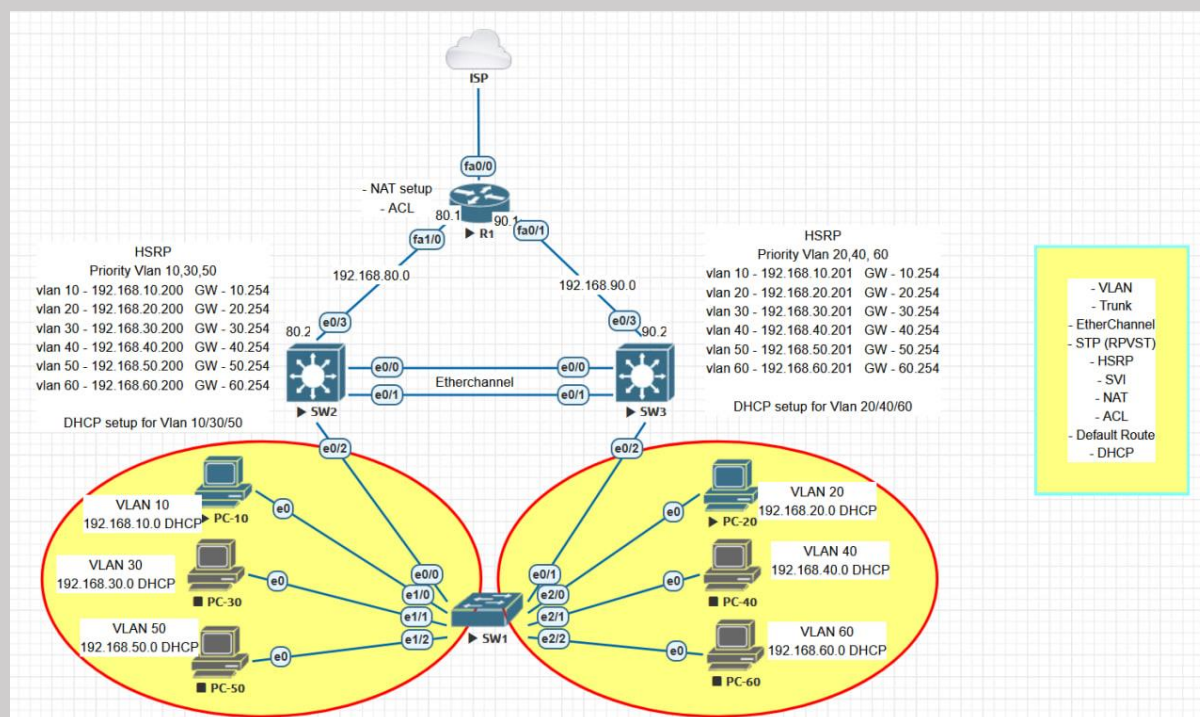


Switching Lab



According to the Switching Lab Diagram, we will make below configuration in SW1.

- 1) Changing the host name and create vlan.
Switch(config)#hostname SW1

```
SW1(config)#vlan 10
SW1(config-vlan)#vlan 20
SW1(config-vlan)#vlan 30
SW1(config-vlan)#vlan 40
SW1(config-vlan)#vlan 50
SW1(config-vlan)#vlan 60
SW1(config-vlan)#exit
```

- 2) Matching VLAN ID and port as follow.

<i>interface Ethernet1/0</i> <i>switchport access vlan 10</i> <i>switchport mode access</i>	<i>interface Ethernet2/0</i> <i>switchport access vlan 20</i> <i>switchport mode access</i>
<i>interface Ethernet1/1</i> <i>switchport access vlan 30</i> <i>switchport mode access</i>	<i>interface Ethernet2/1</i> <i>switchport access vlan 40</i> <i>switchport mode access</i>
<i>interface Ethernet1/2</i> <i>switchport access vlan 50</i> <i>switchport mode access</i>	<i>interface Ethernet2/2</i> <i>switchport access vlan 60</i> <i>switchport mode access</i>

- 3) Then, make switchport trunk mode to the ports which connected to upper switch (distribution SW)
- ```
interface Ethernet0/0
switchport trunk encapsulation dot1q
switchport mode trunk
!
interface Ethernet0/1
switchport trunk encapsulation dot1q
switchport mode trunk
```

Then, in Distribution SW, SW2 and SW3 we have to do the following configuration.

- IP Assign, Routing Protocol, VLAN, Etherchannel, STP, HSRP, DHCP, Default Route to Router

First, make configuration in SW2

- 1) Create VLAN

```
Switch(config)#hostname SW2
SW2(config)#vlan 10
SW2(config-vlan)#vlan 20
SW2(config-vlan)#vlan 30
SW2(config-vlan)#vlan 40
SW2(config-vlan)#vlan 50
SW2(config-vlan)#vlan 60
SW2(config-vlan)#exit
```
- 2) IP Assign for interface which connected to Router

```
SW2(config)#int e0/3
SW2(config-if)#no switchport
SW2(config-if)#ip address 192.168.80.2 255.255.255.0
SW2(config-if)#exit
```
- 3) Configure Etherchannel between SW2 and SW3

```
SW2(config)#int range e0/0-1
SW2(config-if-range)#channel-group 1 mode active
SW2(config-if-range)#switchport trunk encapsulation dot1q
SW2(config-if-range)#switchport mode trunk
SW2(config-if-range)#switchport trunk allowed vlan all
SW2(config-if-range)#exit
```

#### 4) Configure HSRP for each VLAN

First, we have to make track for uplink interface. If uplink is down, traffic will go through another path. Track no can be define as desire between 1-1000.

```
SW2(config)#track 1 interface e0/3 line-protocol
```

In SW2 we will make VLAN 10,30,50 as Active and VLAN 20,40,60 as Standby.

