

ipv6 ospf dead-interval

To set the time period for which hello packets must not be seen before neighbors declare the router down, use the **ipv6 ospf dead-interval** command in interface configuration mode. To return to the default time, use the **no** form of this command.

ipv6 ospf dead-interval *seconds*

no ipv6 ospf dead-interval

Syntax Description	<i>seconds</i>	Specifies the interval (in seconds). The value must be the same for all nodes on the network.
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Command Default	Four times the interval set by the ipv6 ospf hello-interval command
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Command Modes	Interface configuration
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Command History	Release	Modification
	12.0(24)S	This command was introduced.
	12.2(15)T	This command was integrated into Cisco IOS Release 12.2(15)T.
	12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S.
	12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
	12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

Usage Guidelines	The interval is advertised in router hello packets. This value must be the same for all routers and access servers on a specific network.
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Examples	The following example sets the Open Shortest Path First (OSPF) dead interval to 60 seconds:
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```
interface ethernet 1
  ipv6 ospf dead-interval 60
```

Related Commands	Command	Description
	ipv6 ospf hello-interval	Specifies the interval between hello packets that the Cisco IOS software sends on the interface.

ipv6 ospf demand-circuit

To configure Open Shortest Path First (OSPF) to treat the interface as an OSPF demand circuit, use the **ipv6 ospf demand-circuit** command in interface configuration mode. To remove the demand circuit designation from the interface, use the **no** form of this command.

ipv6 ospf demand-circuit

no ipv6 ospf demand-circuit

Syntax Description This command has no arguments or keywords.

Command Default The circuit is not a demand circuit.

Command Modes Interface configuration

Command History

Release	Modification
12.0(24)S	This command was introduced.
12.2(15)T	This command was integrated into Cisco IOS Release 12.2(15)T.
12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

Usage Guidelines

On point-to-point interfaces, only one end of the demand circuit must be configured with this 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.

Examples

The following example sets the configuration for an ISDN on-demand circuit:

```
interface BRI0
  ipv6 ospf 1 area 1
  ipv6 ospf demand-circuit
```

ipv6 ospf encryption

To specify the encryption type for an interface, use the **ipv6 ospf encryption** command in interface configuration mode. To remove the encryption type from an interface, use the **no** form of this command.

```
ipv6 ospf encryption {ipsec spi spi esp encryption-algorithm [[key-encryption-type] key]
authentication-algorithm [key-encryption-type] key | null}
```

```
no ipv6 ospf encryption ipsec spi spi
```

Syntax Description	
ipsec	IP Security (IPSec).
spi <i>spi</i>	Security policy index (SPI) value. The <i>spi</i> value must be a number from 256 to 4294967295.
esp	Encapsulating security payload (ESP).
<i>encryption-algorithm</i>	Encryption algorithm to be used with ESP. The values can be any of the following: <ul style="list-style-type: none"> aes-cdc—Enables AES-CDC encryption. 3des—Enables 3DES encryption. des—Enables DES encryption. null—ESP with no encryption.
<i>key-encryption-type</i>	(Optional) One of two values can be entered: <ul style="list-style-type: none"> 0—The key is not encrypted. 7—The key is encrypted.
<i>key</i>	(Optional) Number used in the calculation of the message digest. The number is 32 hex digits (16 bytes) long. The size of the key depends on the encryption algorithm used. Some algorithms, such as AES-CDC, allow the user to choose the size of the key.
<i>authentication-algorithm</i>	Encryption authentication algorithm to be used. The values can be one of the following: <ul style="list-style-type: none"> md5—Enables message digest 5 (MD5). sha1—Enables SHA-1.
null	Overrides area encryption.

Command Default Authentication and encryption are not configured on an interface.

Command Modes Interface configuration

Command History	Release	Modification
	12.4(9)T	This command was introduced.

Usage Guidelines

When the **ipv6 ospf encryption** command is enabled, both authentication and encryption are enabled. However, when you use an **encryption** command such as **area encryption**, you may not also use an authentication command (such as **area authentication** or **area virtual-link authentication**) at the same time.

The user needs to ensure that the same policy (the SPI and the key) is configured on all of the interfaces on the link. SPI values may automatically be used by other client applications, such as tunnels.

The policy database is common to all client applications on a box. This means that two IPsec clients, such as Open Shortest Path First (OSPF) and a tunnel, cannot use the same SPI. Additionally, an SPI can be used only in one policy.

The **null** keyword is used to override existing area encryption. If area encryption is not configured, then it is not necessary to configure the interface with the **ipv6 ospf encryption null** command.

Examples

The following example specifies the encryption type for Ethernet interface 0/0. The IPsec SPI value is 1001, ESP is used with no encryption, and the authentication algorithm is SHA-1.

```
Router(config)# interface ethernet 0/0
Router(config-if)# ipv6 ospf encryption ipsec spi 1001 esp null sha1
123456789A123456789B123456789C123456789D
```

Related Commands

Command	Description
area authentication	Enables authentication for an OSPF area.
area encryption	Enables encryption for an OSPF area.
area virtual-link authentication	Enables authentication for virtual links in an OSPF area.
ipv6 ospf authentication	Specifies the authentication type for an interface.

ipv6 ospf flood-reduction

To suppress the unnecessary flooding of link-state advertisements (LSAs) in stable topologies, use the **ipv6 ospf flood-reduction** command in interface configuration mode. To disable this feature, use the **no** form of this command.

ipv6 ospf flood-reduction

no ipv6 ospf flood-reduction

Syntax Description This command has no arguments or keywords.

Command Default This command is disabled.

Command Modes Interface configuration

Command History	Release	Modification
	12.0(24)S	This command was introduced.
	12.2(15)T	This command was integrated into Cisco IOS Release 12.2(15)T.
	12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S.
	12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
	12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

Usage Guidelines All routers supporting the Open Shortest Path First (OSPF) demand circuit are compatible and can interact with routers supporting flooding reduction.

Examples The following example suppresses the flooding of unnecessary LSAs on serial interface 0:

```
interface serial 0
  ipv6 ospf flood-reduction
```

Related Commands	Command	Description
	show ipv6 ospf interface	Displays OSPF-related interface information.
	show ipv6 ospf neighbor	Displays OSPF-neighbor information on a per-interface basis.

ipv6 ospf hello-interval

To specify the interval between hello packets that the Cisco IOS software sends on the interface, use the **ipv6 ospf hello-interval** command in interface configuration mode. To return to the default time, use the **no** form of this command.

ipv6 ospf hello-interval *seconds*

no ipv6 ospf hello-interval

Syntax Description	<i>seconds</i>	Specifies the interval (in seconds). The value must be the same for all nodes on a specific network.
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Command Default The default interval is 10 seconds when using Ethernet and 30 seconds when using nonbroadcast.

Command Modes Interface configuration

Command History	Release	Modification
	12.0(24)S	This command was introduced.
	12.2(15)T	This command was integrated into Cisco IOS Release 12.2(15)T.
	12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S.
	12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
	12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

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

Examples The following example sets the interval between hello packets to 15 seconds:

```
interface ethernet 1
  ipv6 ospf hello-interval 15
```

Related Commands	Command	Description
	ipv6 ospf dead-interval	Sets the time period for which hello packets must not have been seen before neighbors declare the router down.

ipv6 ospf mtu-ignore

To disable Open Shortest Path First (OSPF) maximum transmission unit (MTU) mismatch detection on receiving database descriptor (DBD) packets, use the **ipv6 ospf mtu-ignore** command in interface configuration mode. To reset to default, use the **no** form of this command.

ipv6 ospf mtu-ignore

no ipv6 ospf mtu-ignore

Syntax Description This command has no arguments or keywords.

Command Default OSPF MTU mismatch detection is enabled.

Command Modes Interface configuration

Command History

Release	Modification
12.0(24)S	This command was introduced.
12.2(15)T	This command was integrated into Cisco IOS Release 12.2(15)T.
12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

Usage Guidelines

OSPF checks whether 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 IP MTU configured on the incoming interface, OSPF adjacency will not be established.

Examples

The following example disables MTU mismatch detection on receiving DBD packets:

```
interface serial 0/0
  ipv6 ospf mtu-ignore
```

ipv6 ospf name-lookup

To display Open Shortest Path First (OSPF) router IDs as Domain Naming System (DNS) names, use the **ipv6 ospf name-lookup** command in global configuration mode. To stop displaying OSPF router IDs as DNS names, use the **no** form of this command.

ipv6 ospf name-lookup

no ipv6 ospf name-lookup

Syntax Description This command has no arguments or keywords.

Command Default This command is disabled by default

Command Modes Global configuration

Command History

Release	Modification
12.0(24)S	This command was introduced.
12.2(15)T	This command was integrated into Cisco IOS Release 12.2(15)T.
12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

Usage Guidelines This command makes it easier to identify a router because the router is displayed by name rather than by its router ID or neighbor ID.

Examples

The following example configures OSPF to look up DNS names for use in all OSPF show EXEC command displays:

```
ipv6 ospf name-lookup
```

ipv6 ospf neighbor

To configure Open Shortest Path First (OSPF) routers interconnecting to nonbroadcast networks, use the **ipv6 ospf neighbor** command in interface configuration mode. To remove a configuration, use the **no** form of this command.

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

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

Syntax Description		
	<i>ipv6-address</i>	Link-local IPv6 address of the neighbor. This argument must be in the form documented in RFC 2373 where the address is specified in hexadecimal using 16-bit values between colons.
	priority number	(Optional) A number that indicates the router priority value of the nonbroadcast neighbor associated with the IPv6 prefix specified. The default is 0.
	poll-interval seconds	(Optional) A number value that represents the poll interval time (in seconds). RFC 2328 recommends that this value be much larger than the hello interval. The default is 120 seconds (2 minutes). This 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 will assume the cost of the interface, based on the ipv6 ospf cost command.
	database-filter all out	(Optional) Filters outgoing link-state advertisements (LSAs) to an OSPF neighbor.

Command Default No configuration is specified.

Command Modes Interface configuration

Command History	Release	Modification
	12.0(24)S	This command was introduced.
	12.2(15)T	This command was integrated into Cisco IOS Release 12.2(15)T.
	12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S.
	12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
	12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

Usage Guidelines

X.25 and Frame Relay provide an optional broadcast capability that can be configured in the map to allow OSPF to run as a broadcast network. At the OSPF level you can configure the router as a broadcast network.

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

If a neighboring router has become inactive (hello packets have not been seen for the Router Dead Interval period), hello packets may need to be sent to the dead neighbor. These hello packets will be sent at a reduced rate called *Poll Interval*.

When the router first 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 will then start sending hello packets to all neighbors in order to form adjacencies.

The **priority** keyword does not apply to point-to-multipoint interfaces. For point-to-multipoint interfaces, the **cost** keyword and the *number* argument are the only options that are applicable. The **cost** keyword does not apply to nonbroadcast multiaccess (NBMA) networks.

Examples

The following example configures an OSPF neighboring router:

```
ipv6 ospf neighbor FE80::A8BB:CCFF:FE00:C01
```

ipv6 ospf network

To configure the OSPF network type to a type other than the default for a given medium, use the **ipv6 ospf network** command in interface configuration mode. To return to the default type, use the **no** form of this command.

