

OSPFv3 Commands

Note All commands applicable for the Cisco NCS 5500 Series Router are also supported on the Cisco NCS 540 Series Router that is introduced from Cisco IOS XR Release 6.3.2. References to earlier releases in Command History tables apply to only the Cisco NCS 5500 Series Router.

Note

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

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

For detailed information about OSPFv3 concepts, configuration tasks, and examples, see the Implementing OSPF on Cisco NCS 5500 Series Routers module in the *Routing Configuration Guide for Cisco NCS 5500 Series Routers*.

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address-family (OSPFv3)

To enter address family configuration mode for Open Shortest Path First Version 3 (OSPFv3), use the **address-family** command in the router 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 6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
ospf	read, write

Examples

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

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

area (OSPFv3)

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

area *area-id*
no area *area-id*

Syntax Description

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

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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 HundredGigE 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 HundredGigE 0/1/0/1
```

authentication (OSPFv3)

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

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

Syntax Description

ipsec	Specifies IP Security (IPSec). IPSec supported only for OSPFv3.
spi *spi-value*	Specifies a security policy index (SPI) value. Range is 256 to 4294967295.
md5	Enables Message Digest 5 (MD5) authentication.
sha1	Enables SHA1 authentication.
clear	(Optional) Specifies that the key be unencrypted.
password	(Optional) Specifies that the key be encrypted using a two-way algorithm.
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

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

Use the **authentication** command to specify an authentication type for the interface, which overrides the authentication specified for the area to which this interface belongs. If this command is not included in the

configuration file, the authentication configured in the area to which the interface belongs is assumed (as specified by the area **authentication** command).

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

Note

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

Task ID

Task ID	Operations
ospf	read, write

Examples

The following example shows how to 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

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

By default OSPFv3 calculates the OSPFv3 metric for an interface according to the bandwidth of the interface.

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

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

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

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

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

Task ID

Task ID	Operations
ospf	read, write

Examples

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

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

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

capability vrf-lite (OSPFv3)

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

capability vrf-lite
no capability vrf-lite

This command has no keywords or arguments.

Command Default

Disabled.

Command Modes

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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

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

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

Task ID

Task ID	Operation
ospf	read, write

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

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

clear ospfv3 process

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

clear ospfv3 [*process-name*] [**vrf** *vrf-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.
vrf	(Optional) Specifies VPN routing and forwarding (VRF).
vrf-name	Name of a VRF.

Command Default

No default behavior or value

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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 72 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
```

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*] [**vrf** *vrf-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.
vrf	(Optional) Specifies VPN routing and forwarding (VRF).
vrf-name	Name of a VRF.

Command Default

No default behavior or value

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

Use the **clear ospfv3 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*] [**vrf** *vrf-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.
vrf	(Optional) Specifies VPN routing and forwarding (VRF).
vrf-name	Name of a VRF.

Command Default

No default behavior or value

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

Use the **clear ospfv3 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*] [**vrf** *vrf-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. **Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
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.
vrf	(Optional) Specifies VPN routing and forwarding (VRF).
vrf-name	Name of a VRF.

Command Default

No default behavior or value

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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

Task ID

Task ID	Operations
ospf	read, write

Examples

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

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

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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

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

10^8 / bandwidth

Using this formula, the default path cost is 1 for OC-3 Packet-over-SONET/SDH (POS). 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 HundredGigE 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 HundredGigE 0/1/0/1
RP/0/RP0/CPU0:router(config-ospfv3-ar-if)# cost 65
```

database-filter all out (OSPFv3)

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

database-filter all out
no database-filter all out

Syntax Description

This command has no keywords or arguments.

Command Default

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

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

Use the **database-filter all out** command to perform the same function that the **neighbor** command (with the **database-filter** keyword) performs on a neighbor basis.

Task ID

Task ID	Operations
ospf	read, write

Examples

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

dead-interval (OSPFv3)

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

dead-interval *seconds*
no dead-interval

Syntax Description

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

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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

default-cost (OSPFv3)

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

default-cost *cost*
no default-cost

Syntax Description

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 6.0	This command was introduced.

Usage Guidelines

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 HundredGigE 0/3/0/1
```

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: **1**—Type 1 external route **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 6.0	This command was introduced.

Usage Guidelines

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

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

For information about the default-information originate attach point, see the *OSPF v3 Policy Attach Points* section in the *Implementing Routing Policy* chapter in *Routing Configuration Guide for Cisco NCS 5500 Series RoutersRouting Configuration Guide for Cisco NCS 540 Series RoutersRouting Configuration Guide*.

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 Guide*.

Task ID

Task ID	Operations
ospf	read, write

Examples

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

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

default-metric (OSPFv3)

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

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

Syntax Description

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

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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

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

Task ID

Task ID	Operations
ospf	read, write

Examples

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

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

demand-circuit (OSPFv3)

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

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

Syntax Description

disable	(Optional) Disables the demand circuit configuration that may have been specified at a higher level in the configuration.

Command Default

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

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

On point-to-point interfaces, only one end of the demand circuit must be configured with the **demand-circuit** command. Periodic hello messages are suppressed and periodic refreshes of link-state advertisements (LSAs) do not flood the demand circuit. This command allows the underlying data link layer to be closed when the topology is stable. In point-to-multipoint topology, only the multipoint end must be configured with this command.

Task ID

Task ID	Operations
ospf	read, write

Examples

The following example shows how to configure HundredGigE 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 HundredGigE 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: **intra-area** —All routes within an area. **inter-area** —All routes from one area to another area. **external** —All routes from other routing domains, learned by redistribution.
distance	The route administrative distance.

Command Default

distance : 110

Command Modes

Router ospfv3 configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

You must specify one of the keywords.

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

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

Task ID

Task ID	Operations
ospf	read, write

Examples

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

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

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

distribute-list prefix-list in

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

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

Syntax Description

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

OSPFv3 VRF configuration

Usage Guidelines

Use the **distribute-list prefix-list** command to limit the routes that OSPFv3 installs in the RIB of your router. This command does not affect the information sent to other OSPFv3 routers or the routes that these routers compute and install.