Below is the configuration as above said.

```
SW2(config)#interface vlan 10
SW2(config-if)#ip address 192.168.10.200 255.255.255.0
SW2(config-if)#standby 1 ip 192.168.10.254
SW2(config-if)#standby 1 priority 120
SW2(config-if)#standby 1 preempt
SW2(config-if)#standby 1 track 1 decrement 30
SW2(config-if)#no shut
```

```
SW2(config)#int vlan 20
SW2(config-if)#ip address 192.168.20.200 255.255.255.0
SW2(config-if)#standby 1 ip 192.168.20.254
SW2(config-if)#standby 1 preempt
SW2(config-if)#no sh
```

```
SW2(config)#interface vlan 30
SW2(config-if)#ip address 192.168.30.200 255.255.255.0
SW2(config-if)#standby 1 ip 192.168.30.254
SW2(config-if)#standby 1 priority 120
SW2(config-if)#standby 1 preempt
SW2(config-if)#standby 1 track 1 decrement 30
SW2(config-if)#no shut
```

```
SW2(config)#int vlan 40
SW2(config-if)#ip address 192.168.40.200 255.255.255.0
SW2(config-if)#standby 1 ip 192.168.40.254
SW2(config-if)#standby 1 preempt
SW2(config-if)#no sh
```

```
SW2(config-if)#int vlan 50
SW2(config-if)#ip address 192.168.50.200 255.255.255.0
SW2(config-if)#standby 1 ip 192.168.50.254
SW2(config-if)#standby 1 priority 120
SW2(config-if)#standby 1 preempt
SW2(config-if)#standby 1 track 1 decrement 30
SW2(config-if)#no sh
```

```
SW2(config-if)#int vlan 60
SW2(config-if)#ip address 192.168.60.200 255.255.255.0
SW2(config-if)#standby 1 ip 192.168.60.254
SW2(config-if)#standby 1 preempt
SW2(config-if)#no sh
```

- 5) In SW2, we will make DHCP server for VLAN 10,30,50  
We also have to exclude the ip address of VLAN and HSRP in DHCP configuration.

Here is the DHCP configuration for SW2

```
SW2(config)#ip dhcp excluded-address 192.168.10.200
SW2(config)#ip dhcp excluded-address 192.168.10.201
SW2(config)#ip dhcp excluded-address 192.168.10.254
SW2(config)#ip dhcp excluded-address 192.168.30.200
SW2(config)#ip dhcp excluded-address 192.168.30.201
SW2(config)#ip dhcp excluded-address 192.168.30.254
SW2(config)#ip dhcp excluded-address 192.168.50.200
SW2(config)#ip dhcp excluded-address 192.168.50.201
SW2(config)#ip dhcp excluded-address 192.168.50.254
```

```
SW2(config)#ip dhcp pool VLAN10
SW2(dhcp-config)#network 192.168.10.0 255.255.255.0
SW2(dhcp-config)#default-router 192.168.10.254
SW2(dhcp-config)#dns-server 8.8.8.8
SW2(dhcp-config)#exit
```

```
SW2(config)#ip dhcp pool VLAN30
SW2(dhcp-config)#network 192.168.30.0 255.255.255.0
SW2(dhcp-config)#default-router 192.168.30.254
SW2(dhcp-config)#dns-server 8.8.8.8
SW2(dhcp-config)#exit
```

```
SW2(config)#ip dhcp pool VLAN50
SW2(dhcp-config)#network 192.168.50.0 255.255.255.0
SW2(dhcp-config)#default-router 192.168.50.254
SW2(dhcp-config)#dns-server 8.8.8.8
SW2(dhcp-config)#exit
```

- 6) In SW2, we make spanning tree Root port for VLAN 10,30,50
- ```
SW2(config)#spanning-tree mode pvst
SW2(config)#spanning-tree vlan 10,30,50 root primary
```

- 7) Then, setup OSPF routing protocol

```
SW2(config)#router ospf 1
SW2(config-router)#network 192.168.10.0 0.0.0.255 area 0
SW2(config-router)#network 192.168.20.0 0.0.0.255 area 0
SW2(config-router)#network 192.168.30.0 0.0.0.255 area 0
SW2(config-router)#network 192.168.40.0 0.0.0.255 area 0
SW2(config-router)#network 192.168.50.0 0.0.0.255 area 0
SW2(config-router)#network 192.168.60.0 0.0.0.255 area 0
SW2(config-router)#network 192.168.80.0 0.0.0.255 area 0
```

- 8) The last thing is to write static route to go out the traffic to Router.
- ```
SW2(config-if)#ip route 0.0.0.0 0.0.0.0 192.168.80.1
```

These above 8 steps are we have to make configuration in SW2.

