# OSPFv3 Commands

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 Software* module in the *Routing Configuration Guide for Cisco NCS 6000 Series Routers*.

# 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 ospv3 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 5.0.0 | This command was introduced. |

## Usage Guidelines

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

## 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

| | |
|---|---|
| *area-id* | Identifier of an OSPFv3 area. The *area-id* argument can be specified as either a decimal value or as an IPv4 address. |

## Command Default

No OSPFv3 areas are defined.

## Command Modes

Router OSPFv3 configuration

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

An area must be explicitly configured with the **area** command.

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.

## Task ID

| Task ID | Operations |
|---|---|
| ospf | read, write |

**Examples**

The following example shows how to configure area 0 for OSPFv3 process 1. The GigabitEthernet 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 GigabitEthernet 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). |
| **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. |
| *password* | 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 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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.

## 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** *mbps* | (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 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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
```

## Related Commands

| Command | Description |
|---|---|
| cost (OSPFv3), on page 18 | Explicitly specifies the cost of the interface (network) for OSPF path calculation. |

# 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

| | |
|---|---|
| *process-name* | (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

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

When the OSPFv3 router process is reset, OSPFv3 releases all resources allocated, cleans up the internal database, uninstalls routes, and resets all OSPFv3 adjacencies.

**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 82 command.

## 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
```

## Related Commands

| Command | Description |
|---|---|
| router-id (OSPFv3), on page 82 | Configures a router ID for the OSPFv3 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

| | |
|---|---|
| *process-name* | (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

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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

| | |
|---|---|
| *process-name* | (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

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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.

## 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:

```
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

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

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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 GigabitEthernet interface 0/2/0/0:

```
RP/0/RP0/CPU0:router# clear ospfv3 statistics neighbor GigabitEthernet 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 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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 / bandwidth

If this value does not suit your network, you can use your own method of calculating path costs.

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 GigabitEthernet 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 GigabitEthernet 0/1/0/1
RP/0/RP0/CPU0:router(config-ospfv3-ar-if)# cost 65
```

## Related Commands

| Command | Description |
|---|---|
| auto-cost (OSPFv3), on page 9 | Controls how the OSPFv3 protocol calculates default metrics for an interface. |

# 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

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

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

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.

## Command Modes

Interface configuration

Area configuration

Router OSPFv3 configuration

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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

| Task ID | Operations |
|---|---|
| ospf | read, write |

## Examples

The following example shows how to prevent flooding of OSPFv3 LSAs to neighbors reachable through GigabitEthernet 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 GigabitEthernet 0/2/0/3
RP/0/RP0/CPU0:router(config-ospfv3-ar-if)# database-filter all out
```

## Related Commands

| Command | Description |
|---|---|
| neighbor (OSPFv3), on page 60 | Configures OSPFv3 routers interconnecting to nonbroadcast networks. |

# 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

| | |
|---|---|
| *seconds* | 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

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

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

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.

## Command Modes

Interface configuration

Area configuration

Router OSPFv3 configuration

Virtual-link configuration

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

Two Open Shortest Path First Version 3 (OSPFv3) routers do not become adjacent if their dead interval values differ.

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.

## Task ID

| Task ID | Operations |
|---|---|
| ospf | read, write |

## Examples

The following example shows how to set the OSPFv3 dead interval on GigabitEthernet interface 0/2/0/3 to 40 seconds:

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

## Related Commands

| Command | Description |
|---|---|
| hello-interval (OSPFv3), on page 45 | Specifies the interval between hello packets that the Cisco IOS XR software sends on the interface. |

# 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

| | |
|---|---|
| *cost* | 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

*cost* : 1

## Command Modes

Area configuration

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

Use the **default-cost** command only on an Area Border Router (ABR) attached to a stub or an NSSA area.

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 submode. 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.

## Task ID

| Task ID | Operations |
|---|---|
| ospf | read, write |

## Examples

The following example shows how to assign a cost of 20 to the default route sent into area 10.15.0.0:

```
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 GigabitEthernet 0/3/0/1
```

## Related Commands

| Command | Description |
|---|---|
| stub (OSPFv3), on page 140 | Defines an area as a stub area. |

# 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** *policy-name* | (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** *metric-value* | (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** *type-value* | (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:<br>**1—**Type 1 external route<br>**2—**Type 2 external route |
| **tag** *tag-value* | (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 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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 6000 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 6000 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
```

## Related Commands

| Command | Description |
|---|---|
| redistribute (OSPFv3), on page 76 | Redistributes routes from one routing domain into another routing domain. |

# 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

| | |
|---|---|
| *value* | 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 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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
```

## Related Commands

| Command | Description |
|---|---|
| redistribute (OSPFv3), on page 76 | Redistributes routes from one routing domain into another routing domain. |

# 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

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

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

If this command is not specified at any level, then the interface is not a demand circuit.

