



## OSPFv3 Address Families

The Open Shortest Path First version 3 (OSPFv3) address families feature enables both IPv4 and IPv6 unicast traffic to be supported. With this feature, users may have two processes per interface, but only one process per address family (AF).

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## Prerequisites for OSPFv3 Address Families

- To use the IPv4 unicast address families (AF) in OSPFv3, you must enable IPv6 on a link, although the link may not be participating in IPv6 unicast AF.
- With the OSPFv3 Address Families feature, users may have two processes per interface, but only one process per AF. If the AF is IPv4, an IPv4 address must first be configured on the interface, but IPv6 must be enabled on the interface.

## Information About OSPFv3 Address Families

### OSPFv3 Address Families

The OSPFv3 address families feature enables both IPv4 and IPv6 unicast traffic to be supported. With this feature, users may have two processes per interface, but only one process per AF. If the IPv4 AF is used, an IPv4 address must first be configured on the interface, but IPv6 must be enabled on the interface. A single IPv4 or IPv6 OSPFv3 process running multiple instances on the same interface is not supported.

Users with an IPv6 network that uses OSPFv3 as its IGP may want to use the same IGP to help carry and install IPv4 routes. All devices on this network have an IPv6 forwarding stack. Some (or all) of the links on this network may be allowed to do IPv4 forwarding and be configured with IPv4 addresses. Pockets of IPv4-only devices exist around the edges running an IPv4 static or dynamic routing protocol. In this scenario,

users need the ability to forward IPv4 traffic between these pockets without tunneling overhead, which means that any IPv4 transit device has both IPv4 and IPv6 forwarding stacks (e.g., is dual stack).

This feature allows a separate (possibly incongruent) topology to be constructed for the IPv4 AF. It installs IPv4 routes in IPv4 RIB, and then the forwarding occurs natively. The OSPFv3 process fully supports an IPv4 AF topology and can redistribute routes from and into any other IPv4 routing protocol.

An OSPFv3 process can be configured to be either IPv4 or IPv6. The **address-family** command is used to determine which AF will run in the OSPFv3 process, and only one address family can be configured per instance. Once the AF is selected, users can enable multiple instances on a link and enable address-family-specific commands.

Different instance ID ranges are used for each AF. Each AF establishes different adjacencies, has a different link state database, and computes a different shortest path tree. The AF then installs the routes in AF-specific RIB. LSAs that carry IPv6 unicast prefixes are used without any modification in different instances to carry each AFs' prefixes.

The IPv4 subnets configured on OSPFv3-enabled interfaces are advertised through intra-area prefix LSAs, just as any IPv6 prefixes. External LSAs are used to advertise IPv4 routes redistributed from any IPv4 routing protocol, including connected and static. The IPv4 OSPFv3 process runs the SPF calculations and finds the shortest path to those IPv4 destinations. These computed routes are then inserted in the IPv4 RIB (computed routes are inserted into an IPv6 RIB for an IPv6 AF).

Because the IPv4 OSPFv3 process allocates a unique pdbindex in the IPv4 RIB, all other IPv4 routing protocols can redistribute routes from it. The parse chain for all protocols is same, so the **ospfv3** keyword added to the list of IPv4 routing protocols causes OSPFv3 to appear in the **redistribute** command from any IPv4 routing protocol. With the **ospfv3** keyword, IPv4 OSPFv3 routes can be redistributed into any other IPv4 routing protocol as defined in the **redistribute ospfv3** command.

Third-party devices will not neighbor with devices running the AF feature for the IPv4 AF because they do not set the AF bit. Therefore, those devices will not participate in the IPv4 AF SPF calculations and will not install the IPv4 OSPFv3 routes in the IPv6 RIB.

# How to Configure OSPFv3 Address Families

## Configuring the OSPFv3 Router Process

Once you have completed step 3 and entered OSPFv3 router configuration mode, you can perform any of the subsequent steps in this task as needed to perform OSPFv3 device configuration.

