Objective

This tech note outlines the main differences in Enhanced Interior Gateway Protocol (EIGRP) 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 NX-OS documentation on Cisco.com for a complete list of supported features.

EIGRP Overview

EIGRP is a Cisco proprietary hybrid distance vector routing protocol used to exchange network reachability information within an autonomous system.

Important Cisco NX-OS and Cisco IOS Software Differences

In Cisco NX-OS:

- The EIGRP protocol supports In-Service-Software-Upgrades (ISSU) if two supervisors are present in a chassis (Graceful Restart must be enabled).
- EIGRP command-line interface (CLI) configuration and verification commands are not available until you enable the EIGRP feature with the **feature eigrp** command.
- The EIGRP protocol requires the Enterprise Services license.
- Only the Internet Protocol (IP) is supported. Cisco IOS Software supports IP, IPX, and Appletalk.
- The EIGRP instance can consist of 20 characters. Cisco IOS Software supports numbers 1- 65536.
- Eight equal-cost paths are supported by default; Cisco NX-OS supports up to sixteen.
- Unequal cost load balancing is not supported. In Cisco IOS Software, unequal cost load balancing can be configured under an EIGRP routing instance using the variance command with an associated multiplier to select the next hop feasible successors for an IP route.
- Route auto-summarization is disabled by default and cannot be manually configured. Most versions of Cisco IOS Software enable the **auto-summary** command by default, but recently this feature has been disabled in releases 12.2(33)SXI4, 12.2(33)SRE and 15.0(1)M.
- Networks and interfaces are added to an EIGRP instance under the **interface** configuration mode.
- 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.
- A default route can be generated with the **default-information originate** command under the EIGRP instance, whereas Cisco IOS Software requires additional CLI commands to achieve similar results.
- When interface authentication is configured, the EIGRP key is encrypted with Data Encryption Standard 3 (3DES) in the configuration. Cisco IOS Software requires the **service password** command.
- Distribute-lists used to filter routes from routing updates are applied under the interface with the **ip distribute-list eigrp** command, as opposed to under the EIGRP router instance.
- Maximum prefix thresholds (warning and withdraw) can be configured for redistributed routes using the **redistribute maximum-prefix** routing instance command. Cisco IOS Software does not have the ability to set maximum prefix thresholds for redistributed routes.
- When configuring route redistribution under an EIGRP instance, a route-map must be specified and must be configured globally. If the route-map is empty (IE. **route-map eigrp-redistribution permit 10**), all routes matching the route type specified will be redistributed using the EIGRP **default-metric** values. If the route-map has an associate IP prefix-list and an optional EIGRP metric, routes will be filtered based on the IP prefix-list entries and their EIGRP metric will be modified

based on the values specified in the **set metric** command under the route-map. The route-map redistribution filtering and metric modification functionality is optional in Cisco IOS Software.

- The **neighbor** command under an EIGRP routing instance is not supported at this time, as it shouldn?t be required for Ethernet network topologies. Cisco IOS Software supports the neighbor command, which may be required for certain ATM and Frame-Relay WAN configurations.

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 EIGRP network.

- Four EIGRP instances can be configured per virtual device context (VDC).
- Numerous Virtual Route Forwarding (VRF) instances can be associated with an EIGRP instance.
- If the **feature eigrp** command is removed, all relevant EIGRP configuration information is also removed.
- The **shutdown** command can be used to gracefully disable an EIGRP instance while retaining the configuration. This feature can also be applied per interface with the **ip eigrp *<instance>* shutdown** command.
- An EIGRP instance can be restarted with the **restart eigrp *<instance>*** Exec command.
- Graceful restart is enabled by default (It needs to be enabled in order to perform an ISSU upgrade).
- Multiple EIGRP instances can be configured on the same interface.
- Secondary IP addresses are advertised by default and cannot be suppressed per interface.
- The **show running-config eigrp** command displays the current EIGRP configuration.
- EIGRP supports Bidirectional Forwarding Detection (BFD), which can be configured to reduce network convergence time to less than one second.

Configuration Comparison

The following sample code shows configuration similarities and differences between the Cisco NX-OS and Cisco IOS Software CLIs. There are three significant differences: Cisco NX-OS allows EIGRP to be enabled and disabled globally, and it has a more interface-centric configuration that makes it easier to read. In addition, Cisco NX-OS has the capability to generate a default route, whereas Cisco IOS Software requires additional CLI commands to achieve similar results.

Cisco IOS CLI	*Cisco NX-OS CLI*
Enabling the EIGRP Feature	
	feature eigrp
Configuring an EIGRP Instance and Router ID	
	router eigrp 10
	router-id 192.168.1.1
Associating a Network with an EIGRP Instance	

interface Ethernet2/1

ip address 192.168.10.1/24

ip router eigrp 10

Configuring a Passive Interface

interface Ethernet2/1

ip address 192.168.10.1/24

ip router eigrp 10

ip passive-interface eigrp 10

Configuring Interface Authentication (MD5)

key chain eigrp-key

key 1 key-string 7 070c285f4d06485744

interface Ethernet2/1

ip address 192.168.10.1/24

ip router eigrp 10

ip authentication mode eigrp 10 md5

ip authentication key-chain eigrp 10 eigrp-key

Configuring an EIGRP Distribution List to Filter Routes

**ip prefix-list eigrp-10-list seq 5 permit
159.142.1.0/24**

interface Ethernet2/1

ip address 192.168.10.1/24

ip router eigrp 10

ip distribute-list eigrp 10 prefix-list eigrp-10-list out

Configuring Route Summarization

interface Ethernet2/1

ip address 192.168.10.1/24

ip router eigrp 10

ip summary-address eigrp 10 159.142.0.0/16

Generating A Default Route (Conditional)

router eigrp 10

default-information originate

Configuring Route Redistribution (Permit all Static Routes)

router eigrp 10

redistribute static route-map static-to-eigrp

route-map static-to-eigrp permit 10

Configuring a VRF Instance for EIGRP Routing

router eigrp 10

vrf customer-a

autonomous-system 20

Verification Command Comparison

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

Cisco NX-OS EIGRP	Cisco IOS Software EIGRP	Command Description
show ip eigrp	-	Displays global EIGRP information for all instances
show ip eigrp <instance>	show ip eigrp <#>	Displays global EIGRP information for a specific instance
show ip eigrp accounting	show ip eigrp accounting	Displays the number of prefixes that each neighbor advertised
show ip eigrp interfaces	show ip eigrp interfaces	Displays interfaces configured for EIGRP
show ip eigrp interfaces detail	show ip eigrp interfaces detail	Displays detailed interface information
show ip eigrp neighbors	show ip eigrp neighbors	Displays currently connected neighbors
show ip eigrp neighbors detail	show ip eigrp neighbors detail	Displays connected neighbors and associated details
show ip eigrp route	-	Displays EIGRP routes
show ip eigrp route-map statistics redistribute <protocol>	-	Displays statistics for redistributed routes per protocol
show ip eigrp topology	show ip eigrp topology	Displays the EIGRP topology table
show ip eigrp traffic	show ip eigrp traffic	Displays statistics related to EIGRP
show ip eigrp vrf	show ip eigrp vrf	

		Displays VRF information for a specified VRF instance