stub	<p>If enabled, intra-area-prefix LSAs that are referencing router LSA are advertised with maximum metric (0xffff) when stub-router is active.</p> <p>Intra-area-prefix LSAs that are referencing network LSA do not change metric</p> <p>Can be used in r-bit and max-metric modes.</p> <p>/128 prefixes that are normally advertised with LA-bit set and 0 metric are also advertised with maximum metric and LA-bit clear when stub-router is active.</p>

Command Default Disabled.

Command Modes Router OSPFv3 configuration

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines Only one method (r-bit, v6-bit, max-metric) could be activated at a time. Configuring the methods simultaneously, or different method per trigger, is not supported.

Task ID	Task ID	Operation
	ospf	read, write

This example shows how to configure router LSAs are originated with R-bit clear under OSPFv3 VRF, *vrf_1*:

```
RP/0/RP0/CPU0:router#configure
RP/0/RP0/CPU0:router (config)#router ospfv3 1
RP/0/RP0/CPU0:router (config-ospfv3)#vrf vrf_1
RP/0/RP0/CPU0:router (config-ospfv3-vrf)#stub-router router-lsa r-bit
```

summary-prefix (OSPFv3)

To create aggregate addresses for routes being redistributed from another routing protocol into Open Shortest Path First Version 3 (OSPFv3) protocol, use the **summary-prefix** command in an appropriate configuration mode. To stop summarizing redistributed routes, use the **no** form of the command.

```
summary-prefix ipv6-prefix/prefix-length [not-advertise] tag tag
no summary-prefix ipv6-prefix/prefix-length
```

Syntax Description	<table border="1"> <tbody> <tr> <td data-bbox="386 569 560 604"><i>ipv6-prefix</i></td> <td data-bbox="573 569 1528 688">Summary prefix designated for a range of IP Version 6 (IPv6) prefixes. This argument must be in the form documented in RFC 2373, where the address is specified in hexadecimal using 16-bit values between colons.</td> </tr> <tr> <td data-bbox="386 709 560 745">/ <i>prefix-length</i></td> <td data-bbox="573 709 1528 808">Length of the IPv6 prefix. A decimal value that indicates how many of the high-order contiguous bits of the address compose the prefix (the network portion of the address). A slash must precede the decimal value.</td> </tr> <tr> <td data-bbox="386 829 560 865">not-advertise</td> <td data-bbox="573 829 1528 898">(Optional) Suppresses summary routes that match the address and mask pair from being advertised.</td> </tr> <tr> <td data-bbox="386 919 560 955">tag <i>tag</i></td> <td data-bbox="573 919 1528 989">(Optional) Specifies a tag value that can be used as a “match” value for controlling redistribution.</td> </tr> </tbody> </table>	<i>ipv6-prefix</i>	Summary prefix designated for a range of IP Version 6 (IPv6) prefixes. This argument must be in the form documented in RFC 2373, where the address is specified in hexadecimal using 16-bit values between colons.	/ <i>prefix-length</i>	Length of the IPv6 prefix. A decimal value that indicates how many of the high-order contiguous bits of the address compose the prefix (the network portion of the address). A slash must precede the decimal value.	not-advertise	(Optional) Suppresses summary routes that match the address and mask pair from being advertised.	tag <i>tag</i>	(Optional) Specifies a tag value that can be used as a “match” value for controlling redistribution.
<i>ipv6-prefix</i>	Summary prefix designated for a range of IP Version 6 (IPv6) prefixes. This argument must be in the form documented in RFC 2373, where the address is specified in hexadecimal using 16-bit values between colons.								
/ <i>prefix-length</i>	Length of the IPv6 prefix. A decimal value that indicates how many of the high-order contiguous bits of the address compose the prefix (the network portion of the address). A slash must precede the decimal value.								
not-advertise	(Optional) Suppresses summary routes that match the address and mask pair from being advertised.								
tag <i>tag</i>	(Optional) Specifies a tag value that can be used as a “match” value for controlling redistribution.								
Command Default	When this command is not used in router configuration mode, aggregate addresses are not created for routes being redistributed from another routing protocol into the OSPFv3 protocol.								
Command Modes	Router OSPFv3 configuration OSPFv3 VRF configuration								
Command History	<table border="1"> <thead> <tr> <th data-bbox="386 1255 511 1291">Release</th> <th data-bbox="524 1255 673 1291">Modification</th> </tr> </thead> <tbody> <tr> <td data-bbox="386 1312 511 1348">Release 6.0</td> <td data-bbox="524 1312 673 1348">This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 6.0	This command was introduced.				
Release	Modification								
Release 6.0	This command was introduced.								
Usage Guidelines	<p>Use the summary-prefix command to cause an OSPFv3 Autonomous System Boundary Router (ASBR) to advertise one external route as an aggregate for all redistributed routes that are covered by the address. This command summarizes only routes from other routing protocols that are being redistributed into OSPFv3.</p> <p>You can use this command multiple times to summarize multiple groups of addresses. The metric used to advertise the summary is the lowest metric of all the more specific routes. This command helps reduce the size of the routing table.</p> <p>If you want to summarize routes between OSPFv3 areas, use the range command.</p>								
Task ID	<table border="1"> <thead> <tr> <th data-bbox="386 1690 462 1726">Task ID</th> <th data-bbox="475 1690 592 1726">Operations</th> </tr> </thead> <tbody> <tr> <td data-bbox="386 1774 462 1810">ospf</td> <td data-bbox="475 1774 592 1843">read, write</td> </tr> </tbody> </table>	Task ID	Operations	ospf	read, write				
Task ID	Operations								
ospf	read, write								

