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## MPLS

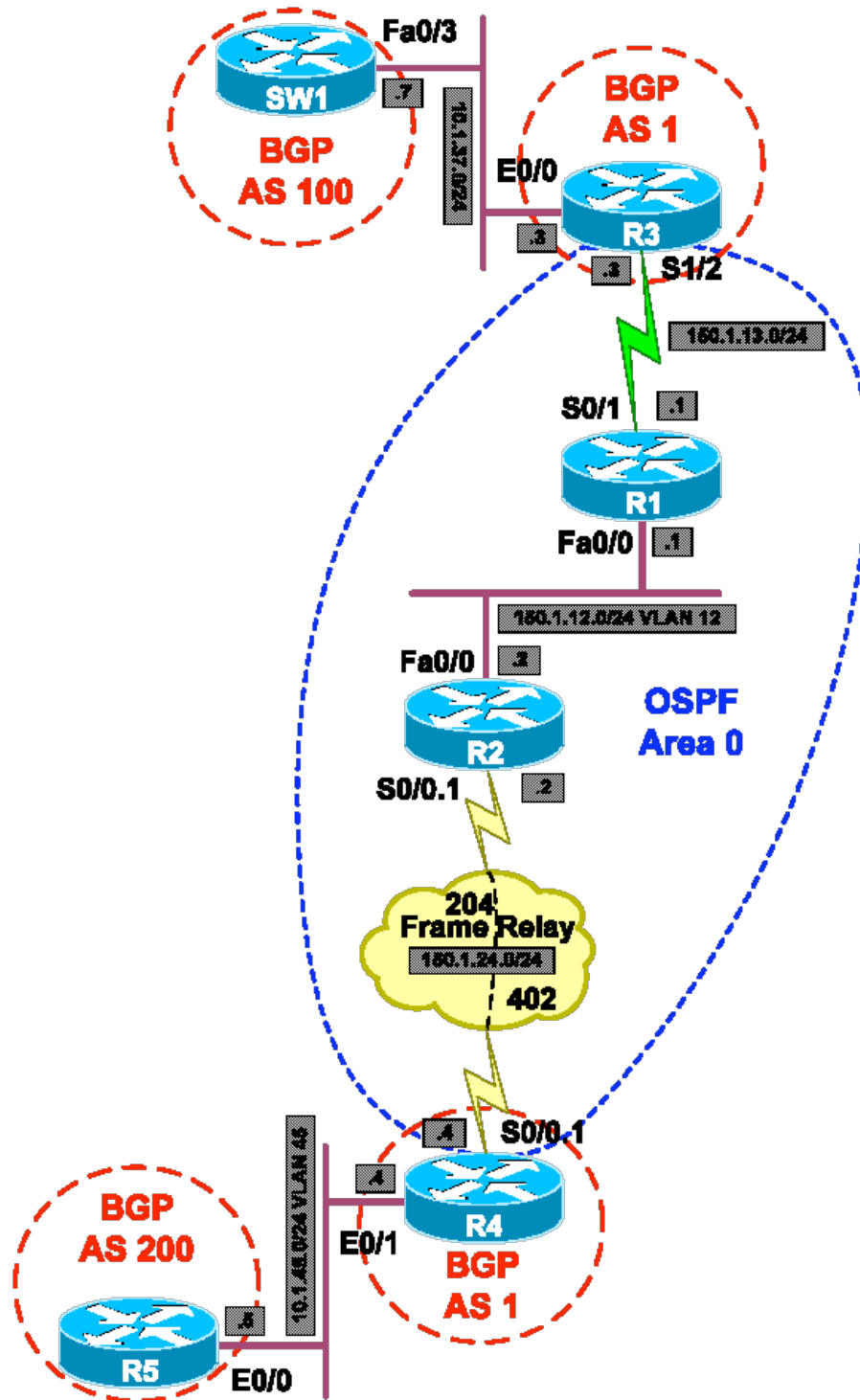
Basic MPLS .....	1
MPLS VPNs with Static Routing.....	8
MPLS VPNs with RIPv2 .....	16
MPLS VPNs with OSPF .....	25
MPLS VPNs with EIGRP .....	34
MPLS VPNs with EBGP .....	43
Central Services MPLS VPNs .....	52
MPLS VPNs with Extranets .....	61
MPLS VPNs and VRF Export Map.....	70
MPLS VPNs with BGP Site-Of-Origin.....	80
MPLS VPNs with OSPF and Sham-Links .....	89
MPLS VPNs with OSPF and Domain-ID .....	97
MPLS VPNs with VPNv4 Route Reflection .....	105
Inter-AS MPLS VPNs with Back-to-Back VRF .....	121
Inter-AS MPLS VPNs with MP-eBGP for VPNv4 Exchange .....	134
Inter-AS MPLS VPNs with Multihop MP-eBGP for VPNv4 Exchange.....	147
Carrier Supporting Carrier – IP Only Customer Carrier.....	158
Carrier Supporting Carrier – MPLS Enabled Customer Carrier .....	168
Carrier Supporting Carrier – Hierarchical MPLS VPNs .....	178
VRF-Lite .....	192
Controlling MPLS Label Distribution.....	204
MPLS Traffic Engineering – Dynamic PE to PE Tunnels .....	213
MPLS Traffic Engineering – Explicit PE to PE Tunnels.....	224
MPLS Traffic Engineering – Unequal Cost Load Balancing.....	233
MPLS QoS.....	246
Multicast over MPLS VPNs .....	260

