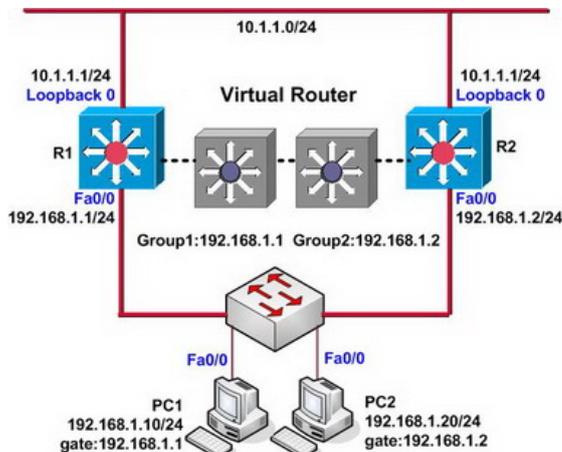


BCMSN Lab5 - Configuring Layer 3 Redundancy with VRRP

?Lab Objective?

Master the configuration of Layer3 redundancy with VRRP for gateways

?Lab Topology?



?Lab Steps?

1. This lab can be completed by using Layer3 switches or routers, if using routers, you should examine the IOS version to make sure that it supports HSRP protocol.
2. Configure PC1 and PC2 to simulate hosts, the configurations are as follows:

```
PC1(config)#no ip routing
PC1(config)#
PC1(config)#interface fastEthernet 0/0
PC1(config-if)#ip address 192.168.1.10 255.255.255.0
PC1(config-if)#no cdp enable
PC1(config-if)#no shutdown
PC1(config-if)#exit
PC1(config)#
PC1(config)#ip default-gateway 192.168.1.1
PC1(config)#exit
```

```
PC2(config)#no ip routing
PC2(config)#
```

```
PC2(config)#interface fastEthernet 0/0
PC2(config-if)#ip address 192.168.1.20 255.255.255.0
PC2(config-if)#no cdp enable
PC2(config-if)#no shutdown
PC2(config-if)#exit
PC2(config)#
PC2(config)#ip default-gateway 192.168.1.2
PC2(config)#exit
```

3. Use the ping command and the traceroute command on PC1 and PC2 to test whether the network can be reached.

```
PC1#ping 10.1.1.1
```

```
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.1.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 48/60/72 ms
PC1#
PC1#traceroute 10.1.1.1
```

```
Type escape sequence to abort.
Tracing the route to 10.1.1.1

 1 192.168.1.1 12 msec * 96 msec
PC1#
```

```
PC2#ping 10.1.1.1
```

```
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.1.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 72/293/1084 ms
PC2#
PC2#traceroute 10.1.1.1
```

Type escape sequence to abort.

Tracing the route to 10.1.1.1

```
1 192.168.1.2 120 msec * 72 msec
```

4. Set the interface FA0/0 on R1 DOWN

```
R1(config)#interface fastEthernet 0/0
```

```
R1(config-if)#shutdown
```

```
R1(config-if)#
```

5. Use the ping command and the traceroute command again on R1 and R2 to test

```
C1#ping 10.1.1.1
```

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 10.1.1.1, timeout is 2 seconds:

```
.....
```

Success rate is 0 percent (0/5)

```
PC1#
```

```
PC1#traceroute 10.1.1.1
```

Type escape sequence to abort.

Tracing the route to 10.1.1.1

```
1 * * *
```

```
2 * * *
```

```
3 * * *
```

```
???
```

```
PC2#ping 10.1.1.1
```

```
Type escape sequence to abort.
```

```
Sending 5, 100-byte ICMP Echos to 10.1.1.1, timeout is 2 seconds:
```

```
!!!!
```

```
Success rate is 100 percent (5/5), round-trip min/avg/max = 72/128/160 ms
```

```
PC2#
```

```
PC2#tr
```

```
PC2#traceroute 10.1.1.1
```

```
Type escape sequence to abort.
```

```
Tracing the route to 10.1.1.1
```

```
1 192.168.1.2 112 msec * 96 msec
```

6. Although the two routers can reach the destination network, the redundant devices are not fully used by default, so, some users can't access network when the network fails on a single-node.