## Command Modes

Interface configuration

Area configuration

Router OSPFv3 configuration

Virtual-link configuration

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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

| Task ID | Operations |
|---|---|
| ospf | read, write |

## Examples

The following example shows how to configure GigabitEthernet interface 0/3/0/1 as an on-demand circuit:

```
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 GigabitEthernet 0/3/0/1
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:<br>**intra-area —**All routes within an area.<br>**inter-area —**All routes from one area to another area.<br>**external —**All routes from other routing domains, learned by redistribution. |
| *distance* | The route administrative distance. |

## Command Default

*distance* : 110

## Command Modes

Router ospfv3 configuration

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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
```

## Related Commands

| Command | Description |
|---|---|
| distance (OSPF) | Defines an administrative distance. |

# 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

| | |
|---|---|
| *prefix-list-name* | 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

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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

| | |
|---|---|
| *prefix-list-name* | IP Version 6 (IPv6) prefix list name. The list defines which IPv6 prefixes are installed in the RIB. |
| *protocol* | (Optional) Source protocol from which routes are being redistributed. It can be one of the following keywords: **bgp, eigrp, isis**, **ospfv3, static**, and **connected**.<br>The **static** keyword is used to redistribute IPv6 static routes.<br>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. |
| *process-id* | (Optional) For the **bgp** keyword, an autonomous system number has the following ranges:<br>• Range for 2-byte Autonomous system numbers (ASNs) is 1 to 65535.<br>• Range for 4-byte Autonomous system numbers (ASNs) in asplain format is 1 to 4294967295.<br>• Range for 4-byte Autonomous system numbers (ASNs) is asdot format is 1.0 to 65535.65535.<br>For the **eigrp** keyword, an autonomous system number.<br>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.<br>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 76 command are redistributed into OSPFv3.

## Command Modes

Router OSPFv3 configuration

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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-pfx)# deny 2001:e624::/32 le 128
RP/0/RP0/CPU0:router(config-ipv6-pfx)# permit ::/0 le 128
!
RP/0/RP0/CPU0:router(config)# ipv6 prefix-list p2
RP/0/RP0/CPU0:router(config-ipv6-pfx)# deny 2064::/16 le 128
RP/0/RP0/CPU0:router(config-ipv6-pfx)# permit ::/0 le 128
!
RP/0/RP0/CPU0:router(config)# ipv6 prefix-list p3
RP/0/RP0/CPU0:router(config-ipv6-pfx)# 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
```

## Related Commands

| Command | Description |
|---|---|
| redistribute (OSPFv3), on page 76 | Redistributes routes from one routing domain into another routing domain for OSPFv3. |

# 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. |
| *spi-value* | 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. |
| *encrypt-password* | Any contiguous string that can be entered from the keyboard as the encryption password. |
| *auth-password* | 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 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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

## 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

| | |
|---|---|
| **disable** | (Optional) Turns off this functionality at a specific level.<br>**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 flood reduction parameter specified by area.

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

If this command is not specified at any level, then flood reduction is disabled.

## Command Modes

Interface configuration

Area configuration

Router OSPFv3 configuration

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

All routers that support Open Shortest Path First Version 3 (OSPFv3) demand circuits are compatible with routers supporting flooding reduction.

## Task ID

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

## Related Commands

| Command | Description |
|---|---|
| show ospfv3 interface, on page 106 | Displays OSPFv3-related interface information. |
| show ospfv3 neighbor, on page 111 | Displays OSPFv3 neighbor information on an individual interface basis. |

# 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** *interval* | (Optional) Specifies the minimum interval between graceful restarts. Range is 90 to 3600 seconds. |
| **lifetime** *lifetime* | (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 5.0.0 | This command was introduced. |

## Usage Guidelines

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

## 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
```

## Related Commands

| Command | Description |
|---|---|
| show ospfv3 interface, on page 106 | Displays OSPFv3-related interface information. |
| show ospfv3 neighbor, on page 111 | Displays OSPFv3 neighbor information on an individual interface basis. |

# 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

| | |
|---|---|
| *seconds* | Interval (in seconds). The value must be the same for all nodes on a specific network. |

## Command Default

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

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

If this command is not specified at any level, then the hello interval is 10 seconds (broadcast) or 30 seconds (nonbroadcast).

## Command Modes

Interface configuration

Area configuration

Router OSPFv3 configuration

Virtual-link configuration

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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

| Task ID | Operations |
|---|---|
| ospf | read, write |

## Examples

The following example shows how to set the interval between hello packets to 15 seconds on GigabitEthernet interface 0/3/0/2:

```
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
```

## Related Commands

| Command | Description |
|---|---|
| dead-interval (OSPFv3), on page 22 | Sets the interval after which a neighbor is declared dead when no hello packets are observed. |

# 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

| | |
|---|---|
| *instance-id* | 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

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

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

If this command is not specified at any level, then the instance is 0.

## Command Modes

Interface configuration

Area configuration

Router OSPFv3 configuration

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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.

**Note** The *instance-id* argument should not be confused with the *process-name* 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.

