IERG4831

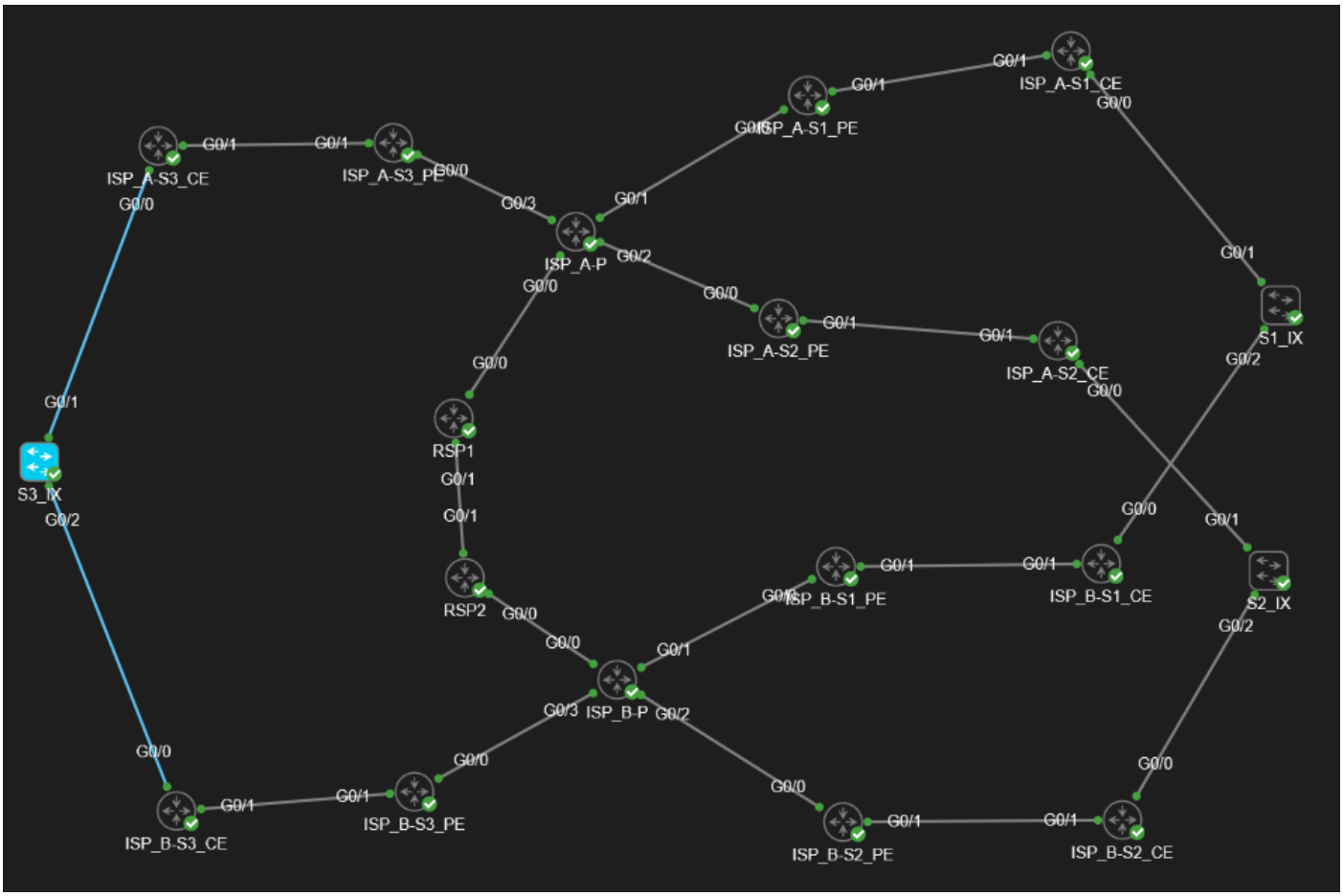
Lab 4: Implementation of inter-domain routing networks

NAME: Doria Tang

SID: 1155126139

Task 0: Core IGP in each ISP network

- Record a screen dump of the network topology.



Task 1: Core IGP in each ISP network

- Record the route table of P in each ISP.

ISP_A-P:

```
      ISP_A-P(config-if)#do sh ip ro
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, p - overrides from PfR

Gateway of last resort is not set
```

```
      1.0.0.0/8 is variably subnetted, 6 subnets, 2 masks
C        1.1.11.0/24 is directly connected, GigabitEthernet0/1
L        1.1.11.254/32 is directly connected, GigabitEthernet0/1
C        1.1.12.0/24 is directly connected, GigabitEthernet0/2
L        1.1.12.254/32 is directly connected, GigabitEthernet0/2
C        1.1.13.0/24 is directly connected, GigabitEthernet0/3
L        1.1.13.254/32 is directly connected, GigabitEthernet0/3
      10.0.0.0/8 is variably subnetted, 6 subnets, 2 masks
O        10.1.1.1/32 [110/2] via 1.1.11.1, 00:01:39, GigabitEthernet0/1
O        10.1.1.2/32 [110/2] via 1.1.12.1, 00:01:25, GigabitEthernet0/2
O        10.1.1.3/32 [110/2] via 1.1.13.1, 00:01:15, GigabitEthernet0/3
C        10.1.1.254/32 is directly connected, Loopback0
C        10.10.10.0/24 is directly connected, GigabitEthernet0/0
L        10.10.10.1/32 is directly connected, GigabitEthernet0/0
```

ISP_B-P:

```
ISP_B-P(config)#do sh ip ro
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, p - overrides from PfR

Gateway of last resort is not set

      2.0.0.0/8 is variably subnetted, 6 subnets, 2 masks
C        2.2.21.0/24 is directly connected, GigabitEthernet0/1
L        2.2.21.254/32 is directly connected, GigabitEthernet0/1
C        2.2.22.0/24 is directly connected, GigabitEthernet0/2
L        2.2.22.254/32 is directly connected, GigabitEthernet0/2
C        2.2.23.0/24 is directly connected, GigabitEthernet0/3
L        2.2.23.254/32 is directly connected, GigabitEthernet0/3
      10.0.0.0/32 is subnetted, 4 subnets
O        10.2.2.1 [110/2] via 2.2.21.1, 00:01:00, GigabitEthernet0/1
O        10.2.2.2 [110/2] via 2.2.22.1, 00:01:21, GigabitEthernet0/2
O        10.2.2.3 [110/2] via 2.2.23.1, 00:00:50, GigabitEthernet0/3
C        10.2.2.254 is directly connected, Loopback0
      20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C        20.20.20.0/24 is directly connected, GigabitEthernet0/0
L        20.20.20.1/32 is directly connected, GigabitEthernet0/0
```

- Record the configurations in this task.

ISP_A-P:

```
!
interface Loopback0
 ip address 10.1.1.254 255.255.255.255
!
interface GigabitEthernet0/0
```

```
 ip address 10.10.10.1 255.255.255.0
 duplex auto
 speed auto
 media-type rj45
!
interface GigabitEthernet0/1
 ip address 1.1.11.254 255.255.255.0
 duplex auto
 speed auto
 media-type rj45
!
interface GigabitEthernet0/2
 ip address 1.1.12.254 255.255.255.0
 duplex auto
 speed auto
 media-type rj45
!
interface GigabitEthernet0/3
 ip address 1.1.13.254 255.255.255.0
 duplex auto
 speed auto
 media-type rj45
!
router ospf 1
 network 1.1.11.0 0.0.0.255 area 0
 network 1.1.12.0 0.0.0.255 area 0
 network 1.1.13.0 0.0.0.255 area 0
 network 10.1.1.254 0.0.0.0 area 0
 network 10.10.10.0 0.0.0.255 area 0
!
```

ISP_A-S1_PE:

```
!
interface Loopback0
 ip address 10.1.1.1 255.255.255.255
!
interface GigabitEthernet0/0
 ip address 1.1.11.1 255.255.255.0
 duplex auto
 speed auto
 media-type rj45
!
interface GigabitEthernet0/1
 ip address 1.1.1.254 255.255.255.0
 shutdown
 duplex auto
 speed auto
 media-type rj45
!
interface GigabitEthernet0/2
 no ip address
 shutdown
 duplex auto
```

```
 speed auto
 media-type rj45
!
interface GigabitEthernet0/3
 no ip address
 shutdown
 duplex auto
 speed auto
 media-type rj45
!
router ospf 1
 network 1.1.11.0 0.0.0.255 area 0
 network 10.1.1.1 0.0.0.0 area 0
!
```

