



## Enabling OSPFv2 on an Interface Basis

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This document describes how to enable Open Shortest Path First version 2 (OSPFv2) on a per-interface basis to simplify the configuration of unnumbered interfaces. The **ip ospf area** command allows you to enable OSPFv2 explicitly on an interface. The **ip ospf area** command is an alternative to enabling OSPFv2 through the address of the interface that matches the address range specified by the **network area** command.

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## Prerequisites for Enabling OSPFv2 on an Interface Basis

OSPFv2 must be running on your network.

## Restrictions on Enabling OSPFv2 on an Interface Basis

The **ip ospf area** command is supported only for OSPFv2.

## Information About Enabling OSPFv2 on an Interface Basis

### Benefits of Enabling OSPFv2 on an Interface Basis

OSPF is enabled on an interface when the network address for the interface matches the range of addresses that is specified by the **network area** command, which is entered in router configuration mode. Alternatively, you can enable OSPFv2 explicitly on an interface by using the **ip ospf area** command, which is entered in interface configuration mode. This capability simplifies the configuration of unnumbered interfaces with different areas.

Because the **ip ospf area** command is configured explicitly for an interface, it supersedes the effects of the **network area** command, which is entered at the network level to affect the interfaces whose addresses fall within the address range specified for the **network area** command.

If you later disable the **ip ospf area** command, the interface still will run OSPFv2 as long as its network address matches the range of addresses that is specified by the **network area** command.

## Implications of Configuring OSPFv2 On a Router Basis or an Interface Basis

Before you use the **ip ospf area** command to enable OSPFv2 on an interface, we recommend that you understand the following scenarios and command behavior. There are implications to using the **network area** command (configuring OSPFv2 in router configuration mode) versus using the **ip ospf area** command (configuring OSPFv2 in interface configuration mode).

### Interface Is Already OSPFv2-Enabled by network area Command with Same Area and Process

If you enter the **ip ospf area** command on an interface that is enabled in OSPFv2 by the **network area** command, the process ID or area ID of the interface does not change, and the interface status will not be changed. However, the interface will be flagged as being configured from interface configuration mode, and the configuration data will be saved in the interface description block (IDB).

### Interface Is Already Configured by network area Command with Different Area or Process

If you enter the **ip ospf area** command on an interface that is enabled in OSPFv2 by the **network area** command, but you change the configuration by changing the process ID and area ID of the interface, after the new configuration information is stored in the IDB, the interface will be removed and reattached. Therefore, the interface will be removed from the original area and process and be added to the new ones. The state of the interface will also be reset.

### Interface Is Not Configured by network area Command

If the interface is not enabled in OSPFv2 by the **network area** command, the area and OSPF router instance will be created if needed. When the router is reloaded, the OSPF process will not begin running until system initialization is complete. To remove an OSPF router instance, enter the **no router ospf** command. Removing the **ip ospf area** command in interface mode will not result in removing an OSPF router instance.

### Removing an ip ospf area Command

When the **ip ospf area** command is removed, the interface will be detached from the area. The area will be removed if it has no other attached interfaces. If the interface address is covered by the **network area** command, the interface will be enabled once again in the area for the network that it is in.

### New Processes

If an OSPF process does not already exist, and a router ID cannot be chosen when either the **router ospf** command or the **interface** command is configured, a Proximity Database (PDB) and a process will be created, but the process will be inactive. The process will become active when a router ID is chosen, either when it is explicitly configured using the **router-id** command or when an IP address becomes available. Note that the **router ospf** command will now be accepted even if a router ID cannot be chosen, putting the command-line interface (CLI) into the OSPF configuration context. Therefore, the **router-id** command is to be entered before an IP address is available. If the process is not active and the **show ip ospf** command is entered, the message "%OSPF: Router process X is not running, please provide a router-id" will be displayed.

**Link-State Advertisements and Shortest Path First**

If a state change occurs as a result of the **ip ospf area** command, new router link-state advertisements (LSAs) will be generated (also for the old area, if the interface is changing areas) and shortest path first (SPF) will be scheduled to run in both the old and new areas.

# How to Enable OSPFv2 on an Interface Basis

## Enabling OSPFv2 on an Interface

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *type* *number*
4. **ip ospf** *process-id* **area** *area-id* [**secondaries none**]
5. **end**
6. **show ip ospf interface** [*type -number*]

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<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>
Step 2	<b>configure terminal</b> <b>Example:</b> <pre>Device# configure terminal</pre>	Enters global configuration mode.
Step 3	<b>interface</b> <i>type</i> <i>number</i> <b>Example:</b> <pre>Device(config)# interface GigabitEthernet 0/2/1</pre>	Configures an interface type and enters interface configuration mode.
Step 4	<b>ip ospf</b> <i>process-id</i> <b>area</b> <i>area-id</i> [ <b>secondaries none</b> ] <b>Example:</b> <pre>Device(config-if)# ip ospf 1 area 0 secondaries none</pre>	Enables OSPFv2 on an interface. <ul style="list-style-type: none"> <li>• To prevent secondary IP addresses on the interface from being advertised, you must enter the optional <b>secondaries</b> keyword followed by the <b>none</b> keyword.</li> </ul>
Step 5	<b>end</b> <b>Example:</b>	Exits interface configuration mode and returns to privileged EXEC mode.