In SW3, we have to do the same procedure (8 steps) as we did in SW2.  
Just changing some necessary thing. Below is the configuration for SW3.

```
Switch(config)#hostname SW3
```

```
SW3(config)#vlan 10
SW3(config-vlan)#vlan 20
SW3(config-vlan)#vlan 30
SW3(config-vlan)#vlan 40
SW3(config-vlan)#vlan 50
SW3(config-vlan)#vlan 60
SW3(config-vlan)#exit
```

```
SW3(config)#int e0/3
SW3(config-if)#no switchport
SW3(config-if)#ip address 192.168.90.2 255.255.255.0
SW3(config-if)#exit
```

```
SW3(config)#int range e0/0-1
SW3(config-if-range)#channel-group 1 mode passive
SW3(config-if-range)#switchport trunk encapsulation dot1q
SW3(config-if-range)#switchport mode trunk
SW3(config-if-range)#switchport trunk allowed vlan all
SW3(config-if-range)#exit
```

```
SW3(config)#track 1 interface e0/3 line-protocol
```

```
SW3(config-if)#int vlan 10
SW3(config-if)#ip address 192.168.10.201 255.255.255.0
SW3(config-if)#standby 1 ip 192.168.10.254
SW3(config-if)#standby 1 preempt
SW3(config-if)#no sh
SW3(config-if)#int vlan 20
SW3(config-if)#ip address 192.168.20.201 255.255.255.0
SW3(config-if)#standby 1 ip 192.168.20.254
SW3(config-if)#standby 1 priority 120
SW3(config-if)#standby 1 preempt
SW3(config-if)#standby 1 track 1 decrement 30
SW3(config-if)#no sh
SW3(config-if)#int vlan 30
SW3(config-if)#ip address 192.168.30.201 255.255.255.0
SW3(config-if)#standby 1 ip 192.168.30.254
SW3(config-if)#standby 1 preempt
SW3(config-if)#no sh
SW3(config-if)#int vlan 40
SW3(config-if)#ip address 192.168.40.201 255.255.255.0
SW3(config-if)#standby 1 ip 192.168.40.254
SW3(config-if)#standby 1 priority 120
SW3(config-if)#standby 1 preempt
```



```
SW3(config-if)#standby 1 track 1 decrement 30
SW3(config-if)#no sh
SW3(config-if)#int vlan 50
SW3(config-if)#ip address 192.168.50.201 255.255.255.0
SW3(config-if)#standby 1 ip 192.168.50.254
SW3(config-if)#standby 1 preempt
SW3(config-if)#no sh
SW3(config-if)#int vlan 60
SW3(config-if)#ip address 192.168.60.201 255.255.255.0
SW3(config-if)#standby 1 ip 192.168.60.254
SW3(config-if)#standby 1 priority 120
SW3(config-if)#standby 1 preempt
SW3(config-if)#standby 1 track 1 decrement 30
SW3(config-if)#no sh
```

```
SW3(config)#ip dhcp excluded-address 192.168.20.200
SW3(config)#ip dhcp excluded-address 192.168.20.201
SW3(config)#ip dhcp excluded-address 192.168.20.254
SW3(config)#ip dhcp excluded-address 192.168.40.201
SW3(config)#ip dhcp excluded-address 192.168.40.200
SW3(config)#ip dhcp excluded-address 192.168.40.254
SW3(config)#ip dhcp excluded-address 192.168.60.200
SW3(config)#ip dhcp excluded-address 192.168.60.201
SW3(config)#ip dhcp excluded-address 192.168.60.254
SW3(config)#ip dhcp pool VLAN20
SW3(dhcp-config)#network 192.168.20.0 255.255.255.0
SW3(dhcp-config)#default-router 192.168.20.254
SW3(dhcp-config)#dns-server 8.8.8.8
SW3(dhcp-config)#exit
SW3(config)#ip dhcp pool VLAN40
SW3(dhcp-config)#network 192.168.40.0 255.255.255.0
SW3(dhcp-config)#default-router 192.168.40.254
SW3(dhcp-config)#dns-server 8.8.8.8
SW3(dhcp-config)#exit
SW3(config)#ip dhcp pool VLAN60
SW3(dhcp-config)#network 192.168.60.0 255.255.255.0
SW3(dhcp-config)#default-router 192.168.60.254
SW3(dhcp-config)#dns-server 8.8.8.8
SW3(dhcp-config)#exit
```

```
SW3(config)#spanning-tree mode pvst
SW3(config)#spanning-tree vlan 20,40,60 root primary
```

```
SW3(config)#router ospf 1
SW3(config-router)#network 192.168.10.0 0.0.0.255 area 0
SW3(config-router)#network 192.168.20.0 0.0.0.255 area 0
SW3(config-router)#network 192.168.30.0 0.0.0.255 area 0
SW3(config-router)#network 192.168.40.0 0.0.0.255 area 0
SW3(config-router)#network 192.168.50.0 0.0.0.255 area 0
SW3(config-router)#network 192.168.60.0 0.0.0.255 area 0
SW3(config-router)#network 192.168.90.0 0.0.0.255 area 0
```

```
SW3(config-router)#exit
```

```
SW3(config-if)#ip route 0.0.0.0 0.0.0.0 192.168.90.1
```

**Now, Let's make configuration in Router to get the internet for end user device.**

In router, we have to do the following configuration.