ISP_A-S2_PE:

```
!
interface Loopback0
 ip address 10.1.1.2 255.255.255.255
!
interface GigabitEthernet0/0
 ip address 1.1.12.1 255.255.255.0
 duplex auto
 speed auto
 media-type rj45
!
interface GigabitEthernet0/1
 ip address 1.1.2.254 255.255.255.0
 shutdown
 duplex auto
 speed auto
 media-type rj45
!
interface GigabitEthernet0/2
 no ip address
 shutdown
 duplex auto
 speed auto
 media-type rj45
!
interface GigabitEthernet0/3
 no ip address
 shutdown
 duplex auto
 speed auto
 media-type rj45
!
router ospf 1
 network 1.1.12.0 0.0.0.255 area 0
 network 10.1.1.2 0.0.0.0 area 0
!
```

ISP_A-S3_PE:

```
!
interface Loopback0
 ip address 10.1.1.3 255.255.255.255
!
interface GigabitEthernet0/0
 ip address 1.1.13.1 255.255.255.0
 duplex auto
 speed auto
 media-type rj45
!
interface GigabitEthernet0/1
 ip address 1.1.3.254 255.255.255.0
 shutdown
 duplex auto
 speed auto
 media-type rj45
!
interface GigabitEthernet0/2
 no ip address
 shutdown
 duplex auto
 speed auto
 media-type rj45
!
interface GigabitEthernet0/3
 no ip address
 shutdown
 duplex auto
 speed auto
 media-type rj45
!
router ospf 1
 network 1.1.13.0 0.0.0.255 area 0
 network 10.1.1.3 0.0.0.0 area 0
!
```

ISP_B-P:

```
!
interface Loopback0
 ip address 10.2.2.254 255.255.255.255
!
interface GigabitEthernet0/0
 ip address 20.20.20.1 255.255.255.0
 duplex auto
 speed auto
 media-type rj45
!
interface GigabitEthernet0/1
 ip address 2.2.21.254 255.255.255.0
 duplex auto
 speed auto
 media-type rj45
!
```

```
interface GigabitEthernet0/2
 ip address 2.2.22.254 255.255.255.0
 duplex auto
 speed auto
 media-type rj45
!
interface GigabitEthernet0/3
 ip address 2.2.23.254 255.255.255.0
 duplex auto
 speed auto
 media-type rj45
!
router ospf 1
 network 2.2.21.0 0.0.0.255 area 0
 network 2.2.22.0 0.0.0.255 area 0
 network 2.2.23.0 0.0.0.255 area 0
 network 10.2.2.254 0.0.0.0 area 0
 network 20.20.20.0 0.0.0.255 area 0
!
```

ISP_B-S1_PE:

```
!
interface Loopback0
 ip address 10.2.2.1 255.255.255.255
!
interface GigabitEthernet0/0
 ip address 2.2.21.1 255.255.255.0
 duplex auto
 speed auto
 media-type rj45
!
interface GigabitEthernet0/1
 ip address 2.2.1.254 255.255.255.0
 shutdown
 duplex auto
 speed auto
 media-type rj45
!
interface GigabitEthernet0/2
 no ip address
 shutdown
 duplex auto
 speed auto
 media-type rj45
!
interface GigabitEthernet0/3
 no ip address
 shutdown
 duplex auto
 speed auto
 media-type rj45
!
router ospf 1
```

```
 network 2.2.21.0 0.0.0.255 area 0
 network 10.2.2.1 0.0.0.0 area 0
!
```

ISP_B-S2_PE:

```
!
interface Loopback0
 ip address 10.2.2.2 255.255.255.255
!
interface GigabitEthernet0/0
 ip address 2.2.22.1 255.255.255.0
 duplex auto
 speed auto
 media-type rj45
!
interface GigabitEthernet0/1
 ip address 2.2.2.254 255.255.255.0
 shutdown
 duplex auto
 speed auto
 media-type rj45
!
interface GigabitEthernet0/2
 no ip address
 shutdown
 duplex auto
 speed auto
 media-type rj45
!
interface GigabitEthernet0/3
 no ip address
 shutdown
 duplex auto
 speed auto
 media-type rj45
!
router ospf 1
 network 2.2.22.0 0.0.0.255 area 0
 network 10.2.2.2 0.0.0.0 area 0
!
```

ISP_B-S3_PE:

```
!
interface Loopback0
 ip address 10.2.2.3 255.255.255.255
!
interface GigabitEthernet0/0
 ip address 2.2.23.1 255.255.255.0
 duplex auto
 speed auto
 media-type rj45
!
```

```
interface GigabitEthernet0/1
 ip address 2.2.3.254 255.255.255.0
 shutdown
 duplex auto
 speed auto
 media-type rj45
!
interface GigabitEthernet0/2
 no ip address
 shutdown
 duplex auto
 speed auto
 media-type rj45
!
interface GigabitEthernet0/3
 no ip address
 shutdown
 duplex auto
 speed auto
 media-type rj45
!
router ospf 1
 network 2.2.23.0 0.0.0.255 area 0
 network 10.2.2.3 0.0.0.0 area 0
!
```

Task 2: Core BGP in each ISP network

- Record the configurations in this task.

ISP_A-P:

```
ISP_A-P(config)# do sh run | s bgp
router bgp 1000
 bgp log-neighbor-changes
 neighbor 10.1.1.1 remote-as 1000
 neighbor 10.1.1.1 update-source Loopback0
 neighbor 10.1.1.1 route-reflector-client
 neighbor 10.1.1.1 next-hop-self
 neighbor 10.1.1.2 remote-as 1000
 neighbor 10.1.1.2 update-source Loopback0
 neighbor 10.1.1.2 route-reflector-client
 neighbor 10.1.1.2 next-hop-self
 neighbor 10.1.1.3 remote-as 1000
 neighbor 10.1.1.3 update-source Loopback0
 neighbor 10.1.1.3 route-reflector-client
 neighbor 10.1.1.3 next-hop-self
```

ISP_A-S1_PE:

```
ISP_A-S1_PE(config)#do sh run | s bgp
router bgp 1000
 bgp log-neighbor-changes
 redistribute connected
 neighbor 10.1.1.254 remote-as 1000
```

```
 neighbor 10.1.1.254 update-source Loopback0
 neighbor 10.1.1.254 update-source Loopback0
 neighbor 10.1.1.254 next-hop-self
```

ISP_A-S2_PE:

```
ISP_A-S2_PE(config)#do sh run | s bgp
router bgp 1000
 bgp log-neighbor-changes
 redistribute connected
 neighbor 10.1.1.254 remote-as 1000
 neighbor 10.1.1.254 update-source Loopback0
 neighbor 10.1.1.254 next-hop-self
```

ISP_A-S3_PE:

```
ISP_A-S3_PE(config)#do sh run | s bgp
router bgp 1000
 bgp log-neighbor-changes
 redistribute connected
 neighbor 10.1.1.254 remote-as 1000
 neighbor 10.1.1.254 update-source Loopback0
 neighbor 10.1.1.254 next-hop-self
```

ISP_B-P:

```
ISP_B-P(config)#do sh run | s bgp
router bgp 2000
 bgp log-neighbor-changes
 neighbor 10.2.2.1 remote-as 2000
 neighbor 10.2.2.1 update-source Loopback0
 neighbor 10.2.2.1 route-reflector-client
 neighbor 10.2.2.1 next-hop-self
 neighbor 10.2.2.2 remote-as 2000
 neighbor 10.2.2.2 update-source Loopback0
 neighbor 10.2.2.2 route-reflector-client
 neighbor 10.2.2.2 next-hop-self
 neighbor 10.2.2.3 remote-as 2000
 neighbor 10.2.2.3 update-source Loopback0
 neighbor 10.2.2.3 route-reflector-client
 neighbor 10.2.2.3 next-hop-self
```

ISP_B-S1_PE:

```
ISP_B-S1_PE(config)#do sh run | s bgp
router bgp 2000
 bgp log-neighbor-changes
 redistribute connected
 neighbor 10.2.2.254 remote-as 2000
 neighbor 10.2.2.254 update-source Loopback0
 neighbor 10.2.2.254 next-hop-self
```

ISP_B-S2_PE:

```
ISP_B-S2_PE(config)#do sh run | s bgp
router bgp 2000
 bgp log-neighbor-changes
 redistribute connected
 neighbor 10.2.2.254 remote-as 2000
 neighbor 10.2.2.254 update-source Loopback0
 neighbor 10.2.2.254 next-hop-self
```

ISP_B-S3_PE:

```
ISP_B-S3_PE(config)#do sh run | s bgp
router bgp 2000
 bgp log-neighbor-changes
 redistribute connected
 neighbor 10.2.2.254 remote-as 2000
 neighbor 10.2.2.254 update-source Loopback0
 neighbor 10.2.2.254 next-hop-self
```

- Record the summary of BGP neighbor status by "`show ip bgp summary`" on the P routers.