## Task ID

| Task ID | Operations |
|---|---|
| ospf | read, write |

## Examples

The following example shows how to set the instance value for GigabitEthernet 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 GigabitEthernet 0/3/0/1
RP/0/RP0/CPU0:router(config-ospfv3-ar-if)# instance 42
```

## Related Commands

| Command | Description |
|---|---|
| router ospfv3, on page 84 | Configures an OSPFv3 routing process. |
| router-id (OSPFv3), on page 82 | Configures a router ID for the OSPFv3 routing process. |

# 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

| | |
|---|---|
| *type* | Interface type. For more information, use the question mark (?) online help function. |
| *interface-path-id* | Physical interface or virtual interface.<br>**Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router.<br>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 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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 GigabitEthernet interface 0/3/0/1 is set at 40; the cost value for GigabitEthernet 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 GigabitEthernet 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 GigabitEthernet 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

| | |
|---|---|
| **detail** | (Optional) Provides all (DOWN, INIT, 2WAY, EXSTART, EXCHANGE, LOADING, FULL) adjacency state changes. |
| **disable** | (Optional) Disables the neighbor state change messages. |

## Command Default

Neighbor state change messages are enabled.

## Command Modes

Router OSPFv3 configuration

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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

| 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

| | |
|---|---|
| *number-interfaces* | Maximum number of interfaces that can be configured for this OSPFv3 process.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 5.0.0 | This command was introduced. |

## Usage Guidelines

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

## Task ID

| Task ID | Operations |
|---|---|
| ospf | read, write |

## Examples

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

| | |
|---|---|
| *maximum-routes-number* | Maximum number of parallel routes that OSPFv3 can install in a routing table. Range is 1 to 32.<br>**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 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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

| | |
|---|---|
| *limit* | 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.<br>**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. |
| *threshold* | (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 *limit* 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 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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.<br>**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 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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 GigabitEthernet 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 GigabitEthernet 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

| | |
|---|---|
| *ipv6-address* | 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** *number* | (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** *seconds* | (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** *number* | (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** *number* 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 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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 GigabitEthernet 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
```

## Related Commands

| Command | Description |
|---|---|
| priority (OSPFv3), on page 72 | Sets the router priority, which helps determine the designated router for this network. |

# 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 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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 TenGigE0/1/0/3
RP/0/RP0/CPU0:router(config-ospfv3-ar-if)# network point-to-point
```

## Related Commands

| Command | Description |
|---|---|
| neighbor (OSPFv3), on page 60 | Configures OSPFv3 routers interconnecting to nonbroadcast networks. |

# 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** *metric-value* | (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** *type-value* | (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:<br>**1—**Type 1 external route<br>**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 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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
```

# nsr (OSPFv3)

To configure nonstop routing (NSR) for the Open Shortest Path First Version 3 (OSPFv3) protocol, use the **nsr** command in OSPFv3 router configuration mode. To remove this command from the configuration file and restore the system to its default condition, use the **no** form of this command.

**nsr**

**no nsr**

## Syntax Description

This command has no keywords or arguments.

## Command Default

NSR is not defined.

## Command Modes

OSPFv3 Router configuration

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

OSPFv3 NSR will be disabled at process startup, by default. When enabled, this state is remembered in the active process, and, is regardless of the presence and pairing state of a standby RP, as well as the state of the standby process.

NSR can be enabled for multiple OSPFv3 processes. The maximum number of processes on which NSR can be enabled is four.

## Task ID

| Task ID | Operation |
|---|---|
| ospf | read, write |

## Examples

This example shows how to configure NSR for OSPFv3 process 211:

```
RP/0/RP0/CPU0:router#configure
RP/0/RP0/CPU0:router(config)#router ospfv3 211
RP/0/RP0/CPU0:router(config-ospfv3)#nsr
```

## Related Commands

| Command | Description |
|---|---|
| router ospfv3, on page 84 | |
| show ospfv3, on page 86 | |

# 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

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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

| | |
|---|---|
| *bytes* | 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 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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.<br>**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 passive parameter specified by the area.

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

If this command is not specified at any level, then the passive parameter is disabled and OSPFv3 updates are sent on the interface.

## Command Modes

Interface configuration

Area configuration

Router OSPFv3 configuration

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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.

## Task ID

| Task ID | Operations |
|---|---|
| ospf | read, write |

## Examples

The following example shows that OSPFv3 updates run over GigabitEthernet 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.

```
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 GigabitEthernet 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 GigabitEthernet 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 GigabitEthernet 0/2/0/0
RP/0/RP0/CPU0:router(config-ospfv3-ar-if)# exit
RP/0/RP0/CPU0:router(config-ospfv3-ar)# interface GigabitEthernet 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 GigabitEthernet 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

| | |
|---|---|
| *value* | 8-bit unsigned integer indicating the router priority value. Range is 0 to 255. |

## Command Default

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

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

If this command is not specified at any level, then the default priority is 1.

## Command Modes

Interface configuration

Area configuration

Router OSPFv3 configuration

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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

| Task ID | Operations |
|---|---|
| ospf | read, write |

## Examples

The following example shows how to set the router priority value to 4 on GigabitEthernet interface 0/1/0/1:

```
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 0/1/0/1
RP/0/RP0/CPU0:router(config-ospfv3-ar-if)# priority 4
```

## Related Commands

| Command | Description |
|---|---|
| neighbor (OSPFv3), on page 60 | Configures OSPFv3 routers interconnecting to nonbroadcast networks. |
| network (OSPFv3), on page 62 | Configures the OSPFv3 network type to a type other than the default for a given medium. |

# 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

| | |
|---|---|
| *ipv6-prefix* | Summary prefix designated for a range of IP Version 6 (IPv6) prefixes.<br>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. |
| / *prefix-length* | 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** *number* | (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 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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*]

### Enhanced Interior Gateway Routing Protocol (EIGRP)

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

**no redistribute eigrp** *process-id* [**match** {**external** [**1**| **2**]| **internal**}] [**metric** *metric-value*] [**metric-type** {**1**| **2**}] [**route-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. |

| | |
|---|---|
| *process-id* | For the **bgp** keyword, an autonomous system number has the following ranges:<br>• Range for 2-byte Autonomous system numbers (ASNs) is 1 to 65535.<br>• Range for 4-byte Autonomous system numbers (ASNs) in asplain format is 1 to 4294967295.<br>• Range for 4-byte Autonomous system numbers (ASNs) is asdot format is 1.0 to 65535.65535.<br>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.<br>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. |
| **metric** *metric-value* | (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** } | (Optional) Specifies the external link type associated with the route advertised into the OSPF routing domain. It can be one of two values:<br>• **1—**Type 1 external route<br>• **2—**Type 2 external route<br>If no **metric-type** is specified, the default is Type 2 external routes. |
| **tag** *t ag-value* | (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** *policy-name* | (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. |
| **eigrp** | Distributes routes from the EIGRP protocol. |
| **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:<br>• **internal —**Routes that are internal to a specific autonomous system (intra- and inter-area OSPF routes).<br>• **external** [ **1 \| 2** ]**—**Routes that are external to the autonomous system, but are imported into OSPF as Type 1 or Type 2 external routes.<br>• **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.<br>For the **external** and **nssa-external** options, if a type is not specified, then both Type 1 and Type 2 are assumed.<br>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 5.0.0 | This command was introduced. |

## Usage Guidelines

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

**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 redistibution 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
```

## Related Commands

| Command | Description |
|---|---|
| default-information originate (OSPFv3), on page 26 | Redistributes routes into a routing domain. |
| distribute-list prefix-list out, on page 36 | Filters the routes redistributed into OSPFv3 from other routing protocols. |

# 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

| | |
|---|---|
| *seconds* | 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

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

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

If this command is not specified at any level, then the default retransmit interval is 5 seconds.

## Command Modes

Interface configuration

Area configuration

Router OSPFv3 configuration

Virtual-link configuration

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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.

The setting of this parameter should be conservative, or needless retransmission results. The value should be larger for serial lines and virtual links.

## Task ID

| Task ID | Operations |
|---|---|
| ospf | read, write |

## Examples

The following example shows how to set the retransmit interval value to 8 seconds while in interface configuration mode:

```
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 0/2/0/0
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

| | |
|---|---|
| *router-id* | 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

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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.

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
```

## Related Commands

| Command | Description |
|---|---|
| clear ospfv3 process, on page 11 | Resets an OSPFv3 router process without stopping and restarting it. |

# 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

| | |
|---|---|
| *process-name* | 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

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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.

## 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
```

## Related Commands

| Command | Description |
|---|---|
| area (OSPFv3), on page 5 | Defines an OSPFv3 area. |
| interface (OSPFv3), on page 49 | Defines an OSPFv3 interface by type. |

# 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*]

## Syntax Description

| | |
|---|---|
| *process-name* | (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

None

## Command Modes

XR EXEC

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

## 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 msecs
Minimum hold time between two consecutive SPFs 10000 msecs
Maximum wait time between two consecutive SPFs 10000 msecs
Initial LSA throttle delay 0 msecs
```

```
Minimum hold time for LSA throttle 5000 msecs
Maximum wait time for LSA throttle 5000 msecs
Minimum LSA arrival 1000 msecs
LSA group pacing timer 240 secs
Interface flood pacing timer 33 msecs
Retransmission pacing timer 66 msecs
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 SPFs | Minimum hold time between consecutive SPFs. |
| Maximum wait time between two consecutive SPFs | Maximum wait time between consecutive SPFs. |
| 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. |

| Field | Description |
|---|---|
| Maximum number of configured interfaces | Maximum number of configured interfaces. |
| 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 *n* 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** 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 msecs
 Minimum hold time between two consecutive SPFs 10000 msecs
 Maximum wait time between two consecutive SPFs 10000 msecs
 Initial LSA throttle delay 0 msecs
 Minimum hold time for LSA throttle 5000 msecs
 Maximum wait time for LSA throttle 5000 msecs
 Minimum LSA arrival 1000 msecs
 LSA group pacing timer 240 secs
 Interface flood pacing timer 33 msecs
 Retransmission pacing timer 66 msecs
 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
```

## Related Commands

| Command | Description |
|---|---|
| router ospfv3, on page 84 | Configures an OSPFv3 routing process. |