- Request DHCP from ISP, Assign IP address for interface, NAT, ACL and Routing Protocol

- 1) First, request DHCP from ISP for the port which connect to the ISP Modem.

```
!
interface FastEthernet0/0
ip address dhcp
ip nat outside
ip virtual-reassembly
speed 100
full-duplex
!
```

- 2) Assign IP Address for the ports which connect to distribution switch (SW2 and SW3)

```
!
interface FastEthernet0/1
ip address 192.168.90.1 255.255.255.0
ip nat inside
ip virtual-reassembly
speed 100
full-duplex
!
interface FastEthernet1/0
ip address 192.168.80.1 255.255.255.0
ip nat inside
ip virtual-reassembly
duplex auto
speed auto
!
```

- 3) Then, setup ospf routing protocol

```
!
router ospf 1
log-adjacency-changes
network 192.168.80.0 0.0.0.255 area 0
network 192.168.90.0 0.0.0.255 area 0
```

- 4) Then, setup NAT and ACL

```
!
ip nat inside source list 10 interface FastEthernet0/0 overload
!
access-list 10 permit any
!
```

Now, All configuration is done. It's the time for checking our configuration is working correctly or not.

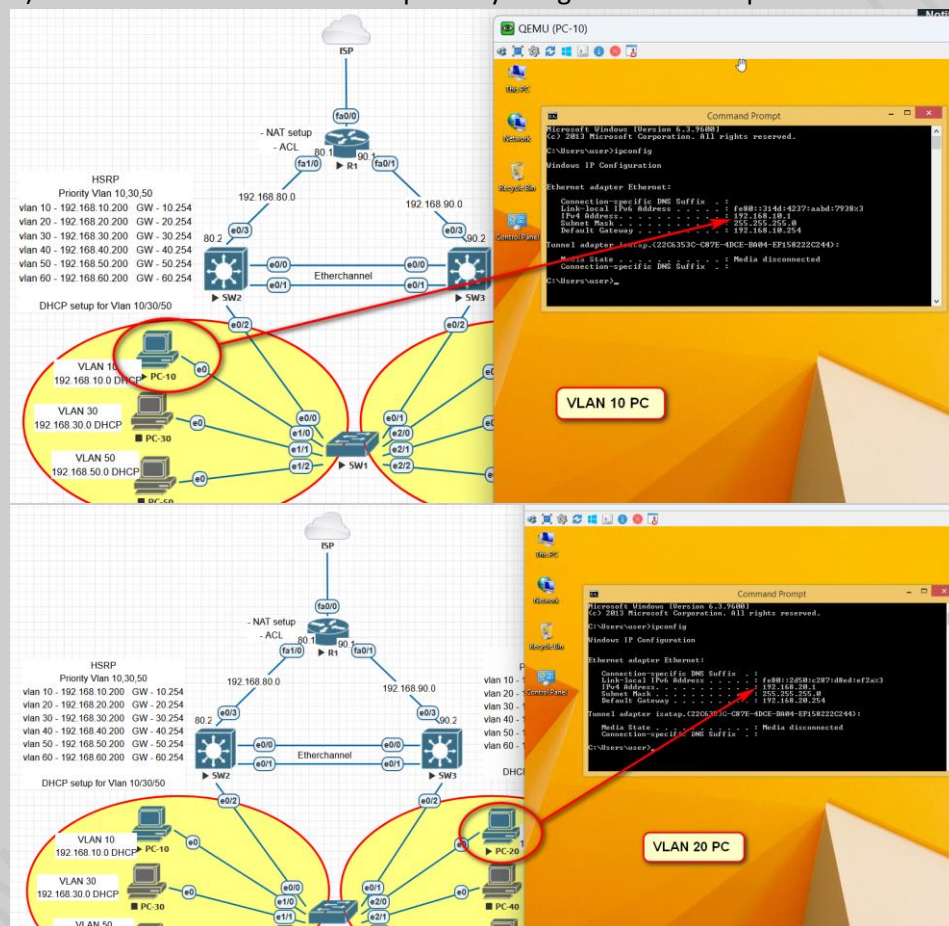
1) In SW1 check VLAN and port number are correct or not.

```
SW1 - [SW1]
File Edit View Options Transfer Script Tools Window Help
Enter host <Alt+R>
SW1#sh vl br
```

| VLAN | Name               | Status    | Ports                      |
|------|--------------------|-----------|----------------------------|
| 1    | default            | active    | Et0/2, Et0/3, Et1/3, Et2/3 |
| 10   | VLAN0010           | active    | Et1/0                      |
| 20   | VLAN0020           | active    | Et2/0                      |
| 30   | VLAN0030           | active    | Et1/1                      |
| 40   | VLAN0040           | active    | Et2/1                      |
| 50   | VLAN0050           | active    | Et1/2                      |
| 60   | VLAN0060           | active    | Et2/2                      |
| 1002 | fddi-default       | act/unsup |                            |
| 1003 | token-ring-default | act/unsup |                            |
| 1004 | fddinet-default    | act/unsup |                            |
| 1005 | trnet-default      | act/unsup |                            |

```
SW1#
```

2) Let's see vlan 10 and vlan 20 pc. They can get the correct ip address or not.