```
ipv6 ospf network { broadcast | non-broadcast | { point-to-multipoint [non-broadcast] |
point-to-point } }
```

```
no ipv6 ospf network
```

Syntax Description		
broadcast	Sets the network type to broadcast.	
non-broadcast	Sets the network type to nonbroadcast multiaccess (NBMA).	
point-to-multipoint [non-broadcast]	Sets the network type to point-to-multipoint. The optional non-broadcast keyword 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 Default depends on the network type.

Command Modes Interface configuration

Command History	Release	Modification
	12.0(24)S	This command was introduced.
	12.2(15)T	This command was integrated into Cisco IOS Release 12.2(15)T.
	12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S.
	12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
	12.4(15)XF	The point-to-multipoint keyword was added to support the Virtual Multipoint Interfaces (VMI) and Mobile Adhoc Networking.
	12.4(15)T	This command was integrated into Cisco IOS 12.4(15)T.
	12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

Usage Guidelines **NBMA Networks**
 Using this feature, you can configure broadcast networks as NBMA networks when, for example, routers in your network do not support multicast addressing. You can also configure NBMA networks (such as X.25, Frame Relay, and Switched Multimegabit Data Service [SMDS]) as broadcast networks. This feature saves you from needing to configure neighbors.

Configuring NBMA networks as either broadcast or nonbroadcast assumes that there are virtual circuits from every router to every router or fully meshed networks. However, the assumption is not true for other configurations, such as for a partially meshed network. In these cases, you can configure the OSPF network type as a point-to-multipoint network. Routing between two routers that are not directly connected will go through the router that has virtual circuits to both routers. You need not configure neighbors when using this feature.

Point-to-Multipoint Networks

OSPFv3 for IPv6 has two features related to point-to-multipoint networks. One feature applies to broadcast networks; 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.

Examples

OSPF Network as Broadcast Network Example

The following example sets your OSPF network as a broadcast network:

```
interface serial 0
  ipv6 enable
  ipv6 ospf 1 area 0
  ipv6 ospf network broadcast
  encapsulation frame-relay
```

OSPF Point-to-Multipoint Network with Broadcast Example

The following example illustrates a point-to-multipoint network with broadcast:

```
interface serial 0
  ipv6 enable
  ipv6 ospf 1 area 0
  encapsulation frame-relay
  ipv6 ospf cost 100
  ipv6 ospf network point-to-multipoint
  frame-relay map ipv6 2001:0DB1::A8BB:CCFF:FE00:C01 broadcast
  frame-relay map ipv6 2001:0DB1B:CCFF:FE00:C02 broadcast
  frame-relay local-dlci 200
  ipv6 ospf neighbor 2001:0DB1B:CCFF:FE00:C01
  ipv6 ospf neighbor 2001:0DB1B:CCFF:FE00:C02
```

Related Commands

Command	Description
frame-relay map	Defines mapping between a destination protocol address and the DLCI used to connect to the destination address.
ipv6 ospf neighbor	Configures OSPF routers interconnecting to nonbroadcast networks.
x25 map	Sets up the LAN protocols-to-remote host mapping.

ipv6 ospf priority

To set the router priority, which helps determine the designated router for this network, use the **ipv6 ospf priority** command in interface configuration mode. To return to the default value, use the **no** form of this command.

ipv6 ospf priority *number-value*

no ipv6 ospf priority *number-value*

Syntax Description	<i>number-value</i>	A number value that specifies the priority of the router. The range is from 0 to 255.
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Command Default The router priority is 1.

Command Modes Interface configuration

Command History	Release	Modification
	12.0(24)S	This command was introduced.
	12.2(15)T	This command was integrated into Cisco IOS Release 12.2(15)T.
	12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S.
	12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
	12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

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 multiaccess networks (in other words, not to point-to-point networks).

This priority value is used when you configure Open Shortest Path First (OSPF) for nonbroadcast networks using the **ipv6 ospf neighbor** command.

Examples The following example sets the router priority value to 4:

```
interface ethernet 0
  ipv6 ospf priority 4
```

Related Commands	Command	Description
	ipv6 ospf network	Configures the OSPF network type to a type other than the default for a given medium.
	ipv6 ospf neighbor	Configures OSPF routers interconnecting to nonbroadcast networks.

ipv6 ospf retransmit-interval

To specify the time between link-state advertisement (LSA) retransmissions for adjacencies belonging to the interface, use the **ipv6 ospf retransmit-interval** command in interface configuration mode. To return to the default value, use the **no** form of this command.

ipv6 ospf retransmit-interval *seconds*

no ipv6 ospf retransmit-interval

Syntax Description	<i>seconds</i>	Time (in seconds) between retransmissions. It must be greater than the expected round-trip delay between any two routers on the attached network. The range is from 1 to 65535 seconds. The default is 5 seconds.
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Command Default	The default is 5 seconds.
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Command Modes	Interface configuration
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Command History	Release	Modification
	12.0(24)S	This command was introduced.
	12.2(15)T	This command was integrated into Cisco IOS Release 12.2(15)T.
	12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S.
	12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
	12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

Usage Guidelines	<p>When a router sends an LSA to its neighbor, it keeps the LSA until it receives back the acknowledgment message. If the router receives no acknowledgment, it will resend the LSA.</p> <p>The setting of this parameter should be conservative, or needless retransmission will result. The value should be larger for serial lines and virtual links.</p>
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Examples	The following example sets the retransmit interval value to 8 seconds:
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```
interface ethernet 2
  ipv6 ospf retransmit-interval 8
```

ipv6 ospf transmit-delay

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

ipv6 ospf transmit-delay *seconds*

no ipv6 ospf transmit-delay

Syntax Description	<i>seconds</i>	Time (in seconds) required to send a link-state update. The range is from 1 to 65535 seconds. The default is 1 second.
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Command Default The default is 1 second.

Command Modes Interface configuration

Command History	Release	Modification
	12.0(24)S	This command was introduced.
	12.2(15)T	This command was integrated into Cisco IOS Release 12.2(15)T.
	12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S.
	12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
	12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

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.

Examples The following example sets the retransmit delay value to 3 seconds:

```
interface ethernet 0
  ipv6 ospf transmit-delay 3
```

ipv6 pim

To reenable IPv6 Protocol Independent Multicast (PIM) on a specified interface, use the **ipv6 pim** command in interface configuration mode. To disable PIM on a specified interface, use the **no** form of the command.

ipv6 pim

no ipv6 pim

Syntax Description

This command has no arguments or keywords.

Command Default

PIM is automatically enabled on every interface.

Command Modes

Interface configuration

Command History

Release	Modification
12.3(2)T	This command was introduced.
12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S.
12.0(26)S	This command was integrated into Cisco IOS Release 12.0(26)S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(25)SG	This command was integrated into Cisco IOS Release 12.2(25)SG.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Usage Guidelines

After a user has enabled the **ipv6 multicast-routing** command, PIM is enabled to run on every interface. Because PIM is enabled on every interface by default, use the **no** form of the **ipv6 pim** command to disable PIM on a specified interface. When PIM is disabled on an interface, it does not react to any host membership notifications from the Multicast Listener Discovery (MLD) protocol.

Examples

The following example turns off PIM on Fast Ethernet interface 1/0:

```
Router(config)# interface FastEthernet 1/0
Router(config-if)# no ipv6 pim
```

Related Commands

Command	Description
ipv6 multicast-routing	Enables multicast routing using PIM and MLD on all IPv6-enabled interfaces of the router and enables multicast forwarding.

ipv6 pim accept-register

To accept or reject registers at the rendezvous point (RP), use the **ipv6 pim accept-register** command in global configuration mode. To return to the default value, use the **no** form of this command.

ipv6 pim accept-register {**list** *access-list* | **route-map** *map-name*}

no ipv6 pim accept-register {**list** *access-list* | **route-map** *map-name*}

Syntax Description

list <i>access-list</i>	Defines the access list name.
route-map <i>map-name</i>	Defines the route map.

Command Default

All sources are accepted at the RP.

Command Modes

Global configuration

Command History

Release	Modification
12.0(26)S	This command was introduced.
12.3(4)T	This command was integrated into Cisco IOS Release 12.3(4)T.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(25)SG	This command was integrated into Cisco IOS Release 12.2(25)SG.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

Usage Guidelines

Use the **ipv6 pim accept-register** command to configure a named access list or route map with match attributes. When the permit conditions as defined by the *access-list* and *map-name* arguments are met, the register message is accepted. Otherwise, the register message is not accepted, and an immediate register-stop message is returned to the encapsulating designated router.

Examples

The following example shows how to filter on all sources that do not have a local multicast Border Gateway Protocol (BGP) prefix:

```
ipv6 pim accept-register route-map reg-filter
route-map reg-filter permit 20
 match as-path 101
ip as-path access-list 101 permit
```

ipv6 pim bsr announced rp

To announce scope-to-rendezvous point (RP) mappings directly from the bootstrap router (BSR) instead of learning them from candidate RPs, use the **ipv6 pim bsr announced rp** command in global configuration mode. To reset the command to the default values, use the **no** form of this command.

```
ipv6 pim bsr announced rp ipv6-address [group-list access-list-name] [priority priority-value] [bidir] [scope scope-value]
```

```
no ipv6 pim bsr announced rp
```

Syntax Description		
<i>ipv6-address</i>		The IPv6 address of each RP to be announced, configured on the BSR. This argument must be in the form documented in RFC 2373 where the address is specified in hexadecimal using 16-bit values between colons.
group-list		(Optional) List of group prefixes to be associated with the configured RP and added to the BSR RP cache. The group prefixes defined by the <i>access-list-name</i> argument are added to the BSR RP cache. If a group prefix in the access list is denied, however, it is not included in the RP cache.
<i>access-list-name</i>		(Optional) Name of the IPv6 access list containing group prefixes that will be added to the BSR RP cache. Names cannot contain a space or quotation mark, or begin with a numeral.
priority		(Optional) Priority of the RP to be announced.
<i>priority-value</i>		(Optional) Integer from 0 through 192. The RP with the larger priority is preferred. If the priority values are the same, the router with the larger IPv6 address is the RP. The default value is 192 and is not NVgened.
bidir		(Optional) RP is advertised as the C-RP for the group-list <i>access-list-name</i> keyword and argument in the bidirectional range.
scope		(Optional) The scope keyword sets groups ranges belonging to the configured scope.
<i>scope-value</i>		(Optional) Integer from 3 through 15 that specify the scope.

Command Default Scope-to-RP mappings are not announced directly from the BSR.

Command Modes Global configuration

Command History	Release	Modification
	12.4(2)T	This command was introduced.
	12.2(33)SRE	This command was modified. It was integrated into Cisco IOS Release 12.2(33)SRE.

Usage Guidelines

IPv6 BSR routers can be statically configured to announce scope-to-RP mappings directly instead of learning them from candidate-RP messages. A user might want to configure a BSR router to announce scope-to-RP mappings so that an RP that does not support BSR is imported into the BSR. Enabling this feature also allows an RP positioned outside the enterprise's BSR domain to be learned by configuring the known remote RP on the local candidate BSR routers.

Announcing RP mappings statically from the BSR without having to listen to candidate RP messages is useful in several cases:

- If the RP address never changes because there is only a single RP or the group range uses an anycast RP, it may be less complex to configure the RP address announcement statically on the candidate BSRs.
- If the RP address is a virtual RP address (possible with bidirectional Protocol Independent Multicast [PIM]), it cannot be learned by the BSR from a candidate RP itself. Instead, it must be configured as an announced RP on the candidate BSRs.
- If an RP itself does not support BSR, the **ipv6 pim bsr announced rp** command allows the RP to be imported into the BSR.
- If an RP is positioned outside an enterprise's BSR domain (which is limited by the **ipv6 pim bsr border** command), then it cannot be learned because the messages from the remote BSR are filtered. Instead, the RP can be learned by configuring the known remote RP using the **ipv6 pim bsr announced rp** command on the local candidate BSR routers.