# 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

| | |
|---|---|
| *process-name* | (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. |
| *router-id* | (Optional) 32-bit router ID value specified in four-part, dotted-decimal notation. |

## Command Default

No default behavior or values

## Command Modes

XR EXEC

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

## 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, GigabitEthernet 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. |
| [1] | Cost of using this route. |
| fe80::3034:30ff:fe33:3742 | Next-hop toward the destination. |
| GigabitEthernet 0/3/0/0 | Packets destined for fe80::3034:30ff:fe33:3742 are sent over GigabitEthernet 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. |

## Related Commands

| Command | Description |
|---|---|
| router ospfv3, on page 84 | Configures an OSPFv3 routing process. |

# 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* ]] **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

| | |
|---|---|
| *process-name* | (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. |
| *area-id* | (Optional) Area number used to define the particular area. |
| **adv-router** [ *router-id* ] | (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). |
| *link-state-id* | (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

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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. |

| Field | Description |
|---|---|
| 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. |

| Field | Description |
|---|---|
| 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). |

| Field | Description |
|---|---|
| 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):<br>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. |

| Field | Description |
|---|---|
| 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. |

| Field | Description |
|---|---|
| Options | Type of service options (Type 0 only):<br>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):<br>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):<br>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). |

| Field | Description |
|---|---|
| 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:<br>• Another Router (point-to-point).<br>• A Transit Network.<br>• A Virtual Link. |
| Link Metric | OSPF cost of using this link. |
| Local Interface ID | Number that uniquely identifies an interface on a router. |

## Related Commands

| Command | Description |
|---|---|
| router ospfv3, on page 84 | Configures an OSPFv3 routing process. |

# 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

| | |
|---|---|
| *process-name* | (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. |
| *area-id* | (Optional) Area number used to define the particular area. |
| *type* | Interface type. For more information, use the question mark (?) online help function. |
| *interface-path-id* | Physical interface or virtual interface.<br>**Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router.<br>For more information about the syntax for the router, use the question mark (?) online help function. |

## Command Default

No default behavior or values

## Command Modes

XR EXEC

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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 GigabitEthernet interface 0/3/0/0:

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

  Flood Lists for OSPFv3 1

  Interface GigabitEthernet 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. |

## Related Commands

| Command | Description |
|---|---|
| router ospfv3, on page 84 | Configures an OSPFv3 routing process. |

# 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

| | |
|---|---|
| *process-name* | (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. |
| *area-id* | (Optional) Area number used to define the particular area. |
| *type* | Interface type. For more information, use the question mark (?) online help function. |
| *interface-path-id* | Physical interface or virtual interface.<br>**Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router.<br>For more information about the syntax for the router, use the question mark (?) online help function. |

## Command Default

No default behavior or values

## Command Modes

XR EXEC

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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 GigabitEthernet interface 0/ /0/0 is specified:

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

             /


         /0//0/0 is up, line protocol is
  Link Local address fe80:::::, Interface ID 2
  Area 0, Process ID , Instance ID 0, Router ID ...
  Network Type BROADCAST, Cost:
  BFD enabled, interval 300 msec, multiplier 5
  Transmit Delay is 1 sec, State BDR, Priority 1
  Designated Router (ID) ..., local address fe80:::::
  Backup Designated router (ID) ..., local address fe80:::::
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    Hello due in 00:00:06
  Index 0//1, flood queue length 0
  Next 0(0)/0(0)/0(0)
  Last flood scan length is , maximum is
  Last flood scan time is 0 msec, maximum is msec
  Neighbor Count is 1, Adjacent neighbor count is 1
    Adjacent with neighbor ... (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 |
|---|---|
| GigabitEthernet | 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. |

| Field | Description |
|---|---|
| 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. |
| Suppress hello | Count of neighbors suppressing hello messages. |

## Related Commands

| Command | Description |
|---|---|
| router ospfv3, on page 84 | Configures an OSPFv3 routing process. |

# 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

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

## Task ID

| Task ID | Operation |
|---|---|
| ospf | read |

## Examples

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
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

| | |
|---|---|
| *process-name* | (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. |
| *area-id* | (Optional) Area ID. If you do not specify an area, all areas are displayed. |
| *type* | Interface type. For more information, use the question mark (?) online help function. |
| *interface-path-id* | Physical interface or virtual interface.<br>**Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router.<br>For more information about the syntax for the router, use the question mark (?) online help function. |
| *neighbor-id* | (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

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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               GigabitEthernet 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 GigabitEthernet 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. |

| Field | Description |
|---|---|
| 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 GigabitEthernet 0/3/0/1 10.0.0.207

  Neighbors for OSPFv3 1

   Neighbor 10.0.0.207
      In the area 0 via interface GigabitEthernet 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
      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 GigabitEthernet 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. |

| Field | Description |
|---|---|
| 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 GigabitEthernet 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               GigabitEthernet 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 GigabitEthernet 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 GigabitEthernet interface 0/3/0/1:

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

  Neighbors for OSPFv3 1

   Neighbor 10.0.0.207
      In the area 0 via interface GigabitEthernet 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 GigabitEthernet 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. |
| 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. |

| Field | Description |
|---|---|
| Index | Index and the remaining lines of this command give detailed information about flooding information received from the neighbor. |

## Related Commands

| Command | Description |
|---|---|
| router ospfv3, on page 84 | Configures an OSPFv3 routing process. |

# 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

| | |
|---|---|
| *process-name* | (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. |
| *area-id* | (Optional) Area ID. If you do not specify an area, all areas are displayed. |
| *type* | (Optional) Interface type. For more information, use the question mark (?) online help function. |
| *interface-path-id* | (Optional) Physical interface or virtual interface.<br>**Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router.<br>For more information about the syntax for the router, use the question mark (?) online help function. |
| *neighbor-id* | (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

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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 GigabitEthernet 0/3/0/0

  Request Lists for OSPFv3 1

   Neighbor 10.0.0.207, interface GigabitEthernet 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. |

## Related Commands

| Command | Description |
|---|---|
| router ospfv3, on page 84 | Configures an OSPFv3 routing process. |
| show ospfv3 retransmission-list, on page 121 | Displays the first ten link-state entries in the retransmission list that the local router sends to the specified neighbor over the specified interface. |

# 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

| | |
|---|---|
| *process-name* | (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. |
| *area-id* | (Optional) Area ID. If you do not specify an area, all areas are displayed. |
| *type* | (Optional) Interface type. For more information, use the question mark (?) online help function. |
| *interface-path-id* | (Optional) Physical interface or virtual interface.<br>**Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router.<br>For more information about the syntax for the router, use the question mark (?) online help function. |
| *neighbor-id* | (Optional) IP address of the OSPFv3 neighbor. |

## Command Default

No default behavior or values

## Command Modes

XR EXEC

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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 GigabitEthernet interface 0/3/0/0:

```
RP/0/RP0/CPU0:router#show ospfv3 retransmission-list 10.0.124.4 GigabitEthernet 0/3/0/0

  Neighbor 10.0.124.4, interface GigabitEthernet 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 GigabitEthernet 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. |

## Related Commands

| Command | Description |
|---|---|
| router ospfv3, on page 84 | Configures an OSPFv3 routing process. |
| show ospfv3 request-list, on page 118 | Displays the first ten link-state requests pending that the local router is making to the specified neighbor and interface. |

# 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

| | |
|---|---|
| *process-name* | (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. |
| *ipv6-prefix* | (Optional) IP Version 6 (IPv6) prefix, which limits output to a specific route.<br>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. |
| / *prefix-length* | (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

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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
      GigabitEthernet 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
  GigabitEthernet 0/3/0/0, fe80::3034:30ff:fe33:3742
      10.0.0.207/1
  * 3333::/56, Ext2, cost 20/1, P:0 F:0
  GigabitEthernet 0/3/0/0, fe80::3034:30ff:fe33:3742
      10.0.0.207/0
  * 6050::/56, Ext2, cost 20/1, P:0 F:0
  GigabitEthernet 0/3/0/0, fe80::3034:30ff:fe33:3742
      10.0.0.207/1
  * 7002::/56, Intra, cost 10/0, area 0
      Ethernet0/0/0/0, connected

  * 3000:11:22::/64, Inter, cost 21/0, area 1
  GigabitEthernet 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. |
| GigabitEthernet 0/3/0/0 | Packets destined for prefix 3000:11:22::/64 are sent over the GigabitEthernet 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. |

## Related Commands

| Command | Description |
|---|---|
| router ospfv3, on page 84 | Configures an OSPFv3 routing process. |

# 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

| | |
|---|---|
| *process-name* | (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

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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

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

## Related Commands

| Command | Description |
|---|---|
| router ospfv3, on page 84 | Configures an OSPFv3 routing process. |
| summary-prefix (OSPFv3), on page 144 | Creates aggregate addresses for routes being redistributed from another routing protocol into OSPFv3. |

# 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

| | |
|---|---|
| *process-name* | (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

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

The information displayed in the **show ospfv3 virtual-links** command is useful in debugging OSPFv3 routing operations.

## Task ID

| 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 GigabitEthernet 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. |
| 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. |

## Related Commands

| Command | Description |
|---|---|
| router ospfv3, on page 84 | Configures an OSPFv3 routing process. |

# 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**] [**all**| *protocol*]

## 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. |
| *protocol* | (Optional) Specifies a routing protocol. For the IPv4 address family, the options are:<br>• **bgp**<br>• **eigrp**<br>• **isis**<br>• **ospf**<br>• **rip**<br>For the IPv6 address family, the options are:<br>• **bgp**<br>• **eigrp**<br>• **isis**<br>• **ospfv3** |

## Command Default

The default address family is IPv4.

## Command Modes

XR EXEC

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

## 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
      GigabitEthernet 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 5.0.0 | 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 Cisco NCS 6000 Series Routers* 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 |

## Examples

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 GigabitEthernet0/2/0/1
   demand-circuit enable
  !
  interface POS0/3/0/0
  !
  interface POS0/3/0/1
  !
 !
!
```