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router ospfv3** [*process-id*]
4. **area** *area-ID* [**default-cost** | **nssa** | **stub**]
5. **auto-cost reference-bandwidth** *Mbps*
6. **bfd all-interfaces** [**strict-mode**]
7. **default** {**area** *area-ID*[**range** *ipv6-prefix* | **virtual-link** *router-id*]} [**default-information originate** [**always** | **metric** | **metric-type** | **route-map**] | **distance** | **distribute-list** *prefix-list prefix-list-name* {**in** | **out**} [*interface*] | **maximum-paths** *paths* | **redistribute** *protocol* | **summary-prefix** *ipv6-prefix*]

8. **ignore-lsa mospf**
9. **interface-id snmp-if-index**
10. **log-adjacency-changes [detail]**
11. **passive-interface [default | interface-type interface-number]**
12. **queue-depth {hello | update} {queue-size | unlimited}**
13. **router-id {router-id}**

## DETAILED STEPS

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <b>Example:</b> <pre>Device&gt; enable</pre>	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b> <pre>Device# configure terminal</pre>	Enters global configuration mode.
<b>Step 3</b>	<b>router ospfv3 [process-id]</b> <b>Example:</b> <pre>Device(config)# router ospfv3 1</pre>	Enables OSPFv3 router configuration mode for the IPv4 or IPv6 address family.
<b>Step 4</b>	<b>area area-ID [default-cost   nssa   stub]</b> <b>Example:</b> <pre>Device(config-router)# area 1</pre>	Configures the OSPFv3 area.
<b>Step 5</b>	<b>auto-cost reference-bandwidth Mbps</b> <b>Example:</b> <pre>Device(config-router)# auto-cost reference-bandwidth 1000</pre>	Controls the reference value OSPFv3 uses when calculating metrics for interfaces in an IPv4 OSPFv3 process.
<b>Step 6</b>	<b>bfd all-interfaces [strict-mode]</b> <b>Example:</b> <pre>Device(config-router)# bfd all-interfaces</pre>	Enables BFD for an OSPFv3 routing process <b>[strict-mode]</b> - BFD session is established in the strict-mode. In the strict-mode, the OSPF session is not established till the BFD session is established.
<b>Step 7</b>	<b>default {area area-ID[range ipv6-prefix   virtual-link router-id]} [default-information originate [always   metric   metric-type   route-map]   distance   distribute-list prefix-list prefix-list-name {in   out}</b>	Returns an OSPFv3 parameter to its default value.

	Command or Action	Purpose
	<code>[interface]   maximum-paths <i>paths</i>   redistribute <i>protocol</i>   summary-prefix <i>ipv6-prefix</i></code> <b>Example:</b> <code>Device(config-router)# default area 1</code>	
<b>Step 8</b>	<b>ignore lsa mospf</b> <b>Example:</b> <code>Device(config-router)# ignore lsa mospf</code>	Suppresses the sending of syslog messages when the device receives LSA Type 6 multicast OSPFv3 packets, which are unsupported.
<b>Step 9</b>	<b>interface-id snmp-if-index</b> <b>Example:</b> <code>Device(config-router)# interface-id snmp-if-index</code>	Configures OSPFv3 interfaces with Simple Network Management Protocol (SNMP) MIB-II interface Index (ifIndex) identification numbers in IPv4 and IPv6.
<b>Step 10</b>	<b>log-adjacency-changes [detail]</b> <b>Example:</b> <code>Device(config-router)# log-adjacency-changes</code>	Configures the router to send a syslog message when an OSPFv3 neighbor goes up or down.
<b>Step 11</b>	<b>passive-interface [default   interface-type interface-number]</b> <b>Example:</b> <code>Device(config-router)# passive-interface default</code>	Suppresses sending routing updates on an interface when using an IPv4 OSPFv3 process.
<b>Step 12</b>	<b>queue-depth {hello   update} {queue-size   unlimited}</b> <b>Example:</b> <code>Device(config-router)# queue-depth update 1500</code>	Configures the number of incoming packets that the IPv4 OSPFv3 process can keep in its queue.
<b>Step 13</b>	<b>router-id {router-id}</b> <b>Example:</b> <code>Device(config-router)# router-id 10.1.1.1</code>	Use a fixed device ID.

## Configuring the IPv6 Address Family in OSPFv3

Perform this task to configure the IPv6 address family in OSPFv3. Once you have completed step 4 and entered IPv6 address-family configuration mode, you can perform any of the subsequent steps in this task as needed to configure the IPv6 AF.