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

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

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

Task ID

Task ID	Operations
ospf	read, write

Examples

The following example shows how to prevent OSPFv3 from installing any routes that have 2001:e624 as the first 32 bits of the address. OSPFv3 is also prevented from installing routes to 2002::/16 that use HundredGigE 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 HundredGigE 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, isis**, **ospfv3, static**, and **connected**. The **static** keyword is used to redistribute IPv6 static routes. The **connected** keyword refers to routes that are established automatically because IPv6 is enabled on an interface. For routing protocols such as OSPFv3 and Intermediate System-to-Intermediate System (IS-IS), these routes are redistributed as external to the autonomous system.
process-id	(Optional) For the **bgp** keyword, an autonomous system number has the following ranges: • Range for 2-byte Autonomous system numbers (ASNs) is 1 to 65535. • Range for 4-byte Autonomous system numbers (ASNs) in asplain format is 1 to 4294967295. • Range for 4-byte Autonomous system numbers (ASNs) is asdot format is 1.0 to 65535.65535. For the **isis** keyword, an optional argument that defines a meaningful name for a routing process. You can specify only one IS-IS process for each router. Creating a name for a routing process means that you use names when configuring routing. For the **ospfv3** keyword, an appropriate OSPFv3 process name from which routes are to be redistributed. The value takes the form of a string. A decimal number can be entered, but it is stored internally as a string.

Command Default

All routes from protocols specified in the redistribute (OSPFv3), on page 66 command are redistributed into OSPFv3.

Command Modes

Router OSPFv3 configuration

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

Routes may be redistributed into OSPFv3 from several other routing protocols or from other OSPFv3 processes. These routes are then communicated to other OSPFv3 routes through Type 5 (External) or Type 7 not-so-stubby

area (NSSA) link-state advertisements (LSAs). Use the **distribute-list prefix-list out** command to control redistribution by matching redistributed routes against an IPv6 prefix list. Only routes permitted by the prefix list are redistributed into OSPFv3.

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

Task ID

Task ID	Operations
ospf	read, write

Examples

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

```
RP/0/RP0/CPU0:router(config)# ipv6 prefix-list p1
RP/0/RP0/CPU0:router(config-ipv6-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
```

domain-id (OSPFv3)

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

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

Syntax Description

secondary	(Optional) OSPFv3 secondary domain ID.
type	Primary OSPFv3 domain ID in hexadecimal format. • 0005 —Type 0x0005 • 0105 —Type 0x0105 • 0205—Type 0x0205
value	OSPF domain ID value in hexadecimal format.
domain-id-value	OSPF domain ID extended community value as a 6 byte hexadecimal number.

Command Default

No domain ID is specified.

Command Modes

VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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

Task ID

Task ID	Operation
ospf	read, write

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

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

encryption

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

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

Syntax Description

disable	Disables OSPFv3 packet encryption.
ipsec spi	Specifies IPSec ESP encryption and authentication with the Security Parameter Index (SPI) value. IPSec supported only for OSPFv3.
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

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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

Note

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

Task ID

Task ID	Operations
ospf	read, write

Examples

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

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

flood-reduction (OSPFv3)

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

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

Syntax Description

disable	(Optional) Turns off this functionality at a specific level.

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

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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

graceful-restart (OSPFv3)

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

graceful-restart [**helper disable** | **interval** *interval* | **lifetime** *lifetime*]
no graceful-restart [**helper disable** | **interval** *interval* | **lifetime** *lifetime*]

Syntax Description

helper disable	(Optional) Disables the routers helper support level.
interval *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

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
ospf	read, write

Examples

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

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

hello-interval (OSPFv3)

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

hello-interval *seconds*
no hello-interval

Syntax Description

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 (non-broadcast).

Command Modes

Interface configuration

Area configuration

Router OSPFv3 configuration

Virtual-link configuration

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

The hello interval value is advertised in the hello packets. The shorter the hello interval, the faster topological changes are detected, but more routing traffic ensues. This value must be the same for all routers and access servers on a specific network.