The group prefixes defined by the *access-list-name* argument are also added to the BSR RP cache. If a group prefix in the access list is denied, however, it is not included in the RP cache.

If the **priority** *priority-value* keyword and argument are used, then the announced RP (A-RP) is added as a candidate RP with the specified priority. The default for the *priority-value* argument is 192, and it is not NVgened. If the **scope** *scope-value* keyword and argument are specified, then the RP will be added as C-RP only on the elected BSR for the specified scope.

If the **bidir** keyword is used, the group range is used for bidirectional shared-tree forwarding; otherwise, it is used for sparse mode forwarding. A single *ipv6-address* argument can be configured to be the RP for either bidir or sparse mode for a group access list. However, this argument should be used only if consistent RP selection is possible throughout the network.

The announced BSR mappings are announced only by the currently elected BSR.

The announced BSR mappings are always included in the BSR messages and are not suppressed by other received candidate-RP announcements.

You can use unicast PIM or BSR message filtering on the BSR to inhibit learning about unwanted dynamic candidate-RP mappings.

Examples

The following example configures the IPv6 address 2001:0DB8:3000:3000::42 to be advertised in the bootstrap message (BSM) as the candidate RP, with a priority of 0:

```
Router(config)# ipv6 pim bsr announced rp 2001:0DB8:3000:3000::42 priority 0
```

The following example configures the IPv6 address 2001:0DB8:1:1:1 to be advertised in the BSM as the candidate RP for scope 6 for the group ranges specified in the access list named list1:

```
Router(config)# ipv6 pim bsr announced rp 2001:0DB8:1:1:1 group-list list1 scope 6
```

Related Commands

Command	Description
ipv6 pim bsr border	Configures a border for all BSMs of any scope on a specified interface.
ipv6 pim bsr candidate bsr	Configures a router to be a candidate BSR.
ipv6 pim bsr candidate rp	Configures the candidate RP to send PIM RP advertisements to the BSR.

ipv6 pim bsr border

To configure a border for all bootstrap message (BSMs) of any scope on a specified interface, use the **ipv6 pim bsr border** command in interface configuration mode. To remove the border, use the **no** form of this command.

ipv6 pim bsr border

no ipv6 pim bsr border

Syntax Description This command has no argument or keywords.

Command Default No border is configured.

Command Modes Interface configuration

Command History	Release	Modification
	12.0(28)S	This command was introduced.
	12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
	12.3(11)T	This command was integrated into Cisco IOS Release 12.3(11)T.
	12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
	12.2(25)SG	This command was integrated into Cisco IOS Release 12.2(25)SG.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
	12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
	Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Usage Guidelines The **ipv6 pim bsr border** command is used to configure a border to all global and scoped BSMs. The command filters incoming or outgoing BSMs, preventing the BSMs from being forwarded or accepted on the interface on which the **ipv6 pim bsr border** command is configured.

Examples The following example configures a BSR border on Ethernet interface 1/0:

```
Router(config)# interface Ethernet1/0
Router(config-if)# ipv6 pim bsr border
Router(config-if)# end

Router# show running-config interface e1/0

Building configuration...

Current configuration :206 bytes
!
interface Ethernet1/0
```

```
ipv6 address 2:2:2::2/64
ipv6 enable
ipv6 rip test enable
ipv6 pim bsr border
no cdp enable
end
```

Related Commands

Command	Description
ipv6 pim bsr candidate bsr	Configures a router as a candidate BSR.
ipv6 pim bsr candidate rp	Sends PIM RP advertisements to the BSR.

ipv6 pim bsr candidate bsr

To configure a router to be a candidate bootstrap router (BSR), use the **ipv6 pim bsr candidate bsr** command in global configuration mode. To remove this router as a candidate BSR, use the **no** form of this command.

ipv6 pim bsr candidate bsr *ipv6-address* [*hash-mask-length*] [**priority** *priority-value*]

no ipv6 pim bsr candidate bsr *ipv6-address* [*hash-mask-length*] [**priority** *priority-value*]

Syntax Description

<i>ipv6-address</i>	The IPv6 address of the router to be configured as a candidate BSR. This argument must be in the form documented in RFC 2373 where the address is specified in hexadecimal using 16-bit values between colons.
<i>hash-mask-length</i>	(Optional) The length (in bits) of the mask to use in the BSR hash function. The default value is 126.
priority	(Optional) Priority of the candidate BSR.
<i>priority-value</i>	(Optional) Integer from 0 through 192. The BSR with the larger priority is preferred. If the priority values are the same, the router with the larger IPv6 address is the BSR. The default value is 0.
scope	(Optional) BSR will originate bootstrap messages (BSMs), including the group range associated with the scope, and accept candidate RP (C-RP) announcements only if they are for groups that belong to the given scope.

Command Default

Router is not enabled as a BSR.

Command Modes

Global configuration

Command History

Release	Modification
12.0(28)S	This command was introduced.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.3(11)T	This command was integrated into Cisco IOS Release 12.3(11)T.
12.4	The scope keyword and <i>scope-value</i> argument are no longer available in syntax.
12.4(2)T	This command was integrated into Cisco IOS Release 12.4(2)T.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(25)SG	This command was integrated into Cisco IOS Release 12.2(25)SG.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
Cisco IOS XE Release 2.1	This command was introduced on Cisco ASR 1000 Series Routers.

Usage Guidelines

The **ipv6 pim bsr candidate bsr** command is used to configure a router as a candidate BSR. When a router is configured, it will participate in BSR election. If elected BSR, this router will periodically originate BSR messages advertising the group-to-RP mappings it has learned through candidate-RP-advertisement messages.

If the **scope** keyword is enabled, the BSR will originate BSMs, including the group range associated with the scope, and accept C-RP announcements only if they are for groups that belong to the given scope. If no scope is configured, all scopes are used.

Examples

The following example configures the router with the IPv6 address 2001:0DB8:3000:3000::42 as the candidate BSR, with a hash mask length of 124 and a priority of 10:

```
ipv6 pim bsr candidate bsr 2001:0DB8:3000:3000::42 124 priority 10
```

Related Commands

Command	Description
ipv6 pim bsr border	Configures a border for all bootstrap message BSMs of any scope.
ipv6 pim bsr candidate rp	Sends PIM RP advertisements to the BSR.

ipv6 pim bsr candidate rp

To configure the candidate rendezvous point (RP) to send Protocol Independent Multicast (PIM) RP advertisements to the bootstrap router (BSR), use the **ipv6 pim bsr candidate rp** command in global configuration mode. To disable PIM RP advertisements to the BSR, use the **no** form of this command.

```
ipv6 pim bsr candidate rp ipv6-address [group-list access-list-name] [priority priority-value]
[interval seconds] [scope scope-value] [bidir]
```

```
no ipv6 pim bsr candidate rp ipv6-address [group-list access-list-name] [priority priority-value]
[interval seconds] [scope scope-value] [bidir]
```

Syntax Description	
<i>ipv6-address</i>	The IPv6 address of the router to be advertised as the candidate RP (C-RP). This argument must be in the form documented in RFC 2373 where the address is specified in hexadecimal using 16-bit values between colons.
group-list	(Optional) List of group prefixes. When the bidir keyword is not enabled, the group-list keyword with the <i>access-list-name</i> argument is advertised in the sparse range. If no access list is specified, all valid multicast nonsource-specific multicast (SSM) address ranges are advertised in association with the specified RP address.
<i>access-list-name</i>	(Optional) Name of the IPv6 access list containing group prefixes that will be advertised in association with the RP address. Names cannot contain a space or quotation mark, or begin with a numeral. When the bidir keyword is not enabled, the group-list keyword with the <i>access-list-name</i> argument is advertised in the sparse range. If the access list contains any group address ranges that overlap the assigned SSM group address range (FF3x::/96), a warning message is displayed, and the overlapping address ranges are ignored.
priority	(Optional) Priority of the candidate BSR.
<i>priority-value</i>	(Optional) Integer from 0 through 192 that specifies the priority. The RP with the higher priority is preferred. If the priority values are the same, the router with the higher IPv6 address is the RP. The default value is 192.
interval	(Optional) Configures the C-RP advertisement interval.
<i>seconds</i>	(Optional) Advertisement interval in number of seconds.
scope	(Optional) Router advertises itself as the C-RP only to the BSR for the specified scope.
<i>scope-value</i>	(Optional) Integer from 3 through 15 that specifies the scope.
bidir	(Optional) Router advertises itself as the C-RP for the group-list <i>access-list-name</i> in the bidirectional range.

Command Default Router is not enabled as a candidate RP.
If no scope is configured, all scopes are advertised.

Command Modes Global configuration

Command History	Release	Modification
	12.0(28)S	This command was introduced.
	12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
	12.3(11)T	This command was integrated into Cisco IOS Release 12.3(11)T.
	12.4	The scope keyword and <i>scope-value</i> argument are no longer available in syntax.
	12.4(2)T	This command was integrated into Cisco IOS Release 12.4(2)T.
	12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
	12.2(25)SG	This command was integrated into Cisco IOS Release 12.2(25)SG.
	12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
	Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.
	12.2(33)SRE	This command was modified. It was integrated into Cisco IOS Release 12.2(33)SRE.

Usage Guidelines Use the **ipv6 pim bsr candidate rp** command to send PIM RP advertisements to the BSR.

The group prefixes defined by the *access-list-name* argument will also be advertised in association with the RP address. If a group prefix in the access list is denied, it will not be included in the C-RP advertisement.

If the **priority** *priority-value* keyword and argument are specified, then the router will announce itself to be a candidate RP with the specified priority.

If the **scope** keyword is used, the router advertises itself as the C-RP only to the BSR for the specified scope. If the **group-list** keyword is specified along with the scope, then only prefixes in the *access-list-name* argument with the same scope as the scope configured will be advertised. If no scope is configured, all scopes are advertised.

Examples The following example configures the router with the IPv6 address 2001:0DB8:3000:3000::42 to be advertised as the candidate RP, with a priority of 0:

```
Router(config)# ipv6 pim bsr candidate rp 2001:0DB8:3000:3000::42 priority 0
```

The following example configures the router with the IPv6 address 2001:0DB8:1:1:1 as the candidate RP for scope 6 for the group ranges specified in the access list named list1:

```
Router(config)# ipv6 pim bsr candidate rp 2001:0DB8:1:1:1 group-list list1 scope 6
```

Related Commands	Command	Description
	ipv6 pim bsr candidate bsr	Configures a router as a candidate BSR.
	ipv6 pim bsr border	Configures a border for all BSMs of any scope.

ipv6 pim dr-priority

To configure the designated router (DR) priority on a Protocol Independent Multicast (PIM) router, use the **ipv6 pim dr-priority** command in interface configuration mode. To restore the default value, use the **no** form of this command.

ipv6 pim dr-priority *value*

no ipv6 pim dr-priority

Syntax Description

value An integer value to represent DR priority. Value range is from 0 to 4294967294. The default value is 1.

Command Default

Default value is 1.

Command Modes

Interface configuration

Command History

Release	Modification
12.3(2)T	This command was introduced.
12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S.
12.0(26)S	This command was integrated into Cisco IOS Release 12.0(26)S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(25)SG	This command was integrated into Cisco IOS Release 12.2(25)SG.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Usage Guidelines

The **ipv6 pim dr-priority** command configures the neighbor priority used for PIM DR election. The router with the highest DR priority on an interface becomes the PIM DR. If several routers have the same priority, then the router with the highest IPv6 address on the interface becomes the DR.