### SUMMARY STEPS

1. **enable**

2. **configure terminal**
3. **router ospfv3** [*process-id*]
4. **address-family ipv6 unicast**
5. **area** *area-ID* **range** *ipv6-prefix / prefix-length*
6. **default** {**area** *area-ID*[**range** *ipv6-prefix* | **virtual-link** *router-id*]} [**default-information originate** [**always** | **metric** | **metric-type** | **route-map**] | **distance** | **distribute-list** *prefix-list prefix-list-name* {**in** | **out**} [*interface*] | **maximum-paths** *paths* | **redistribute** *protocol* | **summary-prefix** *ipv6-prefix*]
7. **default-information originate** [**always** | **metric** *metric-value* | **metric-type** *type-value*] **route-map** *map-name*]
8. **default-metric** *metric-value*
9. **distance** *distance*
10. **distribute-list prefix-list** *list-name* {**in**[*interface-type interface-number*] | **out** *routing-process* [*as-number*]}
11. **maximum-paths** *number-paths*
12. **summary-prefix** *prefix* [**not-advertise** | **tag** *tag-value*]

## DETAILED STEPS

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <b>Example:</b> <pre>Router&gt; enable</pre>	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b> <pre>Router# configure terminal</pre>	Enters global configuration mode.
<b>Step 3</b>	<b>router ospfv3</b> [ <i>process-id</i> ] <b>Example:</b> <pre>Router(config)# router ospfv3 1</pre>	Enables OSPFv3 router configuration mode for the IPv4 or IPv6 address family.
<b>Step 4</b>	<b>address-family ipv6 unicast</b> <b>Example:</b>  <b>Example:</b> or <b>Example:</b>  <pre>address-family ipv4</pre>	Enters IPv6 address family configuration mode for OSPFv3. or Enters IPv4 address family configuration mode for OSPFv3.

	Command or Action	Purpose
	<p><b>unicast</b></p> <p><b>Example:</b></p> <pre>Router(config-router)# address-family ipv6 unicast</pre> <p><b>Example:</b></p> <p><b>Example:</b></p> <p>or</p> <p><b>Example:</b></p> <pre>Router(config-router)# address-family ipv4 unicast</pre>	
<b>Step 5</b>	<p><b>area</b> <i>area-ID</i> <b>range</b> <i>ipv6-prefix / prefix-length</i></p> <p><b>Example:</b></p> <pre>Router(config-router-af)# area 1 range 2001:DB8:0:0::0/128</pre>	Configures OSPFv3 area parameters.
<b>Step 6</b>	<p><b>default</b> {<b>area</b> <i>area-ID</i>[<b>range</b> <i>ipv6-prefix</i>   <b>virtual-link</b> <i>router-id</i>]} [<b>default-information originate</b> [<b>always</b>   <b>metric</b>   <b>metric-type</b>   <b>route-map</b>]   <b>distance</b>   <b>distribute-list</b> <i>prefix-list prefix-list-name</i> {<b>in</b>   <b>out</b>} [<i>interface</i>]   <b>maximum-paths</b> <i>paths</i>   <b>redistribute</b> <i>protocol</i>   <b>summary-prefix</b> <i>ipv6-prefix</i>]</p> <p><b>Example:</b></p> <pre>Router(config-router-af)# default area 1</pre>	Returns an OSPFv3 parameter to its default value.
<b>Step 7</b>	<p><b>default-information originate</b> [<b>always</b>   <b>metric</b> <i>metric-value</i>   <b>metric-type</b> <i>type-value</i>   <b>route-map</b> <i>map-name</i>]</p> <p><b>Example:</b></p> <pre>Router(config-router-af)# default-information originate always metric 100 metric-type 2</pre>	Generates a default external route into an OSPFv3 for a routing domain.
<b>Step 8</b>	<p><b>default-metric</b> <i>metric-value</i></p> <p><b>Example:</b></p> <pre>Router(config-router-af)# default-metric 10</pre>	Sets default metric values for IPv4 and IPv6 routes redistributed into the OSPFv3 routing protocol.
<b>Step 9</b>	<p><b>distance</b> <i>distance</i></p> <p><b>Example:</b></p>	Configures an administrative distance for OSPFv3 routes inserted into the routing table.

