

LAB Configuration

CE1

```
hostname CE1
!  
ip cef
!  
interface Loopback0
  ip address 8.8.8.1 255.255.255.255
!  
interface Ethernet0/0
  description to PE1
  ip address 10.0.0.2 255.255.255.0
!  
router ospf 1
  router-id 8.8.8.1
  network 8.8.8.1 0.0.0.0 area 0
  network 10.0.0.2 0.0.0.0 area 0
!
```

CE2

```
hostname CE2
!  
ip cef
!  
interface Loopback0
  ip address 8.8.8.2 255.255.255.255
!  
interface Ethernet0/0
  description to PE1
  ip address 20.0.0.2 255.255.255.0
!  
router ospf 1
  router-id 8.8.8.2
  network 8.8.8.2 0.0.0.0 area 0
  network 20.0.0.2 0.0.0.0 area 0
!
```

CE3

```
hostname CE3
!  
ip cef
!  
interface Loopback0
```

```
ip address 8.8.8.3 255.255.255.0
!  
interface Ethernet0/0  
description to CE4  
ip address 34.0.0.3 255.255.255.0  
!  
interface Ethernet0/2  
description to PE2  
ip address 30.0.0.2 255.255.255.0  
!  
router ospf 1  
router-id 8.8.8.3  
redistribute static subnets  
network 8.8.8.3 0.0.0.0 area 0  
network 30.0.0.2 0.0.0.0 area 0  
network 34.0.0.3 0.0.0.0 area 0  
default-information originate  
!  
ip route 0.0.0.0 0.0.0.0 Null0  
!
```

CE4

```
hostname CE4  
!  
ip cef  
!  
interface Loopback0  
ip address 8.8.8.4 255.255.255.255  
!  
interface Ethernet0/0  
description to CE3  
ip address 34.0.0.4 255.255.255.0  
!  
interface Ethernet0/2  
description to PE3  
ip address 40.0.0.2 255.255.255.0  
!  
router ospf 1  
router-id 8.8.8.4  
redistribute static subnets  
network 8.8.8.4 0.0.0.0 area 0  
network 34.0.0.4 0.0.0.0 area 0  
network 40.0.0.2 0.0.0.0 area 0  
default-information originate  
!  
ip route 0.0.0.0 0.0.0.0 Null0  
!
```

PE1 (XR)

```
hostname PE1
cdp
interface Loopback0
  ipv4 address 1.1.1.1 255.255.255.255
!
interface GigabitEthernet0/0/0/0
  description to CE1
  cdp
  vrf A1
  ipv4 address 10.0.0.1 255.255.255.0
!
interface GigabitEthernet0/0/0/1
  description to CE2
  cdp
  vrf A2
  ipv4 address 20.0.0.1 255.255.255.0
!
interface GigabitEthernet0/0/0/2
  description to P1
  cdp
  ipv4 address 1.1.0.1 255.255.255.0
!
interface GigabitEthernet0/0/0/3
  description to P2
  cdp
  ipv4 address 1.2.0.1 255.255.255.0
!
router isis SP
  net 49.0001.0000.0000.0001.00
  log adjacency changes
  address-family ipv4 unicast
  metric-style wide
!
interface Loopback0
  address-family ipv4 unicast
!
!
interface GigabitEthernet0/0/0/2
  circuit-type level-1
  address-family ipv4 unicast
!
!
interface GigabitEthernet0/0/0/3
  circuit-type level-1
  address-family ipv4 unicast
!
!
```

```
!  
router ospf 1  
  address-family ipv4 unicast  
  vrf A1  
    default-information originate  
    redistribute bgp 1  
  address-family ipv4 unicast  
  area 0  
    interface GigabitEthernet0/0/0/0  
    !  
  !  
!  
!  
router ospf 2  
  address-family ipv4 unicast  
  vrf A2  
    default-information originate  
    redistribute bgp 1  
  address-family ipv4 unicast  
  area 0  
    interface GigabitEthernet0/0/0/1  
    !  
  !  
!  
!  
vrf A1  
  address-family ipv4 unicast  
  import route-target  
  300:1  
  !  
  export route-target  
  100:1  
  !  
!  
vrf A2  
  address-family ipv4 unicast  
  import route-target  
  300:1  
  !  
  export route-target  
  200:1  
  !  
!  
!  
router bgp 1  
  bgp log neighbor changes detail  
  address-family vpnv4 unicast  
  !
```

```
neighbor 6.6.6.6
  remote-as 1
  update-source Loopback0
  address-family vpnv4 unicast
  !
!
neighbor 7.7.7.7
  remote-as 1
  update-source Loopback0
  address-family vpnv4 unicast
  !
!
vrf A1
  rd 100:1
  address-family ipv4 unicast
  redistribute ospf 1
  !
!
vrf A2
  rd 200:1
  address-family ipv4 unicast
  redistribute ospf 2
  !
!
!
mpls ldp
  router-id 1.1.1.1
  interface GigabitEthernet0/0/0/2
  !
  interface GigabitEthernet0/0/0/3
  !
!
```