ISP_A-P:

```
ISP_A-P(config)#do show ip bgp summary
BGP router identifier 10.1.1.254, local AS number 1000
BGP table version is 5, main routing table version 5

Neighbor        V           AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down
State/PfxRcd
10.1.1.1        4         1000      54      52        5    0    0 00:43:57        0
10.1.1.2        4         1000      50      52        5    0    0 00:43:36        0
10.1.1.3        4         1000      51      50        5    0    0 00:43:16        0
```

ISP_B-P:

```
ISP_B-P(config-router)#do sh ip bgp summary
BGP router identifier 10.2.2.254, local AS number 2000
BGP table version is 1, main routing table version 1

Neighbor        V           AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down
State/PfxRcd
10.2.2.1        4         2000       4       3        1    0    0 00:00:59        0
10.2.2.2        4         2000       2       2        1    0    0 00:00:47        0
10.2.2.3        4         2000       2       2        1    0    0 00:00:25        0
```

Task 3: Configuration of eBGP between PE and CE in each site

- Record the BGP table of P router by the command "`show ip bgp`".

ISP_A-P:

```
ISP_A-P(config)#do sh ip bgp
BGP table version is 101, local router ID is 10.1.1.254
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
              r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
              x best-external, a additional-path, c RIB-compressed,
```

```
              t secondary path,
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found

     Network          Next Hop            Metric LocPrf Weight Path
 *>i  1.1.1.0/24       10.1.1.1                 0    100      0 ?
 *>i  1.1.2.0/24       10.1.1.2                 0    100      0 ?
 *>i  1.1.3.0/24       10.1.1.3                 0    100      0 ?
 r>i  1.1.11.0/24      10.1.1.1                 0    100      0 ?
 r>i  1.1.12.0/24      10.1.1.2                 0    100      0 ?
 r>i  1.1.13.0/24      10.1.1.3                 0    100      0 ?
 *>i  10.0.11.0/24     10.1.1.1                 0    100      0 1100 i
 r>i  10.1.1.1/32      10.1.1.1                 0    100      0 ?
 r>i  10.1.1.2/32      10.1.1.2                 0    100      0 ?
 r>i  10.1.1.3/32      10.1.1.3                 0    100      0 ?
 *>i  172.16.12.0/24   10.1.1.2                 0    100      0 1200 i
 *>i  192.168.13.0     10.1.1.3                 0    100      0 1300 i
 *>i  200.11.1.0       10.1.1.1                 0    100      0 1100 i
     Network          Next Hop            Metric LocPrf Weight Path
 *>i  200.11.2.0       10.1.1.1                 0    100      0 1100 i
 *>i  200.11.3.0       10.1.1.1                 0    100      0 1100 i
 *>i  200.11.4.0       10.1.1.1                 0    100      0 1100 i
 *>i  200.11.5.0       10.1.1.1                 0    100      0 1100 i
 *>i  200.11.6.0       10.1.1.1                 0    100      0 1100 i
 *>i  200.11.7.0       10.1.1.1                 0    100      0 1100 i
 *>i  200.11.8.0       10.1.1.1                 0    100      0 1100 i
 *>i  200.11.9.0       10.1.1.1                 0    100      0 1100 i
 *>i  200.11.10.0      10.1.1.1                 0    100      0 1100 i
 *>i  200.11.11.0      10.1.1.1                 0    100      0 1100 i
 *>i  200.11.12.0      10.1.1.1                 0    100      0 1100 i
 *>i  200.11.13.0      10.1.1.1                 0    100      0 1100 i
 *>i  200.11.14.0      10.1.1.1                 0    100      0 1100 i
 *>i  200.11.15.0      10.1.1.1                 0    100      0 1100 i
 *>i  200.12.1.0       10.1.1.2                 0    100      0 1200 i
 *>i  200.12.2.0       10.1.1.2                 0    100      0 1200 i
 *>i  200.12.3.0       10.1.1.2                 0    100      0 1200 i
 *>i  200.12.4.0       10.1.1.2                 0    100      0 1200 i
 *>i  200.12.5.0       10.1.1.2                 0    100      0 1200 i
 *>i  200.12.6.0       10.1.1.2                 0    100      0 1200 i
 *>i  200.12.7.0       10.1.1.2                 0    100      0 1200 i
 *>i  200.12.8.0       10.1.1.2                 0    100      0 1200 i
     Network          Next Hop            Metric LocPrf Weight Path
 *>i  200.12.9.0       10.1.1.2                 0    100      0 1200 i
 *>i  200.12.10.0      10.1.1.2                 0    100      0 1200 i
 *>i  200.12.11.0      10.1.1.2                 0    100      0 1200 i
 *>i  200.12.12.0      10.1.1.2                 0    100      0 1200 i
 *>i  200.12.13.0      10.1.1.2                 0    100      0 1200 i
 *>i  200.12.14.0      10.1.1.2                 0    100      0 1200 i
 *>i  200.12.15.0      10.1.1.2                 0    100      0 1200 i
 *>i  200.13.1.0       10.1.1.3                 0    100      0 1300 i
 *>i  200.13.2.0       10.1.1.3                 0    100      0 1300 i
 *>i  200.13.3.0       10.1.1.3                 0    100      0 1300 i
 *>i  200.13.4.0       10.1.1.3                 0    100      0 1300 i
 *>i  200.13.5.0       10.1.1.3                 0    100      0 1300 i
 *>i  200.13.6.0       10.1.1.3                 0    100      0 1300 i
```

```
 *>i  200.13.7.0       10.1.1.3                 0    100      0 1300 i
 *>i  200.13.8.0       10.1.1.3                 0    100      0 1300 i
 *>i  200.13.9.0       10.1.1.3                 0    100      0 1300 i
 *>i  200.13.10.0      10.1.1.3                 0    100      0 1300 i
 *>i  200.13.11.0      10.1.1.3                 0    100      0 1300 i
 *>i  200.13.12.0      10.1.1.3                 0    100      0 1300 i
 *>i  200.13.13.0      10.1.1.3                 0    100      0 1300 i
 *>i  200.13.14.0      10.1.1.3                 0    100      0 1300 i
 *>i  200.13.15.0      10.1.1.3                 0    100      0 1300 i
```