## IP Multicast

PIM Dense Mode.....	269
PIM Sparse Mode.....	279
Multicast RPF Failure .....	287
Auto-RP .....	294
Auto-RP – Multiple Candidate RPs .....	301
Auto-RP – Filtering Candidate RPs .....	309
Auto-RP Listener .....	315
PIM NBMA Mode.....	322
Auto-RP and Default RP Placement .....	329
Bootstrap Router .....	336
Multicast Source Distribution Protocol (MSDP).....	341
Anycast RP.....	348
Multicast BGP.....	355

### Basic MPLS

**Objective:** Configure MPLS on R1, R2, R3, and R4 to provide transit between AS 100 and AS 200.



**Directions**

- Build the logical topology per the diagram
- Configure OSPF area 0 on the interfaces between R1, R2, R3, and R4
- Configure MPLS using LDP on the interfaces between R1, R2, R3, and R4
- Create the Loopback 150.1.3.3/32 on R3 and advertise it into OSPF
- Create the Loopback 150.1.4.4/32 on R4 and advertise it into OSPF
- R3 and R4 should peer via iBGP in AS 1 using their Loopback interfaces
- R3 should peer with SW1 via EBGP
- R4 should peer with R5 via EBGP
- Create the Loopback 10.1.5.5/24 on R5 and advertise it into BGP
- Create the Loopback 10.1.7.7/24 on SW1 and advertise it into BGP

**Final Configuration**

```
R1#
ip cef
!
mpls label protocol ldp
!
interface FastEthernet0/0
 ip address 150.1.12.1 255.255.255.0
 tag-switching ip
!
interface Serial0/1
 ip address 150.1.13.1 255.255.255.0
 tag-switching ip
!
router ospf 1
 network 150.1.12.1 0.0.0.0 area 0
 network 150.1.13.1 0.0.0.0 area 0

R2#
ip cef
!
mpls label protocol ldp
!
interface FastEthernet0/0
 ip address 150.1.12.2 255.255.255.0
 tag-switching ip
!
interface Serial0/0
 encapsulation frame-relay
!
interface Serial0/0.1 point-to-point
 ip address 150.1.24.2 255.255.255.0
 tag-switching ip
 frame-relay interface-dlci 204
!
router ospf 1
 network 150.1.12.2 0.0.0.0 area 0
 network 150.1.24.2 0.0.0.0 area 0
```

```
R3#
ip cef
!
mpls label protocol ldp
!
interface Loopback0
 ip address 150.1.3.3 255.255.255.255
!
interface Ethernet0/0
 ip address 10.1.37.3 255.255.255.0
!
interface Serial1/2
 ip address 150.1.13.3 255.255.255.0
 tag-switching ip
 clockrate 64000
!
router ospf 1
 network 150.1.3.3 0.0.0.0 area 0
 network 150.1.13.3 0.0.0.0 area 0
!
router bgp 1
 neighbor 10.1.37.7 remote-as 100
 neighbor 150.1.4.4 remote-as 1
 neighbor 150.1.4.4 update-source Loopback0
 neighbor 150.1.4.4 next-hop-self
```

```
R4#
ip cef
!
mpls label protocol ldp
!
interface Loopback0
 ip address 150.1.4.4 255.255.255.255
!
interface Serial0/0
 encapsulation frame-relay
!
interface Serial0/0.1 point-to-point
 ip address 150.1.24.4 255.255.255.0
 tag-switching ip
 frame-relay interface-dlci 402
!
interface Ethernet0/1
 ip address 10.1.45.4 255.255.255.0
!
router ospf 1
 network 150.1.4.4 0.0.0.0 area 0
 network 150.1.24.4 0.0.0.0 area 0
!
router bgp 1
 neighbor 10.1.45.5 remote-as 200
 neighbor 150.1.3.3 remote-as 1
 neighbor 150.1.3.3 update-source Loopback0
 neighbor 150.1.3.3 next-hop-self
 no auto-summary
```

```
R5#
interface Loopback0
 ip address 10.1.5.5 255.255.255.0
!
interface Ethernet0/0
 ip address 10.1.45.5 255.255.255.0
!
router bgp 200
 network 10.1.5.0 mask 255.255.255.0
 neighbor 10.1.45.4 remote-as 1
```

```
SW1#
interface Loopback0
 ip address 10.1.7.7 255.255.255.0
!
interface FastEthernet0/1
 switchport access vlan 12
!
interface FastEthernet0/2
 switchport access vlan 12
!
interface FastEthernet0/3
 no switchport
 ip address 10.1.37.7 255.255.255.0
!
interface FastEthernet0/5
 switchport access vlan 45
!
router bgp 100
 network 10.1.7.0 mask 255.255.255.0
 neighbor 10.1.37.3 remote-as 1
```

```
SW2#
interface FastEthernet0/4
 switchport access vlan 45
```

