

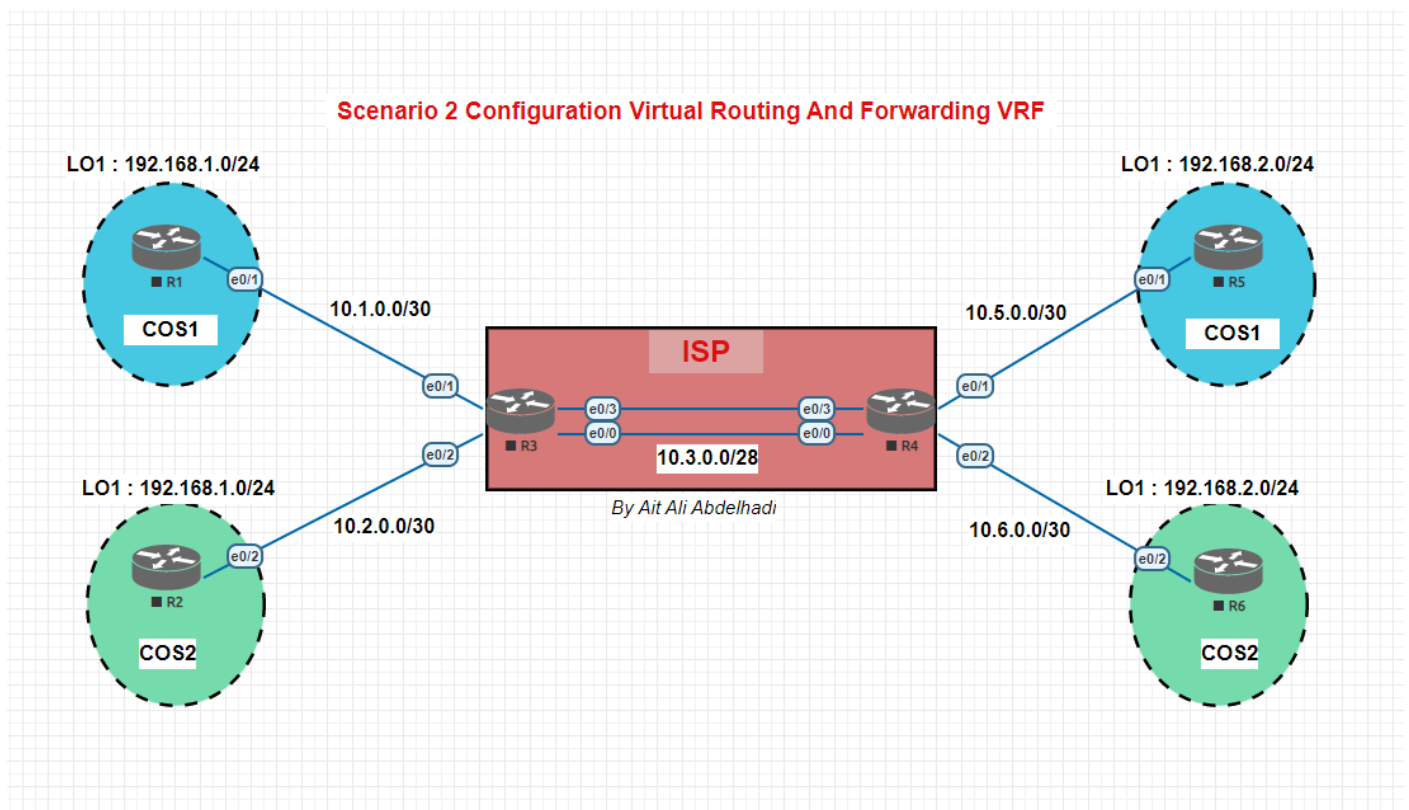
Scenario 2 : Configuration Virtual Routing And Forwarding (VRF)

Lab Objective:

This is a challenge lab designed to test and validate the skills, The purpose of this lab is to configure Virtual Routing And Forwarding (VRF) with OSPF routing.

Lab Topology:

The lab network topology is illustrated below:



Configuration R1:

```
Router#conf t
```

```
Router(config)#host R1
```

```
R1(config)#int e0/1
```

```
R1(config-if)#ip add 10.1.0.2 255.255.255.252
```

```
R1(config-if)#no sh
```

R1(config-if)#exit

R1(config)#int lo1

R1(config-if)#ip add 192.168.1.1 255.255.255.0

R1(config-if)#no sh

R1(config-if)#exit

R1(config)#router ospf 1

R1(config-router)#net 10.1.0.0 255.255.255.252 area 0

R1(config-router)#net 192.168.1.0 255.255.255.0 area 0

R1(config-router)#exit

R1(config)#do wr

Configuration R2:

Router>en

Router#conf t

Router(config)#host R2

R2(config)#int e0/2

R2(config-if)#ip add 10.2.0.2 255.255.255.252

R2(config-if)#no sh

R2(config-if)#exit

R2(config)#int lo1

R2(config-if)#ip add 192.168.1.1 255.255.255.0

R2(config-if)#no sh

R2(config-if)#exit

R2(config)#router ospf 1

```
R2(config-router)#net 192.168.1.0 255.255.255.0 area 0
```

```
R2(config-router)#net 10.2.0.0 255.255.255.252 area 0
```

```
R2(config-router)#exit
```

```
R2(config)#do wr
```

Configuration R5:

```
Router>en
```

```
Router#conf t
```

```
Router(config)#host R5
```

```
R5(config)#int e0/1
```

```
R5(config-if)#ip add 10.5.0.2 255.255.255.252
```

```
R5(config-if)#no sh
```

```
R5(config-if)#exit
```

```
R5(config)#int lo1
```

```
R5(config-if)#ip add 192.168.2.1 255.255.255.0
```

```
R5(config-if)#no sh
```

```
R5(config-if)#exit
```

```
R5(config)#router ospf 1
```

```
R5(config-router)#net 10.5.0.0 255.255.255.252 area 0
```

```
R5(config-router)#net 192.168.2.0 255.255.255.0 area 0
```

```
R5(config-router)#exit
```

```
R5(config)#do wr
```

Configuration R6:

```
Router>en
Router#conf t
Router(config)#host R6
R6(config)#int e0/2
R6 (config-if)#ip add 10.6.0.2 255.255.255.252
R6 (config-if)#no sh
R6 (config-if)#exit
R6(config)#int lo1
R6 (config-if)#ip add 192.168.2.1 255.255.255.0
R6 (config-if)#no sh
R6 (config-if)#exit
R6(config)#router ospf 1
R6 (config-router)#net 10.6.0.0 255.255.255.252 area 0
R6 (config-router)#net 192.168.2.0 255.255.255.0 area 0
R6 (config-router)#exit
R6 (config)#do wr
```

Configuration R3:

```
Router>en
Router#conf t
Router(config)#host R3
R3(config)#ip vrf COS1
R3(config-vrf)#exit
R3(config)#ip vrf COS2
```

R3(config-vrf)#exit

R3(config)#int e0/1

R3(config-if)#ip vrf forw COS1

R3(config-if)#ip add 10.1.0.1 255.255.255.252

R3(config-if)#no sh

R3(config-if)#exit

R3(config)#int e0/3

R3(config-if)#ip vrf forw COS1

R3(config-if)#ip add 10.3.0.1 255.255.255.252

R3(config-if)#no sh

R3(config-if)#exit

R3(config)#int e0/2

R3(config-if)#ip vrf forw COS2

R3(config-if)#ip add 10.2.0.1 255.255.255.252

R3(config-if)#no sh

R3(config-if)#exit

R3(config)#int e0/0

R3(config-if)#ip vrf forw COS2

R3(config-if)#ip add 10.3.0.2 255.255.255.252

R3(config-if)#no sh

R3(config-if)#exit

R3(config)#router ospf 10 vrf COS1

R3(config-router)#net 10.1.0.0 255.255.255.252 area 0

R3(config-router)#net 10.3.0.0 255.255.255.240 area 0

```
R3(config-router)#exit
```

```
R3(config)#router ospf 20 vrf COS2
```

```
R3(config-router)#net 10.3.0.0 255.255.255.240 area 0
```

```
R3(config-router)#net 10.2.0.0 255.255.255.252 area 0
```

```
R3(config-router)#exit
```

```
R3(config)#
```

----- Test VRF Configuration -----

```
R3# Show ip vrf
```

```
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#sho ip vrf
  Name                Default RD          Interfaces
  COS1                <not set>          Et0/1
                      Et0/3
  COS2                <not set>          Et0/0
                      Et0/2
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
R3#
```

```
R3# Show ip route vrf COS1
```

```
R3
R3#show ip route vrf COS1

Routing Table: COS1
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
        D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
        N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
        E1 - OSPF external type 1, E2 - OSPF external type 2
        i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
        ia - IS-IS inter area, * - candidate default, U - per-user static route
        o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
        a - application route
        + - replicated route, % - next hop override

Gateway of last resort is not set

    10.0.0.0/8 is variably subnetted, 5 subnets, 3 masks
C       10.1.0.0/30 is directly connected, Ethernet0/1
L       10.1.0.1/32 is directly connected, Ethernet0/1
C       10.3.0.0/28 is directly connected, Ethernet0/3
L       10.3.0.1/32 is directly connected, Ethernet0/3
O       10.5.0.0/30 [110/20] via 10.3.0.3, 00:10:28, Ethernet0/3
        192.168.1.0/32 is subnetted, 1 subnets
O       192.168.1.1 [110/11] via 10.1.0.2, 00:11:04, Ethernet0/1
R3#
```