If a router does not include the DR priority option in its hello messages, then the router is considered to be the highest-priority router and becomes the DR. If several routers do not include the DR priority option in their hello messages, then the router with the highest IPv6 address becomes the DR.

Examples

The following example configures the router to use DR priority 3:

```
Router(config)# interface FastEthernet 1/0
Router(config-if)# ipv6 pim dr-priority 3
```

Related Commands

Command	Description
ipv6 pim hello-interval	Configures the frequency of PIM hello messages on an interface.

ipv6 pim hello-interval

To configure the frequency of Protocol Independent Multicast (PIM) hello messages on an interface, use the **ipv6 pim hello-interval** command in interface configuration mode. To return to the default interval, use the **no** form of this command.

ipv6 pim hello-interval *seconds*

no ipv6 pim hello-interval *seconds*

Syntax Description

<i>seconds</i>	Interval, in seconds, at which PIM hello messages are sent.
----------------	---

Command Default

Hello messages are sent at 30-second intervals with small random jitter.

Command Modes

Interface configuration

Command History

Release	Modification
12.3(2)T	This command was introduced.
12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S.
12.0(26)S	This command was integrated into Cisco IOS Release 12.0(26)S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(25)SG	This command was integrated into Cisco IOS Release 12.2(25)SG.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Usage Guidelines

Periodic hello messages are sent out at 30-second intervals with a small jitter. The **ipv6 pim hello-interval** command allows users to set a periodic interval.

Examples

The following example sets the PIM hello message interval to 45 seconds:

```
Router(config)# interface FastEthernet 1/0
Router(config-if)# ipv6 pim hello-interval 45
```

Related Commands

Command	Description
ipv6 mld query-interval	Configures the frequency at which the Cisco IOS software sends MLD host-query messages.

Command	Description
ipv6 pim dr-priority	Configures the DR priority on a PIM router.
show ipv6 pim neighbor	Displays the PIM neighbors discovered by the Cisco IOS software.

ipv6 pim join-prune-interval

To configure periodic join and prune announcement intervals for a specified interface, use the **ipv6 pim join-prune-interval** command in interface configuration mode. To return to the default value, use the **no** form of the command.

ipv6 pim join-prune-interval *seconds*

no ipv6 pim join-prune-interval *seconds*

Syntax Description

seconds The join and prune announcement intervals, in number of seconds. The default value is 60 seconds.

Command Default

The default is 60 seconds.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(26)S	This command was introduced.
12.3(4)T	This command was integrated into Cisco IOS Release 12.3(4)T.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(25)SG	This command was integrated into Cisco IOS Release 12.2(25)SG.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Usage Guidelines

Periodic join and prune announcements are sent out at 60-second intervals. The **ipv6 pim join-prune-interval** command allows users to set a periodic interval.

Examples

The following example sets the join and prune announcement intervals to 75 seconds:

```
Router(config)# interface FastEthernet 1/0
Router(config-if)# ipv6 pim join-prune-interval 75
```

ipv6 pim neighbor-filter list

To filter Protocol Independent Multicast (PIM) neighbor messages from specific IPv6 addresses, use the **ipv6 pim neighbor-filter list** command in the global configuration mode. To return to the router default, use the **no** form of this command.

```
ipv6 pim neighbor-filter list access-list
```

```
no ipv6 pim neighbor-filter list access-list
```

Syntax Description	<i>access-list</i>	Name of an IPv6 access list that denies PIM hello packets from a source.
---------------------------	--------------------	--

Command Default	PIM neighbor messages are not filtered.
------------------------	---

Command Modes	Global configuration
----------------------	----------------------

Command History	Release	Modification
	12.4(2)T	This command was introduced.

Usage Guidelines	The ipv6 pim neighbor-filter list command is used to prevent unauthorized routers on the LAN from becoming PIM neighbors. Hello messages from addresses specified in this command are ignored.
-------------------------	---

Examples	The following example causes PIM to ignore all hello messages from IPv6 address FE80::A8BB:CCFF:FE03:7200:
-----------------	--

```
Router(config)# ipv6 pim neighbor-filter list nbr_filter_acl
Router(config)# ipv6 access-list nbr_filter_acl
Router(config-ipv6-acl)# deny ipv6 host FE80::A8BB:CCFF:FE03:7200 any
Router(config-ipv6-acl)# permit any any
```

ipv6 pim rp embedded

To enable embedded rendezvous point (RP) support in IPv6 Protocol Independent Multicast (PIM), use the **ipv6 pim rp-embedded** command in global configuration mode. To disable embedded RP support, use the **no** form of this command.

ipv6 pim rp embedded

no ipv6 pim rp embedded

Syntax Description This command has no arguments or keywords.

Command Default Embedded RP support is enabled by default.

Command Modes Global configuration

Command History	Release	Modification
	12.0(26)S	This command was introduced.
	12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
	12.3(14)T	This command was integrated into Cisco IOS Release 12.3(14)T.
	12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
	12.2(25)SG	This command was integrated into Cisco IOS Release 12.2(25)SG.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
	12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
	Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Usage Guidelines Because embedded RP support is enabled by default, users will generally use the **no** form of this command to turn off embedded RP support.

The **ipv6 pim rp embedded** command applies only to the embedded RP group ranges ff7X::/16 and fffX::/16. When the router is enabled, it parses groups in the embedded RP group ranges ff7X::/16 and fffX::/16, and extracts the RP to be used from the group address.

Examples The following example disables embedded RP support in IPv6 PIM:

```
no ipv6 pim rp embedded
```

ipv6 pim rp-address

To configure the address of a Protocol Independent Multicast (PIM) rendezvous point (RP) for a particular group range, use the **ipv6 pim rp-address** command in global configuration mode. To remove an RP address, use the **no** form of this command.

ipv6 pim rp-address *ipv6-address* [*group-access-list*] [**bidir**]

no ipv6 pim rp-address *ipv6-address* [*group-access-list*] [**bidir**]

Syntax Description

<i>ipv6-address</i>	The IPv6 address of a router to be a PIM RP. The <i>ipv6-address</i> argument must be in the form documented in RFC 2373 where the address is specified in hexadecimal using 16-bit values between colons.
<i>group-access-list</i>	(Optional) Name of an access list that defines for which multicast groups the RP should be used. If the access list contains any group address ranges that overlap the assigned source-specific multicast (SSM) group address range (FF3x::/96), a warning message is displayed, and the overlapping ranges are ignored. If no access list is specified, the specified RP is used for all valid multicast non-SSM address ranges. To support embedded RP, the router configured as the RP must use a configured access list that permits the embedded RP group ranges derived from the embedded RP address. Note that the embedded RP group ranges need not include all the scopes (for example, 3 through 7).
bidir	(Optional) Indicates that the group range will be used for bidirectional shared-tree forwarding; otherwise, it will be used for sparse-mode forwarding. A single IPv6 address can be configured to be RP only for either bidirectional or sparse-mode group ranges. A single group-range list can be configured to operate either in bidirectional or sparse mode.

Command Default

No PIM RPs are preconfigured.
Embedded RP support is enabled by default when IPv6 PIM is enabled (where embedded RP support is provided).
Multicast groups operate in PIM sparse mode.

Command Modes

Global configuration

Command History

Release	Modification
12.3(2)T	This command was introduced.
12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S.
12.0(26)S	Embedded RP support was added.

Release	Modification
12.3(7)T	The bidir keyword was added to Cisco IOS Release 12.3(7)T.
12.2(25)S	The bidir keyword was added to Cisco IOS Release 12.2(25)S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(25)SG	This command was integrated into Cisco IOS Release 12.2(25)SG.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Usage Guidelines

When PIM is configured in sparse mode, you must choose one or more routers to operate as the RP. An RP is a single common root of a shared distribution tree and is statically configured on each router.

Where embedded RP support is available, only the RP needs to be statically configured as the RP for the embedded RP ranges. No additional configuration is needed on other IPv6 PIM routers. The other routers will discover the RP address from the IPv6 group address. If these routers want to select a static RP instead of the embedded RP, the specific embedded RP group range must be configured in the access list of the static RP.

The RP address is used by first-hop routers to send register packets on behalf of source multicast hosts. The RP address is also used by routers on behalf of multicast hosts that want to become members of a group. These routers send join and prune messages to the RP.

If the optional *group-access-list* argument is not specified, the RP is applied to the entire routable IPv6 multicast group range, excluding SSM, which ranges from FFX[3-f]::/8 to FF3X::/96. If the *group-access-list* argument is specified, the IPv6 address is the RP address for the group range specified in the *group-access-list* argument.

You can configure Cisco IOS software to use a single RP for more than one group. The conditions specified by the access list determine which groups the RP can be used for. If no access list is configured, the RP is used for all groups.

A PIM router can use multiple RPs, but only one per group.

Examples

The following example shows how to set the PIM RP address to 2001::10:10 for all multicast groups:

```
Router(config)# ipv6 pim rp-address 2001::10:10
```

The following example sets the PIM RP address to 2001::10:10 for the multicast group FF04::/64 only:

```
Router(config)# ipv6 access-list acc-grp-1
Router(config-ipv6-acl)# permit ipv6 any ff04::/64
Router(config)# ipv6 pim rp-address 2001::10:10 acc-grp-1
```

The following example shows how to configure a group access list that permits the embedded RP ranges derived from the IPv6 RP address 2001:0DB8:2::2:

```
Router(config)# ipv6 pim rp-address 2001:0DB8:2::2 embd-ranges
Router(config)# ipv6 access-list embd-ranges
Router(config-ipv6-acl)# permit ipv6 any ff73:240:2:2:2::/96
Router(config-ipv6-acl)# permit ipv6 any ff74:240:2:2:2::/96
Router(config-ipv6-acl)# permit ipv6 any ff75:240:2:2:2::/96
Router(config-ipv6-acl)# permit ipv6 any ff76:240:2:2:2::/96
Router(config-ipv6-acl)# permit ipv6 any ff77:240:2:2:2::/96
Router(config-ipv6-acl)# permit ipv6 any ff78:240:2:2:2::/96
```

The following example shows how to enable the address 100::1 as the bidirectional RP for the entries multicast range FF::/8:

```
ipv6 pim rp-address 100::1 bidir
```

In the following example, the IPv6 address 200::1 is enabled as the bidirectional RP for the ranges permitted by the access list named bidir-grps. The ranges permitted by this list are ff05::/16 and ff06::/16.

```
Router(config)# ipv6 access-list bidir-grps
Router(config-ipv6-acl)# permit ipv6 any ff05::/16
Router(config-ipv6-acl)# permit ipv6 any ff06::/16
Router(config-ipv6-acl)# exit
Router(config)# ipv6 pim rp-address 200::1 bidir-grps bidir
```

Related Commands

Command	Description
debug ipv6 pim df-election	Displays debug messages for PIM bidirectional DF-election message processing.
ipv6 access-list	Defines an IPv6 access list and places the router in IPv6 access list configuration mode.
show ipv6 pim df	Displays the DF -election state of each interface for each RP.
show ipv6 pim df winner	Displays the DF-election winner on each interface for each RP.

ipv6 pim spt-threshold infinity

To configure when a Protocol Independent Multicast (PIM) leaf router joins the shortest path tree (SPT) for the specified groups, use the **ipv6 pim spt-threshold infinity** command in global configuration mode. To restore the default value, use the **no** form of this command.

ipv6 pim spt-threshold infinity [**group-list** *access-list-name*]

no ipv6 pim spt-threshold infinity

Syntax Description

group-list <i>access-list-name</i>	(Optional) Indicates to which groups the threshold applies. Must be a standard IPv6 access list name. If the value is omitted, the threshold applies to all groups.
--	---

Command Default

When this command is not used, the PIM leaf router joins the SPT immediately after the first packet arrives from a new source. Once the router has joined the SPT, configuring the **ipv6 pim spt-threshold infinity** command will not cause it to switch to the shared tree.