	Command or Action	Purpose
	<code>Router(config-router-af)# distance 200</code>	
<b>Step 10</b>	<b>distribute-list prefix-list</b> <i>list-name</i> { <b>in</b> [ <i>interface-type interface-number</i> ]   <b>out</b> <i>routing-process [as-number]</i> }  <b>Example:</b>  <code>Router(config-router-af)# distribute-list prefix-list PL1 in Ethernet0/0</code>	Applies a prefix list to OSPFv3 routing updates that are received or sent on an interface.
<b>Step 11</b>	<b>maximum-paths</b> <i>number-paths</i>  <b>Example:</b>  <code>Router(config-router-af)# maximum-paths 4</code>	Controls the maximum number of equal-cost routes that a process for OSPFv3 routing can support.
<b>Step 12</b>	<b>summary-prefix</b> <i>prefix</i> [ <b>not-advertise</b>   <b>tag</b> <i>tag-value</i> ]  <b>Example:</b>  <code>Router(config-router-af)# summary-prefix FEC0::/24</code>	Configures an IPv6 summary prefix in OSPFv3.

## Configuring the IPv4 Address Family in OSPFv3

Perform this task to configure the IPv4 address family in OSPFv3. Once you have completed step 4 and entered IPv4 address-family configuration mode, you can perform any of the subsequent steps in this task as needed to configure the IPv4 AF.

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router ospfv3** [*process-id*]
4. **address-family ipv4 unicast**
5. **area** *area-id* **range** *ip-address ip-address-mask* [**advertise** | **not-advertise**] [**cost** *cost*]
6. **default** {**area** *area-ID* [**range** *ipv6-prefix* | **virtual-link** *router-id*]} [**default-information originate** [**always** | **metric** | **metric-type** | **route-map**] | **distance** | **distribute-list** *prefix-list prefix-list-name* {**in** | **out**} [*interface*] | **maximum-paths** *paths* | **redistribute** *protocol* | **summary-prefix** *ipv6-prefix*]
7. **default-information originate** [**always** | **metric** *metric-value* | **metric-type** *type-value*] **route-map** *map-name*]
8. **default-metric** *metric-value*
9. **distance** *distance*
10. **distribute-list prefix-list** *list-name* {**in**[*interface-type interface-number*] | **out** *routing-process [as-number]*}
11. **maximum-paths** *number-paths*
12. **summary-prefix** *prefix* [**not-advertise** | **tag** *tag-value*]

## DETAILED STEPS

## Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <b>Example:</b> <pre>Device&gt; enable</pre>	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b> <pre>Device# configure terminal</pre>	Enters global configuration mode.
<b>Step 3</b>	<b>router ospfv3</b> [ <i>process-id</i> ] <b>Example:</b> <pre>Device(config)# router ospfv3 1</pre>	Enables OSPFv3 router configuration mode for the IPv4 or IPv6 address family.
<b>Step 4</b>	<b>address-family ipv4 unicast</b> <b>Example:</b> <pre>Device(config-router)# address-family ipv4 unicast</pre>	Enters IPv4 address family configuration mode for OSPFv3.
<b>Step 5</b>	<b>area</b> <i>area-id</i> <b>range</b> <i>ip-address ip-address-mask</i> [ <b>advertise</b>   <b>not-advertise</b> ] [ <b>cost</b> <i>cost</i> ] <b>Example:</b> <pre>Device(config-router-af)# area 0 range 192.168.110.0 255.255.0.0</pre>	Consolidates and summarizes routes at an area boundary.
<b>Step 6</b>	<b>default</b> { <b>area</b> <i>area-ID</i> [ <b>range</b> <i>ipv6-prefix</i>   <b>virtual-link</b> <i>router-id</i> ]} [ <b>default-information originate</b> [ <b>always</b>   <b>metric</b>   <b>metric-type</b>   <b>route-map</b> ]   <b>distance</b>   <b>distribute-list</b> <i>prefix-list prefix-list-name</i> { <b>in</b>   <b>out</b> } [ <i>interface</i> ]   <b>maximum-paths</b> <i>paths</i>   <b>redistribute</b> <i>protocol</i>   <b>summary-prefix</b> <i>ipv6-prefix</i> ] <b>Example:</b> <pre>Device(config-router-af)# default area 1</pre>	Returns an OSPFv3 parameter to its default value.
<b>Step 7</b>	<b>default-information originate</b> [ <b>always</b>   <b>metric</b> <i>metric-value</i>   <b>metric-type</b> <i>type-value</i>   <b>route-map</b> <i>map-name</i> ] <b>Example:</b>	Generates a default external route into an OSPFv3 for a routing domain.



