Configuring HSRP

HSRP allows two or more routers to provide backup for each other in the event of a failure. The benefits of **HSRP** is that if one router goes down, devices on the network will be able to access the default gateway without having to change any of their configurations.

In this exercise, you will configure **NYCORE1** and **NYCORE2** to function as an **HSRP** group where one device will function as the backup of the other.

Alert: During this Exercise, **NYCORE1#** and **NYCORE2#** may be displayed in the lab as **Switch#** during certain tasks. The steps do not include this change for the sake of clarity.

Learning Outcomes

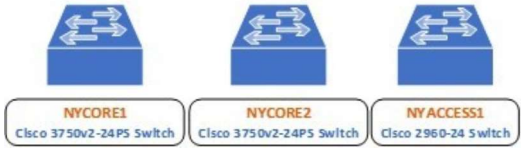
After completing this exercise, you will be able to:

- Configure HSRP

Your Devices

You will be using the following devices in this lab. Please make sure these are powered on before proceeding.

- **NYCORE1** (Cisco 3750v2-24PS Switch)
- **NYCORE2** (Cisco 3750v2-24PS Switch)
- **NYACCESS1** (Cisco 2960-24 Switch)



Note: *Although **NYCORE1** and **NYCORE2** are switches, they do have **Layer 3** functionality. As such, they will be viewed as routers of the network. **HSRP** will be implemented on the VLAN **1 SVIs** of both switches.*

Task 1 - Configuring HSRP

HSRP is always configured on one interface of each device. In essence, **HSRP** provides redundancy not to the whole router, but to individual interfaces. To configure **HSRP**, you must first determine the necessary parameters:

- **HSRP** version
- **HSRP** Group Number
- **HSRP** Standby IP address
- **HSRP** priority
- Implementation of Pre-emption

These will be determined and configured in the following steps.

Note: *When configuring **HSRP**, you never actually use any commands that contain the acronym **hsrp**. The corresponding command that creates the **HSRP** configuration is **standby**.*

Step 1

HSRP will be configured on the VLAN1 **SVI** interfaces of the **NYCORE1** and **NYCORE2** routers. Begin by SVI of VLAN **1** on **NYCORE1** with an IP address. You will use **192.168.16.21/24**:

```
NYCORE1#configure terminal
Enter configuration commands, one per line.  End with
CNTL/Z.
NYCORE1(config)#interface vlan 1
NYCORE1(config-if)#ip address 192.168.16.21
255.255.255.0
NYCORE1(config-if)#no shutdown
NYCORE1(config-if)#
```

Step 2

Next, you will indicate the **HSRP** version to be used.

> ***Note:*** *HSRP has two versions available. Version* ***2*** *of the protocol introduces stability, scalability and diagnostic improvements. It also provides support for* ***IPv6****. It is not compatible with version* ***1****.*

The version is configured on the interface itself:

```
NYCORE1(config-if)#standby version 2
NYCORE1(config-if)#
```

Step 3

In this step, you will configure the **HSRP** group number and the virtual IP address that will be used.

> ***Note:*** *The virtual IP address is the address that the active* ***HSRP*** *router interface adopts. This address does not belong to any physical interface but is automatically migrated to the new active* ***HSRP*** *router whenever an active interface goes down. Note that the virtual IP address and the physical IP addresses of the interfaces participating in* ***HSRP*** *must be in the same subnet.*

The **HSRP** group number you will use is **10,** and the virtual IP address you will use is **192.168.16.20**:

```
NYCORE1(config-if)#standby 10 ip 192.168.16.20
NYCORE1(config-if)#
*Mar  1 01:27:47.349: %HSRP-5-STATECHANGE: Vlan1 Grp 10
state Standby -> Active
NYCORE1(config-if)#exit
NYCORE1(config)#exit
NYCORE1#
```

You will receive a syslog message indicating that there has been a state change in **HSRP**. The VLAN **1** interface of group **10** has changed states from **Standby** to **Active**. This means that the VLAN **1** SVI has now adopted the virtual IP address.

At this point there is only one member in the HSRP group, so only this member can be active.

> ***Note:*** *It may take up to 30 seconds before the syslog message appears.*

Step 4

Connect to **NYCORE2** and configure the VLAN **1** SVI in much the same way. Use an IP address of **192.168.16.22/24** for the VLAN **1** SVI:

```
NYCORE2#configure terminal
Enter configuration commands, one per line.  End with
CNTL/Z.
NYCORE2(config)#interface vlan 1
NYCORE2(config-if)#ip address 192.168.16.22
255.255.255.0
NYCORE2(config-if)#standby version 2
NYCORE2(config-if)#standby 10 ip 192.168.16.20
NYCORE2(config-if)#exit
NYCORE2(config)#exit
NYCORE2#
```

If you wait several seconds, or maybe even close to a minute, you should see a syslog message similar to the following appear:

```
*Mar  1 01:33:57.672: %HSRP-5-STATECHANGE: Vlan1 Grp 10
state Speak -> Standby
```

This indicates that the VLAN **1** SVI of the **NYCORE2** device has changed state from **Speak**, which is a state of negotiation with other members of the group, to **Standby**.