Task ID

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
```

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

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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

interface (OSPFv3)

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

interface *type interface-path-id*
no interface *type interface-path-id*

Syntax Description

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

Command Default

An interface is not defined.

Command Modes

Area configuration

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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

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

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

Task ID

Task ID	Operations
ospf	read, write

Examples

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

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

By default, you are notified of OSPFv3 neighbor changes without explicitly configuring the **log adjacency changes** command. The syslog messages that are sent provide a high-level view of changes to the state of the OSPFv3 peer relationship.

Task ID

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 1024.Range is 1 to 4294967295.

Command Default

If the command is not specified, the default is 255.

If the command is not specified, the default is 1024.

Command Modes

Router OSPFv3 configuration

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
ospf	read, write

Examples

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

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

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

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

maximum paths (OSPFv3)

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

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

Syntax Description

maximum-routes-number	Maximum number of parallel routes that OSPFv3 can install in a routing table. Range is 1 to 32. **Note** The maximum number of paths that can be configured is 32. **Note** The maximum number of paths that can be configured is 16.

Command Default

32 paths16 paths

Command Modes

Router OSPFv3 configuration

VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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

Task ID

Task ID	Operations
ospf	read, write

Examples

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

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

maximum redistributed-prefixes (OSPFv3)

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

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

Syntax Description

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. **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

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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

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

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

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

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

Task ID

Task ID	Operations
ospf	read, write

Examples

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

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

mtu-ignore (OSPFv3)

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

mtu-ignore [**disable**]
no mtu-ignore

Syntax Description

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

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

Command Default

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

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

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

Command Modes

Interface configuration

Area configuration

Router OSPFv3 configuration

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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

Task ID

Task ID	Operations
ospf	read, write

Examples

The following example shows how to disable MTU mismatch detection on received DBD packets on HundredGigE 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 HundredGigE 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 6.0	This command was introduced.

Usage Guidelines

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

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

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

Task ID

Task ID	Operations
ospf	read, write

Examples

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

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

network (OSPFv3)

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

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

Syntax Description

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

Command Default

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

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

If this command is not specified at any level, then the OSPFv3 network type is the default of the given medium.

Command Modes

Interface configuration

Area configuration

Router OSPFv3 configuration

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

Use the **network** command to configure broadcast networks as NBMA networks when, for example, routers in your network do not support multicast addressing.

Most times, it is assumed that when you configure NBMA networks as either broadcast or nonbroadcast, there are virtual circuits from every router to every router or fully meshed network. However, there are other configurations where this assumption is not true; for example, a partially meshed network. In these cases, you can configure the OSPFv3 network type as a point-to-multipoint network. Routing between two routers that are not directly connected goes through the router that has virtual circuits to both routers. You need not configure neighbors when using this command.

If the **network** command is issued on an interface that does not allow it, this command is ignored.

OSPFv3 has two features related to point-to-multipoint networks. One feature applies to broadcast networks and the other feature applies to nonbroadcast networks:

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

Task ID

Task ID	Operations
ospf	read, write

Examples

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

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

nssa (OSPFv3)

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

nssa [**no-redistribution**] [**default-information-originate** [**metric** *metric-value* | **metric-type** *type-value*]] [**no-summary**]
no nssa

Syntax Description

no-redistribution	(Optional) Imports routes into the normal areas, but not into the NSSA area, by the **redistribute** command when the router is an NSSA area border router (ABR).
default-information-originate	(Optional) Generates a Type 7 default into the NSSA area. This keyword takes effect only on an NSSA ABR or NSSA autonomous system boundary router (ASBR).
metric *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: **1**—Type 1 external route **2**—Type 2 external route
no-summary	(Optional) Prevents an (ABR) from sending summary link advertisements into the NSSA area.

Command Default

No NSSA area is defined.

If you do not specify a value using the **default-metric** command, the default metric value is 10.

The default *type-value* is Type 2 external route.

Command Modes

Area configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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

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

Task ID

Task ID	Operations
ospf	read, write

Examples

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

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

ospfv3 name-lookup

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

ospfv3 name-lookup
no ospfv3 name-lookup

Syntax Description

This command has no arguments or keywords.

Command Default

Routers are displayed by router ID or neighbor ID.

Command Modes

XR Config mode

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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

Task ID

Task ID	Operations
ospf	read, write

Examples

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

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

packet-size (OSPFv3)

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

packet-size *bytes*
no packet-size

Syntax Description

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

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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

Task ID

Task ID	Operations
ospf	read, write

Examples

The following example shows how to configure the packet size:

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

passive (OSPFv3)

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

passive [**disable**]
no passive

Syntax Description

disable (Optional) Sends OSPFv3 updates.

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

Command Default

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

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

OSPF routing information is neither sent nor received through the specified router interface. The specified interface address appears as a stub network in the OSPF domain.

Task ID

Task ID	Operations
ospf	read, write

Examples

The following example shows that OSPFv3 updates run over HundredGigE 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 HundredGigE 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 HundredGigE 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 HundredGigE 0/2/0/0
RP/0/RP0/CPU0:router(config-ospfv3-ar-if)# exit
RP/0/RP0/CPU0:router(config-ospfv3-ar)# interface HundredGigE 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 HundredGigE 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

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

When two routers attached to a network both attempt to become the designated router, the one with the higher router priority takes precedence. If there is a tie, the router with the higher router ID takes precedence. A router with a router priority set to zero is ineligible to become the designated router or backup designated router. Router priority is configured only for interfaces to broadcast and nonbroadcast multiaccess (NBMA) networks.

Task ID

Task ID	Operations
ospf	read, write

Examples

The following example shows how to set the router priority value to 4 on HundredGigE 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 HundredGigE 0/1/0/1
```

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

protocol shutdown (OSPFv3)

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

protocol shutdown
no protocol shutdown

Command Default

None

Command Modes

ospfv3 configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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

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

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

Task ID

Task ID	Operations
ospf	read, write

Examples

This example shows how to disable the OSPFv3:

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

range (OSPFv3)

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

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

Syntax Description

ipv6-prefix	Summary prefix designated for a range of IP Version 6 (IPv6) prefixes. This argument must be in the form documented in RFC 2373, in which the address is specified in hexadecimal using 16-bit values between colons.
/ *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 6.0	This command was introduced.

Usage Guidelines

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

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

Task ID

Task ID	Operations
ospf	read, write

Examples

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

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

redistribute (OSPFv3)

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

Border Gateway Protocol (BGP)
redistribute bgp *process-id* [**metric** *metric-value*] [**metric-type** {**1** | **2**}] [**policy** *policy-name*] [**tag** *tag-value*]
no redistribute bgp *process-id* [**metric** *metric-value*] [**metric-type** {**1** | **2**}] [**policy** *policy-name*] [**tag** *tag-value*]

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

Intermediate System-to-Intermediate System (IS-IS)
redistribute isis *process-id* [**level-1** | **level-2** | **level-1-2**] [**metric** *metric-value*] [**metric-type** {**1** | **2**}] [**policy** *policy-name*] [**tag** *tag-value*]
no redistribute isis *process-id* [**level-1** | **level-2** | **level-1-2**] [**metric** *metric-value*] [**metric-type** {**1** | **2**}] [**policy** *policy-name*] [**tag** *tag-value*]

Open Shortest Path First Version 3 (OSPFv3)
redistribute ospfv3 *process-id* **match** {**external** | **1** | **2** | **internal** | **nssa-external** | [**1** | **2**]} [**metric** *metric-value*] [**metric-type** {**1** | **2**}] [**policy** *policy-name*] [**tag** *tag-value*]
no redistribute ospfv3 *process-id* [**match** | {**external** | **internal** | **nssa-external**}] [**metric** *metric-value*] [**metric-type** {**1** | **2**}] [**policy** *policy-name*] [**tag** *tag-value*]

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

Syntax Description

bgp	Distributes routes from the BGP protocol.

process-id	For the **bgp** keyword, an autonomous system number has the following ranges: • Range for 2-byte Autonomous system numbers (ASNs) is 1 to 65535. • Range for 4-byte Autonomous system numbers (ASNs) in asplain format is 1 to 4294967295. • Range for 4-byte Autonomous system numbers (ASNs) is asdot format is 1.0 to 65535.65535. 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. 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: • **1**—Type 1 external route • **2**—Type 2 external route 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.
isis	Distributes routes from the IS-IS protocol.
level-1	(Optional) Redistributes Level 1 routes into other IP routing protocols independently.
level-1- 2	(Optional) Redistributes both Level 1 and Level 2 routes into other IP routing protocols.
level-2	(Optional) Redistributes Level 2 routes into other IP routing protocols independently.
ospf	Distributes routes from the OSPF protocol.