ISP_B-P:

```
ISP_B-P(config)#do sh ip bgp
BGP table version is 86, local router ID is 10.2.2.254
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
              r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
              x best-external, a additional-path, c RIB-compressed,
              t secondary path,
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found

     Network          Next Hop            Metric LocPrf Weight Path
 *>i  2.2.1.0/24       10.2.2.1                 0    100      0 ?
 *>i  2.2.2.0/24       10.2.2.2                 0    100      0 ?
 *>i  2.2.3.0/24       10.2.2.3                 0    100      0 ?
 r>i  2.2.21.0/24      10.2.2.1                 0    100      0 ?
 r>i  2.2.22.0/24      10.2.2.2                 0    100      0 ?
 r>i  2.2.23.0/24      10.2.2.3                 0    100      0 ?
 *>i  10.0.21.0/24     10.2.2.1                 0    100      0 2100 i
 r>i  10.2.2.1/32      10.2.2.1                 0    100      0 ?
 r>i  10.2.2.2/32      10.2.2.2                 0    100      0 ?
 r>i  10.2.2.3/32      10.2.2.3                 0    100      0 ?
 *>i  172.16.22.0/24   10.2.2.2                 0    100      0 2200 i
 *>i  192.168.23.0     10.2.2.3                 0    100      0 2300 i
 *>i  200.21.1.0       10.2.2.1                 0    100      0 2100 i
     Network          Next Hop            Metric LocPrf Weight Path
 *>i  200.21.2.0       10.2.2.1                 0    100      0 2100 i
 *>i  200.21.3.0       10.2.2.1                 0    100      0 2100 i
 *>i  200.21.4.0       10.2.2.1                 0    100      0 2100 i
 *>i  200.21.5.0       10.2.2.1                 0    100      0 2100 i
 *>i  200.21.6.0       10.2.2.1                 0    100      0 2100 i
 *>i  200.21.7.0       10.2.2.1                 0    100      0 2100 i
 *>i  200.21.8.0       10.2.2.1                 0    100      0 2100 i
 *>i  200.21.9.0       10.2.2.1                 0    100      0 2100 i
 *>i  200.21.10.0      10.2.2.1                 0    100      0 2100 i
 *>i  200.21.11.0      10.2.2.1                 0    100      0 2100 i
 *>i  200.21.12.0      10.2.2.1                 0    100      0 2100 i
 *>i  200.21.13.0      10.2.2.1                 0    100      0 2100 i
 *>i  200.21.14.0      10.2.2.1                 0    100      0 2100 i
 *>i  200.21.15.0      10.2.2.1                 0    100      0 2100 i
 *>i  200.22.1.0       10.2.2.2                 0    100      0 2200 i
 *>i  200.22.2.0       10.2.2.2                 0    100      0 2200 i
 *>i  200.22.3.0       10.2.2.2                 0    100      0 2200 i
 *>i  200.22.4.0       10.2.2.2                 0    100      0 2200 i
```

```
 *>i  200.22.5.0       10.2.2.2                 0    100      0 2200 i
 *>i  200.22.6.0       10.2.2.2                 0    100      0 2200 i
 *>i  200.22.7.0       10.2.2.2                 0    100      0 2200 i
 *>i  200.22.8.0       10.2.2.2                 0    100      0 2200 i
     Network          Next Hop            Metric LocPrf Weight Path
 *>i  200.22.9.0       10.2.2.2                 0    100      0 2200 i
 *>i  200.22.10.0      10.2.2.2                 0    100      0 2200 i
 *>i  200.22.11.0      10.2.2.2                 0    100      0 2200 i
 *>i  200.22.12.0      10.2.2.2                 0    100      0 2200 i
 *>i  200.22.13.0      10.2.2.2                 0    100      0 2200 i
 *>i  200.22.14.0      10.2.2.2                 0    100      0 2200 i
 *>i  200.22.15.0      10.2.2.2                 0    100      0 2200 i
 *>i  200.23.1.0       10.2.2.3                 0    100      0 2300 i
 *>i  200.23.2.0       10.2.2.3                 0    100      0 2300 i
 *>i  200.23.3.0       10.2.2.3                 0    100      0 2300 i
 *>i  200.23.4.0       10.2.2.3                 0    100      0 2300 i
 *>i  200.23.5.0       10.2.2.3                 0    100      0 2300 i
 *>i  200.23.6.0       10.2.2.3                 0    100      0 2300 i
 *>i  200.23.7.0       10.2.2.3                 0    100      0 2300 i
 *>i  200.23.8.0       10.2.2.3                 0    100      0 2300 i
 *>i  200.23.9.0       10.2.2.3                 0    100      0 2300 i
 *>i  200.23.10.0      10.2.2.3                 0    100      0 2300 i
 *>i  200.23.11.0      10.2.2.3                 0    100      0 2300 i
 *>i  200.23.12.0      10.2.2.3                 0    100      0 2300 i
 *>i  200.23.13.0      10.2.2.3                 0    100      0 2300 i
 *>i  200.23.14.0      10.2.2.3                 0    100      0 2300 i
 *>i  200.23.15.0      10.2.2.3                 0    100      0 2300 i
```

- Record the configurations in this task.

ISP_A-S1_PE:

```
ISP_A-S1_PE(config)#do sh run | s bgp
router bgp 1000
 bgp log-neighbor-changes
 redistribute connected
 neighbor 1.1.1.1 remote-as 1100
 neighbor 10.1.1.254 remote-as 1000
 neighbor 10.1.1.254 update-source Loopback0
 neighbor 10.1.1.254 next-hop-self
```

ISP_A-S2_PE:

```
ISP_A-S2_PE(config)#do sh run | s bgp
router bgp 1000
 bgp log-neighbor-changes
 redistribute connected
 neighbor 10.1.1.254 remote-as 1000
 neighbor 10.1.1.254 update-source Loopback0
 neighbor 10.1.1.254 next-hop-self
```

ISP_A-S3_PE:

```
ISP_A-S3_PE(config)#do sh run | s bgp
```

```
router bgp 1000
 bgp log-neighbor-changes
 redistribute connected
 neighbor 1.1.3.1 remote-as 1300
 neighbor 10.1.1.254 remote-as 1000
 neighbor 10.1.1.254 update-source Loopback0
 neighbor 10.1.1.254 next-hop-self
```

ISP_A-S1_CE:

```
ISP_A-S1_CE(config)#do sh run | s bgp
router bgp 1100
 bgp log-neighbor-changes
 network 10.0.11.0 mask 255.255.255.0
 network 200.11.1.0
 network 200.11.2.0
 network 200.11.3.0
 network 200.11.4.0
 network 200.11.5.0
 network 200.11.6.0
 network 200.11.7.0
 network 200.11.8.0
 network 200.11.9.0
 network 200.11.10.0
 network 200.11.11.0
 network 200.11.12.0
 network 200.11.13.0
 network 200.11.14.0
 network 200.11.15.0
 neighbor 1.1.1.254 remote-as 1000
```

ISP_A-S2_CE:

```
ISP_A-S2_CE(config)#do sh run | s bgp
router bgp 1200
 bgp log-neighbor-changes
 network 172.16.12.0 mask 255.255.255.0
 network 200.12.1.0
 network 200.12.2.0
 network 200.12.3.0
 network 200.12.4.0
 network 200.12.5.0
 network 200.12.6.0
 network 200.12.7.0
 network 200.12.8.0
 network 200.12.9.0
 network 200.12.10.0
 network 200.12.11.0
 network 200.12.12.0
 network 200.12.13.0
 network 200.12.14.0
 network 200.12.15.0
 neighbor 1.1.2.254 remote-as 1000
```

ISP_A-S3_CE:

```
ISP_A-S3_CE(config)#do sh run | s bgp
router bgp 1300
 bgp log-neighbor-changes
 network 192.168.13.0
 network 200.13.1.0
 network 200.13.2.0
 network 200.13.3.0
 network 200.13.4.0
 network 200.13.5.0
 network 200.13.6.0
 network 200.13.7.0
 network 200.13.8.0
 network 200.13.9.0
 network 200.13.10.0
 network 200.13.11.0
 network 200.13.12.0
 network 200.13.13.0
 network 200.13.14.0
 network 200.13.15.0
 neighbor 1.1.3.254 remote-as 1000
```

ISP_B-S1_PE:

```
ISP_B-S1_PE(config)#do sh run | s bgp
router bgp 2000
 bgp log-neighbor-changes
 redistribute connected
 neighbor 2.2.1.1 remote-as 2100
 neighbor 10.2.2.254 remote-as 2000
 neighbor 10.2.2.254 update-source Loopback0
 neighbor 10.2.2.254 next-hop-self
```

ISP_B-S2_PE:

```
ISP_B-S2_PE(config)#do sh run | s bgp
router bgp 2000
 bgp log-neighbor-changes
 redistribute connected
 neighbor 2.2.2.1 remote-as 2200
 neighbor 10.2.2.254 remote-as 2000
 neighbor 10.2.2.254 update-source Loopback0
 neighbor 10.2.2.254 next-hop-self
```

ISP_B-S3_PE:

```
ISP_B-S3_PE(config)#do sh run | s bgp
router bgp 2000
 bgp log-neighbor-changes
 redistribute connected
 neighbor 2.2.3.1 remote-as 2300
 neighbor 10.2.2.254 remote-as 2000
 neighbor 10.2.2.254 update-source Loopback0
```

```
 neighbor 10.2.2.254 next-hop-self
```

ISP_B-S1_CE:

```
ISP_B-S1_CE(config)#do sh run | s bgp
router bgp 2100
 bgp log-neighbor-changes
 network 10.0.21.0 mask 255.255.255.0
 network 200.21.1.0
 network 200.21.2.0
 network 200.21.3.0
 network 200.21.4.0
 network 200.21.5.0
 network 200.21.6.0
 network 200.21.7.0
 network 200.21.8.0
 network 200.21.9.0
 network 200.21.10.0
 network 200.21.11.0
 network 200.21.12.0
 network 200.21.13.0
 network 200.21.14.0
 network 200.21.15.0
 neighbor 2.2.1.254 remote-as 2000
```