## Related Commands

| Command | Description |
|---|---|
| snmp trap (OSPFv3), on page 135 | Enables SNMP trap for an OSPFv3 instance. |
| **snmp-server host** | Specifies the recipient of an SNMP notification operation. |
| **snmp-server community** | Configures the community access string to permit access to the Simple Network Management Protocol (SNMP). |
| **snmp-server contact** | Sets the Simple Network Management Protocol (SNMP) system contact. |

| Command | Description |
|---|---|
| **snmp-server community-map** | Associates a Simple Network Management Protocol (SNMP) community with an SNMP context. |

# 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 5.0.0 | This command was introduced. |

## Usage Guidelines

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

## Task ID

| Task ID | Operation |
|---|---|
| ospf | read, write |

## Examples

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
```

## Related Commands

| Command | Description |
|---|---|
| snmp context (OSPFv3), on page 132 | Specifies SNMP context for an OSPFv3 instance. |

# 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

| | |
|---|---|
| *window-size* | Specifies the trap rate limit sliding window size. The range is 2 to 60 windows. |
| *max-num-traps* | 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 5.0.0 | This command was introduced. |

## Usage Guidelines

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

## Task ID

| Task ID | Operation |
|---|---|
| ospf | read, write |

## Examples

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 *vrf1*:

```
RP/0/RP0/CPU0:router#configure
```

```
RP/0/RP0/CPU0:router(config)#router ospfv3 100
RP/0/RP0/CPU0:router(config-ospfv3)#vrf vrf1
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 router configuration 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. |
| *policy-name* | Name of the route policy. |
| **disable** | Disables SPF prefix priority |

## Command Default

SPF prefix prioritization is disabled.

## Command Modes

Router configuration

VRF configuration

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

## Task ID

| Task ID | Operation |
|---|---|
| ospf | read, write |

## Examples

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
```

## Related Commands

| Command | Description |
|---|---|
| **prefix-set** | Enters prefix set configuration mode and defines a prefix set. |
| **route-policy (RPL)** | Defines a route policy and enters route-policy configuration mode. |

# 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 *totally stubby* areas. |

## Command Default

No stub area is defined.

## Command Modes

Area configuration

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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
```

## Related Commands

| Command | Description |
|---|---|
| default-cost (OSPFv3), on page 24 | Specifies a cost for the default summary route sent into a stub area. |

# 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** | If enabled, summary LSAs are advertised with modified metric when stub-router is active. This configuration is applicable to max-metric mode.<br>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).<br>If enabled and metric is not explicitly configured, the default metric for summary LSAs when stub-router active is 16711680 (0xFF0000). |

| | |
|---|---|
| **external-lsa** | If enabled, external LSAs are advertised with modified metric when stub-router is active. This configuration is applicable to max-metric mode.<br>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).<br>If enabled and metric is not explicitly configured, the default metric for external LSAs when stub-router active is 16711680 (0xFF0000). |
| **include-stub** | If enabled, intra-area-prefix LSAs that are referencing router LSA are advertised with maximum metric (0xffff) when stub-router is active.<br>Intra-area-prefix LSAs that are referencing network LSA do not change metric<br>Can be used in r-bit and max-metric modes.<br>/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. |

## Command Default

Disabled.

## Command Modes

Router OSPFv3 configuration

OSPFv3 VRF configuration

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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 |

## Examples

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

| | |
|---|---|
| *ipv6-prefix* | Summary prefix designated for a range of IP Version 6 (IPv6) prefixes.<br>This argument must be in the form documented in RFC 2373, where the address is specified in hexadecimal using 16-bit values between colons. |
| / *prefix-length* | 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** *tag* | (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 OSFPv3 protocol.

## Command Modes

Router OSPFv3 configuration

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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.

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.

If you want to summarize routes between OSPFv3 areas, use the **range** command.

## Task ID

| 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
```

## Related Commands

| Command | Description |
|---|---|
| range (OSPFv3), on page 74 | Consolidates and summarizes routes at an area boundary. |

# 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

| | |
|---|---|
| *milliseconds* | Minimum delay (in milliseconds) that must pass between acceptance of the same LSA arriving from neighbors. Range is 0 to 60000 milliseconds. |

## Command Default

1000 milliseconds

## Command Modes

Router OSPFv3 configuration

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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
```

## Related Commands

| Command | Description |
|---|---|
| timers throttle lsa all (OSPFv3), on page 154 | Sets rate-limiting values for LSAs being generated. |

# 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

| | |
|---|---|
| *milliseconds* | Time (in milliseconds) at which LSAs in the flooding queue are paced in between updates. Range is 5 milliseconds to 100 milliseconds. |

## Command Default

*milliseconds*: 33

## Command Modes

Router OSPFv3 configuration

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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
```

## Related Commands

| Command | Description |
|---|---|
| show ospfv3, on page 86 | Displays general information about OSPFv3 routing processes. |
| timers pacing lsa-group, on page 150 | Changes the interval at which OSPFv3 link-state advertisements (LSAs) are collected into a group and refreshed, checksummed, or aged |
| timers pacing retransmission , on page 152 | Configures LSA retransmission packet pacing. |

# 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

| | |
|---|---|
| *seconds* | Interval (in seconds) at which LSAs are grouped and refreshed, checksummed, or aged. Range is 10 to 1800 seconds. |

## Command Default

*seconds* : 240

OSPFv3 LSA group pacing is enabled by default.

## Command Modes

Router OSPFv3 configuration

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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
```

