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**)

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 Softfware 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 consists 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**
show ip ospf	show ip ospf	Displays the running configuration
show ip ospf border-routers	show ip ospf border-routers	Displays a list of border routers
show ip ospf database	show ip ospf database	Displays OSPF database information
show ip ospf interface	show ip ospf interface <*int type*>	Displays OSPF database information
show ip ospf interface detail	-	Displays additional packet statistics for each interface
show ip ospf memory	-	Displays the memory allocated for OSPF
show ip ospf neighbor	show ip ospf neighbors	Displays neighbor-specific information
show ip ospf neighbor detail	show ip ospf neighbor detail	Displays details for each OSPF neighbor
show ip ospf policy statistics	-	Displays redistribution statistics for a specified protocol

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