	Command or Action	Purpose
	Device(config-router-af)# default-information originate always metric 100 metric-type 2	
<b>Step 8</b>	<b>default-metric</b> <i>metric-value</i> <b>Example:</b> Device(config-router-af)# default-metric 10	Sets default metric values for IPv4 and IPv6 routes redistributed into the OSPFv3 routing protocol.
<b>Step 9</b>	<b>distance</b> <i>distance</i> <b>Example:</b> Device(config-router-af)# distance 200	Configures an administrative distance for OSPFv3 routes inserted into the routing table.
<b>Step 10</b>	<b>distribute-list prefix-list</b> <i>list-name</i> { <b>in</b> [ <i>interface-type interface-number</i> ]   <b>out</b> <i>routing-process</i> [ <i>as-number</i> ]} <b>Example:</b> Device(config-router-af)# distribute-list prefix-list PL1 in Ethernet0/0	Applies a prefix list to OSPFv3 routing updates that are received or sent on an interface.
<b>Step 11</b>	<b>maximum-paths</b> <i>number-paths</i> <b>Example:</b> Device(config-router-af)# maximum-paths 4	Controls the maximum number of equal-cost routes that a process for OSPFv3 routing can support.
<b>Step 12</b>	<b>summary-prefix</b> <i>prefix</i> [ <b>not-advertise</b>   <b>tag</b> <i>tag-value</i> ] <b>Example:</b> Device(config-router-af)# summary-prefix FEC0::/24	Configures an IPv6 summary prefix in OSPFv3.

## Configuring Route Redistribution in OSPFv3

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router ospfv3** [*process-id*]
4. **address-family ipv6 unicast**
5. **redistribute** *source-protocol* [*process-id*] [*options*]

## DETAILED STEPS

## Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <b>Example:</b> <pre>Router&gt; enable</pre>	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b> <pre>Router# configure terminal</pre>	Enters global configuration mode.
<b>Step 3</b>	<b>router ospfv3</b> [ <i>process-id</i> ] <b>Example:</b> <pre>Router(config)# router ospfv3 1</pre>	Enables OSPFv3 router configuration mode for the IPv4 or IPv6 address family.
<b>Step 4</b>	<b>address-family ipv6 unicast</b> <b>Example:</b>  <b>Example:</b> <pre>or</pre> <b>Example:</b>  <pre>address-family ipv4 unicast</pre> <b>Example:</b> <pre>Router(config-router)# address-family ipv6 unicast</pre> <b>Example:</b>  <b>Example:</b> <pre>or</pre> <b>Example:</b> <pre>Router(config-router)# address-family ipv4 unicast</pre>	Enters IPv6 address family configuration mode for OSPFv3. or Enters IPv4 address family configuration mode for OSPFv3.

	Command or Action	Purpose
<b>Step 5</b>	<b>redistribute</b> <i>source-protocol</i> [ <i>process-id</i> ] [ <i>options</i> ] <b>Example:</b>	Redistributes IPv6 and IPv4 routes from one routing domain into another routing domain.

## Enabling OSPFv3 on an Interface

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *type number*
4. Do one of the following:
  - **ospfv3** *process-id* **area** *area-ID* {**ipv4** | **ipv6**} [**instance** *instance-id*]
  - **ipv6 ospf** *process-id* **area** *area-id* [**instance** *instance-id*]

### DETAILED STEPS

#### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <b>Example:</b>  Device> enable	Enables privileged EXEC mode.  • Enter your password if prompted.
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b>  Device# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>interface</b> <i>type number</i> <b>Example:</b>  Device(config)# interface ethernet 0/0	Specifies an interface type and number, and places the device in interface configuration mode.
<b>Step 4</b>	Do one of the following:  • <b>ospfv3</b> <i>process-id</i> <b>area</b> <i>area-ID</i> { <b>ipv4</b>   <b>ipv6</b> } [ <b>instance</b> <i>instance-id</i> ] • <b>ipv6 ospf</b> <i>process-id</i> <b>area</b> <i>area-id</i> [ <b>instance</b> <i>instance-id</i> ] <b>Example:</b>  Device(config-if)# ospfv3 1 area 1 ipv4	Enables OSPFv3 on an interface with the IPv4 or IPv6 AF. or Enables OSPFv3 on an interface.