	Command or Action	Purpose
	Device(config-if)# end	
<b>Step 6</b>	<b>show ip ospf interface</b> [ <i>type -number</i> ]  <b>Example:</b>  Device# show ip ospf interface GigabitEthernet 0/2/1	Displays OSPF-related interface information.  <ul style="list-style-type: none"> <li>Once you have enabled OSPFv2 on the interface, you can enter the <b>show ip ospf interface</b> command to verify the configuration.</li> </ul>

## Configuration Example for Enabling OSPFv2 on an Interface

### Example Enabling OSPFv2 on an Interface

In the following example, OSPFv2 is configured explicitly on GigabitEthernet interface 0/0/0:

```
Device(config)# interface GigabitEthernet 0/2/1
Device(config-if)# bandwidth 10000
Device(config-if)# ip address 172.16.1.1 255.255.255.0
Device(config-if)# ip ospf hello-interval 1
Device(config-if)# ip ospf 1 area 0
```

When the **show ip ospf interface** command is entered, the following output shows that GigabitEthernet interface 0/0/0 was configured in interface configuration mode to run OSPFv2. The secondary IP addresses on the interface will also be advertised:

```
Device# show ip ospf interface GigabitEthernet 0/2/1
GigabitEthernet0/0/0 is up, line protocol is up
  Internet Address 172.16.1.1/24, Area 0
  Process ID 1, Router ID 172.16.11.11, Network Type BROADCAST, Cost: 10
  Enabled by interface config, including secondary ip addresses
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 172.16.11.11, Interface address 172.16.1.1
  Backup Designated router (ID) 172.16.22.11, Interface address 172.16.1.2
  Timer intervals configured, Hello 1, Dead 4, Wait 4, Retransmit 5
    oob-resync timeout 40
    Hello due in 00:00:00
  Supports Link-local Signaling (LLS)
  Index 2/2, flood queue length 0
  Next 0x0(0)/0x0(0)
  Last flood scan length is 1, maximum is 1
  Last flood scan time is 0 msec, maximum is 0 msec
  Neighbor Count is 1, Adjacent neighbor count is 1
    Adjacent with neighbor 172.26.22.11 (Backup Designated Router)
  Suppress hello for 0 neighbor(s)
```

## Additional References

The following sections provide references related to enabling OSPFv2 on an interface.

**Related Documents**

Related Topic	Document Title
Configuring OSPF	Configuring OSPF
OSPF commands	<i>Cisco IOS IP Routing: OSPF Command Reference</i>
Cisco IOS master command list, all releases	<a href="#">Cisco IOS Master Command List, All Releases</a>

**Standards**

Standard	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	--

**MIBs**

MIB	MIBs Link
No new or modified MIBs are supported by this feature, and support for existing MIBs has not been modified by this feature.	To locate and download MIBs for selected platforms, Cisco IOS XE releases, and feature sets, use Cisco MIB Locator found at the following URL:  <a href="http://www.cisco.com/go/mibs">http://www.cisco.com/go/mibs</a>

**RFCs**

RFC	Title
RFC 2328	<i>OSPF Version 2</i>

**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 Enabling OSPFv2 on an Interface Basis

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 Enabling OSPFv2 on an Interface Basis**

Feature Name	Releases	Feature Information
Enabling OSPFv2 on an Interface Basis  <b>Note</b> This feature was originally named "Area Command in Interface Mode for OSPFv2."	Cisco IOS XE Release 2.1	This document describes how to enable OSPFv2 on a per-interface basis to simplify the configuration of unnumbered interfaces. The <b>ip ospf area</b> command allows you to enable OSPFv2 explicitly on an interface. The <b>ip ospf area</b> command is an alternative to enabling OSPFv2 through the address of the interface that matches the address range specified by the <b>network area</b> command.  The following commands are introduced or modified in the feature documented in this module: <ul style="list-style-type: none"> <li>• <b>ip ospf area.</b></li> </ul>

**Table 2: Feature Information for Enabling OSPFv2 on an Interface Basis**

Feature Name	Releases	Feature Information
Enabling OSPFv2 on an Interface Basis  <b>Note</b> This feature was originally named "Area Command in Interface Mode for OSPFv2."	Cisco IOS XE Release 17.4	This feature was introduced.