Examples

In the following example, if summary prefix 4004:f000:132 is configured and routes 4004:f000:1::/64, 4004:f000:2::/64, and 4004:f000:3::/64 are redistributed into OSPFv3; only route 4004:f000::/32 is advertised in an external link-state advertisement:

```
RP/0/RP0/CPU0:router(config-ospfv3)# summary-prefix 4004:f000::/32
```


timers lsa arrival

To set the minimum interval at which the software accepts the same link-state advertisement (LSA) from Open Shortest Path First Version 3 (OSPFv3) neighbors, use the **timers lsa arrival** command in an appropriate configuration mode. To restore the default value, use the **no** form of this command.

timers lsa arrival *milliseconds*
no timers lsa arrival

Syntax Description	<i>milliseconds</i> Minimum delay (in milliseconds) that must pass between acceptance of the same LSA arriving from neighbors. Range is 0 to 60000 milliseconds.
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Command Default	1000 milliseconds
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Command Modes	Router OSPFv3 configuration
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Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines Use the **timers lsa arrival** command to control the minimum interval for accepting the same LSA. The same LSA is an LSA instance that contains the same LSA ID number, LSA type, and advertising router ID. If an instance of the same LSA arrives sooner than the interval that is set, the LSA is dropped.

We recommended that the *milliseconds* value of the **timers lsa arrival** command be less than or equal to the *hold-interval* value of the **timers throttle lsa all** command for the neighbor.

Task ID	Task ID	Operations
	ospf	read, write

Examples

The following example shows how to set the minimum interval for accepting the same LSA at 2000 milliseconds:

```
RP/0/RP0/CPU0:router(config)# router ospfv3 1
RP/0/RP0/CPU0:router(config-ospfv3)# timers throttle lsa all 200 10000 45000
RP/0/RP0/CPU0:router(config-ospfv3)# timers lsa arrival 2000
```

timers pacing flood

To configure link-state advertisement (LSA) flood packet pacing, use the **timers pacing flood** command in an appropriate configuration mode. To restore the default flood packet pacing value, use the **no** form of this command.

timers pacing flood *milliseconds*
no timers pacing flood

Syntax Description	<i>milliseconds</i> Time (in milliseconds) at which LSAs in the flooding queue are paced in between updates. Range is 5 milliseconds to 100 milliseconds.				
Command Default	<i>milliseconds</i> : 33				
Command Modes	Router OSPFv3 configuration				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 6.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 6.0	This command was introduced.
Release	Modification				
Release 6.0	This command was introduced.				

Usage Guidelines Configuring OSPFv3 flood pacing timers allows you to control interpacket spacing between consecutive link-state update packets in the OSPF transmission queue. Use the **timers pacing flood** command to control the rate at which LSA updates occur, thereby preventing high CPU or buffer utilization that can result when an area is flooded with a very large number of LSAs.

The default settings for OSPFv3 packet pacing timers are suitable for the majority of OSPFv3 deployments. Do not change the packet pacing timers unless all other options to meet OSPFv3 packet flooding requirements have been exhausted. Specifically, network operators should prefer summarization, stub area usage, queue tuning, and buffer tuning before changing the default flood timers. Furthermore, no guidelines exist for changing timer values; each OSPFv3 deployment is unique and should be considered on a case-by-case basis. The network operator assumes risks associated with changing the default flood timer values.