## Verification

```
SW1#ping 10.1.5.5 source 10.1.7.7
```

```
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.5.5, timeout is 2 seconds:
Packet sent with a source address of 10.1.7.7
!!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 88/88/92 ms
```

**R1#show ip route**

```
<output omitted>
 150.1.0.0/16 is variably subnetted, 5 subnets, 2 masks
O   150.1.24.0/24 [110/65] via 150.1.12.2, 00:11:41, FastEthernet0/0
O   150.1.4.4/32 [110/66] via 150.1.12.2, 00:11:41, FastEthernet0/0
O   150.1.3.3/32 [110/65] via 150.1.13.3, 00:11:41, Serial0/1
C   150.1.13.0/24 is directly connected, Serial0/1
C   150.1.12.0/24 is directly connected, FastEthernet0/0
```

**R2#show ip route**

```
<output omitted>
 150.1.0.0/16 is variably subnetted, 5 subnets, 2 masks
C   150.1.24.0/24 is directly connected, Serial0/0.1
O   150.1.4.4/32 [110/65] via 150.1.24.4, 00:12:01, Serial0/0.1
O   150.1.3.3/32 [110/66] via 150.1.12.1, 00:12:01, FastEthernet0/0
O   150.1.13.0/24 [110/65] via 150.1.12.1, 00:12:01, FastEthernet0/0
C   150.1.12.0/24 is directly connected, FastEthernet0/0
```

**R3#show ip route**

```
<output omitted>
 10.0.0.0/24 is subnetted, 3 subnets
B   10.1.7.0 [20/0] via 10.1.37.7, 00:10:18
B   10.1.5.0 [200/0] via 150.1.4.4, 00:10:35
C   10.1.37.0 is directly connected, Ethernet0/0
 150.1.0.0/16 is variably subnetted, 5 subnets, 2 masks
O   150.1.24.0/24 [110/846] via 150.1.13.1, 00:12:29, Serial1/2
O   150.1.4.4/32 [110/847] via 150.1.13.1, 00:12:29, Serial1/2
C   150.1.3.3/32 is directly connected, Loopback0
C   150.1.13.0/24 is directly connected, Serial1/2
O   150.1.12.0/24 [110/782] via 150.1.13.1, 00:12:29, Serial1/2
```

**R4#show ip route**

```
<output omitted>
 10.0.0.0/24 is subnetted, 3 subnets
B   10.1.7.0 [200/0] via 150.1.3.3, 00:10:36
B   10.1.5.0 [20/0] via 10.1.45.5, 00:10:58
C   10.1.45.0 is directly connected, Ethernet0/1
 150.1.0.0/16 is variably subnetted, 5 subnets, 2 masks
C   150.1.24.0/24 is directly connected, Serial0/0.1
C   150.1.4.4/32 is directly connected, Loopback0
O   150.1.3.3/32 [110/130] via 150.1.24.2, 00:12:49, Serial0/0.1
O   150.1.13.0/24 [110/129] via 150.1.24.2, 00:12:49, Serial0/0.1
O   150.1.12.0/24 [110/65] via 150.1.24.2, 00:12:49, Serial0/0.1
```

**R5#show ip route**

```
<output omitted>
 10.0.0.0/24 is subnetted, 3 subnets
B   10.1.7.0 [20/0] via 10.1.45.4, 00:10:49
C   10.1.5.0 is directly connected, Loopback0
C   10.1.45.0 is directly connected, Ethernet0/0
```

**SW1#show ip route**

```
<output omitted>
    10.0.0.0/24 is subnetted, 3 subnets
C       10.1.7.0 is directly connected, Loopback0
B       10.1.5.0 [20/0] via 10.1.37.3, 00:11:14
C       10.1.37.0 is directly connected, FastEthernet0/3
```