PE2

```
hostname PE2
!
vrf definition A
  rd 300:1
  !
  address-family ipv4
    route-target export 300:1
    route-target import 100:1
    route-target import 200:1
    route-target import 300:1
  exit-address-family
!
ip cef
!
```

```
interface Loopback0
 ip address 2.2.2.2 255.255.255.255
!
interface Ethernet0/0
 description to P1
 ip address 2.1.0.1 255.255.255.0
 ip router isis SP
 mpls ip
 isis circuit-type level-1
!
interface Ethernet0/1
 description to P2
 ip address 2.2.0.1 255.255.255.0
 ip router isis SP
 mpls ip
 isis circuit-type level-1
!
interface Ethernet0/2
 description to CE3
 vrf forwarding A
 ip address 30.0.0.1 255.255.255.0
!
router ospf 1 vrf A
 redistribute bgp 1 subnets
 network 30.0.0.1 0.0.0.0 area 0
!
router isis SP
 net 49.0001.0000.0000.0002.00
 metric-style wide
 log-adjacency-changes
 passive-interface Loopback0
!
router bgp 1
 bgp log-neighbor-changes
 no bgp default ipv4-unicast
 neighbor 6.6.6.6 remote-as 1
 neighbor 6.6.6.6 update-source Loopback0
 neighbor 7.7.7.7 remote-as 1
 neighbor 7.7.7.7 update-source Loopback0
!
 address-family ipv4
 exit-address-family
!
 address-family vpnv4
 neighbor 6.6.6.6 activate
 neighbor 6.6.6.6 send-community extended
 neighbor 7.7.7.7 activate
 neighbor 7.7.7.7 send-community extended
 exit-address-family
```

```

!
address-family ipv4 vrf A
  redistribute ospf 1 match internal external 1 external 2
route-map ospftobgp
  default-information originate
  exit-address-family
!
access-list 1 permit 0.0.0.0
!
route-map ospftobgp permit 10
  match ip address 1
!
mpls ldp router-id Loopback0
!

```

PE3

```

hostname PE3
!
vrf definition A
  rd 300:1
  !
  address-family ipv4
    route-target export 300:1
    route-target import 100:1
    route-target import 200:1
    route-target import 300:1
  exit-address-family
!
ip cef
!
interface Loopback0
  ip address 3.3.3.3 255.255.255.255
!
interface Ethernet0/0
  description to P1
  ip address 3.1.0.1 255.255.255.0
  ip router isis SP
  mpls ip
  isis circuit-type level-1
!
interface Ethernet0/1
  description to P2
  ip address 3.2.0.1 255.255.255.0
  ip router isis SP
  mpls ip
  isis circuit-type level-1
!
interface Ethernet0/2

```

```

description to CE4
vrf forwarding A
ip address 40.0.0.1 255.255.255.0
!
router ospf 1 vrf A
 redistribute bgp 1 subnets
 network 40.0.0.1 0.0.0.0 area 0
!
router isis SP
 net 49.0001.0000.0000.0003.00
 metric-style wide
 log-adjacency-changes
 passive-interface Loopback0
!
router bgp 1
 bgp log-neighbor-changes
 no bgp default ipv4-unicast
 neighbor 6.6.6.6 remote-as 1
 neighbor 6.6.6.6 update-source Loopback0
 neighbor 7.7.7.7 remote-as 1
 neighbor 7.7.7.7 update-source Loopback0
!
 address-family ipv4
  exit-address-family
!
 address-family vpnv4
  neighbor 6.6.6.6 activate
  neighbor 6.6.6.6 send-community extended
  neighbor 7.7.7.7 activate
  neighbor 7.7.7.7 send-community extended
  exit-address-family
!
 address-family ipv4 vrf A
  redistribute ospf 1 match internal external 1 external 2
route-map ospftobgp
 default-information originate
 exit-address-family
!
access-list 1 permit 0.0.0.0
!
route-map ospftobgp permit 10
 match ip address 1
!
mpls ldp router-id Loopback0
!