match { **internal** | **external** [**1** | **2**] | **nssa-external** [**1** | **2**]}	(Optional) Specifies the criteria by which OSPF routes are redistributed into other routing domains. It can be one or more of the following: • **internal** —Routes that are internal to a specific autonomous system (intra- and inter-area OSPF routes). • **external** [**1 | 2**]—Routes that are external to the autonomous system, but are imported into OSPF as Type 1 or Type 2 external routes. • **nssa-external** [**1 | 2**]—Routes that are external to the autonomous system, but are imported into OSPF as Type 1 or Type 2 not-so-stubby area (NSSA) external routes. For the **external** and **nssa-external** options, if a type is not specified, then both Type 1 and Type 2 are assumed. If no match is specified, the default is no filtering.
static	Redistributes IP static routes.

Command Default

Route redistribution is disabled.

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

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

All routes from the OSPFv3 routing protocol are redistributed.

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

Command Modes

Router OSPFv3 configuration

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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

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

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

The 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
```

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

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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 HundredGigE 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

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

We recommend that you use the **router-id** command to explicitly specify a unique 32-bit numeric value for the router ID. This configuration ensures that OSPFv3 can function regardless of the interface address configuration. Clear the OSPF process using the **clear ospf process** command or restart the OSPF process for the **no router-id** command to take effect.

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.

In VRF configuration mode, it is mandatory to configure a router ID manually. Otherwise, the OSPFv3 process will not become operational in the VRF.

Task ID

Task ID	Operations
ospf	read, write

Examples

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

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

router ospfv3

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

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

Syntax Description

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 mode

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

You can specify multiple OSPFv3 routing processes in each router. Up to 10 processes can be configured. The recommendation is not to exceed 4 OSPFv3 processes.

Task ID

Task ID	Operations
ospf	read, write

Examples

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

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

sham-link (OSPFv3)

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

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

Syntax Description

source-address	IP address of the local (source) sham-link endpoint specified in four-part, dotted-decimal notation.
destination-address	IP address of the remote (destination) sham-link endpoint specified in four-part, dotted-decimal notation.

Command Default

No sham link is configured.

Command Modes

OSPFv3 router area sub-configuration.

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

Use the **sham-link** command to configure a point-to-point connection between two provider edge (PE) routers creating an interconnect between two VPN sites (VPN backbone). Sham links are configured on PE provider edge (PE) routers in a Multiprotocol Label Switching (MPLS) VPN backbone.

Task ID

Task ID	Operations
ospf	read, write

Examples

This example shows how to configure an OSPFv3 sham link:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# router ospfv3 ospfv3
RP/0/RP0/CPU0:router(config_ospfv3)# vrf 1
RP/0/RP0/CPU0:router(config_ospfv3_vrf)# area 1
RP/0/RP0/CPU0:router(config_ospfv3_vrf_ar)# sham-link 100::1 200::1
RP/0/RP0/CPU0:router(config_ospf_vrf_ar_sl)# cost 23
```

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*] [**vrf** {**all** *vrf-name*}]**sham-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.
vrf	Specifies an OSPF VPN routing and forwarding (VRF) instance.
all	Display all the VRFs, excluding the default VRF.
vrf-name	Specifies the name of the of the OSPFv3 VRF.
sham-links	Displays OSPFv3 Sham-link information.

Command Default

None

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
ospf	read

Examples

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

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

Routing Process "ospfv3 test" with ID 3.3.3.3
It is an autonomous system boundary router
Redistributing External Routes from,
static
 Maximum number of redistributed prefixes 10240
 Threshold for warning message 75%
Initial SPF schedule delay 5000 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
```

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

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

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

Routing Process "ospfv3 test" with ID 3.3.3.3
It is an autonomous system boundary router
Redistributing External Routes from,
static
 Maximum number of redistributed prefixes 10240
 Threshold for warning message 75%
Initial SPF schedule delay 5000 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
```

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

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

Routing Process "ospfv3 test" with ID 3.3.3.3 in OSPFV3_ADMIN_DOWN state
%ROUTING-OSPFv3-6-GRACEFUL_SHUTDOWN : Shutdown Complete

Routing Process "ospfv3 test" with ID 3.3.3.3
It is an autonomous system boundary router
```

```
Redistributing External Routes from,
static
 Maximum number of redistributed prefixes 10240
 Threshold for warning message 75%
Initial SPF schedule delay 5000 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).

Field	Description
Interface flood pacing timer	Flooding pacing interval.
Retransmission pacing timer	Retransmission pacing interval.
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 vrf command that displays domain -id configuration:

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

 Routing Process "ospfv3 0" with ID 100.0.0.2 VRF V1
 It is an area border and autonomous system boundary router
 Redistributing External Routes from,
    bgp 1
    Maximum number of redistributed prefixes 10240
    Threshold for warning message 75%
 Primary Domain ID:
   0x0005:0xcafe00112233
 Secondary Domain ID:
   0x0105:0xbeef00000001
   0x0205:0xbeef00000002
 Initial SPF schedule delay 5000 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
 Maximum number of configured paths 16
 Number of external LSA 2. Checksum Sum 0x015bb3
 Number of areas in this router is 1. 1 normal 0 stub 0 nssa
 Auto cost is enabled. Reference bandwidth 100
    Area BACKBONE(0)
        Number of interfaces in this area is 1
        SPF algorithm executed 2 times
```

```
        Number of LSA 4. Checksum Sum 0x02629d
        Number of DCbitless LSA 0
        Number of indication LSA 0
        Number of DoNotAge LSA 0
        Flood list length 0
```

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

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

 Routing Process "ospfv3 0" with ID 2.2.2.2 VRF V2
 VRF lite capability is enabled
 Initial SPF schedule delay 5000 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
 Maximum number of configured paths 16
 Number of external LSA 0. Checksum Sum 00000000
 Number of areas in this router is 0. 0 normal 0 stub 0 nssa
 Auto cost is enabled. Reference bandwidth 100
```