ISP_B-S2_CE:

```
ISP_B-S2_CE(config)#do sh run | s bgp
router bgp 2200
 bgp log-neighbor-changes
 network 172.16.22.0 mask 255.255.255.0
 network 200.22.1.0
 network 200.22.2.0
 network 200.22.3.0
 network 200.22.4.0
 network 200.22.5.0
 network 200.22.6.0
 network 200.22.7.0
 network 200.22.8.0
 network 200.22.9.0
 network 200.22.10.0
 network 200.22.11.0
 network 200.22.12.0
 network 200.22.13.0
 network 200.22.14.0
 network 200.22.15.0
 neighbor 2.2.2.254 remote-as 2000
```

ISP_B-S3_CE:

```
ISP_B-S3_CE(config)#do sh run | s bgp
router bgp 2300
 bgp log-neighbor-changes
 network 192.168.23.0
```

```
 network 200.23.1.0
 network 200.23.2.0
 network 200.23.3.0
 network 200.23.4.0
 network 200.23.5.0
 network 200.23.6.0
 network 200.23.7.0
 network 200.23.8.0
 network 200.23.9.0
 network 200.23.10.0
 network 200.23.11.0
 network 200.23.12.0
 network 200.23.13.0
 network 200.23.14.0
 network 200.23.15.0
 neighbor 2.2.3.254 remote-as 2000
```

Task 4: Configuration of eBGP between ISP and RSP

- Record the BGP table of ISP_A-S1_CE and ISP_B-S2_CE by the command "`show ip bgp`".

ISP_A-S1_CE:

```
ISP_A-S1_CE(config)#do sh ip bgp
BGP table version is 155, local router ID is 10.0.11.254
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
              r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
              x best-external, a additional-path, c RIB-compressed,
              t secondary path,
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found

     Network          Next Hop            Metric LocPrf Weight Path
 r>   1.1.1.0/24       1.1.1.254                0             0 1000 ?
 *>   1.1.2.0/24       1.1.1.254                              0 1000 ?
 *>   1.1.3.0/24       1.1.1.254                              0 1000 ?
 *>   1.1.11.0/24      1.1.1.254                0             0 1000 ?
 *>   1.1.12.0/24      1.1.1.254                              0 1000 ?
 *>   1.1.13.0/24      1.1.1.254                              0 1000 ?
 *>   2.2.1.0/24       1.1.1.254                              0 1000 10 20 2000 ?
 *>   2.2.2.0/24       1.1.1.254                              0 1000 10 20 2000 ?
 *>   2.2.3.0/24       1.1.1.254                              0 1000 10 20 2000 ?
 *>   2.2.21.0/24      1.1.1.254                              0 1000 10 20 2000 ?
     Network          Next Hop            Metric LocPrf Weight Path
 *>   2.2.22.0/24      1.1.1.254                              0 1000 10 20 2000 ?
 *>   2.2.23.0/24      1.1.1.254                              0 1000 10 20 2000 ?
 *>   10.0.11.0/24     0.0.0.0                  0         32768 i
 *>   10.0.21.0/24     1.1.1.254                              0 1000 10 20 2000
2100 i
 *>   10.1.1.1/32      1.1.1.254                0             0 1000 ?
 *>   10.1.1.2/32      1.1.1.254                              0 1000 ?
 *>   10.1.1.3/32      1.1.1.254                              0 1000 ?
 *>   10.1.1.254/32    1.1.1.254                              0 1000 ?
 *>   10.2.2.1/32      1.1.1.254                              0 1000 10 20 2000 ?
 *>   10.2.2.2/32      1.1.1.254                              0 1000 10 20 2000 ?
```

```
 *>   10.2.2.3/32      1.1.1.254                              0 1000 10 20 2000 ?
 *>   10.2.2.254/32    1.1.1.254                              0 1000 10 20 2000 ?
 *>   10.10.10.0/24    1.1.1.254                              0 1000 ?
 *>   10.123.123.1/32  1.1.1.254                              0 1000 10 ?
 *>   10.123.123.2/32  1.1.1.254                              0 1000 10 20 ?
     Network          Next Hop            Metric LocPrf Weight Path
 *>   12.12.12.0/24    1.1.1.254                              0 1000 10 ?
 *>   20.20.20.0/24    1.1.1.254                              0 1000 10 20 ?
 *>   172.16.12.0/24   1.1.1.254                              0 1000 1200 i
 *>   172.16.22.0/24   1.1.1.254                              0 1000 10 20 2000
2200 i
 *>   192.168.13.0     1.1.1.254                              0 1000 1300 i
 *>   192.168.23.0     1.1.1.254                              0 1000 10 20 2000
2300 i
 *>   200.11.1.0       0.0.0.0                  0         32768 i
 *>   200.11.2.0       0.0.0.0                  0         32768 i
 *>   200.11.3.0       0.0.0.0                  0         32768 i
 *>   200.11.4.0       0.0.0.0                  0         32768 i
 *>   200.11.5.0       0.0.0.0                  0         32768 i
 *>   200.11.6.0       0.0.0.0                  0         32768 i
 *>   200.11.7.0       0.0.0.0                  0         32768 i
 *>   200.11.8.0       0.0.0.0                  0         32768 i
 *>   200.11.9.0       0.0.0.0                  0         32768 i
 *>   200.11.10.0      0.0.0.0                  0         32768 i
 *>   200.11.11.0      0.0.0.0                  0         32768 i
 *>   200.11.12.0      0.0.0.0                  0         32768 i
 *>   200.11.13.0      0.0.0.0                  0         32768 i
 *>   200.11.14.0      0.0.0.0                  0         32768 i
     Network          Next Hop            Metric LocPrf Weight Path
 *>   200.11.15.0      0.0.0.0                  0         32768 i
 *>   200.12.1.0       1.1.1.254                              0 1000 1200 i
 *>   200.12.2.0       1.1.1.254                              0 1000 1200 i
 *>   200.12.3.0       1.1.1.254                              0 1000 1200 i
 *>   200.12.4.0       1.1.1.254                              0 1000 1200 i
 *>   200.12.5.0       1.1.1.254                              0 1000 1200 i
 *>   200.12.6.0       1.1.1.254                              0 1000 1200 i
 *>   200.12.7.0       1.1.1.254                              0 1000 1200 i
 *>   200.12.8.0       1.1.1.254                              0 1000 1200 i
 *>   200.12.9.0       1.1.1.254                              0 1000 1200 i
 *>   200.12.10.0      1.1.1.254                              0 1000 1200 i
 *>   200.12.11.0      1.1.1.254                              0 1000 1200 i
 *>   200.12.12.0      1.1.1.254                              0 1000 1200 i
 *>   200.12.13.0      1.1.1.254                              0 1000 1200 i
 *>   200.12.14.0      1.1.1.254                              0 1000 1200 i
 *>   200.12.15.0      1.1.1.254                              0 1000 1200 i
 *>   200.13.1.0       1.1.1.254                              0 1000 1300 i
 *>   200.13.2.0       1.1.1.254                              0 1000 1300 i
 *>   200.13.3.0       1.1.1.254                              0 1000 1300 i
 *>   200.13.4.0       1.1.1.254                              0 1000 1300 i
 *>   200.13.5.0       1.1.1.254                              0 1000 1300 i
 *>   200.13.6.0       1.1.1.254                              0 1000 1300 i
     Network          Next Hop            Metric LocPrf Weight Path
 *>   200.13.7.0       1.1.1.254                              0 1000 1300 i
 *>   200.13.8.0       1.1.1.254                              0 1000 1300 i
 *>   200.13.9.0       1.1.1.254                              0 1000 1300 i
```

```
 *>   200.13.10.0      1.1.1.254                              0 1000 1300 i
 *>   200.13.11.0      1.1.1.254                              0 1000 1300 i
 *>   200.13.12.0      1.1.1.254                              0 1000 1300 i
 *>   200.13.13.0      1.1.1.254                              0 1000 1300 i
 *>   200.13.14.0      1.1.1.254                              0 1000 1300 i
 *>   200.13.15.0      1.1.1.254                              0 1000 1300 i
 *>   200.21.1.0       1.1.1.254                              0 1000 10 20 2000
2100 i
 *>   200.21.2.0       1.1.1.254                              0 1000 10 20 2000
2100 i
 *>   200.21.3.0       1.1.1.254                              0 1000 10 20 2000
2100 i
 *>   200.21.4.0       1.1.1.254                              0 1000 10 20 2000
2100 i
 *>   200.21.5.0       1.1.1.254                              0 1000 10 20 2000
2100 i
 *>   200.21.6.0       1.1.1.254                              0 1000 10 20 2000
2100 i
 *>   200.21.7.0       1.1.1.254                              0 1000 10 20 2000
2100 i
     Network          Next Hop            Metric LocPrf Weight Path
 *>   200.21.8.0       1.1.1.254                              0 1000 10 20 2000
2100 i
 *>   200.21.9.0       1.1.1.254                              0 1000 10 20 2000
2100 i
 *>   200.21.10.0      1.1.1.254                              0 1000 10 20 2000
2100 i
 *>   200.21.11.0      1.1.1.254                              0 1000 10 20 2000
2100 i
 *>   200.21.12.0      1.1.1.254                              0 1000 10 20 2000
2100 i
 *>   200.21.13.0      1.1.1.254                              0 1000 10 20 2000
2100 i
 *>   200.21.14.0      1.1.1.254                              0 1000 10 20 2000
2100 i
 *>   200.21.15.0      1.1.1.254                              0 1000 10 20 2000
2100 i
 *>   200.22.1.0       1.1.1.254                              0 1000 10 20 2000
2200 i
 *>   200.22.2.0       1.1.1.254                              0 1000 10 20 2000
2200 i
 *>   200.22.3.0       1.1.1.254                              0 1000 10 20 2000
2200 i
     Network          Next Hop            Metric LocPrf Weight Path
 *>   200.22.4.0       1.1.1.254                              0 1000 10 20 2000
2200 i
 *>   200.22.5.0       1.1.1.254                              0 1000 10 20 2000
2200 i
 *>   200.22.6.0       1.1.1.254                              0 1000 10 20 2000
2200 i
 *>   200.22.7.0       1.1.1.254                              0 1000 10 20 2000
2200 i
 *>   200.22.8.0       1.1.1.254                              0 1000 10 20 2000
2200 i
 *>   200.22.9.0       1.1.1.254                              0 1000 10 20 2000
```

```
2200 i
 *>   200.22.10.0      1.1.1.254                              0 1000 10 20 2000
2200 i
 *>   200.22.11.0      1.1.1.254                              0 1000 10 20 2000
2200 i
 *>   200.22.12.0      1.1.1.254                              0 1000 10 20 2000
2200 i
 *>   200.22.13.0      1.1.1.254                              0 1000 10 20 2000
2200 i
 *>   200.22.14.0      1.1.1.254                              0 1000 10 20 2000
2200 i
     Network          Next Hop            Metric LocPrf Weight Path
 *>   200.22.15.0      1.1.1.254                              0 1000 10 20 2000
2200 i
 *>   200.23.1.0       1.1.1.254                              0 1000 10 20 2000
2300 i
 *>   200.23.2.0       1.1.1.254                              0 1000 10 20 2000
2300 i
 *>   200.23.3.0       1.1.1.254                              0 1000 10 20 2000
2300 i
 *>   200.23.4.0       1.1.1.254                              0 1000 10 20 2000
2300 i
 *>   200.23.5.0       1.1.1.254                              0 1000 10 20 2000
2300 i
 *>   200.23.6.0       1.1.1.254                              0 1000 10 20 2000
2300 i
 *>   200.23.7.0       1.1.1.254                              0 1000 10 20 2000
2300 i
 *>   200.23.8.0       1.1.1.254                              0 1000 10 20 2000
2300 i
 *>   200.23.9.0       1.1.1.254                              0 1000 10 20 2000
2300 i
 *>   200.23.10.0      1.1.1.254                              0 1000 10 20 2000
2300 i
     Network          Next Hop            Metric LocPrf Weight Path
 *>   200.23.11.0      1.1.1.254                              0 1000 10 20 2000
2300 i
 *>   200.23.12.0      1.1.1.254                              0 1000 10 20 2000
2300 i
 *>   200.23.13.0      1.1.1.254                              0 1000 10 20 2000
2300 i
 *>   200.23.14.0      1.1.1.254                              0 1000 10 20 2000
2300 i
 *>   200.23.15.0      1.1.1.254                              0 1000 10 20 2000
2300 i
```