```

P1

```
hostname P1
```



```
!  
ip cef  
!  
interface Loopback0  
 ip address 4.4.4.4 255.255.255.255  
!  
interface Ethernet0/0  
 description to PE1  
 ip address 1.1.0.2 255.255.255.0  
 ip router isis SP  
 mpls ip  
 isis circuit-type level-1  
!  
interface Ethernet0/2  
 description to PE2  
 ip address 2.1.0.2 255.255.255.0  
 ip router isis SP  
 mpls ip  
 isis circuit-type level-1  
!  
interface Ethernet0/3  
 description to PE3  
 ip address 3.1.0.2 255.255.255.0  
 ip router isis SP  
 mpls ip  
 isis circuit-type level-1  
!  
interface Ethernet1/0  
 description to RR1  
 ip address 7.1.0.2 255.255.255.0  
 ip router isis SP  
 isis circuit-type level-1  
!  
router isis SP  
 net 49.0001.0000.0000.0004.00  
 metric-style wide  
 log-adjacency-changes  
 passive-interface Loopback0  
!  
mpls ldp router-id Loopback0  
!
```

P2

```
hostname P2  
!  
ip cef  
!  
interface Loopback0
```

```
ip address 5.5.5.5 255.255.255.255
!
interface Ethernet0/1
description to PE1
ip address 1.2.0.2 255.255.255.0
ip router isis SP
mpls ip
isis circuit-type level-1
!
interface Ethernet0/2
description to PE2
ip address 2.2.0.2 255.255.255.0
ip router isis SP
mpls ip
isis circuit-type level-1
!
interface Ethernet0/3
description to PE3
ip address 3.2.0.2 255.255.255.0
ip router isis SP
mpls ip
isis circuit-type level-1
!
interface Ethernet1/0
description to RR2
ip address 7.2.0.2 255.255.255.0
ip router isis SP
isis circuit-type level-1
!
router isis SP
net 49.0001.0000.0000.0005.00
metric-style wide
log-adjacency-changes
passive-interface Loopback0
!
mpls ldp router-id Loopback0
!
```

RR1

```
hostname RR1
!
ip cef
!
interface Loopback0
ip address 6.6.6.6 255.255.255.255
!
interface Ethernet1/0
description to P1
```

```

ip address 7.1.0.1 255.255.255.0
ip router isis SP
isis circuit-type level-1
!
router isis SP
net 49.0001.0000.0000.0006.00
metric-style wide
log-adjacency-changes
passive-interface Loopback0
!
router bgp 1
bgp log-neighbor-changes
no bgp default ipv4-unicast
neighbor 1.1.1.1 remote-as 1
neighbor 1.1.1.1 update-source Loopback0
neighbor 2.2.2.2 remote-as 1
neighbor 2.2.2.2 update-source Loopback0
neighbor 3.3.3.3 remote-as 1
neighbor 3.3.3.3 update-source Loopback0
!
address-family ipv4
exit-address-family
!
address-family vpnv4
neighbor 1.1.1.1 activate
neighbor 1.1.1.1 send-community extended
neighbor 1.1.1.1 route-reflector-client
neighbor 2.2.2.2 activate
neighbor 2.2.2.2 send-community extended
neighbor 2.2.2.2 route-reflector-client
neighbor 3.3.3.3 activate
neighbor 3.3.3.3 send-community extended
neighbor 3.3.3.3 route-reflector-client
exit-address-family
!

```

RR2

```

hostname RR2
!
ip cef
!
interface Loopback0
ip address 7.7.7.7 255.255.255.255
!
interface Ethernet1/0
description to P2
ip address 7.2.0.1 255.255.255.0
ip router isis SP

```

```
isis circuit-type level-1
!
router isis SP
net 49.0001.0000.0000.0007.00
metric-style wide
log-adjacency-changes
passive-interface Loopback0
!
router bgp 1
bgp log-neighbor-changes
no bgp default ipv4-unicast
neighbor 1.1.1.1 remote-as 1
neighbor 1.1.1.1 update-source Loopback0
neighbor 2.2.2.2 remote-as 1
neighbor 2.2.2.2 update-source Loopback0
neighbor 3.3.3.3 remote-as 1
neighbor 3.3.3.3 update-source Loopback0
!
address-family ipv4
exit-address-family
!
address-family vpnv4
neighbor 1.1.1.1 activate
neighbor 1.1.1.1 send-community extended
neighbor 1.1.1.1 route-reflector-client
neighbor 2.2.2.2 activate
neighbor 2.2.2.2 send-community extended
neighbor 2.2.2.2 route-reflector-client
neighbor 3.3.3.3 activate
neighbor 3.3.3.3 send-community extended
neighbor 3.3.3.3 route-reflector-client
exit-address-family
!
```