Command Modes

Global configuration

Command History

Release	Modification
12.3(2)T	This command was introduced.
12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S.
12.0(26)S	This command was integrated into Cisco IOS Release 12.0(26)S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(25)SG	This command was integrated into Cisco IOS Release 12.2(25)SG.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Usage Guidelines

Using the **ipv6 pim spt-threshold infinity** command enables all sources for the specified groups to use the shared tree. The **group-list** keyword indicates to which groups the SPT threshold applies.

The *access-list-name* argument refers to an IPv6 access list. When the *access-list-name* argument is specified with a value of 0, or the **group-list** keyword is not used, the SPT threshold applies to all groups. The default setting (that is, when this command is not enabled) is to join the SPT immediately after the first packet arrives from a new source.

Examples

The following example configures a PIM last-hop router to stay on the shared tree and not switch to the SPT for the group range ff04::/64.:

```
Router(config)# ipv6 access-list acc-grp-1  
Router(config-ipv6-acl)# permit ipv6 any FF04::/64  
Router(config-ipv6-acl)# exit  
Router(config)# ipv6 pim spt-threshold infinity group-list acc-grp-1
```

ipv6 policy route-map

To configure IPv6 policy-based routing (PBR) on an interface, use the **ipv6 policy route-map** command in interface configuration mode. To disable PBR on an interface, use the **no** form of this command.

ipv6 policy route-map *route-map-name*

no ipv6 policy route-map *route-map-name*

Syntax Description

<i>route-map-name</i>	Name of the route map to use for PBR. The name must match a <i>map-tag</i> value specified by a route-map command.
-----------------------	---

Command Default

Policy routing does not occur on the interface.

Command Modes

Interface configuration

Command History

Release	Modification
12.3(7)T	This command was introduced.
12.2(30)S	This command was integrated into Cisco IOS Release 12.2(30)S.

Usage Guidelines

You could enable PBR if you want your packets to take a route other than the obvious shortest path.

The **ipv6 policy route-map** command identifies a route map to use for policy-based routing. The **route-map** commands each have a list of **match** and **set** commands associated with them. The **match** commands specify the match criteria—the conditions under which PBR is allowed for the interface. The **set** commands specify the set actions—the particular PBR actions to perform if the criteria enforced by the **match** commands are met. The **no ipv6 policy route-map** command deletes the pointer to the route map.

Policy-based routing can be performed on any match criteria that can be defined in an IPv6 access list.

Examples

In the following example, a route map named pbr-dest-1 is created and configured, specifying packet match criteria and desired policy-route action. Then, PBR is enabled on Ethernet interface 0/0:

```

ipv6 access-list match-dest-1
  permit ipv6 any 2001:1760::/32

route-map pbr-dest-1 permit 10
  match ipv6 address match-dest-1
  set interface Ethernet0/0

interface Ethernet0/0
  ipv6 policy-route-map pbr-dest-1
  
```

Related Commands

Command	Description
ipv6 local policy route-map	Identifies a route map to use for local IPv6 PBR.
match ipv6 address	Specifies an IPv6 access list to use to match packets for PBR for IPv6.
match length	Bases policy routing on the Level 3 length of a packet.
route-map (IP)	Define the conditions for redistributing routes from one routing protocol into another, or to enable policy routing.
set default interface	Indicates where to output packets that pass a match clause of a route map for policy routing and have no explicit route to the destination.
set interface	Indicates where to output packets that pass a match clause of a route map for policy routing.
set ipv6 default next-hop	Specifies an IPv6 default next hop to which matching packets will be forwarded.
set ipv6 next-hop	Indicates where to output IPv6 packets that pass a match clause of a route map for policy routing.
set ipv6 precedence	Sets the precedence value in the IPv6 packet header.

ipv6 port-map

To establish port-to-application mapping (PAM) for the system, use the **ipv6 port-map** command in global configuration mode. To delete user-defined PAM entries, use the **no** form of this command.

ipv6 port-map {*application* **port** *port-num* [**list** *acl-name*]}

no ipv6 port-map {*application* **port** *port-num* [**list** *acl-name*]}

Syntax Description

<i>application</i>	Specifies the predefined application that requires port mapping.
port <i>port-num</i>	Specifies a port number. The range is from 1 to 65535.
list <i>acl-name</i>	(Optional) Specifies the name of the IPv6 access list (ACL) associated with the port mapping.

Command Default

None

Command Modes

Global configuration

Command History

Release	Modification
12.3(11)T	This command was introduced.

Usage Guidelines

The **ipv6 port-map** command associates TCP or User Datagram Protocol (UDP) port numbers with applications or services, establishing a table of default port mapping information at the firewall. This information is used to support network environments that run services using ports that are different from the registered or well-known ports associated with a service or application.

The port mapping information in the PAM table is of one of three types:

- System-defined
- User-defined
- Host-specific

System-Defined Port Mapping

Initially, PAM creates a set of system-defined entries in the mapping table using well-known or registered port mapping information set up during the system start-up. The Cisco IOS Firewall Context-Based Access Control feature requires the system-defined mapping information to function properly. System-defined mapping information cannot be deleted or changed; that is, you cannot map HTTP services to port 21 (FTP) or FTP services to port 80 (HTTP).

[Table 33](#) lists the default system-defined services and applications in the PAM table.

Table 33 System-Defined Port Mapping

Application Name	Well-Known or Registered Port Number	Protocol Description
cuseeme	7648	CU-SeeMe Protocol
exec	512	Remote Process Execution
ftp	21	File Transfer Protocol (control port)
h323	1720	H.323 Protocol (for example, MS NetMeeting, Intel Video Phone)
http	80	Hypertext Transfer Protocol
login	513	Remote login
msrpc	135	Microsoft Remote Procedure Call
netshow	1755	Microsoft NetShow
real-audio-video	7070	RealAudio and RealVideo
sccp	2000	Skinny Client Control Protocol (SCCP)
smtp	25	Simple Mail Transfer Protocol (SMTP)
sql-net	1521	SQL-NET
streamworks	1558	StreamWorks Protocol
sunrpc	111	SUN Remote Procedure Call
tftp	69	Trivial File Transfer Protocol
vdolive	7000	VDOLive Protocol



Note

You can override the system-defined entries for a specific host or subnet using the **list** keyword in the **ipv6 port-map** command.

User-Defined Port Mapping

Network applications that use non-standard ports require user-defined entries in the mapping table. Use the **ipv6 port-map** command to create default user-defined entries in the PAM table.

To map a range of port numbers with a service or application, you must create a separate entry for each port number.



Note

If you try to map an application to a system-defined port, a message appears warning you of a mapping conflict.

Use the **no** form of the **ipv6 port-map** command to delete user-defined entries from the PAM table.

To overwrite an existing user-defined port mapping, use the **ipv6 port-map** command to associate another service or application with the specific port.

Host-Specific Port Mapping

User-defined entries in the mapping table can include host-specific mapping information, which establishes port mapping information for specific hosts or subnets. In some environments, it might be necessary to override the default port mapping information for a specific host or subnet, including a system-defined default port mapping information. Use the **list** keyword for the **ipv6 port-map** command to specify an ACL for a host or subnet that uses PAM.



Note

If the host-specific port mapping information is the same as existing system-defined or user-defined default entries, host-specific port changes have no effect.

Examples

The following user-defined port-mapping configuration map port 8080 to the HTTP application:

```
ipv6 port-map http port 8080
```

Host-specific port-mapping configuration maps port 2121 to the FTP application from a particular set of host. First, the user needs to create a permit IPv6 access list for the allowed host(s). In the following example, packets from the hosts in the 2001:0DB8:1:7 subset destined for port 2121 will be mapped to the FTP application:

```
Router(config)# ipv6 access-list ftp-host
Router(config-ipv6-acl)# permit 2001:0DB8:1:7::/64 any
```

The port-map configuration is then configured as follows:

```
Router(config)# ipv6 port-map ftp port 2121 list ftp-host
```

Related Commands

Command	Description
show ipv6 port-map	Displays IPv6 port-mapping information.

ipv6 prefix-list

To create an entry in an IPv6 prefix list, use the **ipv6 prefix-list** command in global configuration mode. To delete the entry, use the **no** form of this command.

```
ipv6 prefix-list list-name [seq seq-number] {deny ipv6-prefix/prefix-length | permit
ipv6-prefix/prefix-length | description text} [ge ge-value] [le le-value]
```

```
no ipv6 prefix-list list-name
```

Syntax Description	
<i>list-name</i>	Name of the prefix list (cannot be the same as an existing access list).
seq <i>seq-number</i>	(Optional) Sequence number of the prefix list entry being configured.
deny	Denies networks that matches the condition.
permit	Permits networks that matches the condition.
<i>ipv6-prefix</i>	The IPv6 network assigned to the specified prefix list. This argument must be in the form documented in RFC 2373 where the address is specified in hexadecimal using 16-bit values between colons.
<i>/prefix-length</i>	The length of the IPv6 prefix. A decimal value that indicates how many of the high-order contiguous bits of the address comprise the prefix (the network portion of the address). A slash mark must precede the decimal value.
description <i>text</i>	A description of the prefix list that can be up to 80 characters in length.
ge <i>ge-value</i>	(Optional) Specifies a prefix length greater than or equal to the <i>ipv6-prefix/prefix-length</i> arguments. It is the lowest value of a range of the <i>length</i> (the “from” portion of the length range).
le <i>le-value</i>	(Optional) Specifies a prefix length less than or equal to the <i>ipv6-prefix/prefix-length</i> arguments. It is the highest value of a range of the <i>length</i> (the “to” portion of the length range).

Command Default No prefix list is created.

Command Modes Global configuration

Command History	Release	Modification
	12.2(2)T	This command was introduced.
	12.0(21)ST	This command was integrated into Cisco IOS Release 12.0(21)ST.
	12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
	12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
	12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
	12.2(25)SG	This command was integrated into Cisco IOS Release 12.2(25)SG.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Release	Modification
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Usage Guidelines

The **ipv6 prefix-list** command is similar to the **ip prefix-list** command, except that it is IPv6-specific. To suppress networks from being advertised in updates, use the **distribute-list out** command.

The sequence number of a prefix list entry determines the order of the entries in the list. The router compares network addresses to the prefix list entries. The router begins the comparison at the top of the prefix list, with the entry having the lowest sequence number.

If multiple entries of a prefix list match a prefix, the entry with the lowest sequence number is considered the real match. Once a match or deny occurs, the router does not go through the rest of the prefix list. For efficiency, you may want to put the most common permits or denies near the top of the list, using the *seq-number* argument.

The **show ipv6 prefix-list** command displays the sequence numbers of entries.