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

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

 Routing Process "ospfv3 100" with ID 3.3.3.3
 NSR (Non-stop routing) is Enabled
 It is an area border and autonomous system boundary router
 Redistributing External Routes from,
    bgp 100
    Maximum number of redistributed prefixes 10240
    Threshold for warning message 75%
 Initial SPF schedule delay 5000 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
```

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

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

Sham Links for OSPFv3 100, VRF vrf1

Sham Link OSPF_SL1 to address 300::1 is up
Area 2, source address 100::1
IfIndex = 2
  Run as demand circuit
  DoNotAge LSA allowed., Cost of using 1
  Transmit Delay is 1 sec, State POINT_TO_POINT,
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    Hello due in 00:00:08
    Adjacency State FULL (Hello suppressed)
    Number of DBD retrans during last exchange 0
    Index 2/2, retransmission queue length 0, number of retransmission 0
    First 0(0)/0(0) Next 0(0)/0(0)
    Last retransmission scan length is 0, maximum is 0
    Last retransmission scan time is 0 msec, maximum is 0 msec
Sham Link OSPF_SL0 to address 200::1 is up
Area 2, source address 100::1
IfIndex = 2
  Run as demand circuit
  DoNotAge LSA allowed., Cost of using 1
  Transmit Delay is 1 sec, State POINT_TO_POINT,
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    Hello due in 00:00:01
    Adjacency State FULL (Hello suppressed)
    Number of DBD retrans during last exchange 0
    Index 3/3, retransmission queue length 0, number of retransmission 0
    First 0(0)/0(0) Next 0(0)/0(0)
    Last retransmission scan length is 0, maximum is 0
    Last retransmission scan time is 0 msec, maximum is 0 msec
```

show ospfv3 border-routers

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

show ospfv3 [*process-name*] [**vrf** {**all** *vrf-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.
vrf	Specifies an OSPF VPN routing and forwarding (VRF) instance.
all	Display all the VRFs, excluding the default VRF.
vrf-name	Specifies the name of the of the OSPFv3 VRF.
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 mode

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
ospf	read

Examples

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

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

  OSPFv3 1 Internal Routing Table
  Codes: i - Intra-area route, I - Inter-area route
  i 10.0.0.207 [1] via fe80::3034:30ff:fe33:3742, HundredGigE 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.
HundredGigE 0/3/0/0	Packets destined for fe80::3034:30ff:fe33:3742 are sent over HundredGigE interface 3/0/0/0.
ABR/ASBR	Router type of the destination; it is either an area border router (ABR) or autonomous system boundary router (ASBR) or both.
Area 1	Area ID of the area from which this route is learned.
SPF 3	Internal number of the shortest path first (SPF) calculation that installs this route.

show ospfv3 database

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

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

show ospfv3 [*process-name* [*area-id*]][**vrf** {**all** *vrf-name*}] **database** [**prefix**] [*link-state-id*] [**internal**] [**self-originate**]
show ospfv3 [*process-name* [*area-id*]] [**vrf** {**all** *vrf-name*}]**database** [**router**] [*link-state-id*]
show ospfv3 [*process-name area-id*] [**vrf** {**all** *vrf-name*}]**database [router]** [**adv-router** [*router-id*]]
show ospfv3 [*process-name* [*area-id*]] [**vrf** {**all** *vrf-name*}]**database** [**router**] [*link-state-id*] [**internal**] [**self-originate**]
show ospfv3 [*process-name* [*area-id*]][**vrf** {**all** *vrf-name*}] **database** [**self-originate**]
show ospfv3 [*process-name* [*area-id*]] [**vrf** {**all** *vrf-name*}]**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.
vrf	Specifies an OSPF VPN routing and forwarding (VRF) instance.
all	Display all the VRFs, excluding the default VRF.
vrf-name	Specifies the name of the of the OSPFv3 VRF.

Command Default

No default behavior or values

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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

Task ID

Task ID	Operations
ospf	read

Examples

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

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

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

                  Router Link States (Area 0)

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

                  Net Link States (Area 0)

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

                  Inter Area Prefix Link States (Area 0)

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

                  Inter Area Router Link States (Area 0)

  ADV Router      Age         Seq#       Link ID    Dest RtrID
```

```
10.0.0.207      182         0x80000001 167772366  10.0.0.206
10.0.0.206      182         0x80000001 167772367  10.0.0.207

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

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

                Intra Area Prefix Link States (Area 0)

ADV Router      Age         Seq#       Link ID    Ref-lstype  Ref-LSID
192.168.0.0     163         0x80000039 0          0x2002      1
192.168.0.0     163         0x80000039 1          0x2001      0
10.0.0.207      157         0x80000001 1001       0x2002      1
```

This table describes the significant fields shown in the display.

Table 3: show ospfv3 database Field Descriptions

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

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

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

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

                Type-5 AS External Link States

  LS age: 189
  LS Type: AS External Link
  Link State ID: 0
  Advertising Router: 10.0.0.206
  LS Seq Number: 80000002
  Checksum: 0xa303
  Length: 36
  Prefix Address: 2222::
  Prefix Length: 56, Options: None
  Metric Type: 2 (Larger than any link state path)
  Metric: 20
  External Route Tag: 0
```

This table describes the significant fields shown in the display.

Table 4: show ospfv3 database external Field Descriptions

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

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

```
RP/0/RP0/CPU0:router# show ospfv3 database inter-area prefix
```

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

                Inter Area Prefix Link States (Area 0)

LS age: 715
LS Type: Inter Area Prefix Links
Link State ID: 0
Advertising Router: 10.0.0.206
LS Seq Number: 80000002
Checksum: 0x3cb5
Length: 36
Metric: 1
Prefix Address: 3002::
Prefix Length: 56, Options: None
```

This table describes the significant fields shown in the display.

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

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

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

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

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

```
                Inter Area Router Link States (Area 0)

    LS age: 1522
    Options: (V6-Bit E-Bit R-bit DC-Bit)
    LS Type: Inter Area Router Links
    Link State ID: 167772366
    Advertising Router: 10.0.0.207
    LS Seq Number: 80000002
    Checksum: 0xcaae
    Length: 32
    Metric: 1
    Destination Router ID: 10.0.0.206
```

This table describes the significant fields shown in the display.

Table 6: show ospfv3 database inter-area routerField Descriptions

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

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

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

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

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

    LS age: 620
    Options: (V6-Bit E-Bit R-bit DC-Bit)
```

```
LS Type: Link-LSA (Interface: Ethernet0/0/0/0)
Link State ID: 1 (Interface ID)
Advertising Router: 10.0.0.207
LS Seq Number: 80000003
Checksum: 0x7235
Length: 56
Router Priority: 1
Link Local Address: fe80::204:c0ff:fe22:73fe
Number of Prefixes: 1
Prefix Address: 7002::
Prefix Length: 56, Options: None
```

This table describes the significant fields shown in the display.

