**VRRP [Virtual Router Redundancy Protocol]**
- Open standard, Developed in 1997
- Multicast 224.0.0.18 using IP protocol 445
- Hello - 1 sec Dead -3 sec
- Master / Backup
- No load Balancing
- Group range is 0 to 255 i.e router priorities range from 1 to 254 default is 100
- Same as HSRP

**VRRP LAB**

In this lab, we are configure R1 and R2 are connected in the same LAN. We are going to configure HSRP for that case we will create a virtual router help of a virtual-IP. This Virtual IP used as the default-gateway of the all devices of the LAN.

Task 1: Configure R4 must be work as a host.
Task 2: Configure R3 with routing protocol Static Route.
Task 3: Configure R1 and R2 with static route & virtual IP 192.168.100.254 with standby group 22
Task 4: Verify using show command and traceroute
Task 1: Configure R4 must be work as a host.
Here we will make this router will work as a host

R4#configure terminal
R4(config)#hostname PC10
PC10(config)#no ip routing
PC10(config)#
PC10(config)#ip default-gateway 192.168.100.254 // Virtual IP Address

PC10(config)#interface fastEthernet 0/0
PC10(config-if)#ip address 192.168.100.10 255.255.255.0
PC10(config-if)#no shutdown
PC10(config-if)#exit

PC10(config)#do sh ip int br
Interface IP-Address OK? Method Status Protocol
FastEthernet0/0 192.168.100.10 YES NVRAM up up
PC10(config)#do wr
Warning: Attempting to overwrite an NVRAM configuration previously written
by a different version of the system image.
Overwrite the previous NVRAM configuration?[confirm]
Building configuration...
[OK]

PC10(config)#-------------------------------
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Now R4 works as a PC.
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Task 2: Configure R3 with Static Route

R3 configuration
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R3#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.

R3(config)#interface loopback 0
R3(config-if)#ip address 33.33.33.33 255.255.255.255
R3(config-if)#no sh
R3(config-if)#exit
R3(config)#
R3(config)#interface Serial0/0
R3(config-if)# description <<<< Connected to the R-1 >>>>
R3(config-if)# ip address 172.16.1.6 255.255.255.252
R3(config-if)# clockrate 128000
R3(config-if)#exit
R3(config)#
R3(config)#interface Serial0/1
R3(config-if)# description <<<< Connected to the R-2 >>>>
R3(config-if)# ip address 172.16.1.10 255.255.255.252
R3(config-if)# clockrate 128000
R3(config-if)#exit
R3(config)#
R3(config)# ip route 192.168.100.0 255.255.255.0 Serial0/0
R3(config)# ip route 192.168.100.0 255.255.255.0 Serial0/1
R3(config-router)#end

R3#copy running-config startup-config
Destination filename [startup-config]?
Warning: Attempting to overwrite an NVRAM configuration previously written
by a different version of the system image.
Overwrite the previous NVRAM configuration?[confirm]
Building configuration...
[OK]
R3#
R3#show ip interface brief
<table>
<thead>
<tr>
<th>Interface</th>
<th>IP-Address</th>
<th>OK? Method Status</th>
<th>Status</th>
<th>Protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial0/0</td>
<td>172.16.1.6</td>
<td>YES NVRAM</td>
<td>up</td>
<td>up</td>
</tr>
<tr>
<td>Serial0/1</td>
<td>172.16.1.10</td>
<td>YES NVRAM</td>
<td>up</td>
<td>up</td>
</tr>
<tr>
<td>Serial0/2</td>
<td>unassigned</td>
<td>YES NVRAM</td>
<td>administratively down</td>
<td>down</td>
</tr>
</tbody>
</table>
Serial0/3          unassigned  YES NVRAM  administratively down down
Ethernet1/0       unassigned  YES NVRAM  administratively down down
Ethernet1/1       unassigned  YES NVRAM  administratively down down
Ethernet1/2       unassigned  YES NVRAM  administratively down down
Ethernet1/3       unassigned  YES NVRAM  administratively down down
FastEthernet2/0   unassigned  YES NVRAM  administratively down down
Loopback0         33.33.33.33  YES NVRAM  up                    up

Task 3: Configure R1 and R2 with Static Route & virtual IP 10.1.1.10 with standby group 11

R1 Configuration

R1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#interface serial 0/0
R1(config-if)#description <<<Connected to the R-3>>> 
R1(config-if)#ip address 172.16.1.5 255.255.255.252
R1(config-if)#clockrate 128000
R1(config-if)#no shutdown
R1(config-if)# exit

R1(config)#interface FastEthernet1/0
R1(config-if)#ip address 192.168.100.1 255.255.255.0
R1(config-if)#no shutdown
R1(config-if)# vrrp 22 ip 192.168.100.254  // Group Number
R1(config-if)#vrrp 22 timers advertise 5  //Set the advertisement timers
R1(config-if)#exit