Step 5

Examine the state of **HSRP** on **NYCORE2** using the following command:

```
NYCORE2#show standby
Vlan1 - Group 10 (version 2)
  State is Standby
    1 state change, last state change 00:03:07
  Virtual IP address is 192.168.16.20
  Active virtual MAC address is 0000.0c9f.f00a
    Local virtual MAC address is 0000.0c9f.f00a (v2
default)
  Hello time 3 sec, hold time 10 sec
    Next hello sent in 0.384 secs
  Preemption disabled
  Active router is 192.168.16.21, priority 100 (expires
in 9.968 sec)
    MAC address is 0012.0119.3d40
  Standby router is local
  Priority 100 (default 100)
  Group name is "hsrp-Vl1-10" (default)
NYCORE2#
```

From the above output you can see the following:

- This device is in a state of **Standby** which means it is not currently forwarding traffic
- The Virtual IP address is **192.168.16.20**
- The corresponding virtual MAC address is address is **0000.0c9f.f00a**
- The timers can be examined
- The active router is indicated as **192.168.16.21** which is the VLAN **1** SVI of **NYCORE1**

Step 6

Examine the state of **HSRP** on **NYCORE1** as well:

```
NYCORE1#show standby
Vlan1 - Group 10 (version 2)
  State is Active
    2 state changes, last state change 00:14:50
  Virtual IP address is 192.168.16.20
  Active virtual MAC address is 0000.0c9f.f00a
    Local virtual MAC address is 0000.0c9f.f00a (v2
default)
  Hello time 3 sec, hold time 10 sec
    Next hello sent in 0.304 secs
  Preemption disabled
  Active router is local
  Standby router is 192.168.16.22, priority 100
(expires in 10.144 sec)
  Priority 100 (default 100)
  Group name is "hsrp-Vl1-10" (default)
NYCORE1#
```

Here you can see that this device is active and the standby router is indicated with the IP address corresponding to the VLAN **1** SVI of **NYCORE2**.

Step 7

Connect to **NYACCESS1** and attempt to ping the virtual IP address:

```
NYACCESS1#ping 192.168.16.20
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.16.20,
timeout is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip
min/avg/max = 1/1/1 ms
NYACCESS1#
```

The ping is successful.

Step 8

In this step you will shut down the VLAN **1** interface on the **NYCORE1** device and see how **HSRP** reacts to this:

```
NYCORE1#configure terminal
Enter configuration commands, one per line.  End with
CNTL/Z.
NYCORE1(config)#interface vlan 1
NYCORE1(config-if)#shutdown
NYCORE1(config-if)#
*Mar  1 01:59:38.332: %HSRP-5-STATECHANGE: Vlan1 Grp 10
state Active -> Init
*Mar  1 01:59:40.337: %LINK-5-CHANGED: Interface Vlan1,
changed state to administratively down
*Mar  1 01:59:40.363: %LINEPROTO-5-UPDOWN: Line
protocol on Interface Vlan1, changed state to down
NYCORE1(config-if)#
```

Within seconds, other than the interface state change messages, you will notice a syslog message indicating a change in **HSRP** state from **Active** to **Init**. If you look on the console of **NYCORE2** you should see a syslog message similar to the following:

```
*Mar  1 01:59:40.581: %HSRP-5-STATECHANGE: Vlan1 Grp 10
state Standby -> Active
```

The VLAN **1** interface of **NYCORE2** has now become **Active**.

Step 9

Connect to **NYACCESS1** once again and attempt to ping the virtual IP address:

```
NYACCESS1#ping 192.168.16.20
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.16.20,
timeout is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip
min/avg/max = 1/1/1 ms
NYACCESS1#
```

The ping is successful once again.

Step 10

Return to the **NYCORE1** device and bring the VLAN **1** interface back up. Once again, observe how **HSRP** reacts to this:

```
NYCORE1(config-if)#no shutdown
*Mar  1 02:04:04.251: %LINK-3-UPDOWN: Interface Vlan1,
changed state to up
*Mar  1 02:04:04.260: %LINEPROTO-5-UPDOWN: Line
protocol on Interface Vlan1, changed state to up
NYCORE1(config-if)#exit
NYCORE1(config)#exit
NYCORE1#
```

Other than the messages indicating that the VLAN **1** interface changed states, you will also see a syslog message relating to **HSRP**. This time you will wait longer, but you will eventually see a message indicating that there is a state change in **HSRP**. The state change may not be what you expect. You should see something like this:

```
*Mar  1 02:04:25.584: %HSRP-5-STATECHANGE: Vlan1 Grp 10
state Speak -> Standby
```

NYCORE1 is now the standby router while **NYCORE2** is the active router.

Step 11

Confirm this by reviewing the state of HSRP on the **NYCORE1** device:

```
NYCORE1#show standby
Vlan1 - Group 10 (version 2)
  State is Standby
    4 state changes, last state change 00:04:17
  Virtual IP address is 192.168.16.20
  Active virtual MAC address is 0000.0c9f.f00a
    Local virtual MAC address is 0000.0c9f.f00a (v2
default)
  Hello time 3 sec, hold time 10 sec
    Next hello sent in 1.680 secs
  Preemption disabled
  Active router is 192.168.16.22, priority 100 (expires
in 9.168 sec)
    MAC address is 001a.e222.bfc0
  Standby router is local
  Priority 100 (default 100)
  Group name is "hsrp-Vl1-10" (default)
NYCORE1#
```

NYCORE1 is now in a state of **standby** and **NYCORE2** is **active**.

You have successfully configured **HSRP** on **NYCORE1** and **NYCORE2**.

Leave the devices in their current states and continue on to the next exercise.