According to above picture, PC from vlan 10 and vlan 20 get the correct ip address.



3) Now, let's see they can get internet or not.

QEMU (PC-10)

Command Prompt

Connection-specific DNS Suffix . : fe80::314d:4237:aabd:7938%3  
Link-local IPv6 Address . . . . . : fe80::314d:4237:aabd:7938%3  
IPv4 Address. . . . . : 192.168.10.1  
Subnet Mask . . . . . : 255.255.255.0  
Default Gateway . . . . . : 192.168.10.254  
Tunnel adapter {22C6353C-C87E-4DCE-BA04-EF158222C244}:  
Media State . . . . . : Media disconnected  
Connection-specific DNS Suffix . :  
C:\Users\user>ping 8.8.8.8  
Pinging 8.8.8.8 with 32 bytes of data:  
Reply from 8.8.8.8: bytes=32 time=238ms TTL=126  
Reply from 8.8.8.8: bytes=32 time=55ms TTL=126  
Reply from 8.8.8.8: bytes=32 time=390ms TTL=126  
Reply from 8.8.8.8: bytes=32 time=737ms TTL=126  
Ping statistics for 8.8.8.8:  
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
Approximate round trip times in milli-seconds:  
Minimum = 55ms, Maximum = 737ms, Average = 355ms  
C:\Users\user>

QEMU (PC-20)

Command Prompt

Connection-specific DNS Suffix . : fe80::2d50:c287:d8ed:ef2a%3  
Link-local IPv6 Address . . . . . : fe80::2d50:c287:d8ed:ef2a%3  
IPv4 Address. . . . . : 192.168.20.1  
Subnet Mask . . . . . : 255.255.255.0  
Default Gateway . . . . . : 192.168.20.254  
Tunnel adapter {22C6353C-C87E-4DCE-BA04-EF158222C244}:  
Media State . . . . . : Media disconnected  
Connection-specific DNS Suffix . :  
C:\Users\user>ping 8.8.8.8  
Pinging 8.8.8.8 with 32 bytes of data:  
Reply from 8.8.8.8: bytes=32 time=1809ms TTL=126  
Request timed out.  
Reply from 8.8.8.8: bytes=32 time=532ms TTL=126  
Reply from 8.8.8.8: bytes=32 time=459ms TTL=126  
Ping statistics for 8.8.8.8:  
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),  
Approximate round trip times in milli-seconds:  
Minimum = 459ms, Maximum = 1809ms, Average = 933ms  
C:\Users\user>

Now, PC from VLAN 10 and 20 get the internet.

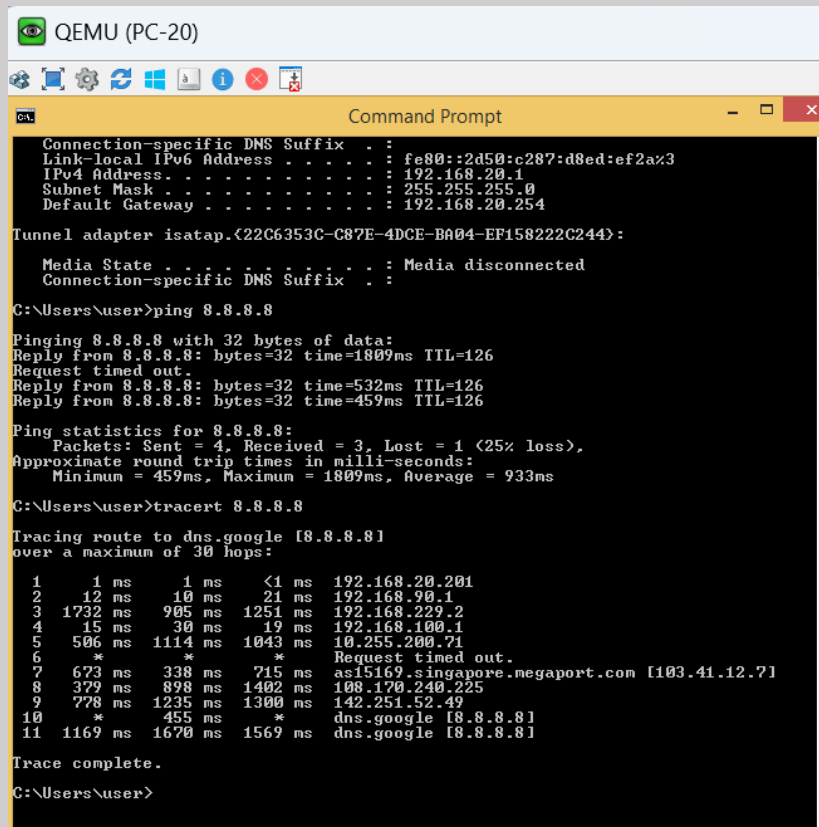
4) Let's check PC 10 and PC 20 go to internet from which Distribution SW, SW2 or SW3.