**R1#show mpls ldp neighbor**

```
Peer LDP Ident: 150.1.24.2:0; Local LDP Ident 150.1.13.1:0
TCP connection: 150.1.24.2.11005 - 150.1.13.1.646
State: Oper; Msgs sent/rcvd: 12/12; Downstream
Up time: 00:03:53
LDP discovery sources:
    FastEthernet0/0, Src IP addr: 150.1.12.2
Addresses bound to peer LDP Ident:
    150.1.12.2      150.1.24.2
Peer LDP Ident: 150.1.3.3:0; Local LDP Ident 150.1.13.1:0
TCP connection: 150.1.3.3.646 - 150.1.13.1.11003
State: Oper; Msgs sent/rcvd: 10/11; Downstream
Up time: 00:02:43
LDP discovery sources:
    Serial0/1, Src IP addr: 150.1.13.3
Addresses bound to peer LDP Ident:
    10.1.37.3      150.1.13.3      150.1.3.3
```

**R2#show mpls ldp neighbor**

```
Peer LDP Ident: 150.1.13.1:0; Local LDP Ident 150.1.24.2:0
TCP connection: 150.1.13.1.646 - 150.1.24.2.11005
State: Oper; Msgs sent/rcvd: 12/12; Downstream
Up time: 00:04:09
LDP discovery sources:
    FastEthernet0/0, Src IP addr: 150.1.12.1
Addresses bound to peer LDP Ident:
    150.1.12.1      150.1.13.1
Peer LDP Ident: 150.1.4.4:0; Local LDP Ident 150.1.24.2:0
TCP connection: 150.1.4.4.646 - 150.1.24.2.11007
State: Oper; Msgs sent/rcvd: 11/12; Downstream
Up time: 00:03:04
LDP discovery sources:
    Serial0/0.1, Src IP addr: 150.1.24.4
Addresses bound to peer LDP Ident:
    150.1.24.4      10.1.45.4      150.1.4.4
```

**R3#show mpls ldp neighbor**

```
Peer LDP Ident: 150.1.13.1:0; Local LDP Ident 150.1.3.3:0
TCP connection: 150.1.13.1.11003 - 150.1.3.3.646
State: Oper; Msgs sent/rcvd: 12/11; Downstream
Up time: 00:03:31
LDP discovery sources:
    Serial1/2, Src IP addr: 150.1.13.1
Addresses bound to peer LDP Ident:
    150.1.12.1      150.1.13.1
```

**R4#show mpls ldp neighbor**

```
Peer LDP Ident: 150.1.24.2:0; Local LDP Ident 150.1.4.4:0
TCP connection: 150.1.24.2.11007 - 150.1.4.4.646
State: Oper; Msgs sent/rcvd: 13/12; Downstream
Up time: 00:03:54
LDP discovery sources:
  Serial0/0.1, Src IP addr: 150.1.24.2
Addresses bound to peer LDP Ident:
  150.1.12.2      150.1.24.2
```

**R1#show mpls forwarding-table**

Local tag	Outgoing tag or VC	Prefix or Tunnel Id	Bytes tag switched	Outgoing interface	Next Hop
16	Pop tag	150.1.24.0/24	0	Fa0/0	150.1.12.2
17	16	150.1.4.4/32	4318	Fa0/0	150.1.12.2
18	Pop tag	150.1.3.3/32	753	Se0/1	point2point

**R2#show mpls forwarding-table**

Local tag	Outgoing tag or VC	Prefix or Tunnel Id	Bytes tag switched	Outgoing interface	Next Hop
16	Pop tag	150.1.4.4/32	797	Se0/0.1	point2point
17	18	150.1.3.3/32	4318	Fa0/0	150.1.12.1
18	Pop tag	150.1.13.0/24	0	Fa0/0	150.1.12.1

