LAB4 - Network Configuration

Root Cause 1: R3 missing BGP neighbor configuration.

Despite R3 (the PE router) having VRF ONE set up correctly, it lacked the BGP neighbor configuration for R1 (the CE router) within the VRF ONE address-family. As a result, R3 was unable to form a BGP session with R1 in that VRF.

```
R3#sh run | sec router
router ospf 1
 log-adjacency-changes
 network 3.3.3.3 0.0.0.0 area 0
 network 192.168.3.0 0.0.0.255 area 0
 network 192.168.5.0 0.0.0.255 area 0
router bgp 100
 bgp log-neighbor-changes
 neighbor 5.5.5.5 remote-as 100
 neighbor 5.5.5.5 update-source Loopback0
 neighbor 192.168.1.1 remote-as 1
 !
 address-family ipv4
  neighbor 5.5.5.5 activate
  no neighbor 192.168.1.1 activate
  no auto-summary
  no synchronization
 exit-address-family
 !
 address-family vpnv4
  neighbor 5.5.5.5 activate
  neighbor 5.5.5.5 send-community extended
 exit-address-family
 !
 address-family ipv4 vrf ONE
  neighbor 192.168.1.1 remote-as 1
  neighbor 192.168.1.1 activate
  no synchronization
 exit-address-family
```

Root Cause 2: R1 route-map preventing VPN propagation

1

The STOP route-map on R1 injected a "no-advertise" community into its BGP updates, preventing any advertisement into the MPLS VPN.

Removed the STOP route-map (and its "no-advertise" community) from the BGP neighbor configuration on R1.
no route-map STOP permit 10
router bgp 1
no neighbor 192.168.1.2 route-map STOP out

Root Cause 3:
The OSPF session between R3 and R4 never formed, so R3 lacked the necessary MPLS labels for downstream forwarding.

Ensured all core routers (R3, R4, R5, R6) formed OSPF adjacencies, reestablishing proper label distribution for VPN traffic.

```
R1#sh run | sec router
router bgp 1
 no synchronization
 bgp log-neighbor-changes
 network 1.1.1.1 mask 255.255.255.255
 network 11.11.11.11 mask 255.255.255.255
 neighbor 192.168.1.2 remote-as 100
 no auto-summary
R1#
```

```
R2#sh run | sec router
router bgp 2
 no synchronization
 bgp log-neighbor-changes
 network 2.2.2.2 mask 255.255.255.255
 network 22.22.22.22 mask 255.255.255.255
 neighbor 192.168.2.2 remote-as 100
 auto-summary
R2#
```

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Jeevanandh Ravi   002313120

```
R3#sh run | sec router
router ospf 1
 log-adjacency-changes
 network 3.3.3.3 0.0.0.0 area 0
 network 192.168.3.0 0.0.0.255 area 0
 network 192.168.5.0 0.0.0.255 area 0
router bgp 100
 bgp log-neighbor-changes
 neighbor 5.5.5.5 remote-as 100
 neighbor 5.5.5.5 update-source Loopback0
 neighbor 192.168.1.1 remote-as 1
 !
 address-family ipv4
  neighbor 5.5.5.5 activate
  no neighbor 192.168.1.1 activate
  no auto-summary
  no synchronization
 exit-address-family
 !
 address-family vpnv4
  neighbor 5.5.5.5 activate
  neighbor 5.5.5.5 send-community extended
 exit-address-family
 !
 address-family ipv4 vrf ONE
  neighbor 192.168.1.1 remote-as 1
  neighbor 192.168.1.1 activate
  no synchronization
 exit-address-family
```

```
R4#sh run | sec router
router ospf 1
 log-adjacency-changes
 network 4.4.4.4 0.0.0.0 area 0
 network 192.168.3.0 0.0.0.255 area 0
 network 192.168.4.0 0.0.0.255 area 0
```

```
R5#sh run | sec router
router ospf 1
 log-adjacency-changes
 network 5.5.5.5 0.0.0.0 area 0
 network 192.168.4.0 0.0.0.255 area 0
 network 192.168.6.0 0.0.0.255 area 0
router bgp 100
 bgp log-neighbor-changes
 neighbor 3.3.3.3 remote-as 100
 neighbor 3.3.3.3 update-source Loopback0
 !
 address-family ipv4
  neighbor 3.3.3.3 activate
  no auto-summary
  synchronization
 exit-address-family
 !
 address-family vpnv4
  neighbor 3.3.3.3 activate
  neighbor 3.3.3.3 send-community extended
 exit-address-family
 !
 address-family ipv4 vrf ONE
  neighbor 192.168.2.1 remote-as 2
  neighbor 192.168.2.1 activate
  no synchronization
 exit-address-family
```

```
R6#sh run | sec router
router ospf 1
 log-adjacency-changes
 network 6.6.6.6 0.0.0.0 area 0
 network 192.168.5.0 0.0.0.255 area 0
 network 192.168.6.0 0.0.0.255 area 0
```

Results:

```
R1#ping 2.2.2.2 source 1.1.1.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2.2.2.2, timeout is 2 seconds:
Packet sent with a source address of 1.1.1.1
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 124/283/500 ms
R1#
```

```
R2#ping 1.1.1.1 source 2.2.2.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 1.1.1.1, timeout is 2 seconds:
Packet sent with a source address of 2.2.2.2
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 328/561/728 ms
R2#
```