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Hot-Standby Redundancy Protocol Lab

Lab 1 – 24-1 HSRP Configuration – Lab Exercise

In this lab you will configure and test HSRP for a small campus network.

Basic HSRP

1. Configure basic HSRP for the 10.10.10.0/24 network using the IP addresses shown in the topology diagram.

```
R1#sh ip int brief
Interface          IP-Address      OK? Method Status
Protocol
GigabitEthernet0/0 203.0.113.2    YES NVRAM   up
GigabitEthernet0/1 10.10.10.2     YES NVRAM   up
GigabitEthernet0/2 10.10.20.1     YES NVRAM   up
Vlan1              unassigned     YES NVRAM   administratively down
down
```

```
R2#show ip int brief
Interface          IP-Address      OK? Method Status
Protocol
GigabitEthernet0/0 203.0.113.6    YES manual  up
GigabitEthernet0/1 10.10.10.3     YES manual  up
GigabitEthernet0/2 10.10.20.2     YES manual  up
Vlan1              unassigned     YES unset   administratively down
down
R2#
```

2. Wait for HSRP to come up on both routers and then check which is the active router

R1 is the active router:

```
R1#show standby
GigabitEthernet0/2 - Group 1
  State is Active
    5 state changes, last state change 00:06:33
  Virtual IP address is 10.10.10.1
  Active virtual MAC address is 0000.0C07.AC01
    Local virtual MAC address is 0000.0C07.AC01 (v1 default)
  Hello time 3 sec, hold time 10 sec
    Next hello sent in 1.612 secs
  Preemption disabled
  Active router is local
  Standby router is 10.10.20.2
  Priority 100 (default 100)
  Group name is hsrp-Gig0/2-1 (default)
```

R2 is the standby router:

```
R2#show standby
GigabitEthernet0/2 - Group 1
  State is Standby
    3 state changes, last state change 00:12:36
  Virtual IP address is 10.10.10.1
  Active virtual MAC address is 0000.0C07.AC01
    Local virtual MAC address is 0000.0C07.AC01 (v1 default)
  Hello time 3 sec, hold time 10 sec
    Next hello sent in 0.667 secs
  Preemption disabled
  Active router is 10.10.20.1
  Standby router is local
  Priority 100 (default 100)
  Group name is hsrp-Gig0/2-1 (default)
```

3. Verify that the PCs can ping their default gateway using the HSRP address 10.10.10.1.

PC1

```
C:\>ping 10.10.10.1
Pinging 10.10.10.1 with 32 bytes of data:
```

```
Reply from 10.10.10.1: bytes=32 time<1ms TTL=255
Reply from 10.10.10.1: bytes=32 time<1ms TTL=255
Reply from 10.10.10.1: bytes=32 time<1ms TTL=255
Reply from 10.10.10.1: bytes=32 time<1ms TTL=255
Ping statistics for 10.10.10.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

PC2

```
C:\>ping 10.10.10.1
Pinging 10.10.10.1 with 32 bytes of data:
Reply from 10.10.10.1: bytes=32 time<1ms TTL=255
Reply from 10.10.10.1: bytes=32 time<1ms TTL=255
Reply from 10.10.10.1: bytes=32 time<1ms TTL=255
Reply from 10.10.10.1: bytes=32 time<1ms TTL=255
Ping statistics for 10.10.10.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

4. Verify that the PCs have upstream connectivity via their HSRP default gateway. Ping SP1 at 203.0.113.1

PC1

```
C:\>ping 203.0.113.1
Pinging 203.0.113.1 with 32 bytes of data:
Reply from 203.0.113.1: bytes=32 time=1ms TTL=254
Reply from 203.0.113.1: bytes=32 time<1ms TTL=254
Reply from 203.0.113.1: bytes=32 time<1ms TTL=254
Reply from 203.0.113.1: bytes=32 time<1ms TTL=254
Ping statistics for 203.0.113.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

PC2

```
C:\>ping 203.0.113.1
Pinging 203.0.113.1 with 32 bytes of data:
Reply from 203.0.113.1: bytes=32 time<1ms TTL=254
Reply from 203.0.113.1: bytes=32 time<1ms TTL=254
Reply from 203.0.113.1: bytes=32 time<1ms TTL=254
Reply from 203.0.113.1: bytes=32 time<1ms TTL=254
Ping statistics for 203.0.113.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

5. What is the MAC address on the physical interface of the active router?

```
R2#show interface g0/1 | include address
Hardware is CN Gigabit Ethernet, address is 0001.6470.2502 (bia
0001.6470.2502)
Internet address is 10.10.10.3/24
```

6. What is the MAC address of the HSRP virtual interface?

```
R2#show standby
GigabitEthernet0/1 - Group 1
State is Active
  5 state changes, last state change 00:03:51
Virtual IP address is 10.10.10.1
Active virtual MAC address is 0000.0C07.AC01
  Local virtual MAC address is 0000.0C07.AC01 (v1 default)
Hello time 3 sec, hold time 10 sec
  Next hello sent in 1.479 secs
Preemption disabled
Active router is local
Standby router is 10.10.10.2
Priority 100 (default 100)
Group name is hsrp-Gig0/1-1 (default)
```

7. Verify the PCs are using the virtual MAC address for their default gateway.

PC1

```
C:\>arp -a
Internet Address      Physical Address      Type
10.10.10.1            0000.0c07.ac01       dynamic
10.10.10.2            00d0.ffeb.2d02       dynamic
C:\>
```

PC2

```
C:\>arp -a
Internet Address      Physical Address      Type
10.10.10.1            0000.0c07.ac01       dynamic
10.10.10.2            00d0.ffeb.2d02       dynamic
```

Priority and Pre-emption

8. Configure HSRP so that R1 will be the preferred router. Use a single command.

```
R1(config)#interface G0/1
R1(config-if)#standby 1 priority 110
R1(config-if)#end
```

9. Which router do you expect will be active now? Verify this.

Router 1 since it has a higher priority of 110 whereas R2 has a priority of 100. It also has preemptive mode enabled therefore, it'll become the active router if it has a higher priority.