## Related Commands

| Command | Description |
|---|---|
| show ospfv3, on page 86 | Displays general information about OSPFv3 routing processes. |
| timers pacing flood, on page 148 | Configures LSA flood packet pacing. |
| timers pacing retransmission , on page 152 | Configures LSA retransmission packet pacing. |

# 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

| | |
|---|---|
| *milliseconds* | Time (in milliseconds) at which LSAs in the retransmission queue are paced. Range is 5 milliseconds to 100 milliseconds. |

## Command Default

*milliseconds* : 66

## Command Modes

Router OSPFv3 configuration

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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
```

## Related Commands

| Command | Description |
|---|---|
| show ospfv3, on page 86 | Displays general information about OSPFv3 routing processes. |
| timers pacing flood, on page 148 | Configures LSA flood packet pacing. |
| timers pacing lsa-group, on page 150 | Changes the interval at which OSPFv3 LSAs are collected into a group and refreshed, checksummed, or aged. |

# 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

| | |
|---|---|
| *start-interval* | 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. |
| *hold-interval* | Incremental time (in milliseconds). This value is used to calculate the subsequent rate limiting times for LSA generation. Range is 1 to 600000 milliseconds. |
| *max-interval* | Maximum wait time (in milliseconds) between generation of the same LSA. Range is 1 to 600000 milliseconds. |

## Command Default

*start-interval* : 500 milliseconds

*hold-interval* : 5000 milliseconds

*max-interval* : 5000 milliseconds

## Command Modes

Router OSPFv3 configuration

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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 *milliseconds* value of the **timers lsa arrival** command less than or equal to the *hold-interval* 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
```

## Related Commands

| Command | Description |
|---|---|
| show ospfv3, on page 86 | Displays general information about OSPFv3 routing processes. |
| timers lsa arrival, on page 146 | Sets the minimum interval at which the software accepts the same LSA from OSPFv3 neighbors. |

# 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

| | |
|---|---|
| *spf-start* | Initial SPF schedule delay (in milliseconds). Range is 1 to 600000 milliseconds. |
| *spf-hold* | Minimum hold time (in milliseconds) between two consecutive SPF calculations. Range is 1 to 600000 milliseconds. |
| *spf-max-wait* | Maximum wait time (in milliseconds) between two consecutive SPF calculations. Range is 1 to 600000 milliseconds. |

## Command Default

*spf-start* : 5000 milliseconds

*spf-hold:* 10000 milliseconds

*spf-max-wait:* 10000 milliseconds

## Command Modes

Router OSPFv3 configuration

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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 *N* entries. |
| *buffer_name* | Specifies a buffer from one of the 15 listed buffers. Refer Table 24: Buffer Types, on page 158 table for details on the buffers. |
| *size* | Specifies allowed size for the selected buffer. Options are: 0, 256, 1024, 2048, 4096, 8192, 16384, 32768, and 65536.<br>Select 0 to disable traces. |

## Command Default

No default behavior or values

## Command Modes

Router ospfv3 configuration

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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 |

| Name | Description |
|---|---|
| errors | errors |
| events | mda/rtrid/bfd/vrf |
| ha | startup/HA/NSF |
| hello | hello events/pkts |
| idb | interface |
| pkt | I/O packets |
| rib | rib batching |
| 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

| | |
|---|---|
| *seconds* | Time (in seconds) required to send a link-state update. Range is 1 to 65535 seconds. |

## Command Default

1 second

## Command Modes

Process configuration

Area configuration

Interface configuration

Virtual-link configuration

## Command History

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

Link-state advertisements (LSAs) in the update packet must have their ages incremented by the amount specified in the *seconds* argument before transmission. The value assigned should take into account the transmission and propagation delays for the interface.

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 GigabitEthernet interface 0/3/0/0:

```
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 GigabitEthernet 0/3/0/0
RP/0/RP0/CPU0:router(config-ospfv3-ar-if)# transmit-delay 3
```

## Related Commands

| Command | Description |
|---|---|
| show ospfv3, on page 86 | Displays general information about OSPF routing processes. |

# 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

| | |
|---|---|
| *router-id* | 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

| Release | Modification |
|---|---|
| Release 5.0.0 | This command was introduced. |

## Usage Guidelines

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

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.

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.

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.

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.

## Task ID

| Task ID | Operations |
|---|---|
| ospf | read, write |

## Examples

The following example shows how to establish a virtual link with default values for all optional parameters:

```
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
```

## Related Commands

| Command | Description |
|---|---|
| show ospfv3, on page 86 | Displays general information about OSPF routing processes. |
| transmit-delay (OSPFv3), on page 160 | Sets the estimated time required to send a link-state update packet on the interface. |