

## Objective

This tech note outlines the main differences in Open Shortest Path First Version 2 (OSPFv2) support between Cisco® NX-OS Software and Cisco IOS® Software. Sample configurations are included for Cisco NX-OS and Cisco IOS Software for some common features to demonstrate the similarities and differences. Please refer to the Cisco NX-OS documentation on Cisco.com for a complete list of supported features.

([http://www.cisco.com/en/US/products/ps9402/products\\_installation\\_and\\_configuration\\_guides\\_list.html](http://www.cisco.com/en/US/products/ps9402/products_installation_and_configuration_guides_list.html))

## OSPF Overview

OSPFv2 is an IETF ([RFC 2328](#)) standards-based dynamic link-state routing protocol used to exchange network reachability within an autonomous system.

## Important Cisco NX-OS and Cisco IOS Software Differences

In Cisco NX-OS:

- OSPF command-line interface (CLI) configuration and verification commands are not available until you enable the OSPF feature with the **feature ospf** command.
- The OSPF protocol requires the Enterprise Services license.
- The OSPF instance can consist of 20 characters, whereas the IOS supports numbers 1 ? 65536.
- Eight equal-cost paths are supported by default. You can configure up to sixteen.
- The reference bandwidth used in the OSPF cost calculation is 40 Gbps
- Networks and interfaces are added to an OSPF instance under the interface configuration mode.
- Passive interfaces are applied to the interface as opposed to under the OSPF instance.
- If a router ID is not manually configured, the loopback 0 IP address is always preferred. If loopback 0 does not exist, Cisco NX-OS selects the IP address for the first loopback interface in the configuration. If no loopback interfaces exist, Cisco NX-OS selects the IP address for the first physical interface in the configuration.
- Neighbor adjacency changes logging is not enabled by default under the OSPF instance.
- When interface authentication is configured, the OSPF key is encrypted with Data Encryption Standard 3 (3DES) in the configuration. Cisco IOS Software requires the **service password** command.

## Things You Should Know

The following list provides some additional facts about Cisco NX-OS that should be helpful when designing, configuring, and maintaining an OSPF network.

- Four OSPF instances can be configured per virtual device context (VDC).
- Numerous Virtual Route Forwarding (VRF) instances can be associated with an OSPF instance.
- If you remove the **feature ospf** command, all relevant OSPF configuration information is also removed.
- The **shutdown** command under the OSPF process can be used to disable OSPF while retaining the configuration. Similar functionality can also be applied per interface with the **ip ospf shutdown** command.
- The **show running-config ospf** command displays the current OSPF configuration.
- An OSPF instance can be restarted with the **restart ospf ''' <instance #> command**.

- Graceful Restart ([RFC 3623](#)) is enabled by default.
- OSPF is the only layer 3 routing protocol that supports stateful process restart.
- You cannot configure multiple OSPF instances on the same interface.
- Secondary IP addresses are advertised by default, but can be suppressed per interface.

## Configuration Comparison

The following sample code shows configuration similarities and differences between the Cisco NX-OS and Cisco IOS Software CLIs. There are two significant differences: Cisco NX-OS allows OSPF to be enabled and disabled globally, and it has a more interface-centric configuration that makes it easier to read.

### *Cisco IOS CLI*

### *Cisco NX-OS CLI*

#### Enabling the OSPF Feature

```
feature ospf
```

#### Configuring an OSPF Instance and Router ID

```
router ospf 10
```

```
router-id 192.168.1.1
```

#### Associating a Network with an OSPF Instance and Area

```
interface Ethernet2/1
```

```
ip address 192.168.10.1/24
```

```
ip router ospf 10 area 1
```

#### Configuring a Passive Interface

```
interface Ethernet2/1
```

```
ip address 192.168.11.1/24
```

```
ip ospf passive-interface
```

```
ip router ospf 10 area 0
```

#### Configuring Interface Authentication (MD5)

```
interface Ethernet2/1
```

```
ip address 192.168.10.1/24
```

```
ip ospf authentication message-digest
```

```
ip ospf message-digest-key 1 md5 3  
a667d47acc18ea6b
```

```
ip router ospf 10 area 1
```

**Configuring a Stub Area with the no summary Option**

```
router ospf 10
area 2 stub no-summary
```

**Creating a Not-So-Stubby Area (NSSA) and Generating a Default Route**

```
router ospf 10
area 3 nssa default-information-originate
```

**Configuring Inter-Area and External Summarization**

```
router ospf 10
area 0 range 159.142.0.0/16 summary-address
172.16.0.0/16
```

**Generating a Default Route (Conditional)**

```
router ospf 10
default-information originate
```

**Generating a Maximum Metric (Max-Metric) Value**

```
router ospf 10
max-metric router-lsa
```

**Verification Command Comparison**

The following table compares some useful **show** commands for verifying and troubleshooting an OSPFv2 network configuration.

Cisco NX-OS OSPFv2	Cisco IOS Software OSPFv2	Command Description
<b>show ip ospf</b>	show ip ospf	Displays the running configuration
<b>show ip ospf border-routers</b>	show ip ospf border-routers	Displays a list of border routers
<b>show ip ospf database</b>	show ip ospf database	Displays OSPF database information
<b>show ip ospf interface</b>	show ip ospf interface <int type>	Displays OSPF database information
<b>show ip ospf interface detail</b>	-	Displays additional packet statistics for each interface
<b>show ip ospf memory</b>	-	Displays the memory allocated for OSPF
<b>show ip ospf neighbor</b>	show ip ospf neighbors	Displays neighbor-specific information
<b>show ip ospf neighbor detail</b>	show ip ospf neighbor detail	Displays details for each OSPF neighbor
<b>show ip ospf policy statistics</b>	-	Displays redistribution statistics for a specified protocol

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<b>show ip ospf request list</b>	show ip ospf request list	Displays a list of link-state advertisements (LSAs) that have been requested
<b>show ip ospf retransmission list</b>	show module	Displays installed modules and their status
<b>show ip ospf route</b>	-	Displays all routes learned through OSPF
<b>show ip ospf statistics</b>	show ip ospf statistics	Displays OSPF LSA statistics
<b>show ip ospf summary-address</b>	show ip ospf summary-address	Displays OSPF-summarized networks
<b>show ip ospf traffic</b>	show ip ospf traffic	Displays OSPF-related packet counters
<b>show ip ospf vrf</b>	-	Displays information for a specified OSPF VRF instance