**R3#show mpls forwarding-table**

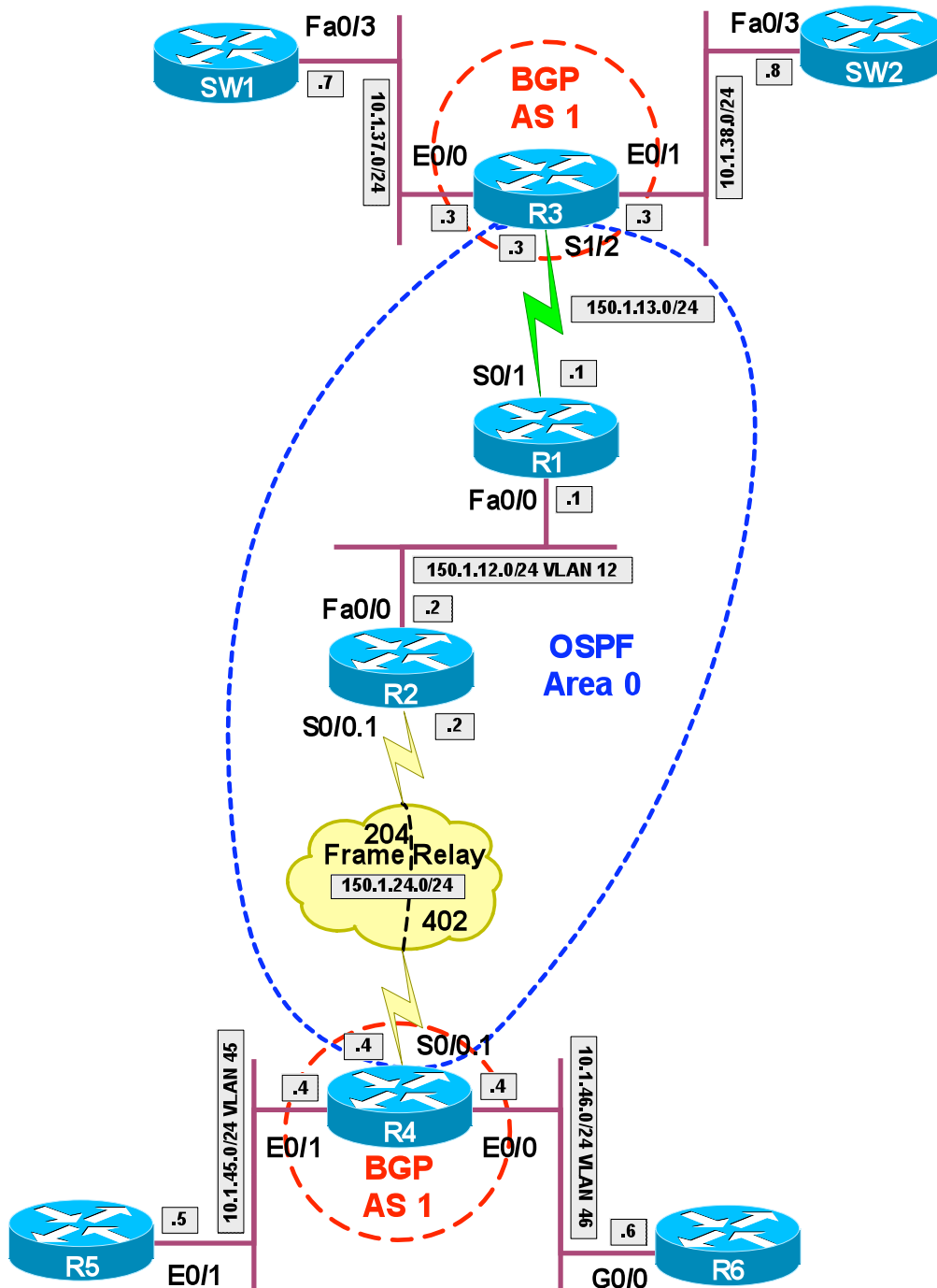
Local tag	Outgoing tag or VC	Prefix or Tunnel Id	Bytes tag switched	Outgoing interface	Next Hop
16	16	150.1.24.0/24	0	Se1/2	point2point
17	17	150.1.4.4/32	0	Se1/2	point2point
18	Pop tag	150.1.12.0/24	0	Se1/2	point2point

**R4#show mpls forwarding-table**

Local tag	Outgoing tag or VC	Prefix or Tunnel Id	Bytes tag switched	Outgoing interface	Next Hop
16	17	150.1.3.3/32	0	Se0/0.1	point2point
17	18	150.1.13.0/24	0	Se0/0.1	point2point
18	Pop tag	150.1.12.0/24	0	Se0/0.1	point2point