	Command or Action	Purpose
	<b>Example:</b>  Device(config-if)# ipv6 ospf 1 area 0	

## Defining an OSPFv3 Area Range for the IPv6 or IPv4 Address Family

The cost of the summarized routes will be the highest cost of the routes being summarized. For example, if the following routes are summarized:

```
OI 2001:DB8:0:7::/64 [110/20]
    via FE80::A8BB:CCFF:FE00:6F00, GigabitEthernet0/0/0
OI 2001:DB8:0:8::/64 [110/100]
    via FE80::A8BB:CCFF:FE00:6F00, GigabitEthernet0/0/0
OI 2001:DB8:0:9::/64 [110/20]
    via FE80::A8BB:CCFF:FE00:6F00, GigabitEthernet0/0/0
```

They become one summarized route, as follows:

```
OI 2001:DB8::/48 [110/100]
    via FE80::A8BB:CCFF:FE00:6F00, GigabitEthernet0/0/0
```

### Before you begin

OSPFv3 routing must be enabled.

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router ospfv3** [*process-id*]
4. **address-family ipv6 unicast**
5. **area** *area-ID* **range** *ipv6-prefix*

### DETAILED STEPS

#### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b>  Router> enable	Enables privileged EXEC mode.  <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b>  Router# configure terminal	Enters global configuration mode.

	Command or Action	Purpose
<b>Step 3</b>	<b>router ospfv3</b> [ <i>process-id</i> ] <b>Example:</b> <pre>Router(config)# router ospfv3 1</pre>	Enables OSPFv3 router configuration mode for the IPv4 or IPv6 address family.
<b>Step 4</b>	<b>address-family ipv6 unicast</b> <b>Example:</b>  <b>Example:</b>  or <b>Example:</b>  <pre>address-family ipv4 unicast</pre> <b>Example:</b> <pre>Router(config-router)# address-family ipv6 unicast</pre> <b>Example:</b>  <b>Example:</b>  or <b>Example:</b> <pre>Router(config-router)# address-family ipv4 unicast</pre>	Enters IPv6 address family configuration mode for OSPFv3. or Enters IPv4 address family configuration mode for OSPFv3.
<b>Step 5</b>	<b>area</b> <i>area-ID</i> <b>range</b> <i>ipv6-prefix</i> <b>Example:</b> <pre>Router(config-router-af)# area 1 range 2001:DB8:0:0::0/128</pre>	Configures OSPFv3 area parameters.

## Defining an OSPFv3 Area Range

This task can be performed in releases prior to Cisco IOS XE Release 3.4S.

### SUMMARY STEPS

1. **enable**
2. **configure terminal**

3. **ipv6 router ospf** *process-id*
4. **area** *area-id* **range** *ipv6-prefix / prefix-length* **advertise** | **not-advertise** [**cost** *cost*]

## DETAILED STEPS

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b> Router# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>ipv6 router ospf</b> <i>process-id</i> <b>Example:</b> Router(config)# ipv6 router ospf 1	Enables OSPFv3 router configuration mode.
<b>Step 4</b>	<b>area</b> <i>area-id</i> <b>range</b> <i>ipv6-prefix / prefix-length</i> <b>advertise</b>   <b>not-advertise</b> [ <b>cost</b> <i>cost</i> ] <b>Example:</b> Router(config-rtr)# area 1 range 2001:DB8::/48	Consolidates and summarizes routes at an area boundary.

# Configuration Examples for OSPFv3 Address Families

## Example: Configuring OSPFv3 Address Families

```

Device# show ospfv3
Routing Process "ospfv3 1" with ID 10.0.0.1
Supports IPv6 Address Family
Event-log enabled, Maximum number of events: 1000, Mode: cyclic
Initial SPF schedule delay 5000 msecs
Minimum hold time between two consecutive SPF's 10000 msecs
Maximum wait time between two consecutive SPF's 10000 msecs
Minimum LSA interval 5 secs
Minimum LSA arrival 1000 msecs
LSA group pacing timer 240 secs
Interface flood pacing timer 33 msecs
Retransmission pacing timer 66 msecs
Number of external LSA 0. Checksum Sum 0x000000
Number of areas in this router is 0. 0 normal 0 stub 0 nssa
Graceful restart helper support enabled