ISP_B-S2_CE:

```
ISP_B-S2_CE(config)#do sh ip bgp
BGP table version is 150, local router ID is 172.16.22.254
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
              r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
              x best-external, a additional-path, c RIB-compressed,
              t secondary path,
```

```
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found

     Network          Next Hop            Metric LocPrf Weight Path
 *>   1.1.1.0/24       2.2.2.254                              0 2000 20 10 1000 ?
 *>   1.1.2.0/24       2.2.2.254                              0 2000 20 10 1000 ?
 *>   1.1.3.0/24       2.2.2.254                              0 2000 20 10 1000 ?
 *>   1.1.11.0/24      2.2.2.254                              0 2000 20 10 1000 ?
 *>   1.1.12.0/24      2.2.2.254                              0 2000 20 10 1000 ?
 *>   1.1.13.0/24      2.2.2.254                              0 2000 20 10 1000 ?
 *>   2.2.1.0/24       2.2.2.254                              0 2000 ?
     Network          Next Hop            Metric LocPrf Weight Path
 r>   2.2.2.0/24       2.2.2.254                0             0 2000 ?
 *>   2.2.3.0/24       2.2.2.254                              0 2000 ?
 *>   2.2.21.0/24      2.2.2.254                              0 2000 ?
 *>   2.2.22.0/24      2.2.2.254                0             0 2000 ?
 *>   2.2.23.0/24      2.2.2.254                              0 2000 ?
 *>   10.0.11.0/24     2.2.2.254                              0 2000 20 10 1000
1100 i
 *>   10.0.21.0/24     2.2.2.254                              0 2000 2100 i
 *>   10.1.1.1/32      2.2.2.254                              0 2000 20 10 1000 ?
 *>   10.1.1.2/32      2.2.2.254                              0 2000 20 10 1000 ?
 *>   10.1.1.3/32      2.2.2.254                              0 2000 20 10 1000 ?
 *>   10.1.1.254/32    2.2.2.254                              0 2000 20 10 1000 ?
 *>   10.2.2.1/32      2.2.2.254                              0 2000 ?
 *>   10.2.2.2/32      2.2.2.254                0             0 2000 ?
 *>   10.2.2.3/32      2.2.2.254                              0 2000 ?
 *>   10.2.2.254/32    2.2.2.254                              0 2000 ?
 *>   10.10.10.0/24    2.2.2.254                              0 2000 20 10 ?
 *>   10.123.123.1/32  2.2.2.254                              0 2000 20 10 ?
     Network          Next Hop            Metric LocPrf Weight Path
 *>   10.123.123.2/32  2.2.2.254                              0 2000 20 ?
 *>   12.12.12.0/24    2.2.2.254                              0 2000 20 ?
 *>   20.20.20.0/24    2.2.2.254                              0 2000 ?
 *>   172.16.12.0/24   2.2.2.254                              0 2000 20 10 1000
1200 i
 *>   172.16.22.0/24   0.0.0.0                  0         32768 i
 *>   192.168.13.0     2.2.2.254                              0 2000 20 10 1000
1300 i
 *>   192.168.23.0     2.2.2.254                              0 2000 2300 i
 *>   200.11.1.0       2.2.2.254                              0 2000 20 10 1000
1100 i
 *>   200.11.2.0       2.2.2.254                              0 2000 20 10 1000
1100 i
 *>   200.11.3.0       2.2.2.254                              0 2000 20 10 1000
1100 i
 *>   200.11.4.0       2.2.2.254                              0 2000 20 10 1000
1100 i
 *>   200.11.5.0       2.2.2.254                              0 2000 20 10 1000
1100 i
 *>   200.11.6.0       2.2.2.254                              0 2000 20 10 1000
1100 i
 *>   200.11.7.0       2.2.2.254                              0 2000 20 10 1000
1100 i
     Network          Next Hop            Metric LocPrf Weight Path
```

```
 *>   200.11.8.0       2.2.2.254                              0 2000 20 10 1000
1100 i
 *>   200.11.9.0       2.2.2.254                              0 2000 20 10 1000
1100 i
 *>   200.11.10.0      2.2.2.254                              0 2000 20 10 1000
1100 i
 *>   200.11.11.0      2.2.2.254                              0 2000 20 10 1000
1100 i
 *>   200.11.12.0      2.2.2.254                              0 2000 20 10 1000
1100 i
 *>   200.11.13.0      2.2.2.254                              0 2000 20 10 1000
1100 i
 *>   200.11.14.0      2.2.2.254                              0 2000 20 10 1000
1100 i
 *>   200.11.15.0      2.2.2.254                              0 2000 20 10 1000
1100 i
 *>   200.12.1.0       2.2.2.254                              0 2000 20 10 1000
1200 i
 *>   200.12.2.0       2.2.2.254                              0 2000 20 10 1000
1200 i
 *>   200.12.3.0       2.2.2.254                              0 2000 20 10 1000
1200 i
     Network          Next Hop            Metric LocPrf Weight Path
 *>   200.12.4.0       2.2.2.254                              0 2000 20 10 1000
1200 i
 *>   200.12.5.0       2.2.2.254                              0 2000 20 10 1000
1200 i
 *>   200.12.6.0       2.2.2.254                              0 2000 20 10 1000
1200 i
 *>   200.12.7.0       2.2.2.254                              0 2000 20 10 1000
1200 i
 *>   200.12.8.0       2.2.2.254                              0 2000 20 10 1000
1200 i
 *>   200.12.9.0       2.2.2.254                              0 2000 20 10 1000
1200 i
 *>   200.12.10.0      2.2.2.254                              0 2000 20 10 1000
1200 i
 *>   200.12.11.0      2.2.2.254                              0 2000 20 10 1000
1200 i
 *>   200.12.12.0      2.2.2.254                              0 2000 20 10 1000
1200 i
 *>   200.12.13.0      2.2.2.254                              0 2000 20 10 1000
1200 i
 *>   200.12.14.0      2.2.2.254                              0 2000 20 10 1000
1200 i
     Network          Next Hop            Metric LocPrf Weight Path
 *>   200.12.15.0      2.2.2.254                              0 2000 20 10 1000
1200 i
 *>   200.13.1.0       2.2.2.254                              0 2000 20 10 1000
1300 i
 *>   200.13.2.0       2.2.2.254                              0 2000 20 10 1000
1300 i
 *>   200.13.3.0       2.2.2.254                              0 2000 20 10 1000
1300 i
 *>   200.13.4.0       2.2.2.254                              0 2000 20 10 1000
```

```
1300 i
 *>   200.13.5.0       2.2.2.254                              0 2000 20 10 1000
1300 i
 *>   200.13.6.0       2.2.2.254                              0 2000 20 10 1000
1300 i
 *>   200.13.7.0       2.2.2.254                              0 2000 20 10 1000
1300 i
 *>   200.13.8.0       2.2.2.254                              0 2000 20 10 1000
1300 i
 *>   200.13.9.0       2.2.2.254                              0 2000 20 10 1000
1300 i
 *>   200.13.10.0      2.2.2.254                              0 2000 20 10 1000
1300 i
     Network          Next Hop            Metric LocPrf Weight Path
 *>   200.13.11.0      2.2.2.254                              0 2000 20 10 1000
1300 i
 *>   200.13.12.0      2.2.2.254                              0 2000 20 10 1000
1300 i
 *>   200.13.13.0      2.2.2.254                              0 2000 20 10 1000
1300 i
 *>   200.13.14.0      2.2.2.254                              0 2000 20 10 1000
1300 i
 *>   200.13.15.0      2.2.2.254                              0 2000 20 10 1000
1300 i
 *>   200.21.1.0       2.2.2.254                              0 2000 2100 i
 *>   200.21.2.0       2.2.2.254                              0 2000 2100 i
 *>   200.21.3.0       2.2.2.254                              0 2000 2100 i
 *>   200.21.4.0       2.2.2.254                              0 2000 2100 i
 *>   200.21.5.0       2.2.2.254                              0 2000 2100 i
 *>   200.21.6.0       2.2.2.254                              0 2000 2100 i
 *>   200.21.7.0       2.2.2.254                              0 2000 2100 i
 *>   200.21.8.0       2.2.2.254                              0 2000 2100 i
 *>   200.21.9.0       2.2.2.254                              0 2000 2100 i
 *>   200.21.10.0      2.2.2.254                              0 2000 2100 i
 *>   200.21.11.0      2.2.2.254                              0 2000 2100 i
 *>   200.21.12.0      2.2.2.254                              0 2000 2100 i
     Network          Next Hop            Metric LocPrf Weight Path
 *>   200.21.13.0      2.2.2.254                              0 2000 2100 i
 *>   200.21.14.0      2.2.2.254                              0 2000 2100 i
 *>   200.21.15.0      2.2.2.254                              0 2000 2100 i
 *>   200.22.1.0       0.0.0.0                  0         32768 i
 *>   200.22.2.0       0.0.0.0                  0         32768 i
 *>   200.22.3.0       0.0.0.0                  0         32768 i
 *>   200.22.4.0       0.0.0.0                  0         32768 i
 *>   200.22.5.0       0.0.0.0                  0         32768 i
 *>   200.22.6.0       0.0.0.0                  0         32768 i
 *>   200.22.7.0       0.0.0.0                  0         32768 i
 *>   200.22.8.0       0.0.0.0                  0         32768 i
 *>   200.22.9.0       0.0.0.0                  0         32768 i
 *>   200.22.10.0      0.0.0.0                  0         32768 i
 *>   200.22.11.0      0.0.0.0                  0         32768 i
 *>   200.22.12.0      0.0.0.0                  0         32768 i
 *>   200.22.13.0      0.0.0.0                  0         32768 i
 *>   200.22.14.0      0.0.0.0                  0         32768 i
 *>   200.22.15.0      0.0.0.0                  0         32768 i
```

```
 *>   200.23.1.0       2.2.2.254                              0 2000 2300 i
 *>   200.23.2.0       2.2.2.254                              0 2000 2300 i
 *>   200.23.3.0       2.2.2.254                              0 2000 2300 i
 *>   200.23.4.0       2.2.2.254                              0 2000 2300 i
     Network          Next Hop            Metric LocPrf Weight Path
 *>   200.23.5.0       2.2.2.254                              0 2000 2300 i
 *>   200.23.6.0       2.2.2.254                              0 2000 2300 i
 *>   200.23.7.0       2.2.2.254                              0 2000 2300 i
 *>   200.23.8.0       2.2.2.254                              0 2000 2300 i
 *>   200.23.9.0       2.2.2.254                              0 2000 2300 i
 *>   200.23.10.0      2.2.2.254                              0 2000 2300 i
 *>   200.23.11.0      2.2.2.254                              0 2000 2300 i
 *>   200.23.12.0      2.2.2.254                              0 2000 2300 i
 *>   200.23.13.0      2.2.2.254                              0 2000 2300 i
 *>   200.23.14.0      2.2.2.254                              0 2000 2300 i
 *>   200.23.15.0      2.2.2.254                              0 2000 2300 i
```