10. Ensure that R1 is the active router. Do not reboot

R1's Perspective

```
R1#
%SYS-5-CONFIG_I: Configured from console by console
%HSRP-6-STATECHANGE: GigabitEthernet0/1 Grp 1 state Standby -> Active.
R1#
%SYS-5-CONFIG_I: Configured from console by console
R1#show standby
GigabitEthernet0/1 - Group 1
State is Active
```

```
9 state changes, last state change 00:30:14
Virtual IP address is 10.10.10.1
Active virtual MAC address is 0000.0C07.AC01
Local virtual MAC address is 0000.0C07.AC01 (v1 default)
Hello time 3 sec, hold time 10 sec
Next hello sent in 0.07 secs
Preemption enabled
Active router is local
Standby router is 10.10.10.3, priority 100 (expires in 8 sec)
Priority 110 (configured 110)
Group name is hsrp-Gig0/1-1 (default)
R1#
```

R2's perspective:

```
R2#show standby
GigabitEthernet0/1 - Group 1
State is Standby
9 state changes, last state change 00:30:31
Virtual IP address is 10.10.10.1
Active virtual MAC address is 0000.0C07.AC01
Local virtual MAC address is 0000.0C07.AC01 (v1 default)
Hello time 3 sec, hold time 10 sec
Next hello sent in 2.507 secs
Preemption disabled
Active router is 10.10.10.2, priority 110 (expires in 8 sec)
MAC address is 0000.0C07.AC01
Standby router is local
Priority 100 (default 100)
Group name is hsrp-Gig0/1-1 (default)
```

Test HSRP

11. Run a continuous ping to the HSRP IP address from PC1 with the 'ping 10.10.10.1 -n 1000' command.

```
Reply from 10.10.10.1: bytes=32 time<1ms TTL=255
Reply from 10.10.10.1: bytes=32 time<1ms TTL=255
```

```
Reply from 10.10.10.1: bytes=32 time<1ms TTL=255
Reply from 10.10.10.1: bytes=32 time<1ms TTL=255
Reply from 10.10.10.1: bytes=32 time=14ms TTL=255
Reply from 10.10.10.1: bytes=32 time<1ms TTL=255
Reply from 10.10.10.1: bytes=32 time=15ms TTL=255
Reply from 10.10.10.1: bytes=32 time<1ms TTL=255
Reply from 10.10.10.1: bytes=32 time<1ms TTL=255
Reply from 10.10.10.1: bytes=32 time<1ms TTL=255
Reply from 10.10.10.1: bytes=32 time<1ms TTL=255
```

12. Save the configuration on R1 then reboot.

```
R1#copy running-config startup-config
```

13. View the ping output on PC1. You should see a few dropped pings as R2 transitions to active following the outage of R1.

Yes it dropped two pings/packets when R1 rebooted though I'm not able to copy it as PC1 won't stop pinging the default gateway.

14. Verify R2 has transitioned to HSRP active.

```
R2#show standby
GigabitEthernet0/1 - Group 1
  State is Active
    10 state changes, last state change 00:46:34
  Virtual IP address is 10.10.10.1
  Active virtual MAC address is 0000.0C07.AC01
    Local virtual MAC address is 0000.0C07.AC01 (v1 default)
  Hello time 3 sec, hold time 10 sec
    Next hello sent in 1.873 secs
  Preemption disabled
  Active router is local
  Standby router is unknown, priority 110
  Priority 100 (default 100)
  Group name is hsrp-Gig0/1-1 (default)
```

15. Wait for R1 to complete booting and HSRP to come up. Verify R1 transitions to HSRP active because pre-emption is enabled.

```
%HSRP-6-STATECHANGE: GigabitEthernet0/1 Grp 1 state Standby -> Active
end
R1#show standby
GigabitEthernet0/1 - Group 1
  State is Active
    5 state changes, last state change 00:00:39
  Virtual IP address is 10.10.10.1
  Active virtual MAC address is 0000.0C07.AC01
    Local virtual MAC address is 0000.0C07.AC01 (v1 default)
  Hello time 3 sec, hold time 10 sec
    Next hello sent in 2.273 secs
  Preemption enabled
  Active router is local
  Standby router is unknown, priority 100
  Priority 110 (configured 110)
  Group name is hsrp-Gig0/1-1 (default)
```

16. Hit 'Ctrl-C' to cancel the ping on PC1. If you scroll back you should see a dropped ping or two as R1 transitioned back to HSRP active.

It didn't allow me to cancel the ping on PC1 for some reason. Not sure if its a mac issue or just packet tracer itself though ctrl +c works on a normal terminal