```

```

Reference bandwidth unit is 100 mbps
Relay willingness value is 128
Pushback timer value is 2000 msec
Relay acknowledgement timer value is 1000 msec
LSA cache Disabled : current count 0, maximum 1000
ACK cache Disabled : current count 0, maximum 1000
Selective Peering is not enabled
Hello requests and responses will be sent multicast

```

## Additional References

### Related Documents

Related Topic	Document Title
IPv6 addressing and connectivity	<i>IPv6 Configuration Guide</i>
Cisco IOS commands	<a href="#">Cisco IOS Master Commands List, All Releases</a>
IPv6 commands	<a href="#">Cisco IOS IPv6 Command Reference</a>
Cisco IOS IPv6 features	<a href="#">Cisco IOS IPv6 Feature Mapping</a>
OSPFv3 Address Families	“OSPF Forwarding Address Suppression in Translated Type-5 LSAs” module

### Standards and RFCs

Standard/RFC	Title
RFCs for IPv6	IPv6 RFCs

### MIBs

MIB	MIBs Link
	<p>To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL:</p> <p><a href="http://www.cisco.com/go/mibs">http://www.cisco.com/go/mibs</a></p>

**Technical Assistance**

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	<a href="http://www.cisco.com/cisco/web/support/index.html">http://www.cisco.com/cisco/web/support/index.html</a>

## Feature Information for OSPFv3 Address Families

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to [www.cisco.com/go/cfn](http://www.cisco.com/go/cfn). An account on Cisco.com is not required.



**Table 1: Feature Information for OSPFv3 Address Families**

Feature Name	Releases	Feature Information
OSPFv3 Address Families	Cisco IOS XE Release 3.4S	

Feature Name	Releases	Feature Information
		<p>The OSPFv3 address families feature enables IPv4 and IPv6 unicast traffic to be supported with a single network topology.</p> <p>The following commands were introduced or modified:</p> <p><b>address-family ipv4 (OSPFv3), address-family ipv6 (OSPFv3), area (OSPFv3), auto-cost (OSPFv3), bfd all-interfaces (OSPFv3), clear ospfv3 counters, clear ospfv3 force-spf, clear ospfv3 process, clear ospfv3 redistribution, clear ospfv3 traffic, debug ospfv3, debug ospfv3 database-timer rate-limit, debug ospfv3 events, debug ospfv3 lsd, debug ospfv3 packet, debug ospfv3 spf statistic, default (OSPFv3), default-information originate (OSPFv3), default-metric (OSPFv3), distance (OSPFv3), distribute-list prefix-list (OSPFv3), event-log (OSPFv3), log-adjacency-changes (OSPFv3), maximum-paths (OSPFv3), ospfv3 area, ospfv3 authentication, ospfv3 bfd, ospfv3 cost, ospfv3 database-filter, ospfv3 dead-interval, ospfv3 demand-circuit, ospfv3 encryption, ospfv3 flood-reduction, ospfv3 hello-interval, ospfv3 mtu-ignore, ospfv3 network, ospfv3 priority, ospfv3 retransmit-interval, ospfv3 transmit-delay, passive-interface (OSPFv3), queue-depth (OSPFv3), redistribute (OSPFv3), router ospfv3, router-id (OSPFv3), show ospfv3 border-routers, show ospfv3 database, show ospfv3 events, show ospfv3 flood-list, show ospfv3 graceful-restart, show ospfv3 interface, show ospfv3 max-metric, show ospfv3 neighbor, show ospfv3 request-list, show ospfv3</b></p>

Feature Name	Releases	Feature Information
		retransmission-list, show ospfv3 statistics, show ospfv3 summary-prefix, show ospfv3 timers rate-limit, show ospfv3 traffic, show ospfv3 virtual-links, summary-prefix (OSPFv3), timers pacing flood (OSPFv3), timers pacing lsa-group (OSPFv3), timers pacing retransmission (OSPFv3).

**Table 2: Feature Information for OSPFv3 Address Families**

Feature Name	Releases	Feature Information
OSPFv3 Address Families	Cisco IOS XE Release 17.4	This feature was introduced.