QEMU (PC-10)

Command Prompt

Connection-specific DNS Suffix . :  
Link-local IPv6 Address . . . . . : fe80::314d:4237:aabd:7938%3  
IPv4 Address. . . . . : 192.168.10.1  
Subnet Mask . . . . . : 255.255.255.0  
Default Gateway . . . . . : 192.168.10.254  
Tunnel adapter {22C6353C-C87E-4DCE-BA04-EF158222C244}:  
Media State . . . . . : Media disconnected  
Connection-specific DNS Suffix . :  
C:\Users\user>ping 8.8.8.8  
Pinging 8.8.8.8 with 32 bytes of data:  
Reply from 8.8.8.8: bytes=32 time=238ms TTL=126  
Reply from 8.8.8.8: bytes=32 time=55ms TTL=126  
Reply from 8.8.8.8: bytes=32 time=390ms TTL=126  
Reply from 8.8.8.8: bytes=32 time=737ms TTL=126  
Ping statistics for 8.8.8.8:  
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
Approximate round trip times in milli-seconds:  
Minimum = 55ms, Maximum = 737ms, Average = 355ms  
C:\Users\user>tracert 8.8.8.8  
Tracing route to dns.google [8.8.8.8]  
over a maximum of 30 hops:  
 0 1 ms <1 ms <1 ms 192.168.10.200  
 1 7 ms 9 ms 9 ms 192.168.80.1  
 2 1520 ms 1034 ms 646 ms 192.168.229.2  
 3 493 ms \* 946 ms 192.168.100.1  
 4 2137 ms 43 ms 395 ms 10.255.200.71  
 5 \* \* \* Request timed out.  
 6 \* 864 ms 953 ms as15169.singapore.megaport.com [103.41.12.7]  
 7 1071 ms 609 ms 1357 ms 108.170.240.225  
 8 1683 ms 1355 ms 1116 ms 142.251.52.49  
 9 233 ms 592 ms 496 ms dns.google [8.8.8.8]  
Trace complete.  
C:\Users\user>

PC from VLAN 10 pass through SW2 switch and going to internet from 192.168.80.0 network.



```

QEMU (PC-20)
Command Prompt
Connection-specific DNS Suffix . :
Link-local IPv6 Address : fe80::2d50:c287:d8ed:ef2a%3
IPv4 Address. : 192.168.20.1
Subnet Mask : 255.255.255.0
Default Gateway : 192.168.20.254

Tunnel adapter isatap.{22C6353C-C87E-4DCE-B404-EF158222C244}:
Media State : Media disconnected
Connection-specific DNS Suffix . :

C:\Users\user>ping 8.8.8.8

Pinging 8.8.8.8 with 32 bytes of data:
Reply from 8.8.8.8: bytes=32 time=1809ms TTL=126
Request timed out.
Reply from 8.8.8.8: bytes=32 time=532ms TTL=126
Reply from 8.8.8.8: bytes=32 time=459ms TTL=126

Ping statistics for 8.8.8.8:
 Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
 Approximate round trip times in milli-seconds:
 Minimum = 459ms, Maximum = 1809ms, Average = 933ms

C:\Users\user>tracert 8.8.8.8

Tracing route to dns.google [8.8.8.8]
over a maximum of 30 hops:
 0 1 ms 1 ms <1 ms 192.168.20.1
 1 12 ms 10 ms 21 ms 192.168.90.1
 2 1732 ms 905 ms 1251 ms 192.168.229.2
 3 15 ms 30 ms 19 ms 192.168.100.1
 4 506 ms 1114 ms 1043 ms 10.255.200.71
 5 * * * Request timed out.
 6 673 ms 338 ms 715 ms as15169.singapore.megaport.com [103.41.12.7]
 7 379 ms 898 ms 1402 ms 108.170.240.225
 8 778 ms 1235 ms 1300 ms 142.251.52.49
 9 * 455 ms * dns.google [8.8.8.8]
 10 1169 ms 1670 ms 1569 ms dns.google [8.8.8.8]

Trace complete.

C:\Users\user>

```

PC from VLAN 20 pass through SW3 switch and going to internet from 192.168.90.0 network.

- 5) Currently, VLAN 10 PC go to internet from 192.168.80.0 network, uplink of SW2 switch. And, VLAN 20 PC go through 192.168.90.0 network. Now, it's time for checking HSRP. Let's see the HSRP in SW2 and SW3.

SW2#sh standby brief

P indicates configured to preempt.

|

| Interface   | Grp      | Pri        | P        | State         | Active         | Standby        | Virtual IP     |
|-------------|----------|------------|----------|---------------|----------------|----------------|----------------|
| <b>VI10</b> | <b>1</b> | <b>120</b> | <b>P</b> | <b>Active</b> | local          | 192.168.10.201 | 192.168.10.254 |
| VI20        | 1        | 100        | P        | Standby       | 192.168.20.201 | local          | 192.168.20.254 |
| <b>VI30</b> | <b>1</b> | <b>120</b> | <b>P</b> | <b>Active</b> | local          | 192.168.30.201 | 192.168.30.254 |
| VI40        | 1        | 100        | P        | Standby       | 192.168.40.201 | local          | 192.168.40.254 |
| <b>VI50</b> | <b>1</b> | <b>120</b> | <b>P</b> | <b>Active</b> | local          | 192.168.50.201 | 192.168.50.254 |
| VI60        | 1        | 100        | P        | Standby       | 192.168.60.201 | local          | 192.168.60.254 |

SW2#

SW3#sh standby brief

P indicates configured to preempt.