Task ID	Task ID	Operations
	ospf	read, write

Examples

The following example shows how to configure LSA flood packet-pacing updates to occur in 55-millisecond intervals for OSPFv3 routing process 1:

```
RP/0/RP0/CPU0:router(config)# router ospfv3 1
RP/0/RP0/CPU0:router(config-ospfv3)# timers pacing flood 55
```

timers pacing lsa-group

To change the interval at which Open Shortest Path First Version 3 (OSPFv3) link-state advertisements (LSAs) are collected into a group and refreshed, checksummed, or aged, use the **timers pacing lsa-group** command in an appropriate configuration mode. To restore the default value, use the **no** form of this command.

timers pacing lsa-group *seconds*
no timers pacing lsa-group

Syntax Description	<i>seconds</i> Interval (in seconds) at which LSAs are grouped and refreshed, checksummed, or aged. Range is 10 to 1800 seconds.				
Command Default	<i>seconds</i> : 240 OSPFv3 LSA group pacing is enabled by default.				
Command Modes	Router OSPFv3 configuration				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 6.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 6.0	This command was introduced.
Release	Modification				
Release 6.0	This command was introduced.				

Usage Guidelines

Use the **timers pacing lsa-group** command to control the rate at which LSA updates occur so that high CPU or buffer utilization that can occur when an area is flooded with a very large number of LSAs can be reduced. The default settings for OSPFv3 packet pacing timers are suitable for the majority of deployments. Do not change the packet pacing timers unless all other options to meet OSPFv3 packet flooding requirements have been exhausted. Specifically, network operators should prefer summarization, stub area usage, queue tuning, and buffer tuning before changing the default flooding timers. Furthermore, no guidelines exist for changing timer values; each OSPFv3 deployment is unique and should be considered on a case-by-case basis. The network operator assumes the risks associated with changing the default timer values.

Cisco IOS XR software groups the periodic refresh of LSAs to improve the LSA packing density for the refreshes in large topologies. The group timer controls the interval used for group refreshment of LSAs; however, this timer does not change the frequency that individual LSAs are refreshed (the default refresh rate is every 30 minutes).

The duration of the LSA group pacing is inversely proportional to the number of LSAs the router is handling. For example, if you have about 10,000 LSAs, decreasing the pacing interval would benefit you. If you have a very small database (40 to 100 LSAs), increasing the pacing interval to 10 to 20 minutes might benefit you slightly.

Task ID	Task ID	Operations
	ospf	read, write

Examples

The following example shows how to configure OSPFv3 group packet-pacing updates between LSA groups to occur in 60-second intervals for OSPFv3 routing process 1:

```
RP/0/RP0/CPU0:router(config)# router ospfv3 1  
RP/0/RP0/CPU0:router(config-ospfv3)# timers pacing lsa-group 60
```

timers pacing retransmission

To configure link-state advertisement (LSA) retransmission packet pacing, use the **timers pacing retransmission** command in an appropriate configuration mode. To restore the default retransmission packet pacing value, use the **no** form of this command.

timers pacing retransmission *milliseconds*
no timers pacing retransmission

Syntax Description	<i>milliseconds</i> Time (in milliseconds) at which LSAs in the retransmission queue are paced. Range is 5 milliseconds to 100 milliseconds.
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Command Default	<i>milliseconds</i> : 66
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Command Modes	Router OSPFv3 configuration
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Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines Use the **timers pacing retransmission** command to control interpacket spacing between consecutive link-state update packets in the OSPFv3 retransmission queue. This command controls the rate at which LSA updates occur. When an area is flooded with a very large number of LSAs, the LSA updates can result in high CPU or buffer utilization. Using this command reduces CPU or buffer utilization.

The default settings for OSPFv3 packet retransmission pacing timers are suitable for the majority of deployments. Do not change the packet retransmission pacing timers unless all other options to meet OSPFv3 packet flooding requirements have been exhausted. Specifically, network operators should prefer summarization, stub area usage, queue tuning, and buffer tuning before changing the default flooding timers. Furthermore, no guidelines exist for changing timer values; each OSPFv3 deployment is unique and should be considered on a case-by-case basis. The network operator assumes risks associated with changing the default packet retransmission pacing timer values.

Task ID	Task ID	Operations
	ospf	read, write

Examples The following example shows how to configure LSA flood pacing updates to occur in 55-millisecond intervals for OSPFv3 routing process 1:

```
RP/0/RP0/CPU0:router(config)# router ospfv3 1
RP/0/RP0/CPU0:router(config-ospfv3)# timers pacing retransmission 55
```

timers throttle lsa all (OSPFv3)

To set rate-limiting values for Open Shortest Path First Version 3 (OSPFv3) link-state advertisement (LSA) generation, use the **timers throttle lsa all** command in an appropriate configuration mode. To restore the default values, use the **no** form of this command.

timers throttle lsa all *start-interval hold-interval max-interval*
no timers throttle lsa all

Syntax Description	
<i>start-interval</i>	Minimum delay (in milliseconds) for the generation of LSAs. The first instance of LSA is always generated immediately upon a local OSPFv3 topology change. The generation of the next LSA is not before the start interval. Range is 0 to 600000 milliseconds.
<i>hold-interval</i>	Incremental time (in milliseconds). This value is used to calculate the subsequent rate limiting times for LSA generation. Range is 1 to 600000 milliseconds.
<i>max-interval</i>	Maximum wait time (in milliseconds) between generation of the same LSA. Range is 1 to 600000 milliseconds.