Table 7: show ospfv3 database link Field Descriptions

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

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

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

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

                  Net Link States (Area 0)

    LS age: 1915
    Options: (V6-Bit E-Bit R-bit DC-Bit)
    LS Type: Network Links
    Link State ID: 1 (Interface ID of Designated Router)
    Advertising Router: 10.0.0.207
    LS Seq Number: 80000004
    Checksum: 0x4330
    Length: 36
          Attached Router: 10.0.0.207
          Attached Router: 0.0.0.1
          Attached Router: 10.0.0.206
```

This table describes the significant fields shown in the display.

Table 8: show ospfv3 database network Field Descriptions

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

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

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

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

```
                Intra Area Prefix Link States (Area 1)

Routing Bit Set on this LSA
LS age: 356
LS Type: Intra-Area-Prefix-LSA
Link State ID: 0
Advertising Router: 10.0.0.206
LS Seq Number: 8000001e
Checksum: 0xcdaa
Length: 44
Referenced LSA Type: 2001
Referenced Link State ID: 0
Referenced Advertising Router: 10.0.0.206
Number of Prefixes: 1
Prefix Address: 8006::
Prefix Length: 56, Options: None, Metric: 1
```

This table describes the significant fields shown in the display.

Table 9: show ospfv3 database prefix Field Descriptions

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

Field	Description
Metric	Cost of the prefix.

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

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


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

                  Router Link States (Area 0)

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

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

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

This table describes the significant fields shown in the display.

Table 10: show ospfv3 database router Field Descriptions

Field	Description
OSPFv3 Router with ID	Router ID number.
Process ID 1	OSPFv3 process name.
LS age	Link-state age.
Options	Type of service options (Type 0 only): DC—Supports demand circuits.E—Capable of processing external LSAs.MC—Forwards IP multicast. N—Supports Type 7 LSAs.R—Router is active.V6—Include in IPv6 routing calculations.
LS Type	Link-state type.
Link State ID	Link-state ID of the designated router.

Field	Description
Advertising Router	ID of the advertising router.
LS Seq Number	Link-state sequence (detects old or duplicate LSAs).
Checksum	Link-state checksum (Fletcher checksum of the complete contents of the LSA).
Length	Length (in bytes) of the LSA.
Link connected to	The type of network to which this interface is connected. Values are: • Another Router (point-to-point). • A Transit Network. • A Virtual Link.
Link Metric	OSPF cost of using this link.
Local Interface ID	Number that uniquely identifies an interface on a router.

show ospfv3 flood-list

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

show ospfv3 [*process-name*] [*area-id*] [**vrf** {**all** *vrf-name*}]**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. **Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
vrf	Specifies an OSPF VPN routing and forwarding (VRF) instance.
all	Display all the VRFs, excluding the default VRF.
vrf-name	Specifies the name of the of the OSPFv3 VRF.

Command Default

No default behavior or values

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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

Task ID

Task ID	Operations
ospf	read

Examples

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

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

  Flood Lists for OSPFv3 1

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

  Displaying 3 entries from flood list:

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

This table describes the significant fields shown in the display.

Table 11: show ospfv3 flood-list Field Descriptions

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

show ospfv3 interface

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

show ospfv3 [*process-name*] [*area-id*] **interface** [**vrf** {**all** *vrf-name*}][*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. **Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
vrf	Specifies an OSPF VPN routing and forwarding (VRF) instance.
all	Display all the VRFs, excluding the default VRF.
vrf-name	Specifies the name of the of the OSPFv3 VRF.

Command Default

No default behavior or values

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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

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

If you have configured BFD interface at the process level, then that applies to both area and interface level, unless area and interface level have different interval configurations specified.

Task ID

Task ID	Operations
ospf	read

Examples

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

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

             /

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

This table describes the significant fields shown in the display.

Table 12: show ospfv3 interface Field Descriptions

Field	Description
HundredGigE	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.
BFD	BFD configuration state.
Transmit Delay	Transmit delay and interface state.
Designated Router	Designated router ID and respective interface IPv6 address.
Backup Designated router	Backup designated router ID and respective interface IPv6 address.
Timer intervals configured	Configuration of timer intervals.
Hello	Number of seconds until next hello packet is sent over this interface.
Index 0/2/1	Link, area and autonomous system flood indexes, and number of flood queue entries.

Field	Description
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.

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*] [**vrf** {**all** *vrf-name*}] **message-queue**

This command has no keywords or arguments.

Syntax Description

vrf	Specifies an OSPF VPN routing and forwarding (VRF) instance.
all	Display all the VRFs, excluding the default VRF.
vrf-name	Specifies the name of the of the OSPFv3 VRF.

Command Default

None

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
ospf	read

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

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

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

  Router Thread Message Queue
    Current queue length:         0
    Peak queue length:            2
    Low queue limit:              8000
```

```
Medium queuing limit:         9000
High queuing limit:           9500
Messages queued:              1472
Messages deleted:             0
Messages processed:           1472
Low queue drops:              0
Medium queue drops:           0
High queue drops:             0
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*] [**vrf** {**all** *vrf-name*}]**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. **Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
neighbor-id	(Optional) Neighbor router ID.
detail	(Optional) Displays all neighbors given in detail (lists all neighbors).
vrf	Specifies an OSPF VPN routing and forwarding (VRF) instance.
all	Display all the VRFs, excluding the default VRF.
vrf-name	Specifies the name of the of the OSPFv3 VRF.

Command Default

No default behavior or values

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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

Task ID

Task ID	Operations
ospf	read

Examples

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

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

  Neighbors for OSPFv3 1

  Neighbor ID     Pri   State           Dead Time   Interface ID    Interface
  10.0.0.207      1     FULL/  -        00:00:35    3               HundredGigE 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 HundredGigE 0/3/0/0
    Neighbor: interface-id 3, link-local address fe80::3034:30ff:fe33:3742
    Neighbor priority is 1, State is FULL, 6 state changes
    Options is 0x13
    Dead timer due in 00:00:38
    Neighbor is up for 01:09:21
    Index 0/1/1, retransmission queue length 0, number of retransmission 1
    First 0(0)/0(0)/0(0) Next 0(0)/0(0)/0(0)
    Last retransmission scan length is 1, maximum is 1
    Last retransmission scan time is 0 msec, maximum is 0 msec


Total neighbor count: 2
```

This table describes the significant fields shown in the display.