|

| Interface   | Grp      | Pri        | P        | State         | Active         | Standby        | Virtual IP     |
|-------------|----------|------------|----------|---------------|----------------|----------------|----------------|
| VI10        | 1        | 100        | P        | Standby       | 192.168.10.200 | local          | 192.168.10.254 |
| <b>VI20</b> | <b>1</b> | <b>120</b> | <b>P</b> | <b>Active</b> | local          | 192.168.20.200 | 192.168.20.254 |
| VI30        | 1        | 100        | P        | Standby       | 192.168.30.200 | local          | 192.168.30.254 |
| <b>VI40</b> | <b>1</b> | <b>120</b> | <b>P</b> | <b>Active</b> | local          | 192.168.40.200 | 192.168.40.254 |
| VI50        | 1        | 100        | P        | Standby       | 192.168.50.200 | local          | 192.168.50.254 |
| <b>VI60</b> | <b>1</b> | <b>120</b> | <b>P</b> | <b>Active</b> | local          | 192.168.60.200 | 192.168.60.25  |

SW3#

Now, let's check the internet traffic path of VLAN 10 and 20 PC if uplink of SW2 is down.

The image shows a network diagram on the left and two command-line windows on the right. The diagram illustrates a network with three VLANs (10, 30, 50) connected to two switches (SW2 and SW3) via a shared uplink (e0/3). SW2 is configured with HSRP for these VLANs, with SW3 as the standby. The command-line windows show the configuration of SW2 and the output of a traceroute command, indicating that traffic for VLAN 10 and 20 PC is being routed through SW3 and the internet when the uplink of SW2 is down.

**SW2 Configuration:**

```

SW2(config)#int e0/3
SW2(config-if)#sh
*Feb 4 07:55:10.051: %TRACK-6-STATE: 1 interface Et0/3 line-protocol Up -> Down
SW2(config-if)#
*Feb 4 07:55:10.056: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.229.148 on Ethernet0/3 from FULL to DOWN: Neighbor Down: Interface down or detached
*Feb 4 07:55:10.166: %HSRP-5-STATECHANGE: Vlan10 Grp 1 state Active -> Standby
SW2(config-if)#
*Feb 4 07:55:11.512: %HSRP-5-STATECHANGE: Vlan30 Grp 1 state Active -> Standby
SW2(config-if)#
*Feb 4 07:55:12.053: %LINK-5-CHANGED: Interface Ethernet0/3, changed state to administratively down
SW2(config-if)#
*Feb 4 07:55:12.570: %HSRP-5-STATECHANGE: Vlan50 Grp 1 state Active -> Standby
SW2(config-if)#
*Feb 4 07:55:20.279: %HSRP-5-STATECHANGE: Vlan10 Grp 1 state Standby -> Standby
SW2(config-if)#
*Feb 4 07:55:23.151: %HSRP-5-STATECHANGE: Vlan30 Grp 1 state Standby -> Standby
SW2(config-if)#
*Feb 4 07:55:24.133: %HSRP-5-STATECHANGE: Vlan50 Grp 1 state Standby -> Standby
SW2(config-if)#

```

**Traceroute Output:**

```

C:\Users\user>tracert 8.8.8.8
Tracing route to dns.google [8.8.8.8]
over a maximum of 30 hops:
 0 3 ms <1 ms <1 ms 192.168.10.200
 1 8 ms 9 ms 9 ms 192.168.88.1
 2 21 ms 20 ms 20 ms 192.168.229.2
 3 21 ms 19 ms 22 ms 192.168.100.1
 4 14 ms 20 ms 20 ms 10.255.200.1
 5 * * * Request timed out.
 6 35 ms 63 ms 83 ms as15169.singapore.megaopt.com [103.41.48.55]
 7 45 ms 52 ms 52 ms 108.170.240.225
 8 33 ms 52 ms 42 ms 142.251.52.49
 9 68 ms 39 ms 41 ms dns.google [8.8.8.8]
Trace complete.

```

When shutdown the uplink (e0/3) port of SW2, traffic go through SW3 and internet go out from 192.168.90.0 network. And HSRP state of Vlan 10,30,50 in SW2 are go to standby state and these will be Active in SW3.

The screenshot shows the command-line interface of SW3, displaying the HSRP state changes for VLANs 10, 30, and 50. The states are transitioning from Standby to Active.

```

SW3#wr
Building configuration...
Compressed configuration from 3093 bytes to 1547 bytes[OK]
SW3#
*Feb 4 07:55:10.164: %HSRP-5-STATECHANGE: Vlan10 Grp 1 state Standby -> Active
SW3#
*Feb 4 07:55:11.512: %HSRP-5-STATECHANGE: Vlan30 Grp 1 state Standby -> Active
SW3#
*Feb 4 07:55:12.568: %HSRP-5-STATECHANGE: Vlan50 Grp 1 state Standby -> Active
SW3#

```

When uplink (e0/3) port of SW2 is up, Vlan 10,30,50 will be Active in SW2 and Standby in SW3