Command Default	
<i>start-interval</i>	500 milliseconds 50 milliseconds
<i>hold-interval</i>	5000 milliseconds 200 milliseconds
<i>max-interval</i>	5000 milliseconds

Command Modes	
	Router OSPFv3 configuration

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines	
	The “same LSA” is defined as an LSA instance that contains the same LSA ID number, LSA type, and advertising router ID. We recommend that you keep the <i>milliseconds</i> value of the timers lsa arrival command less than or equal to the <i>hold-interval</i> value of the timers throttle lsa all command.

Task ID	Task ID	Operations
	ospf	read, write

Examples

This example shows how to customize OSPFv3 LSA throttling so that the start interval is 200 milliseconds, the hold interval is 10,000 milliseconds, and the maximum interval is 45,000 milliseconds. The minimum interval between instances of receiving the same LSA is 2000 milliseconds.

```
RP/0/RP0/CPU0:router(config)# router ospfv3 1
RP/0/RP0/CPU0:router(config-ospfv3)# timers throttle lsa all 200 10000 45000
```

```
RP/0/RP0/CPU0:router(config-ospfv3)# timers lsa arrival 2000
```

timers throttle spf (OSPFv3)

To turn on Open Shortest Path First Version 3 (OSPFv3) shortest path first (SPF) throttling, use the **timers throttle spf** command in an appropriate configuration mode. To turn off SPF throttling, use the **no** form of this command.

timers throttle spf *spf-start spf-hold spf-max-wait*
no timers throttle spf *spf-start spf-hold spf-max-wait*

Syntax Description		
<i>spf-start</i>	Initial SPF schedule delay (in milliseconds). Range is 1 to 600000 milliseconds.	
<i>spf-hold</i>	Minimum hold time (in milliseconds) between two consecutive SPF calculations. Range is 1 to 600000 milliseconds.	
<i>spf-max-wait</i>	Maximum wait time (in milliseconds) between two consecutive SPF calculations. Range is 1 to 600000 milliseconds.	

Command Default	
<i>spf-start</i>	5000 milliseconds
<i>spf-hold</i>	10000 milliseconds
<i>spf-max-wait</i>	10000 milliseconds

Command Modes Router OSPFv3 configuration

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines The first wait interval between SPF calculations is the amount of time (in milliseconds) specified by the *spf-start* argument. Each consecutive wait interval is twice the current hold level (in milliseconds) until the wait time reaches the maximum time (in milliseconds) as specified by the *spf-max-wait* argument. Subsequent wait times remain at the maximum until the values are reset or a link-state advertisement (LSA) is received between SPF calculations.



Tip Setting a low *spf-start* time and *spf-hold* time causes routing to switch to the alternate path more quickly if a failure occurs. However, it consumes more CPU processing time.

Task ID	Task ID	Operations
	ospf	read, write

Examples The following example shows how to change the start, hold, and maximum wait interval values to 5, 1000, and 90,000 milliseconds, respectively:


```
RP/0/RP0/CPU0:router(config)# router ospfv3 1  
RP/0/RP0/CPU0:router(config-ospfv3)# timers throttle spf 5 1000 90000
```

trace (OSPFv3)

To specify the Open Shortest Path First Version 3 (OSPFv3) buffer size, use the **trace** command in router ospfv3 configuration mode. To return to the default value, use the **no** form of this command.

```
trace size buffer_name size
no trace size buffer_name size
```

Syntax Description	size	Deletes existing buffer and creates one with <i>N</i> entries.
	<i>buffer_name</i>	Specifies a buffer from one of the 15 listed buffers. Refer Table 24: Buffer Types, on page 138 table for details on the buffers.
	<i>size</i>	Specifies allowed size for the selected buffer. Options are: 0, 256, 1024, 2048, 4096, 8192, 16384, 32768, and 65536. Select 0 to disable traces.