R1(config)# ip route 33.33.33.33 255.255.255.255 Serial0/0
R1(config-router)#end

R1#wr
Warning: Attempting to overwrite an NVRAM configuration previously written by a different version of the system image.
Overwrite the previous NVRAM configuration?[confirm]
Building configuration...
[OK]

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R2 Configuration
R2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#interface serial 0/0
R2(config-if)#description "<<Connected to the R-3>>"
R2(config-if)#ip address 172.16.1.9 255.255.255.252
R2(config-if)#clockrate 128000
R2(config-if)#no shutdown
R2(config-if)#exit

R2(config)#interface FastEthernet1/0
R2(config-if)#ip address 192.168.100.2 255.255.255.0
R2(config-if)#no shutdown
R2(config-if)#vrrp 22 ip 192.168.100.254 // Group Number
R2(config-if)#vrrp 22 timer learn // Learn timer values from current Master.
R2(config-if)#exit

R2(config)# ip route 33.33.33.33 255.255.255.255 Serial0/0
R2(config-router)#end

R2#wr
Warning: Attempting to overwrite an NVRAM configuration previously written
by a different version of the system image.
Overwrite the previous NVRAM configuration?[confirm]
Building configuration...  [OK]

Here in VRRP Preemption is automatic enable.

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R4#ping 33.33.33.33
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 33.33.33.33, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 16/47/64 ms
R4#traceroute 33.33.33.33
Type escape sequence to abort.
Tracing the route to 33.33.33.33

1 192.168.100.2 80 msec 56 msec 20 msec
2 172.16.1.10 104 msec * 36 msec
Note: PC50 ping in the R-3 Loopback 33.33.33.33 packets are go via R-2 because R2 is Master here
Now I will shutdown the R-2 interface let see what will happen

Here I am going to ping in the repeat at the same time I will go to the R2 fa1/0 and shutdown

R4#ping 33.33.33.33 repeat 666

Type escape sequence to abort.
Sending 666, 100-byte ICMP Echos to 33.33.33.33, timeout is 2 seconds:
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Success rate is 99 percent (665/666), round-trip min/avg/max = 8/47/136 ms
R4#

R2(config)#int fa1/0
R2(config-if)#shutdown
R2(config-if)#
*Mar 1 00:22:16.039: %VRRP-6-STATECHANGE: Fa1/0 Grp 22 state Master -> Init
R2(config-if)#
*Mar 1 00:22:18.039: %LINK-5-CHANGED: Interface FastEthernet1/0, changed state to administratively down
*Mar 1 00:22:19.039: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0, changed state to down
R2(config-if)#

Fantastic no any packet is not drop humm !!! Due to VRRP.
R1#show vrrp
FastEthernet1/0 - Group 22
  State is Master
  Virtual IP address is 192.168.100.254
  Virtual MAC address is 0000.5e00.0116
  Advertisement interval is 1.000 sec
  Preemption enabled
  Priority is 100
  Master Router is 192.168.100.1 (local), priority is 100
  Master Advertisement interval is 1.000 sec
  Master Down interval is 3.609 sec

R2#
R2#show vrrp
FastEthernet1/0 - Group 22
  State is Init
  Virtual IP address is 192.168.100.254
  Virtual MAC address is 0000.5e00.0116
  Advertisement interval is 1.000 sec
  Preemption enabled
  Priority is 100
  Master Router is unknown, priority is unknown
  Master Advertisement interval is unknown
  Master Down interval is unknown

When R-2 fa1/0 interface will comes up the R1 VRRS becomes Master

R2(config)#int fa1/0
R2(config-if)#no shutdown
R2(config-if)#end

R2#
R2#
R2#wr
Building configuration...

R2#show vrrp
FastEthernet1/0 - Group 22
  State is Backup
  Virtual IP address is 192.168.100.254
  Virtual MAC address is 0000.5e00.0116
  Advertisement interval is 1.000 sec
  Preemption enabled
  Priority is 100
Master Router is 192.168.100.1, priority is 100
Master Advertisement interval is 1.000 sec
Master Down interval is 3.609 sec (expires in 2.745 sec)

R2#

R1#show vrrp
FastEthernet1/0 - Group 22
  State is Master
  Virtual IP address is 192.168.100.254
  Virtual MAC address is 0000.5e00.0116
  Advertisement interval is 1.000 sec
  Preemption enabled
  Priority is 100
  Master Router is 192.168.100.1 (local), priority is 100
  Master Advertisement interval is 1.000 sec
  Master Down interval is 3.609 sec

PC50#traceroute 33.33.33.33

Type escape sequence to abort.
Tracing the route to 33.33.33.33

    1 192.168.100.1 124 msec 68 msec 80 msec
    2 172.16.1.6 140 msec * 44 msec

PC50#

Good Luck
Authentication and Track is same in HSRP
Please check that yourself