7. In order to solve this problem, configure VRRP on R1 and R2, the configurations are as follows:

```
R1(config)#interface fastEthernet 0/0
```

```
R1(config-if)#vrrp 1 ip 192.168.1.1
```

```
R1(config-if)#vrrp 1 priority 200
```

```
R1(config-if)#vrrp 1 preempt
```

```
R1(config-if)#
```

```
R1(config-if)#vrrp 2 ip 192.168.1.2
```

```
R1(config-if)#vrrp 2 priority 100
```

```
R1(config-if)#vrrp 2 preempt
```

```
R1(config-if)#exit
```

```
R1(config)#
```

```
R2(config)#interface fastEthernet 0/0
```

```
R2(config-if)#vrrp 1 ip 192.168.1.1
```

```
R2(config-if)#vrrp 1 priority 100
```

```
R2(config-if)#vrrp 1 preempt
```

```
R2(config-if)#
```

```
R2(config-if)#vrrp 2 ip 192.168.1.2
```

```
R2(config-if)#vrrp 2 priority 200
R2(config-if)#vrrp 2 preempt
R2(config-if)#exit
R2(config)#exit
R2#
```

8. Identify the IDs of different router groups by checking the summary information of VRRP groups of the two routers:

```
R1#show vrrp
FastEthernet0/0 - Group 1
State is Master
Virtual IP address is 192.168.1.1
Virtual MAC address is 0000.5e00.0101
Advertisement interval is 1.000 sec
Preemption enabled
Priority is 255 (cfgd 200)
Master Router is 192.168.1.1 (local), priority is 255
Master Advertisement interval is 1.000 sec
Master Down interval is 3.003 sec

FastEthernet0/0 - Group 2
State is Backup
Virtual IP address is 192.168.1.2
Virtual MAC address is 0000.5e00.0102
Advertisement interval is 1.000 sec
Preemption enabled
Priority is 100
Master Router is 192.168.1.2, priority is 255
Master Advertisement interval is 1.000 sec
Master Down interval is 3.609 sec (expires in 3.349 sec)
```

```
R2#show vrrp
FastEthernet0/0 - Group 1
State is Backup
Virtual IP address is 192.168.1.1
Virtual MAC address is 0000.5e00.0101
```

```
Advertisement interval is 1.000 sec
Preemption enabled
Priority is 100
Master Router is 192.168.1.1, priority is 255
Master Advertisement interval is 1.000 sec
Master Down interval is 3.609 sec (expires in 2.773 sec)
```

```
FastEthernet0/0 - Group 2
State is Master
Virtual IP address is 192.168.1.2
Virtual MAC address is 0000.5e00.0102
Advertisement interval is 1.000 sec
Preemption enabled
Priority is 255 (cfgd 200)
Master Router is 192.168.1.2 (local), priority is 255
Master Advertisement interval is 1.000 sec
Master Down interval is 3.003 sec
```

9. Set the interface Fa0/0 on R1 DOWN again, the two routers will display the following information:

```
R1(config)#interface fastEthernet 0/0
R1(config-if)#shutdown
R1(config-if)#
*Jul 8 21:49:59.131: %VRRP-6-STATECHANGE: Fa0/0 Grp 1 state Master -> Init
*Jul 8 21:49:59.135: %VRRP-6-STATECHANGE: Fa0/0 Grp 2 state Backup -> Init
```

```
R2#
*Jul 8 21:50:03.191: %VRRP-6-STATECHANGE: Fa0/0 Grp 1 state Backup -> Master
```

10. Use the ping command and the traceroute command on R1 and R2 to confirm

```
PC1#ping 10.1.1.1
```

```
Type escape sequence to abort.
```

```
Sending 5, 100-byte ICMP Echos to 10.1.1.1, timeout is 2 seconds:
```

```
!!!!
```

```
Success rate is 100 percent (5/5), round-trip min/avg/max = 48/78/96 ms
```

```
PC1#
```

```
PC1#traceroute 10.1.1.1
```

```
Type escape sequence to abort.
```

```
Tracing the route to 10.1.1.1
```

```
1 192.168.1.2 92 msec * 120 msec
```

```
PC2#ping 10.1.1.1
```

```
Type escape sequence to abort.
```

```
Sending 5, 100-byte ICMP Echos to 10.1.1.1, timeout is 2 seconds:
```

```
!!!!
```

```
Success rate is 100 percent (5/5), round-trip min/avg/max = 72/172/452 ms
```

```
PC2#
```

```
PC2#traceroute 10.1.1.1
```

```
Type escape sequence to abort.
```

```
Tracing the route to 10.1.1.1
```

```
1 192.168.1.2 132 msec * 168 msec
```

11. Because two different VRRP groups are enabled in the network, network redundancy can be guaranteed at large extent. It is recommended to use the extended PING command on R1 and R2 to send data packets to the destination network in order to best observe the working process of VRRP. Use the following commands on R1 and R2 to debug, the detailed steps will not be listed:

```
debug vrrp events  
debug vrrp packets
```

12. End.

Hope to helpful for you!