Table 14: show ospfv3 neighbor 10.0.0.207 Field Descriptions

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

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

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

  Neighbors for OSPFv3 1

   Neighbor 10.0.0.207
```

```
    In the area 0 via interface HundredGigE 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 HundredGigE 0/3/0/1 10.0.0.207 Field Descriptions

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

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

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

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

  Neighbors for OSPFv3 1

   Neighbor 10.0.0.207
      In the area 0 via interface HundredGigE 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 HundredGigE 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.

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

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

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

  Neighbors for OSPFv3 foo

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


  Total neighbor count: 1
```

show ospfv3 request-list

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

show ospfv3 [*process-name*] [*area-id*] [**vrf** {**all** *vrf-name*}]**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. **Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
neighbor-id	(Optional) Router ID of the OSPFv3 neighbor. This argument must be in 32-bit dotted-decimal notation, similar to an IPv4 address.
vrf	Specifies an OSPF VPN routing and forwarding (VRF) instance.
all	Display all the VRFs, excluding the default VRF.
vrf-name	Specifies the name of the of the OSPFv3 VRF.

Command Default

No default behavior or values

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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

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

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

Task ID

Task ID	Operations
ospf	read

Examples

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

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

  Request Lists for OSPFv3 1

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

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

This table describes the significant fields shown in the display.

Table 18: show ospfv3 request-list Field Descriptions

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

show ospfv3 retransmission-list

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

show ospfv3 [*process-name*] [*area-id*] [**vrf** {**all** *vrf-name*}]**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. **Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
neighbor-id	(Optional) IP address of the OSPFv3 neighbor.
vrf	Specifies an OSPF VPN routing and forwarding (VRF) instance.
all	Display all the VRFs, excluding the default VRF.
vrf-name	Specifies the name of the of the OSPFv3 VRF.

Command Default

No default behavior or values

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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

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

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

Task ID

Task ID	Operations
ospf	read

Examples

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

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

  Neighbor 10.0.124.4, interface HundredGigE 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 HundredGigE 0/3/0/0 Field Descriptions

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

show ospfv3 routes

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

show ospfv3 [*process-name*] [**vrf** {**all** *vrf-name*}]**routes** [**external** | **connected**] [*ipv6-prefix*/*prefix-length*]
show ospfv3 [*process-name*] [**vrf** {**all** *vrf-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. 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.
vrf	Specifies an OSPF VPN routing and forwarding (VRF) instance.
all	Display all the VRFs, excluding the default VRF.
vrf-name	Specifies the name of the of the OSPFv3 VRF.

Command Default

No default behavior or values

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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

Task ID

Task ID	Operations
ospf	read

Examples

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

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

  Route Table for OSPFv3 1 with ID 10.3.4.2

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

  * 3000:11:22::/64, Inter, cost 21/0, area 1
  HundredGigE 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.
HundredGigE 0/3/0/0	Packets destined for prefix 3000:11:22::/64 are sent over the HundredGigE 0/3/0/0 interface.
fe80::3034:30ff:fe33:3742	Next-hop router on the path to prefix 3000:11:22::/64.
10.0.0.207	Router 10.0.0.207 is the router that advertised this route.

show ospfv3 statistics rib-thread

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

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

Syntax Description

process-name	(Optional) Name that uniquely identifies an OSPF routing process. The process name is defined by the **router ospfv3** command. If this argument is included, only information for the specified routing process is displayed.
area id	(Optional) Area number used to define the particular area.

Command Default

None

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
ospf	read

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

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

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

show ospfv3 summary-prefix

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

show ospfv3 [*process-name*] [**vrf** {**all** *vrf-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.
vrf	Specifies an OSPF VPN routing and forwarding (VRF) instance.
vrf-name	Specifies the name of the of the OSPFv3 VRF.

Command Default

No default behavior or values

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

Use the **show ospfv3 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.

Field	Description
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.

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*] [**vrf** {**all** *vrf-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.
vrf	Specifies an OSPF VPN routing and forwarding (VRF) instance.
vrf-name	Specifies the name of the of the OSPFv3 VRF.

Command Default

No default behavior or values

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

The 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 HundredGigE 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.

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: • **bgp** • **isis** • **ospf** • **rip** For the IPv6 address family, the options are: • **bgp** • **isis** • **ospfv3**

Command Default

The default address family is IPv4.

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
ospf	read

Examples

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

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

  Routing Protocol OSPFv3 1
    Router Id:10.0.0.1
```

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

This table describes the significant fields shown in the display.

Table 23: show protocols Field Descriptions

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

snmp context (OSPFv3)

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

snmp context *context_name*
no snmp context *context_name*

Syntax Description

context_name	Specifies name of the SNMP context for OSPFv3 instance.

Command Default

SNMP context is not specified.

Command Modes

Router OSPFv3 configuration

VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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

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



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

Task ID

Task ID	Operation
ospf	read, write

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

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

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

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

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

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

snmp-server community-map public context foo


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

snmp trap (OSPFv3)

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

snmp trap
no snmp trap

Syntax Description

This command has no keywords or arguments.

Command Default

Disabled.

Command Modes

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
ospf	read, write

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

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

snmp trap rate-limit (OSPFv3)

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

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

Syntax Description

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 6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
ospf	read, write

This example shows how to set the trap rate limit sliding window size to 50 and the maximum number of traps sent to 250 for OSPFv3 instance *100* under vrf *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 XR Config mode or VRF configuration mode. To return to the system default value, use the **no** form of this command.