- Record the configurations in this task.

ISP_A-P:

```
ISP_A-P(config)#do sh run | s bgp
router bgp 1000
 bgp log-neighbor-changes
 redistribute connected
 neighbor 10.1.1.1 remote-as 1000
 neighbor 10.1.1.1 update-source Loopback0
 neighbor 10.1.1.1 route-reflector-client
 neighbor 10.1.1.1 next-hop-self
 neighbor 10.1.1.2 remote-as 1000
 neighbor 10.1.1.2 update-source Loopback0
 neighbor 10.1.1.2 route-reflector-client
 neighbor 10.1.1.2 next-hop-self
 neighbor 10.1.1.3 remote-as 1000
 neighbor 10.1.1.3 update-source Loopback0
 neighbor 10.1.1.3 route-reflector-client
 neighbor 10.1.1.3 next-hop-self
 neighbor 10.10.10.254 remote-as 10
```

ISP_B-P:

```
ISP_B-P(config)#do sh run | s bgp
router bgp 2000
 bgp log-neighbor-changes
 redistribute connected
 neighbor 10.2.2.1 remote-as 2000
 neighbor 10.2.2.1 update-source Loopback0
 neighbor 10.2.2.1 route-reflector-client
 neighbor 10.2.2.1 next-hop-self
 neighbor 10.2.2.2 remote-as 2000
 neighbor 10.2.2.2 update-source Loopback0
 neighbor 10.2.2.2 route-reflector-client
 neighbor 10.2.2.2 next-hop-self
 neighbor 10.2.2.3 remote-as 2000
 neighbor 10.2.2.3 update-source Loopback0
```

```
 neighbor 10.2.2.3 route-reflector-client
 neighbor 10.2.2.3 next-hop-self
 neighbor 20.20.20.254 remote-as 20
```

RSP1:

```
RSP1(config)#do sh run | s bgp
router bgp 10
 bgp log-neighbor-changes
 redistribute connected
 neighbor 10.10.10.1 remote-as 1000
 neighbor 12.12.12.2 remote-as 20
```

RSP2:

```
RSP2(config)#do sh run | s bgp
router bgp 20
 bgp log-neighbor-changes
 redistribute connected
 neighbor 12.12.12.1 remote-as 10
 neighbor 20.20.20.1 remote-as 2000
```

Task 5: Configuration of eBGP between CE and IX in each site

- Record the BGP tables from each IX.

