Objective

This tech note outlines the main differences in Hot Standby Routing Protocol (HSRP) (IPv4) 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.

HSRP Overview

HSRP is a Cisco proprietary First Hop Redundancy Protocol (FHRP) designed to allow transparent failover for an IP client?s default gateway (first-hop router).

Important Cisco NX-OS and Cisco IOS Software Differences

In Cisco NX-OS:

- HSRP command-line interface (CLI) configuration and verification commands are not available until you enable the HSRP feature with the **feature hsrp** command.
- HSRP is hierarchical. All related commands for an HSRP group are configured under the group number.
- The HSRP configuration commands use the format **hsrp** <*option*> instead of **standby** <*option*>.
- The HSRP verification commands use the format **show hsrp** <*option*> instead of **show standby** <*option*>.
- HSRP supports stateful process restarts, and switchovers if two supervisor modules are present.
- The hello and hold-time timer ranges for the millisecond options are different. In Cisco NX-OS, hello = 250 to 999 milliseconds, and hold time = 750 to 3000 milliseconds. In Cisco IOS Software, hello = 15 to 999 milliseconds, and hold time = 50 to 3000 milliseconds.
- Proxy-ARP is not supported when configuring multiple HSRP groups on a physical or logical interface. Cisco IOS Software supports proxy-ARP when configuring multiple HSRP groups on an interface.
- HSRP supports Bidirectional Forwarding Detection (BFD). Cisco IOS Software does not support BFD for HSRP.

Things You Should Know

The following list provides some additional facts about Cisco NX-OS that should be helpful when designing, configuring, and maintaining HSRP-enabled networks.

- If you remove the **feature hsrp** command, all relevant HSRP configuration information is also removed.
- HSRPv1 is enabled by default (HSRPv2 can be enabled per interface).
- HSRPv1 supports 256 group numbers (0 to 255). HSRPv2 supports 4096 group numbers (0 to 4095).
- HSRPv1 and HSRPv2 are not compatible. However, a device can be configured to run a different version on different interfaces.
- The **show running-config hsrp** command displays the current HSRP configuration.
- Configuration of more than one FHRP on an interface is not recommended.
- Both HSRP devices forward traffic when configured in a vPC domain.

- HSRP timers should not be adjusted when configured on SVI?s in a vPC domain since both vPC peers will forward traffic destined to the HSRP virtual IP address and the timers only determine which peer is responsible for managing the control-plane functionality of HSRP.
- Object tracking is supported. Tracking can be configured for an interface?s line protocol state, IP address state, and for IP route reachability (determining whether a route is available in the routing table).
- Object Tracking can be enabled using Boolean or threshold list types for finer fail-over granularity.
- An interface HSRP group can track multiple objects by referencing more than one tracked object.
- Secondary IP addresses are supported in the same or a different group as the interface?s primary IP address.
- Load sharing can be accomplished by using multiple HSRP groups per interface (Proxy-ARP is not supported as documented in the previous section)
- HSRP has been enhanced for vPC environments, so both the active and standby router can forward data traffic. The primary router (higher priority) responds to ARP requests.
- Extended hold timers can be configured globally (**hsrp timers extended-hold**) to temporarily extend timeout values during an In Service Software Upgrade (ISSU). This prevents unnecessary HSRP switch-overs in environments that use aggressive hello/hold timers.

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 uses a hierarchical configuration, and it uses the **hsrp** keyword instead of the **standby** keyword for configuration and verification commands. The enhancements make the configuration easier to read and work with.

Cisco IOS CLI	*Cisco NX-OS CLI*
Enabling the HSRP Feature	
	feature hsrp
Configuring HSRP on an Interface	
	interface Ethernet2/1 ip address 192.168.10.2/24 hsrp 0 ip 192.168.10.1
Configuring the priority and preempt Options	
	interface Ethernet2/1 ip address 192.168.10.2/24 hsrp 0 preempt

priority 110

ip 192.168.10.1

Modifying the Hello and Holdtime Timers (Seconds)

interface Ethernet2/1

ip address 192.168.10.2/24

hsrp 0

timers 1 3

ip 192.168.10.1

Modifying the Hello and Holdtime Timers (Milliseconds)

interface Ethernet2/1

ip address 192.168.10.2/24

hsrp 0

timers msec 250 msec 750

ip 192.168.10.1

Configuring MD5 Authentication

interface Ethernet2/1

ip address 192.168.10.2/24

hsrp 0

authentication md5 key-string cisco123

ip 192.168.10.1

Configuring HSRP Version 2 on an Interface

interface Ethernet2/1

ip address 192.168.10.2/24

hsrp version 2

Configuring Minimum and Reload Initialization Delay

interface Ethernet2/1

ip address 192.168.10.2/24

hsrp delay minimum 5 reload 10

Configuring Object Tracking (Interface Line-Protocol)

track 1 interface ethernet 2/2 line-protocol

```
interface Ethernet2/1

ip address 192.168.10.2/24

hsrp 0

track 1 decrement 20

ip 192.168.10.1
```

Verification Command Comparison

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

Cisco NX-OS HSRP	Cisco IOS Software HSRP	Command Description
show hsrp	show standby	Displays detailed information for all HSRP groups
show hsrp active	-	Displays all of the groups in the ?active? state
show hsrp all	show standby all	Displays all of the groups including groups in the disabled state
show hsrp bfd-sessions	-	Displays all BFD sessions
show hsrp brief	show standby brief	Displays a summary of all the HSRP groups
show hsrp delay	show standby delay	Displays minimum and maximum delay times for preempting
show hsrp detail	-	Displays detailed information
show hsrp group <#>	-	Displays detailed information for a specified group
show hsrp init	-	Displays all the groups in the "init" state
show hsrp interface	show standby *int-type*	Displays detailed information for a specific interface
show hsrp learn	-	Displays all the groups in the "learn" state
show hsrp listen	-	Displays all the groups in the "listen" state
show hsrp speak	-	Displays all the groups in the "speak" state
show hsrp standby	-	Displays all the groups in the "standby" state
show hsrp summary	-	Displays summary information for HSRP groups
show track	show track	Displays the configured tracked objects
show track brief	show track brief	Displays a brief list of tracked objects
show track interface	show track interface	Displays the status of tracked interfaces
show track ip	show track ip	Displays the IP protocol objects that are tracked