IPv6 prefix lists are used to specify certain prefixes or a range of prefixes that must be matched before a permit or deny statement can be applied. Two operand keywords can be used to designate a range of prefix lengths to be matched. A prefix length of less than, or equal to, a value is configured with the **le** keyword. A prefix length greater than, or equal to, a value is specified using the **ge** keyword. The **ge** and **le** keywords can be used to specify the range of the prefix length to be matched in more detail than the usual *ipv6-prefix/prefix-length* argument. For a candidate prefix to match against a prefix list entry three conditions can exist:

- the candidate prefix must match the specified prefix list and prefix length entry
- the value of the optional **le** keyword specifies the range of allowed prefix lengths from the *prefix-length* argument up to, and including, the value of the **le** keyword
- the value of the optional **ge** keyword specifies the range of allowed prefix lengths from the value of the **ge** keyword up to, and including, 128.



Note

Note that the first condition must match before the other conditions take effect.

An exact match is assumed when the **ge** or **le** keywords are not specified. If only one keyword operand is specified then the condition for that keyword is applied, and the other condition is not applied. The *prefix-length* value must be less than the **ge** value. The **ge** value must be less than, or equal to, the **le** value. The **le** value must be less than or equal to 128.

Every IPv6 prefix list, including prefix lists that do not have any permit and deny condition statements, has an implicit deny any statement as its last match condition.

Examples

The following example denies all routes with a prefix of `::/0`.

```
Router(config)# ipv6 prefix-list abc deny ::/0
```

The following example permits the prefix `2002::/16`:

```
Router(config)# ipv6 prefix-list abc permit 2002::/16
```

The following example shows how to specify a group of prefixes to accept any prefixes from prefix 5F00::/48 up to and including prefix 5F00::/64.

```
Router(config)# ipv6 prefix-list abc permit 5F00::/48 le 64
```

The following example denies prefix lengths greater than 64 bits in routes that have the prefix 2001:0DB8::/64.

```
Router(config)# ipv6 prefix-list abc permit 2001:0DB8::/64 le 128
```

The following example permits mask lengths from 32 to 64 bits in all address space.

```
Router(config)# ipv6 prefix-list abc permit ::/0 ge 32 le 64
```

The following example denies mask lengths greater than 32 bits in all address space.

```
Router(config)# ipv6 prefix-list abc deny ::/0 ge 32
```

The following example denies all routes with a prefix of 2002::/128.

```
Router(config)# ipv6 prefix-list abc deny 2002::/128
```

The following example permits all routes with a prefix of ::/0.

```
Router(config)# ipv6 prefix-list abc permit ::/0
```

Related Commands

Command	Description
clear ipv6 prefix-list	Resets the hit count of the IPv6 prefix list entries.
distribute-list out	Suppresses networks from being advertised in updates.
ipv6 prefix-list sequence-number	Enables the generation of sequence numbers for entries in an IPv6 prefix list.
match ipv6 address	Distributes IPv6 routes that have a prefix permitted by a prefix list.
show ipv6 prefix-list	Displays information about an IPv6 prefix list or IPv6 prefix list entries.

ipv6 prefix-list sequence-number

To enable the generation of sequence numbers for entries in an IPv6 prefix list, use the **ipv6 prefix-list sequence-number** command in global configuration mode. To disable the generation of sequence numbers, use the **no** form of this command.

ipv6 prefix-list sequence-number

no ipv6 prefix-list sequence-number

Syntax Description This command has no arguments or keywords.

Command Default Sequence numbers are automatically generated for entries in an IPv6 prefix list.

Command Modes Global configuration

Command History	Release	Modification
	12.2(2)T	This command was introduced.
	12.0(21)ST	This command was integrated into Cisco IOS Release 12.0(21)ST.
	12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
	12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
	12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
	12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

Usage Guidelines To suppress sequence numbers use the **no ipv6 prefix-list sequence-number** command. If you disable the generation of sequence numbers in an IPv6 prefix list, you must specify the sequence number for each entry using the *seq-number* argument of the **ipv6 prefix-list** command.

The **show ipv6 prefix-list** command displays the sequence numbers of entries.

Examples The following example shows the automatic sequence number generation for entries in an IPv6 prefix list being disabled:

```
Router(config)# no ipv6 prefix-list sequence-number
```

Related Commands	Command	Description
	ipv6 prefix-list	Creates an entry in an IPv6 prefix list.
	show ipv6 prefix-list	Displays information about an IPv6 prefix list or IPv6 prefix list entries.

ipv6 redirects

To enable the sending of Internet Control Message Protocol (ICMP) IPv6 redirect messages if Cisco IOS software is forced to resend a packet through the same interface on which the packet was received, use the **ipv6 redirects** command in interface configuration mode. To disable the sending of redirect messages, use the **no** form of this command.

ipv6 redirects

no ipv6 redirects

Syntax Description This command has no arguments or keywords.

Command Default The sending of ICMP IPv6 redirect messages is enabled.

Command Modes Interface configuration

Command History	Release	Modification
	12.2(4)T	This command was introduced.
	12.0(21)ST	This command was integrated into Cisco IOS Release 12.0(21)ST.
	12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
	12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
	12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
	12.2(25)SG	This command was integrated into Cisco IOS Release 12.2(25)SG.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
	12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

Usage Guidelines The rate at which the router generates all IPv6 ICMP error messages can be limited by using the **ipv6 icmp error-interval** command.

Examples The following example disables the sending of ICMP IPv6 redirect messages on Ethernet interface 0 and reenables the messages on Ethernet interface 1:

```
Router(config)# interface ethernet 0
Router(config-if)# no ipv6 redirects
```

```
Router(config)# interface ethernet 1
Router(config-if)# ipv6 redirects
```

To verify whether the sending of IPv6 redirect messages is enabled or disabled on an interface, enter the **show ipv6 interface** command:

```
Router# show ipv6 interface
```

```

Ethernet0 is up, line protocol is up
  IPv6 is stalled, link-local address is FE80::1
  Global unicast address(es):
    2000::1, subnet is 2000::/64
    3000::1, subnet is 3000::/64
  Joined group address(es):
    FF02::1
    FF02::2
    FF02::1:FF00:1
  MTU is 1500 bytes
  ICMP error messages limited to one every 100 milliseconds
  ICMP redirects are disabled
  ND DAD is enabled, number of DAD attempts: 1
  ND reachable time is 30000 milliseconds
  ND advertised reachable time is 0 milliseconds
  ND advertised retransmit interval is 0 milliseconds
  ND router advertisements are sent every 200 seconds
  ND router advertisements live for 1800 seconds
  Hosts use stateless autoconfig for addresses.

```

```

Ethernet1 is up, line protocol is up
  IPv6 is stalled, link-local address is FE80::2
  Global unicast address(es):
    2000::2, subnet is 2000::/64
    3000::3, subnet is 3000::/64
  Joined group address(es):
    FF02::1
    FF02::2
    FF02::1:FF00:1
  MTU is 1500 bytes
  ICMP error messages limited to one every 100 milliseconds
  ICMP redirects are enabled
  ND DAD is disabled, number of DAD attempts: 0
  ND reachable time is 30000 milliseconds
  ND advertised reachable time is 0 milliseconds
  ND advertised retransmit interval is 0 milliseconds
  ND router advertisements are sent every 200 seconds
  ND router advertisements live for 1800 seconds
  Hosts use stateless autoconfig for addresses.

```

Related Commands

Command	Description
ipv6 icmp error-interval	Configures the interval for IPv6 ICMP error messages.

ipv6 rip default-information

To originate a default IPv6 route into the Routing Information Protocol (RIP), use the **ipv6 rip default-information** command in interface configuration mode. To remove the default IPv6 RIP route, use the **no** form of this command.

```
ipv6 rip name default-information {only | originate} [metric metric-value]
```

```
no ipv6 rip name default-information
```

Syntax Description

<i>name</i>	Name of the IPv6 RIP routing process.
only	Advertises the IPv6 default route (::/0) only. Suppresses the advertisement of all other routes.
originate	Advertises the IPv6 default route (::/0). The advertisement of other routes is unaffected.
metric <i>metric-value</i>	(Optional) Associates a metric with the default route. The <i>metric-value</i> range is from 1 through 15.

Command Default

Metric value is 1.

Command Modes

Interface configuration

Command History

Release	Modification
12.2(2)T	This command was introduced.
12.0(21)ST	This command was integrated into Cisco IOS Release 12.0(21)ST.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.3(14)T	The metric keyword and <i>metric-value</i> argument were added.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(25)SG	This command was integrated into Cisco IOS Release 12.2(25)SG.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Usage Guidelines

The **ipv6 rip default-information** command is similar to the **default-information originate** (RIP) command, except that it is IPv6-specific.

Originating a default IPv6 route into RIP also forces the advertisement of the route in router updates sent on the interface. The advertisement of the route occurs regardless of whether the route is present in the IPv6 routing table.

The **metric** *metric-value* keyword and argument allow more flexibility in topologies with multiple RIP routers on a LAN. For example, a user may want to configure one of many routers on a LAN as the preferred default router, so that all default route traffic will transit this router. This function can be achieved by configuring the preferred router to advertise a default route with a lower metric than the other routers on the network.



Note

To avoid routing loops after the IPv6 default route (::/0) is originated into a specified RIP routing process, the routing process ignores all default route information received in subsequent IPv6 RIP update messages.

Examples

The following example originates a default IPv6 route into RIP on Ethernet interface 0/0 and advertises only the default route in router updates sent on the interface:

```
Router(config)# interface ethernet 0/0
Router(config-if)# ipv6 rip cisco default-information only
```

The following example originates a default IPv6 route into RIP on Ethernet interface 0/0 and advertises the default route with all other routes in router updates sent on the interface:

```
Router(config)# interface ethernet 0/0
Router(config-if)# ipv6 rip cisco default-information originate
```

Related Commands

Command	Description
show ipv6 rip	Displays information about current IPv6 RIP processes.

ipv6 rip enable

To enable an IPv6 Routing Information Protocol (RIP) routing process on an interface, use the **ipv6 rip enable** command in interface configuration mode. To disable an IPv6 RIP routing process on an interface, use the **no** form of this command.

ipv6 rip *name* **enable**

no ipv6 rip *name*

Syntax Description

<i>name</i>	Name of the IPv6 RIP routing process.
-------------	---------------------------------------

Command Default

An IPv6 RIP routing process is not defined.

Command Modes

Interface configuration

Command History

Release	Modification
12.2(2)T	This command was introduced.
12.0(21)ST	This command was integrated into Cisco IOS Release 12.0(21)ST.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(25)SG	This command was integrated into Cisco IOS Release 12.2(25)SG.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Usage Guidelines

The **ipv6 rip enable** interface configuration command is used to enable IPv6 RIP explicitly on required interfaces. In IPv4, the **network** *network-number* router configuration command is used to implicitly specify the interfaces on which to run IPv4 RIP.

Examples

The following example enables the IPv6 RIP routing process named cisco on Ethernet interface 0/0:

```
Router(config)# interface ethernet 0/0
Router(config-if)# ipv6 rip cisco enable
```

Related Commands

Command	Description
show ipv6 rip	Displays information about current IPv6 RIP processes.

ipv6 rip metric-offset

To set the IPv6 Routing Information Protocol (RIP) metric for an interface, use the **ipv6 rip metric-offset** command in interface configuration mode. To return the metric to its default value, use the **no** form of this command.

ipv6 rip *word* **metric-offset** *value*

no ipv6 rip *word* **metric-offset**

Syntax Description

<i>word</i>	Name of the IPv6 RIP routing process.
<i>value</i>	Value added to the metric of an IPv6 RIP route received in a report message. A number from 1 to 16.

Command Default

The default metric value is 1.