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

Syntax Description

route-policy	Specifies the route-policy to prioritize route installation.
policy-name	Name of the route policy.
disable	Disables SPF prefix priority

Command Default

SPF prefix prioritization is disabled.

Command Modes

XR Config mode

VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
ospf	read, write

This example shows how to configure OSPFv3 SPF prefix prioritization:

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

stub (OSPFv3)

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

stub [**no-summary**]
no stub

Syntax Description

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

Command Default

No stub area is defined.

Command Modes

Area configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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

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

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

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

Task ID

Task ID	Operations
ospf	read, write

Examples

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

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

stub-router

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

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

Syntax Description

router-lsa	Specifies that always originate router link-state advertisements (LSAs) with the stub-router.
r-bit	Router-LSAs are originated with R-bit clear (v6 bit set), which means the node does not act as a transit router. Directly connected networks (native to OSPF) are still reachable within the OSPF area.
v6-bit	Router-LSAs are originated with V6 bit clear (and also r-bit clear). That means the node is not willing to receive any ipv6 traffic. Other ospfv3 routers won't install any route to a node with v6-bit clear.
max-metric	Router-LSAs are originated with maximum metric. Unlike the r-bit and v6-bit mode, the router may still act as a transit node, if there is no alternate path.
always	Stub-router mode is activated unconditionally.
on-proc-migration	Stub-router mode is activated for the desired period of time, upon ospfv3 process migration.
on-proc-restart	Stub-router mode is activated for the desired period of time, upon ospfv3 process restart.
on-switchover	Stub-router mode is activated for the desired period of time, upon RP failover.
on-startup	Stub-router mode is activated (for configured time, or until BGP converges) upon router startup (boot).
wait-for-bgp	Stub-router mode is terminated upon BGP convergence in ipv6 unicast address family. This option could only be used in the global routing table, not in a non-default VRF. This option is only supported with the on-startup trigger when the router boots.
summary-lsa	If enabled, summary LSAs are advertised with modified metric when stub-router is active. This configuration is applicable to max-metric mode. 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). 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. 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). 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. Intra-area-prefix LSAs that are referencing network LSA do not change metric Can be used in r-bit and max-metric modes. /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 6.0	This command was introduced.

Usage Guidelines

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

Task ID

Task ID	Operation
ospf	read, write

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

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

summary-prefix (OSPFv3)

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

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

Syntax Description

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

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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
```

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

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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

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

Task ID

Task ID	Operations
ospf	read, write

Examples

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

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

timers pacing flood

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

timers pacing flood *milliseconds*
no timers pacing flood

Syntax Description

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

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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

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

Task ID

Task ID	Operations
ospf	read, write

Examples

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

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

timers pacing lsa-group

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

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

Syntax Description

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

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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

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

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

Task ID

Task ID	Operations
ospf	read, write

Examples

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

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

timers pacing retransmission

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

timers pacing retransmission *milliseconds*
no timers pacing retransmission

Syntax Description

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

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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

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

Task ID

Task ID	Operations
ospf	read, write

Examples

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

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

timers throttle lsa all (OSPFv3)

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

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

Syntax Description

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 50 milliseconds

hold-interval : 5000 milliseconds 200 milliseconds

max-interval : 5000 milliseconds

Command Modes

Router OSPFv3 configuration

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

The “same LSA” is defined as an LSA instance that contains the same LSA ID number, LSA type, and advertising router ID. We recommend that you keep the *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
```

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 milliseconds50 milliseconds

spf-hold: 10000 milliseconds200 milliseconds

spf-max-wait: 10000 milliseconds5000 milliseconds

Command Modes

Router OSPFv3 configuration

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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



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

Task ID

Task ID	Operations
ospf	read, write

Examples

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

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

trace (OSPFv3)

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

trace size *buffer_name size*
no trace size *buffer_name size*

Syntax Description

size	Deletes existing buffer and creates one with *N* entries.
buffer_name	Specifies a buffer from one of the 15 listed buffers. Refer Table 24: Buffer Types, on page 142 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. Select 0 to disable traces.

Command Default

No default behavior or values

Command Modes

Router ospfv3 configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

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

Table 24: Buffer Types

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

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

Task ID

Task ID	Operations
ospf	read, write

Examples

This example shows how to set 1024 error trace entries:

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

transmit-delay (OSPFv3)

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

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

Syntax Description

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

OSPFv3 VRF configuration

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

Link-state advertisements (LSAs) in the update packet must have their ages incremented by the amount specified in the *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 HundredGigE 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 HundredGigE 0/3/0/0
RP/0/RP0/CPU0:router(config-ospfv3-ar-if)# transmit-delay 3
```

virtual-link (OSPFv3)

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

virtual-link *router-id*
no virtual-link

Syntax Description

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 6.0	This command was introduced.

Usage Guidelines

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
```

vrf (OSPFv3)

To configure an Open Shortest Path First Version 3 (OSPFv3) VPN routing and forwarding (VRF) instance and enter OSPFv3 VRF configuration submode, use the **vrf** command in XR Config mode. To terminate an OSPFv3 VRF, use the **no** form of this command.

vrf *vrf-name*
no vrf *vrf-name*

Syntax Description

vrf-name	Specifies a name for the OSPFV3 vrf. If a name is not specified, the default vrf is assumed.

Command Default

No OSPFv3 VRF is configured.

Command Modes

XR Config mode

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

Use the **vrf** command to explicitly configure a VRF. This command creates a separate instance of OSPFv3 within the process. Commands configured under the VRF configuration mode (such as the **interface** [OSPFv3] and **authentication** [OSPFv3] commands) are automatically bound to that VRF.

To modify or remove the VRF, the *vrf-name* argument format must be the same as the format used when creating the VRF.

Task ID

Task ID	Operation
ospf	read, write

This example shows how to configure VRF *vrf_1* and enter OSPFv3 VRF configuration submode:

```
RP/0/RP0/CPU0:router#configure
RP/0/RP0/CPU0:router(config)#router ospfv3 osp3
RP/0/RP0/CPU0:router(config-ospfv3)#vrf vrf_1
RP/0/RP0/CPU0:router(config-ospfv3-vrf)#
```