Command Default No default behavior or values

Command Modes Router ospfv3 configuration

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines Trace buffers are used to store various traffic and processing events during the runtime. Large buffers can store more events. If the buffer becomes full, old entries are overwritten by the latest entries. In a large network, user may want to increase the trace buffer size to accommodate more events.

Table 24: Buffer Types

Name	Description
adj	adjacency
adj_cycle	dbd/flood events/pkts
config	config events
errors	errors
events	mda/rtrid/bfd/vrf
ha	startup/HA/NSF
hello	hello events/pkts
idb	interface
pkt	I/O packets
rib	rib batching

Name	Description
spf	spf/topology
spf_cycle	spf/topology detail
te	mpls-te
test	testing info
mq	message queue info

Task ID

Task ID	Operations
ospf	read, write

Examples

This example shows how to set 1024 error trace entries:

```
RP/0/RP0/CPU0:router#configure
RP/0/RP0/CPU0:router(config)#router ospfv3 osp3
RP/0/RP0/CPU0:router(config-ospfv3)#trace size errors ?
 0          disable trace
256        trace entries
512        trace entries
1024       trace entries
2048       trace entries
4096       trace entries
8192       trace entries
16384      trace entries
32768      trace entries
65536     trace entries
RP/0/RP0/CPU0:router(config-ospfv3)#trace size errors 1024
```

transmit-delay (OSPFv3)

To set the estimated time required to send a link-state update packet on the interface, use the **transmit-delay** command in an appropriate configuration mode. To return to the default value, use the **no** form of this command.

transmit-delay *seconds*
no transmit-delay *seconds*

Syntax Description	<i>seconds</i> Time (in seconds) required to send a link-state update. Range is 1 to 65535 seconds.
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Command Default	1 second
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Command Modes	Process configuration Area configuration Interface configuration Virtual-link configuration
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Command History	Release Modification
	Release 6.0 This command was introduced.

Usage Guidelines	Link-state advertisements (LSAs) in the update packet must have their ages incremented by the amount specified in the <i>seconds</i> argument before transmission. The value assigned should take into account the transmission and propagation delays for the interface.
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If the delay is not added before transmission over a link, the time in which the LSA propagates over the link is not considered. This setting has more significance on very low-speed links.

Task ID	Task ID Operations
	ospf read, write

Examples	The following example shows how to configure a transmit delay of 3 seconds for tenGigE interface 0/3/0/0:
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```
RP/0/RP0/CPU0:router(config)# router ospfv3 1
RP/0/RP0/CPU0:router(config-ospfv3)# area 0
RP/0/RP0/CPU0:router(config-ospfv3-ar)# interface tenGigE 0/3/0/0
RP/0/RP0/CPU0:router(config-ospfv3-ar-if)# transmit-delay 3
```

virtual-link (OSPFv3)

To define an Open Shortest Path First Version 3 (OSPFv3) virtual link, use the **virtual-link** command in area configuration mode. To remove a virtual link, use the **no** form of this command.

```
virtual-link router-id
no virtual-link
```

Syntax Description	<i>router-id</i> Router ID associated with the virtual link neighbor. The router ID appears in the show ospfv3 display. This value must be entered in 32-bit dotted-decimal notation, similar to an IP Version 4 (IPv4) address. There is no default.				
Command Default	No virtual links are defined.				
Command Modes	Area configuration				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 6.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 6.0	This command was introduced.
Release	Modification				
Release 6.0	This command was introduced.				
Usage Guidelines	<p>In OSPFv3, when there exists a path through another non-backbone area over which the virtual link can function, all areas must be connected to a backbone area. If the connection to the backbone is lost, it can be repaired by establishing a virtual link.</p> <p>Virtual links, which are defined in the submode of the area they transit, are in effect virtual point-to-point interfaces belonging to area 0 (the backbone). The virtual links inherit parameter values from the backbone area, rather than the transit area in which they are defined.</p> <p>Each virtual link neighbor must include the router ID of the virtual link neighbor for the link to be properly established. Use the show ospfv3 command to display the router ID of an OSPFv3 process.</p> <p>Use the virtual-link command to place the router in virtual-link configuration mode (config-router-ar-vl), from which you can configure virtual-link-specific settings. Commands configured under this mode (such as the transmit-delay command) are automatically bound to that virtual link.</p>				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>ospf</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	ospf	read, write
Task ID	Operations				
ospf	read, write				
Examples	<p>The following example shows how to establish a virtual link with default values for all optional parameters:</p> <pre>RP/0/RP0/CPU0:router(config)# router ospfv3 201 RP/0/RP0/CPU0:router(config-ospfv3)# area 1 RP/0/RP0/CPU0:router(config-ospfv3-ar)# virtual-link 10.3.4.5</pre>				