Command Modes

Interface configuration

Command History

Release	Modification
12.2(2)T	This command was introduced.
12.0(21)ST	This command was integrated into Cisco IOS Release 12.0(21)ST.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(25)SG	This command was integrated into Cisco IOS Release 12.2(25)SG.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

Usage Guidelines

When an IPv6 RIP route is received, the interface metric value set by the **ipv6 rip metric-offset** command is added before the route is inserted into the routing table. Therefore, increasing the IPv6 RIP metric value of an interface increases the metric value of IPv6 RIP routes received over the interface.

Use the **ipv6 rip metric-offset** command to influence which routes are used, as you prefer. The IPv6 RIP metric is in hop count.

Examples

The following example configures a metric increment of 10 for the RIP routing process named cisco on Ethernet interface 0/0:

```
Router(config)# interface ethernet 0/0
Router(config-if)# ipv6 rip cisco metric-offset 10
```

Related Commands

Command	Description
show ipv6 rip	Displays information about current IPv6 RIP processes.

ipv6 rip summary-address

To configure IPv6 Routing Information Protocol (RIP) to advertise summarized IPv6 addresses on an interface and to specify the IPv6 prefix that identifies the routes to be summarized, use the **ipv6 rip summary-address** command in interface configuration mode. To stop the advertising of the summarized IPv6 addresses, use the **no** form of this command.

ipv6 rip *word* **summary-address** *ipv6-prefix/prefix-length*

no ipv6 rip *word* **summary-address**

Syntax Description

<i>word</i>	Name of the IPv6 RIP routing process.
<i>ipv6-prefix</i>	Specifies an IPv6 network number as the summary address. This argument must be in the form documented in RFC 2373 where the address is specified in hexadecimal using 16-bit values between colons.
<i>prefix-length</i>	The length of the IPv6 prefix. A decimal value that indicates how many of the high-order contiguous bits of the address comprise the prefix (the network portion of the address). A slash mark must precede the decimal value.

Command Default

No default behavior or values.

Command Modes

Interface configuration

Command History

Release	Modification
12.2(2)T	This command was introduced.
12.0(21)ST	This command was integrated into Cisco IOS Release 12.0(21)ST.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(25)SG	This command was integrated into Cisco IOS Release 12.2(25)SG.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

Usage Guidelines

The **ipv6 rip summary-address** command is similar to the **ip summary-address rip** command, except that it is IPv6-specific.

Use the **ipv6 rip summary-address** command to force IPv6 RIP to advertise specific networks on specific interfaces (assuming that routes to those networks exist).

If the first bits of the prefix length for a route match the value specified for the *ipv6-prefix* argument, the prefix specified in the *ipv6-prefix* argument is advertised instead of the route. As a result, multiple routes can be replaced by a single route whose metric is the lowest metric of the multiple routes.

Examples

In the following example, the IPv6 address 2001:0DB8:0:1:260:3EFF:FE11:6770 that is assigned to Ethernet interface 0/0 with an IPv6 prefix length of 64 bits is summarized as IPv6 prefix 2001:0DB8::/35 for the IPv6 RIP routing process named cisco:

```
Router(config)# interface ethernet 0/0
Router(config-if)# ipv6 address 2001:0DB8:0:1:260:3EFF:FE11:6770 /64
Router(config-if)# ipv6 rip cisco summary-address 2001:0DB8::/35
```



Note

A route advertisement that is suppressed as a result of split horizon is not considered by RIP when RIP is deciding whether to advertise a summary route.

Related Commands

Command	Description
poison-reverse (IPv6 RIP)	Configures the poison reverse processing of IPv6 RIP router updates.
show ipv6 rip	Displays information about current IPv6 RIP processes.

ipv6 route

To establish static IPv6 routes, use the **ipv6 route** command in global configuration mode. To remove a previously configured static route, use the **no** form of this command.

```
ipv6 route [vrf vrf-name] ipv6-prefix/prefix-length {ipv6-address | interface-type interface-number [ipv6-address]} [nexthop-vrf [vrf-name1 | default]] [administrative-distance] [administrative-multicast-distance | unicast | multicast] [next-hop-address] [tag tag]
```

```
no ipv6 route [vrf vrf-name] ipv6-prefix/prefix-length {ipv6-address | interface-type interface-number [ipv6-address]} [nexthop-vrf [vrf-name1 | default]] [administrative-distance] [administrative-multicast-distance | unicast | multicast] [next-hop-address] [tag tag]
```

Syntax Description

<i>ipv6-prefix</i>	The IPv6 network that is the destination of the static route. Can also be a host name when static host routes are configured.
<i>/prefix-length</i>	The length of the IPv6 prefix. A decimal value that indicates how many of the high-order contiguous bits of the address comprise the prefix (the network portion of the address). A slash mark must precede the decimal value.
vrf	(Optional) Specifies all virtual private network (VPN) routing/forwarding instance (VRF) tables or a specific VRF table for IPv4 or IPv6 address.
<i>vrf-name</i>	(Optional) Names a specific VRF table for an IPv4 or IPv6 address.
<i>ipv6-address</i>	The IPv6 address of the next hop that can be used to reach the specified network. The IPv6 address of the next hop need not be directly connected; recursion is done to find the IPv6 address of the directly connected next hop. When an interface type and interface number are specified, you can optionally specify the IPv6 address of the next hop to which packets are output. Note You must specify an interface type and an interface number when using a link-local address as the next hop (the link-local next hop must also be an adjacent router). This argument must be in the form documented in RFC 2373 where the address is specified in hexadecimal using 16-bit values between colons.
<i>interface-type</i>	Interface type. For more information about supported interface types, use the question mark (?) online help function. You can use the <i>interface-type</i> argument to direct static routes out point-to-point interfaces (such as serial or tunnel interfaces) and broadcast interfaces (such as Ethernet interfaces). When using the <i>interface-type</i> argument with point-to-point interfaces, there is no need to specify the IPv6 address of the next hop. When using the <i>interface-type</i> argument with broadcast interfaces, you should always specify the IPv6 address of the next hop or ensure that the specified prefix is assigned to the link. A link-local address should be specified as the next hop for broadcast interfaces.
<i>interface-number</i>	Interface number. For more information about the numbering syntax for supported interface types, use the question mark (?) online help function.

nexthop-vrf	(Optional) Indicator that the next hop is a VRF.
<i>vrf-name l</i>	(Optional) Name of the next-hop VRF.
default	(Optional) Indicator that the next hop is the default.
<i>administrative-distance</i>	(Optional) An administrative distance. The default value is 1, which gives static routes precedence over any other type of route except connected routes.
<i>administrative-multicast-distance</i>	(Optional) The distance used when selecting this route for multicast Reverse Path Forwarding (RPF).
unicast	(Optional) Specifies a route that must not be used in multicast RPF selection.
multicast	(Optional) Specifies a route that must not be populated in the unicast Routing Information Base (RIB).
<i>next-hop-address</i>	(Optional) Address of the next hop that can be used to reach the specified network.
tag tag	(Optional) Tag value that can be used as a “match” value for controlling redistribution via route maps.

Command Default

No static routes are established.

Command Modes

Global configuration

Command History

Release	Modification
12.2(2)T	This command was introduced.
12.2(4)T	The optional <i>ipv6-address</i> argument was added.
12.0(21)ST	This command was integrated into Cisco IOS Release 12.0(21)ST.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.0(26)S	The optional unicast and multicast keywords and <i>administrative-multicast-distance</i> argument were added.
12.3(4)T	The optional unicast and multicast keywords and <i>administrative-multicast-distance</i> argument were added.
12.2(25)S	The optional unicast and multicast keywords and <i>administrative-multicast-distance</i> argument were added.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(25)SG	This command was integrated into Cisco IOS Release 12.2(25)SG.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRB	The optional vrf and nexthop-vrf keywords, and <i>vrf-name</i> and <i>next-hop-address</i> arguments were added.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

Release	Modification
Cisco IOS XE Release 2.1	This command was introduced on Cisco ASR 1000 series routers.
12.2(33)XNE	This command was modified. It was integrated into Cisco IOS Release 12.2(33)XNE.

Usage Guidelines

Use the **ipv6 route** command to implement static multicast routes in IPv6. For a static multicast route, the IPv6 address of the next-hop router must be provided. The *administrative-multicast-distance* argument determines the distance that will be used when selecting this route for RPF. When the **unicast** keyword is used, this route will not be used in multicast RPF selection.

When the **ipv6 route** command is used with the **multicast** keyword, the route will not be populated in the unicast RIB. When the optional *administrative-multicast-distance* argument is not specified, the multicast RPF administrative distance defaults to the same value as that determined by the *administrative-distance* argument.

Examples

The following example shows a static route that applies to unicast routing only:

```
ipv6 route 2001::/64 5::5 100 unicast
```

The following example shows a static route used only for multicast RPF selection:

```
ipv6 route 2001::/64 7::7 100 multicast
```

The following example shows a static route used for both unicast routing and multicast RPF selection:

```
ipv6 route 2001::/64 6::6 100
```

The following example shows a static route used for both unicast routing and multicast RPF selection, but with different administrative distances:

```
ipv6 route 10::/64 7::7 100 200
```

The following example configures a static route for use in VPN for IPv6:

```
ipv6 route vrf red 4004::/64 pos 1/0
```

The following example configures a static default route within a VRF. Use of the **global** keyword in this static route provides access to the Internet:

```
ipv6 route vrf red ::0/0 7007::1 global
```

Related Commands

Command	Description
show ipv6 route	Displays the current contents of the IPv6 routing table.
show ipv6 route summary	Displays the current contents of the IPv6 routing table in summary format.
show ipv6 rpf	Displays RPF information for a given unicast host address and prefix.

ipv6 route static bfd

To specify static route Bidirectional Forwarding Detection for IPv6 (BFDv6) neighbors, use the **ipv6 route static bfd** command in global configuration mode. To remove a static route BFD neighbor, use the **no** form of this command.

```
ipv6 route static bfd [vrf vrf-name] interface-type interface-number ipv6-address [unassociated]
```

```
no ipv6 route static bfd
```

Syntax Description		
vrf <i>vrf-name</i>	(Optional) Name of the virtual routing and forwarding (VRF) instance by which static routes should be specified.	
<i>interface-type</i> <i>interface-number</i>	Interface type and number.	
<i>ipv6-address</i>	IPv6 address of the neighbor.	
unassociated	(Optional) Moves a static BFD neighbor from associated mode to unassociated mode.	

Command Default No static BFDv6 neighbors are specified.

Command Modes Global configuration (config#)

Command History	Release	Modification
	Cisco IOS XE Release 2.1	This command was introduced.

Usage Guidelines Use the **ipv6 route static bfd** command to specify static route neighbors. All of the static routes that have the same interface and gateway specified in the configuration share the same BFDv6 session for reachability notification. BFDv6 requires that BFDv6 sessions are initiated on both endpoint routers. Therefore, this command must be configured on each endpoint router. An IPv6 static BFDv6 neighbor must be fully specified (with the interface and the neighbor address) and must be directly attached.

All static routes that specify the same values for **vrf vrf-name**, *interface-type interface-number*, and *ipv6-address* will automatically use BFDv6 to determine gateway reachability and take advantage of fast failure detection.