### MPLS VPNs with Static Routing

**Objective:** Configure MPLS VPNs between R5 & SW1 and R6 & SW2 using static routing between the PE-CE.



**Directions**

- Build the logical topology per the diagram
- Configure OSPF area 0 on the interfaces between R1, R2, R3, and R4
- Configure MPLS on the interfaces between R1, R2, R3, and R4
- Create the Loopback 150.1.3.3/32 on R3 and advertise it into OSPF
- Create the Loopback 150.1.4.4/32 on R4 and advertise it into OSPF
- Configure default static routes on R5 and R6 pointing to R4
- Configure default static routes on SW1 and SW2 pointing to R3
- Create the Loopback 10.1.5.5/24 on R5
- Create the Loopback 10.1.6.6/24 on R6
- Create the Loopback 10.1.7.7/24 on SW1
- Create the Loopback 10.1.8.8/24 on SW2
- R3 and R4 should peer via iBGP in AS 1 using their Loopback interfaces
- R5 and SW1 should be in VRF "R5-SW1"
- Use the route distinguisher and route target 1:57 for this VRF
- R6 and SW2 should be in VRF "R6-SW2"
- Use the route distinguisher and route target 1:68 for this VRF
- Configure static routes on R3 to reach the networks of SW1 and SW2
- Configure static routes on R4 to reach the networks of R5 and R6
- Redistribute where necessary to gain connectivity within the VPNs

**Final Configuration**

```
R1#
ip cef
!
interface FastEthernet0/0
 ip address 150.1.12.1 255.255.255.0
 tag-switching ip
!
interface Serial0/1
 ip address 150.1.13.1 255.255.255.0
 tag-switching ip
!
router ospf 1
 network 150.1.12.1 0.0.0.0 area 0
 network 150.1.13.1 0.0.0.0 area 0

R2#
ip cef
!
interface FastEthernet0/0
 ip address 150.1.12.2 255.255.255.0
 tag-switching ip
!
interface Serial0/0
 encapsulation frame-relay
!

interface Serial0/0.1 point-to-point
```

```
ip address 150.1.24.2 255.255.255.0
tag-switching ip
frame-relay interface-dlci 204
!
router ospf 1
network 150.1.12.2 0.0.0.0 area 0
network 150.1.24.2 0.0.0.0 area 0

R3#
ip cef
!
ip vrf R5-SW1
rd 1:57
route-target export 1:57
route-target import 1:57
!
ip vrf R6-SW2
rd 1:68
route-target export 1:68
route-target import 1:68
!
interface Loopback0
ip address 150.1.3.3 255.255.255.255
!
interface Ethernet0/0
ip vrf forwarding R5-SW1
ip address 10.1.37.3 255.255.255.0
!
interface Ethernet0/1
ip vrf forwarding R6-SW2
ip address 10.1.38.3 255.255.255.0
!
interface Serial1/2
ip address 150.1.13.3 255.255.255.0
tag-switching ip
clockrate 64000
!
router ospf 1
network 150.1.3.3 0.0.0.0 area 0
network 150.1.13.3 0.0.0.0 area 0
!
router bgp 1
neighbor 150.1.4.4 remote-as 1
neighbor 150.1.4.4 update-source Loopback0
neighbor 150.1.4.4 next-hop-self
!
address-family vpnv4
neighbor 150.1.4.4 activate
neighbor 150.1.4.4 send-community both
exit-address-family
!
address-family ipv4 vrf R6-SW2
redistribute connected
redistribute static
exit-address-family
!
address-family ipv4 vrf R5-SW1
```

```

redistribute connected
redistribute static
exit-address-family
!
ip route vrf R5-SW1 10.1.7.0 255.255.255.0 10.1.37.7
ip route vrf R6-SW2 10.1.8.0 255.255.255.0 10.1.38.8

```

**R4#**

```

ip cef
!
ip vrf R5-SW1
 rd 1:57
 route-target export 1:57
 route-target import 1:57
!
ip vrf R6-SW2
 rd 1:68
 route-target export 1:68
 route-target import 1:68
!
interface Loopback0
 ip address 150.1.4.4 255.255.255.255
!
interface Ethernet0/0
 ip vrf forwarding R6-SW2
 ip address 10.1.46.4 255.255.255.0
!
interface Serial0/0
 encapsulation frame-relay
!
interface Serial0/0.1 point-to-point
 ip address 150.1.24.4 255.255.255.0
 tag-switching ip
 frame-relay interface-dlci 402
!
interface Ethernet0/1
 ip vrf forwarding R5-SW1
 ip address 10.1.45.4 255.255.255.0
!
router ospf 1
 network 150.1.4.4 0.0.0.0 area 0
 network 150.1.24.4 0.0.0.0 area 0
!
router bgp 1
 neighbor 150.1.3.3 remote-as 1
 neighbor 150.1.3.3 update-source Loopback0
 neighbor 150.1.3.3 next-hop-self
!
 address-family vpnv4
 neighbor 150.1.3.3 activate
 neighbor 150.1.3.3 send-community both
 exit-address-family
!

address-family ipv4 vrf R6-SW2

```

```

redistribute connected
redistribute static
exit-address-family
!
address-family ipv4 vrf R5-SW1
redistribute connected
redistribute static
exit-address-family
!
ip route vrf R5-SW1 10.1.5.0 255.255.255.0 10.1.45.5
ip route vrf R6-SW2 10.1.6.0 255.255.255.0 10.1.46.6