R3# Show ip route vrf COS2

```
R3
R3#show ip route vrf COS2

Routing Table: COS2
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
        D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
        N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
        E1 - OSPF external type 1, E2 - OSPF external type 2
        i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
        ia - IS-IS inter area, * - candidate default, U - per-user static route
        o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
        a - application route
        + - replicated route, % - next hop override

Gateway of last resort is not set

    10.0.0.0/8 is variably subnetted, 5 subnets, 3 masks
C       10.2.0.0/30 is directly connected, Ethernet0/2
L       10.2.0.1/32 is directly connected, Ethernet0/2
C       10.3.0.0/28 is directly connected, Ethernet0/0
L       10.3.0.2/32 is directly connected, Ethernet0/0
O       10.6.0.0/30 [110/20] via 10.3.0.4, 00:11:23, Ethernet0/0
        192.168.1.0/32 is subnetted, 1 subnets
O       192.168.1.1 [110/11] via 10.2.0.2, 00:11:59, Ethernet0/2
        192.168.2.0/32 is subnetted, 1 subnets
O       192.168.2.1 [110/21] via 10.3.0.4, 00:11:23, Ethernet0/0
R3#
R3#
```

Configuration R4:

Router>en

Router#conf t

Router(config)#host R4

R4(config)#ip vrf COS1

R4(config-vrf)#EXIT

R4(config)#ip vrf COS2

R4(config-vrf)#exit

R4(config)#int e0/3

R4(config-if)#ip vrf forw COS1

R4(config-if)#ip add 10.3.0.3 255.255.255.240

R4(config-if)#no sh

R4(config-if)#exit

R4(config)#int e0/0

R4(config-if)#ip vrf forw COS2

R4(config-if)#ip add 10.3.0.4 255.255.255.240

R4(config-if)#no sh

R4(config-if)# exit

R4(config)#int e0/1

R4(config-if)#ip vrf forw COS1

R4(config-if)#ip add 10.5.0.1 255.255.255.252

R4(config-if)#no sh

R4(config-if)#exit

R4(config)#int e0/2

R4(config-if)#ip vrf forw COS2


```
R4(config-if)#ip add 10.6.0.1 255.255.255.252
```

```
R4(config-if)#no sh
```

```
R4(config-if)#exit
```

```
R4(config)#router ospf 10 vrf COS1
```

```
R4(config-router)#net 10.5.0.0 255.255.255.252 area 0
```

```
R4(config-router)#net 10.3.0.0 255.255.255.240 area 0
```

```
R4(config-router)#exit
```

```
R4(config)#router ospf 20 vrf COS2
```

```
R4(config-router)#net 10.3.0.0 255.255.255.240 area 0
```

```
R4(config-router)#net 10.6.0.0 255.255.255.252 area 0
```

```
R4(config-router)#exit
```

```
R4(config)#do wr
```

```
----- Test VRF Configuration -----
```

```
R4# Show ip vrf
```

```
R4#
R4#
R4#
R4#
R4#
R4#show ip vrf
  Name                Default RD          Interfaces
  COS1                 <not set>          Et0/1
                      Et0/3
  COS2                 <not set>          Et0/0
                      Et0/2
R4#
R4#
R4#
R4#
R4#
R4#
R4#
R4#
R4#
R4#
R4#
R4#
R4#
```

R4# Show ip route vrf COS1

```
R4#show ip route vrf COS1

Routing Table: COS1
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
       a - application route
       + - replicated route, % - next hop override

Gateway of last resort is not set

    10.0.0.0/8 is variably subnetted, 5 subnets, 3 masks
O       10.1.0.0/30 [110/20] via 10.3.0.1, 00:14:09, Ethernet0/3
C       10.3.0.0/28 is directly connected, Ethernet0/3
L       10.3.0.3/32 is directly connected, Ethernet0/3
C       10.5.0.0/30 is directly connected, Ethernet0/1
L       10.5.0.1/32 is directly connected, Ethernet0/1
L       192.168.1.0/32 is subnetted, 1 subnets
O       192.168.1.1 [110/21] via 10.3.0.1, 00:14:09, Ethernet0/3
R4#
```

R4# Show ip route vrf COS2

```
R4
Routing Table: COS2
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
       a - application route
       + - replicated route, % - next hop override

Gateway of last resort is not set

    10.0.0.0/8 is variably subnetted, 5 subnets, 3 masks
O       10.2.0.0/30 [110/20] via 10.3.0.2, 00:14:47, Ethernet0/0
C       10.3.0.0/28 is directly connected, Ethernet0/0
L       10.3.0.4/32 is directly connected, Ethernet0/0
C       10.6.0.0/30 is directly connected, Ethernet0/2
L       10.6.0.1/32 is directly connected, Ethernet0/2
       192.168.1.0/32 is subnetted, 1 subnets
O       192.168.1.1 [110/21] via 10.3.0.2, 00:14:47, Ethernet0/0
       192.168.2.0/32 is subnetted, 1 subnets
O       192.168.2.1 [110/11] via 10.6.0.2, 00:15:23, Ethernet0/2
R4#
```