Examples The following example creates a neighbor on Ethernet 0/0 with an address of 2001::1:

```
Router(global)# ipv6 route static bfd ethernet 0/0 2001::1
```

The following example converts the neighbor to unassociated mode:

```
Router(global)# ipv6 route static bfd ethernet 0/0 2001::1 unassociated
```

Related Commands

Command	Description
show ipv6 static	Displays the current contents of the IPv6 routing table.

ipv6 router eigrp

To place the router in router configuration mode, create an Enhanced Interior Gateway Routing Protocol (EIGRP) routing process in IPv6, and configure this process, use the **ipv6 router eigrp** command in global configuration mode. To shut down a routing process, use the **no** form of this command.

```
ipv6 router eigrp as-number [eigrp event-log-size event-log-size]
```

```
no ipv6 router eigrp as-number
```

Syntax Description

<i>as-number</i>	Autonomous system number.
eigrp event-log-size <i>event-log-size</i>	(Optional) Memory allocation value of the EIGRP event. The <i>event-log-size</i> value is the memory allocation, in bytes, calculated dynamically based on available memory. The <i>event-log-size</i> value is between 0 and the dynamically calculated number.

Command Default

This command is disabled by default.

Command Modes

Global configuration

Command History

Release	Modification
12.4(6)T	This command was introduced.
12.2(33)SRB	The eigrp event-log-size keyword and <i>event-log-size</i> argument were added.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Usage Guidelines

Use the **ipv6 router eigrp** command in global configuration mode to place the router in router configuration mode and create a routing process. Once in router configuration mode, you can configure the EIGRP for IPv6 routing process using the **ipv6 router eigrp** command.

Examples

The following example places the router in router configuration mode and allows you to configure an EIGRP for IPv6 routing process:

```
Router(config)# ipv6 router eigrp 400

  eigrp router-id 10.13.14.15
  eigrp stub connected summary
  eigrp event-log-size 1000
  no shutdown
```

Related Commands

Command	Description
ipv6 eigrp	Enables EIGRP for IPv6 on a specified interface.
router eigrp	Configures the EIGRP process.

ipv6 router isis

To configure an Intermediate System-to-Intermediate System (IS-IS) routing process for IPv6 on an interface and to attach an area designator to the routing process, use the **ipv6 router isis** command in interface configuration mode. To disable IS-IS for IPv6, use the **no** form of the command.

ipv6 router isis *area-name*

no ipv6 router isis *area-name*

Syntax Description

<i>area-name</i>	Meaningful name for a routing process. If a name is not specified, a null name is assumed and the process is referenced with a null name. This name must be unique among all IP or Connectionless Network Service (CLNS) router processes for a given router. Required for multiarea IS-IS configuration. Each area in a multiarea configuration should have a nonnull area name to facilitate identification of the area. Optional for conventional IS-IS configuration.
------------------	--

Command Default

No routing processes are specified.

Command Modes

Interface configuration

Command History

Release	Modification
12.2(8)T	This command was introduced.
12.0(21)ST	This command was integrated into Cisco IOS Release 12.0(21)ST.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(25)SG	This command was integrated into Cisco IOS Release 12.2(25)SG.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
Cisco IOS XE Release 2.4	This command was introduced on Cisco ASR 1000 Series Routers.

Usage Guidelines

Before the IPv6 IS-IS routing process can be configured, IPv6 routing must be enabled using the **ipv6 unicast-routing** global configuration command, and an IPv6 address must be configured on an interface using either the **ipv6 enable** interface configuration command or the **ipv6 address** interface configuration command. The **ipv6 enable** command will automatically configure an IPv6 link-local address on the interface.

Examples

The following example specifies IS-IS as an IPv6 routing protocol for a process named Finance. The Finance process will run over the Fast Ethernet interface 0/1.

```
Router(config)# router isis Finance
Router(config-router)# net 49.0001.aaaa.aaaa.aaaa.00
Router(config-router)# exit
Router(config)# interface FastEthernet 0/1
Router(config-if)# ipv6 router isis Finance
```

Related Commands

Command	Description
ipv6 address link-local	Configures an IPv6 link-local address for an interface and enables IPv6 processing on the interface.
ipv6 enable	Enables an interface for IPv6 processing and automatically assigns an IPv6 link-local address on the interface.
ipv6 unicast-routing	Enables the forwarding of IPv6 unicast datagrams.
net	Configures an IS-IS NET for a CLNS routing process.
router isis	Enables the IPv4 IS-IS routing protocol.

ipv6 router nemo

To enable the network mobility (NEMO) routing process on the home agent and place the router in router configuration mode, use the **ipv6 router nemo** command in global configuration mode. To disable this function, use the **no** form of the command.

ipv6 router nemo

no ipv6 router nemo

Syntax Description This command has no arguments or keywords.

Command Default The NEMO routing process is not enabled on the home agent.

Command Modes Global configuration (config)

Command History	Release	Modification
	12.4(20)T	This command was introduced.

Usage Guidelines This command enables the NEMO routing process on the home agent.

Examples In the following example, NEMO is enabled on the home agent:

```
Router(config)# ipv6 router nemo
```

ipv6 router ospf

To enable Open Shortest Path First (OSPF) for IPv6 router configuration mode, use the **ipv6 router ospf** command in global configuration mode.

ipv6 router ospf *process-id*

Syntax Description

<i>process-id</i>	Internal identification. It is locally assigned and can be a positive integer from 1 to 65535. The number used here is the number assigned administratively when enabling the OSPF for IPv6 routing process.
-------------------	--

Command Default

No OSPF for IPv6 routing process is defined.

Command Modes

Global configuration

Command History

Release	Modification
12.0(24)S	This command was introduced.
12.2(15)T	This command was integrated into Cisco IOS Release 12.2(15)T.
12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(25)SG	This command was integrated into Cisco IOS Release 12.2(25)SG.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.
15.0(1)M	This command was modified. It was integrated into Cisco IOS Release 15.0(1)M.
12.2(33)XNE	This command was modified. It was integrated into Cisco IOS Release 12.2(33)XNE.

Usage Guidelines

Use this command to enter the OSPF for IPv6 router configuration mode. From this mode, you can enter several commands to customize OSPF for IPv6.

Examples

The following example enables router OSPF for IPv6 configuration mode and identifies the process with the number 1:

```
ipv6 router ospf 1
```

ipv6 router rip

To configure an IPv6 Routing Information Protocol (RIP) routing process, use the **ipv6 router rip** command in global configuration mode. To remove a routing process, use the **no** form of this command.

ipv6 router rip *word*

no ipv6 router rip *word*

Syntax Description	<i>word</i>	A word that describes the routing process.
---------------------------	-------------	--

Command Default	No IPv6 RIP routing process is defined.
------------------------	---

Command Modes	Global configuration
----------------------	----------------------

Command History	Release	Modification
	12.2(2)T	This command was introduced.
	12.0(21)ST	This command was integrated into Cisco IOS Release 12.0(21)ST.
	12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
	12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
	12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
	12.2(25)SG	This command was integrated into Cisco IOS Release 12.2(25)SG.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
	12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
	Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Usage Guidelines	<p>The ipv6 router rip command is similar to the router rip command, except that it is IPv6-specific.</p> <p>Use this command to enable an IPv6 RIP routing process. Configuring this command places the router in router configuration mode for the IPv6 RIP routing process. The router prompt changes to Router(config-rtr-rip)#.</p>
-------------------------	--

Examples	<p>The following example configures the IPv6 RIP routing process named cisco and places the router in router configuration mode for the IPv6 RIP routing process:</p>
-----------------	---

```
Router(config)# ipv6 router rip cisco
```

Related Commands	Command	Description
	ipv6 rip enable	Enables an IPv6 RIP routing process on an interface.

ipv6 source-route

To enable processing of the IPv6 type 0 routing header (the IPv6 source routing header), use the **ipv6 source-route** command in global configuration mode. To disable the processing of this IPv6 extension header, use the **no** form of this command.

ipv6 source-route

no ipv6 source-route

Syntax Description

This command has no arguments or keywords.

Command Default

The **no** version of the **ipv6 source-route** command is the default. When the router receives a packet with a type 0 routing header, the router drops the packet and sends an IPv6 Internet Control Message Protocol (ICMP) error message back to the source and logs an appropriate debug message.

Command Modes

Global configuration

Command History

Release	Modification
12.3(4)T	This command was introduced.
12.2(33)SRB1	This command was integrated into Cisco IOS Release 12.2(33)SRB1.
12.4(15)T	The default was changed to be the no version of the ipv6 source-route command. When the router receives a packet with a type 0 routing header, the router drops the packet and sends an IPv6 ICMP error message back to the source and logs an appropriate debug message.
12.2(33)SRC	Changes made to this command were integrated into Cisco IOS 12.2(33)SRC.
Cisco IOS XE Release 2.5	This command was updated. It was integrated into Cisco IOS XE Release 2.5.

Usage Guidelines

The default was changed to be the **no** version of the **ipv6 source-route** command, which means this functionality is not enabled. Before this change, this functionality was enabled automatically. User who had configured the **no ipv6 source-route** command before the default was changed will continue to see this configuration in their **show config** command output, even though the **no** version of the command is the default.

The **no ipv6 source-route** command (which is the default) prevents hosts from performing source routing using your routers. When the **no ipv6 source-route** command is configured and the router receives a packet with a type0 source routing header, the router drops the packet and sends an IPv6 ICMP error message back to the source and logs an appropriate debug message.

In IPv6, source routing is performed only by the destination of the packet. Therefore, in order to stop source routing from occurring inside your network, you need to configure an IPv6 access control list (ACL) that includes the following rule:

```
deny ipv6 any any routing
```

The rate at which the router generates all IPv6 ICMP error messages can be limited by using the **ipv6 icmp error-interval** command.

Examples

The following example disables the processing of IPv6 type 0 routing headers:

```
no ipv6 source-route
```

Related Commands

Command	Description
deny (IPv6)	Sets deny conditions for an IPv6 access list.
ipv6 icmp error-interval	Configures the interval for IPv6 ICMP error messages.

ipv6 split-horizon eigrp

To enable Enhanced Interior Gateway Routing Protocol (EIGRP) for IPv6 split horizon, use the **ipv6 split-horizon eigrp** command in interface configuration mode. To disable split horizon, use the **no** form of this command.

ipv6 split-horizon eigrp *as-number*

no ipv6 split-horizon eigrp *as-number*

Syntax Description

as-number Autonomous system number.

Command Default

EIGRP for IPv6 split horizon is enabled.

Command Modes

Interface configuration

Command History

Release	Modification
12.4(6)T	This command was introduced.
12.2(33)SRB	This command was integrated into Cisco IOS Release 12.2(33)SRB.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
Cisco IOS XE Release 2.1	This command was introduced on Cisco ASR 1000 Series Routers.

Usage Guidelines

For networks that include links over X.25 packet-switched networks (PSNs), you can use the **neighbor** command in router configuration mode to disable the split horizon feature. Or, you can specify the **no ipv6 split-horizon eigrp** command in your configuration. However, if you do disable the split horizon feature, you must similarly disable split horizon for all routers and access servers in any relevant multicast groups on that network.



Note

In general, we recommend that you not change the default state of split horizon unless you are certain that your application requires the change in order to advertise routes properly. Remember that if split horizon is disabled on a serial interface and that interface is attached to a packet-switched network, you must disable split horizon for all routers and access servers in any relevant multicast groups on that network.

Examples

The following example disables split horizon on a serial link connected to an X.25 network:

```
interface serial 0
 encapsulation x25
 no ipv6 split-horizon eigrp 101
```

Related Commands

Command	Description
neighbor (EIGRP)	Defines a neighboring router with which to exchange routing information on a router that is running EIGRP.