```

**R5#**

```

ip cef
!
interface Loopback0
 ip address 10.1.5.5 255.255.255.0
!
interface Ethernet0/1
 ip address 10.1.45.5 255.255.255.0
!
ip route 0.0.0.0 0.0.0.0 10.1.45.4

```

**R6#**

```

ip cef
!
interface Loopback0
 ip address 10.1.6.6 255.255.255.0
!
interface GigabitEthernet0/0
 ip address 10.1.46.6 255.255.255.0
!
ip route 0.0.0.0 0.0.0.0 10.1.46.4

```

**SW1#**

```

interface Loopback0
 ip address 10.1.7.7 255.255.255.0
!
interface FastEthernet0/1
 switchport access vlan 12
!
interface FastEthernet0/2
 switchport access vlan 12
!
interface FastEthernet0/3
 no switchport
 ip address 10.1.37.7 255.255.255.0
!
interface FastEthernet0/4
 switchport access vlan 46
!
interface FastEthernet0/6
 switchport access vlan 46
!
ip route 0.0.0.0 0.0.0.0 10.1.37.3

```

**SW2#**

```

interface Loopback0
 ip address 10.1.8.8 255.255.255.0
!
interface FastEthernet0/3
 no switchport
 ip address 10.1.38.8 255.255.255.0
!
interface FastEthernet0/4
 switchport access vlan 45
!
interface FastEthernet0/5
 switchport access vlan 45
!
ip route 0.0.0.0 0.0.0.0 10.1.38.3
    
```

## Verification

### R1#show ip route

```

<output omitted>
 150.1.0.0/16 is variably subnetted, 5 subnets, 2 masks
O   150.1.24.0/24 [110/65] via 150.1.12.2, 00:13:36, FastEthernet0/0
O   150.1.4.4/32 [110/66] via 150.1.12.2, 00:13:36, FastEthernet0/0
O   150.1.3.3/32 [110/65] via 150.1.13.3, 00:13:36, Serial0/1
C   150.1.13.0/24 is directly connected, Serial0/1
C   150.1.12.0/24 is directly connected, FastEthernet0/0
    
```

### R2#show ip route

```

<output omitted>
 150.1.0.0/16 is variably subnetted, 5 subnets, 2 masks
C   150.1.24.0/24 is directly connected, Serial0/0.1
O   150.1.4.4/32 [110/65] via 150.1.24.4, 00:13:57, Serial0/0.1
O   150.1.3.3/32 [110/66] via 150.1.12.1, 00:13:57, FastEthernet0/0
O   150.1.13.0/24 [110/65] via 150.1.12.1, 00:13:57, FastEthernet0/0
C   150.1.12.0/24 is directly connected, FastEthernet0/0
    
```

### R3#show ip route vrf \*

```

<output omitted>
 150.1.0.0/16 is variably subnetted, 5 subnets, 2 masks
O   150.1.24.0/24 [110/846] via 150.1.13.1, 00:11:38, Serial1/2
O   150.1.4.4/32 [110/847] via 150.1.13.1, 00:11:38, Serial1/2
C   150.1.3.3/32 is directly connected, Loopback0
C   150.1.13.0/24 is directly connected, Serial1/2
O   150.1.12.0/24 [110/782] via 150.1.13.1, 00:11:38, Serial1/2
    
```

### Routing Table: R5-SW1

```

<output omitted>
 10.0.0.0/24 is subnetted, 4 subnets
S   10.1.7.0 [1/0] via 10.1.37.7
B   10.1.5.0 [200/0] via 150.1.4.4, 00:05:28
B   10.1.45.0 [200/0] via 150.1.4.4, 00:05:28
C   10.1.37.0 is directly connected, Ethernet0/0
    
```

### Routing Table: R6-SW2

```
<output omitted>
  10.0.0.0/24 is subnetted, 4 subnets
S   10.1.8.0 [1/0] via 10.1.38.8
B   10.1.6.0 [200/0] via 150.1.4.4, 00:05:28
B   10.1.46.0 [200/0] via 150.1.4.4, 00:05:28
C   10.1.38.0 is directly connected, Ethernet0/1
```

**R4#show ip route vrf \***

```
<output omitted>
  150.1.0.0/16 is variably subnetted, 5 subnets, 2 masks
C   150.1.24.0/24 is directly connected, Serial0/0.1
C   150.1.4.4/32 is directly connected, Loopback0
O   150.1.3.3/32 [110/130] via 150.1.24.2, 00:11:57, Serial0/0.1
O   150.1.13.0/24 [110/129] via 150.1.24.2, 00:11:57, Serial0/0.1
O   150.1.12.0/24 [110/65] via 150.1.24.2, 00:11:57, Serial0/0.1
```