The image shows two command-line windows. The left window shows the HSRP state changes on SW2, where the states transition from Standby to Active. The right window shows the HSRP state changes on SW3, where the states transition from Active to Standby.

```

SW2 - [SW2]
*Feb 4 07:55:24.133: %HSRP-5-STATECHANGE: Vlan50 Grp 1 state Standby -> Standby
SW2(config-if)#no sh
SW2(config-if)#
*Feb 4 08:03:14.426: %TRACK-6-STATE: 1 interface Et0/3 line-protocol Up -> Up
SW2(config-if)#
*Feb 4 08:03:14.918: %HSRP-5-STATECHANGE: Vlan30 Grp 1 state Standby -> Active
*Feb 4 08:03:14.987: %HSRP-5-STATECHANGE: Vlan10 Grp 1 state Standby -> Active
*Feb 4 08:03:16.065: %LINK-3-UPDOWN: Interface Ethernet0/3, changed state to up
SW2(config-if)#
*Feb 4 08:03:16.489: %HSRP-5-STATECHANGE: Vlan50 Grp 1 state Standby -> Active
*Feb 4 08:03:17.072: %LINEPROTO-5-UPDOWN: Line protocol on I
interface Ethernet0/3, changed state to up
*Feb 4 08:03:17.113: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.

SW3 - [SW3]
Compressed configuration from 3093 bytes to 1547 bytes[OK]
SW3#
*Feb 4 07:55:10.164: %HSRP-5-STATECHANGE: Vlan10 Grp 1 state Standby -> Active
SW3#
*Feb 4 07:55:11.512: %HSRP-5-STATECHANGE: Vlan30 Grp 1 state Standby -> Active
SW3#
*Feb 4 07:55:12.568: %HSRP-5-STATECHANGE: Vlan50 Grp 1 state Standby -> Active
SW3#
*Feb 4 08:03:14.920: %HSRP-5-STATECHANGE: Vlan30 Grp 1 state Active -> Speak
*Feb 4 08:03:14.988: %HSRP-5-STATECHANGE: Vlan10 Grp 1 state Active -> Speak
*Feb 4 08:03:16.491: %HSRP-5-STATECHANGE: Vlan50 Grp 1 state Active -> Speak
SW3#
*Feb 4 08:03:25.877: %HSRP-5-STATECHANGE: Vlan30 Grp 1 state Speak -> Standby
SW3#
*Feb 4 08:03:26.991: %HSRP-5-STATECHANGE: Vlan10 Grp 1 state Speak -> Standby
SW3#
*Feb 4 08:03:28.464: %HSRP-5-STATECHANGE: Vlan50 Grp 1 state Speak -> Standby
SW3#

```

So, it means that HSRP configuration is working well.

It will be the same if we shutdown uplink of SW3.

## 6) Checking the Root Bridge for each VLAN.

SW2 - [SW2]

```

SW2#sh spanning-tree vlan 10-60 summary
Switch is in pvst mode
Root bridge for VLAN0010 is this bridge.
Root bridge for VLAN0020 is 24596.aabb.cc00.9000.
Root bridge for VLAN0030 is this bridge.
Root bridge for VLAN0040 is 24616.aabb.cc00.9000.
Root bridge for VLAN0050 is this bridge.
Root bridge for VLAN0060 is 24636.aabb.cc00.9000.
Extended system ID is enabled
Portfast Default is disabled
Portfast Edge BPDU Guard Default is disabled
Portfast Edge BPDU Filter Default is disabled
Loopguard Default is disabled
PVST Simulation Default is enabled but inactive in pvst mode
Bridge Assurance is enabled but inactive in pvst mode
EtherChannel misconfig guard is enabled
Configured Pathcost method used is short
UplinkFast is disabled
BackboneFast is disabled

Name Blocking Listening Learning Forwarding STP Active

VLAN0010 0 0 0 2 2
Name Blocking Listening Learning Forwarding STP Active

VLAN0020 0 0 0 2 2
VLAN0030 0 0 0 2 2
VLAN0040 0 0 0 2 2
VLAN0050 0 0 0 2 2
VLAN0060 0 0 0 2 2
SW2#

```

SW3 - [SW3]

```

SW3#sh spanning-tree vlan 10-60 summary
Switch is in pvst mode
Root bridge for VLAN0010 is 24586.aabb.cc00.8000.
Root bridge for VLAN0020 is this bridge.
Root bridge for VLAN0030 is 24606.aabb.cc00.8000.
Root bridge for VLAN0040 is this bridge.
Root bridge for VLAN0050 is 24626.aabb.cc00.8000.
Root bridge for VLAN0060 is this bridge.
Extended system ID is enabled
Portfast Default is disabled
Portfast Edge BPDU Guard Default is disabled
Portfast Edge BPDU Filter Default is disabled
Loopguard Default is disabled
PVST Simulation Default is enabled but inactive in pvst mode
Bridge Assurance is enabled but inactive in pvst mode
EtherChannel misconfig guard is enabled
Configured Pathcost method used is short
UplinkFast is disabled
BackboneFast is disabled

Name Blocking Listening Learning Forwarding STP Active

VLAN0010 0 0 0 2 2
Name Blocking Listening Learning Forwarding STP Active

VLAN0020 0 0 0 2 2
VLAN0030 0 0 0 2 2
VLAN0040 0 0 0 2 2
VLAN0050 0 0 0 2 2
VLAN0060 0 0 0 2 2
SW3#

```

SW2 is root bridge for VLAN 10,30,50.

And SW3 is root bridge for VLAN Sw20,40,60.

Thank you,  
Saw Pyi Phyoo