**Routing Table: R5-SW1**

```
<output omitted>
  10.0.0.0/24 is subnetted, 4 subnets
B   10.1.7.0 [200/0] via 150.1.3.3, 00:06:21
S   10.1.5.0 [1/0] via 10.1.45.5
C   10.1.45.0 is directly connected, Ethernet0/1
B   10.1.37.0 [200/0] via 150.1.3.3, 00:06:21
```

**Routing Table: R6-SW2**

```
<output omitted>
  10.0.0.0/24 is subnetted, 4 subnets
B   10.1.8.0 [200/0] via 150.1.3.3, 00:06:07
S   10.1.6.0 [1/0] via 10.1.46.6
C   10.1.46.0 is directly connected, Ethernet0/0
B   10.1.38.0 [200/0] via 150.1.3.3, 00:06:07
```

**R5#show ip route**

```
<output omitted>
Gateway of last resort is 10.1.45.4 to network 0.0.0.0

  10.0.0.0/24 is subnetted, 2 subnets
C   10.1.5.0 is directly connected, Loopback0
C   10.1.45.0 is directly connected, Ethernet0/1
S*  0.0.0.0/0 [1/0] via 10.1.45.4
```

**R6#show ip route**

```
<output omitted>
Gateway of last resort is 10.1.46.4 to network 0.0.0.0

  10.0.0.0/24 is subnetted, 2 subnets
C   10.1.6.0 is directly connected, Loopback0
C   10.1.46.0 is directly connected, GigabitEthernet0/0
S*  0.0.0.0/0 [1/0] via 10.1.46.4
```

**SW1#show ip route**

<output omitted>

Gateway of last resort is 10.1.46.4 to network 0.0.0.0

10.0.0.0/24 is subnetted, 2 subnets

C 10.1.6.0 is directly connected, Loopback0

C 10.1.46.0 is directly connected, GigabitEthernet0/0

S\* 0.0.0.0/0 [1/0] via 10.1.46.4

**SW2#show ip route**

<output omitted>

Gateway of last resort is 10.1.38.3 to network 0.0.0.0

10.0.0.0/24 is subnetted, 2 subnets

C 10.1.8.0 is directly connected, Loopback0

C 10.1.38.0 is directly connected, FastEthernet0/3

S\* 0.0.0.0/0 [1/0] via 10.1.38.3

**R3#show ip bgp vpnv4 all**

BGP table version is 137, local router ID is 150.1.3.3

Status codes: s suppressed, d damped, h history, \* valid, > best, i - internal,  
r RIB-failure, S Stale

Origin codes: i - IGP, e - EGP, ? - incomplete

Network	Next Hop	Metric	LocPrf	Weight	Path
Route Distinguisher: 1:57 (default for vrf R5-SW1)					
*>i10.1.5.0/24	150.1.4.4	0	100	0	?
*> 10.1.7.0/24	10.1.37.7	0		32768	?
*> 10.1.37.0/24	0.0.0.0	0		32768	?
*>i10.1.45.0/24	150.1.4.4	0	100	0	?
Route Distinguisher: 1:68 (default for vrf R6-SW2)					
*>i10.1.6.0/24	150.1.4.4	0	100	0	?
*> 10.1.8.0/24	10.1.38.8	0		32768	?
*> 10.1.38.0/24	0.0.0.0	0		32768	?
*>i10.1.46.0/24	150.1.4.4	0	100	0	?

**R4#show ip bgp vpnv4 all**

BGP table version is 142, local router ID is 150.1.4.4

Status codes: s suppressed, d damped, h history, \* valid, > best, i - internal,  
r RIB-failure, S Stale

Origin codes: i - IGP, e - EGP, ? - incomplete

Network	Next Hop	Metric	LocPrf	Weight	Path
Route Distinguisher: 1:57 (default for vrf R5-SW1)					
*> 10.1.5.0/24	10.1.45.5	0		32768	?
*>i10.1.7.0/24	150.1.3.3	0	100	0	?
*>i10.1.37.0/24	150.1.3.3	0	100	0	?
*> 10.1.45.0/24	0.0.0.0	0		32768	?
Route Distinguisher: 1:68 (default for vrf R6-SW2)					
*> 10.1.6.0/24	10.1.46.6	0		32768	?
*>i10.1.8.0/24	150.1.3.3	0	100	0	?
*>i10.1.38.0/24	150.1.3.3	0	100	0	?
*> 10.1.46.0/24	0.0.0.0	0		32768	?