S1_IX:

```
S1_IX(config-if)#do sh ip bgp
BGP table version is 182, local router ID is 172.16.11.1
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
              r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
              x best-external, a additional-path, c RIB-compressed,
              t secondary path,
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found

     Network          Next Hop            Metric LocPrf Weight Path
 *>   1.1.1.0/24       11.11.11.1                             0 1100 1000 ?
 *>   1.1.2.0/24       11.11.11.1                             0 1100 1000 ?
 *>   1.1.3.0/24       11.11.11.1                             0 1100 1000 ?
 *>   1.1.11.0/24      11.11.11.1                             0 1100 1000 ?
 *>   1.1.12.0/24      11.11.11.1                             0 1100 1000 ?
 *>   1.1.13.0/24      11.11.11.1                             0 1100 1000 ?
 *>   2.2.1.0/24       11.11.11.2                             0 2100 2000 ?
 *>   2.2.2.0/24       11.11.11.2                             0 2100 2000 ?
 *>   2.2.3.0/24       11.11.11.2                             0 2100 2000 ?
 *>   2.2.21.0/24      11.11.11.2                             0 2100 2000 ?
     Network          Next Hop            Metric LocPrf Weight Path
 *>   2.2.22.0/24      11.11.11.2                             0 2100 2000 ?
 *>   2.2.23.0/24      11.11.11.2                             0 2100 2000 ?
 *>   10.0.11.0/24     11.11.11.1               0             0 1100 i
 *>   10.0.21.0/24     11.11.11.2               0             0 2100 i
 *>   10.1.1.1/32      11.11.11.1                             0 1100 1000 ?
 *>   10.1.1.2/32      11.11.11.1                             0 1100 1000 ?
```

```
*>   10.1.1.3/32      11.11.11.1                             0 1100 1000 ?
*>   10.1.1.254/32    11.11.11.1                             0 1100 1000 ?
*>   10.2.2.1/32      11.11.11.2                             0 2100 2000 ?
*>   10.2.2.2/32      11.11.11.2                             0 2100 2000 ?
*>   10.2.2.3/32      11.11.11.2                             0 2100 2000 ?
*>   10.2.2.254/32    11.11.11.2                             0 2100 2000 ?
*    10.10.10.0/24    11.11.11.2                             0 2100 2000 20 10 ?
*>                     11.11.11.1                             0 1100 1000 ?
*    10.123.123.1/32  11.11.11.2                             0 2100 2000 20 10 ?
*>                     11.11.11.1                             0 1100 1000 10 ?
*>   10.123.123.2/32  11.11.11.2                             0 2100 2000 20 ?
*                     11.11.11.1                             0 1100 1000 10 20 ?
*    12.12.12.0/24    11.11.11.2                             0 2100 2000 20 ?
     Network          Next Hop            Metric LocPrf Weight Path
*>                    11.11.11.1                             0 1100 1000 10 ?
*>   20.20.20.0/24    11.11.11.2                             0 2100 2000 ?
*                     11.11.11.1                             0 1100 1000 10 20 ?
*>   172.16.12.0/24   11.11.11.1                             0 1100 1000 1200 i
*>   172.16.22.0/24   11.11.11.2                             0 2100 2000 2200 i
*>   192.168.13.0     11.11.11.1                             0 1100 1000 1300 i
*>   192.168.23.0     11.11.11.2                             0 2100 2000 2300 i
*>   200.11.1.0       11.11.11.1                  0          0 1100 i
*>   200.11.2.0       11.11.11.1                  0          0 1100 i
*>   200.11.3.0       11.11.11.1                  0          0 1100 i
*>   200.11.4.0       11.11.11.1                  0          0 1100 i
*>   200.11.5.0       11.11.11.1                  0          0 1100 i
*>   200.11.6.0       11.11.11.1                  0          0 1100 i
*>   200.11.7.0       11.11.11.1                  0          0 1100 i
*>   200.11.8.0       11.11.11.1                  0          0 1100 i
*>   200.11.9.0       11.11.11.1                  0          0 1100 i
*>   200.11.10.0      11.11.11.1                  0          0 1100 i
*>   200.11.11.0      11.11.11.1                  0          0 1100 i
*>   200.11.12.0      11.11.11.1                  0          0 1100 i
*>   200.11.13.0      11.11.11.1                  0          0 1100 i
*>   200.11.14.0      11.11.11.1                  0          0 1100 i
     Network          Next Hop            Metric LocPrf Weight Path
*>   200.11.15.0      11.11.11.1                  0          0 1100 i
*>   200.12.1.0       11.11.11.1                             0 1100 1000 1200 i
*>   200.12.2.0       11.11.11.1                             0 1100 1000 1200 i
*>   200.12.3.0       11.11.11.1                             0 1100 1000 1200 i
*>   200.12.4.0       11.11.11.1                             0 1100 1000 1200 i
*>   200.12.5.0       11.11.11.1                             0 1100 1000 1200 i
*>   200.12.6.0       11.11.11.1                             0 1100 1000 1200 i
*>   200.12.7.0       11.11.11.1                             0 1100 1000 1200 i
*>   200.12.8.0       11.11.11.1                             0 1100 1000 1200 i
*>   200.12.9.0       11.11.11.1                             0 1100 1000 1200 i
*>   200.12.10.0      11.11.11.1                             0 1100 1000 1200 i
*>   200.12.11.0      11.11.11.1                             0 1100 1000 1200 i
*>   200.12.12.0      11.11.11.1                             0 1100 1000 1200 i
*>   200.12.13.0      11.11.11.1                             0 1100 1000 1200 i
*>   200.12.14.0      11.11.11.1                             0 1100 1000 1200 i
*>   200.12.15.0      11.11.11.1                             0 1100 1000 1200 i
*>   200.13.1.0       11.11.11.1                             0 1100 1000 1300 i
*>   200.13.2.0       11.11.11.1                             0 1100 1000 1300 i
*>   200.13.3.0       11.11.11.1                             0 1100 1000 1300 i
```

```
*>   200.13.4.0       11.11.11.1                             0 1100 1000 1300 i
*>   200.13.5.0       11.11.11.1                             0 1100 1000 1300 i
*>   200.13.6.0       11.11.11.1                             0 1100 1000 1300 i
    Network          Next Hop            Metric LocPrf Weight Path
*>   200.13.7.0       11.11.11.1                             0 1100 1000 1300 i
*>   200.13.8.0       11.11.11.1                             0 1100 1000 1300 i
*>   200.13.9.0       11.11.11.1                             0 1100 1000 1300 i
*>   200.13.10.0      11.11.11.1                             0 1100 1000 1300 i
*>   200.13.11.0      11.11.11.1                             0 1100 1000 1300 i
*>   200.13.12.0      11.11.11.1                             0 1100 1000 1300 i
*>   200.13.13.0      11.11.11.1                             0 1100 1000 1300 i
*>   200.13.14.0      11.11.11.1                             0 1100 1000 1300 i
*>   200.13.15.0      11.11.11.1                             0 1100 1000 1300 i
*>   200.21.1.0       11.11.11.2                    0        0 2100 i
*>   200.21.2.0       11.11.11.2                    0        0 2100 i
*>   200.21.3.0       11.11.11.2                    0        0 2100 i
*>   200.21.4.0       11.11.11.2                    0        0 2100 i
*>   200.21.5.0       11.11.11.2                    0        0 2100 i
*>   200.21.6.0       11.11.11.2                    0        0 2100 i
*>   200.21.7.0       11.11.11.2                    0        0 2100 i
*>   200.21.8.0       11.11.11.2                    0        0 2100 i
*>   200.21.9.0       11.11.11.2                    0        0 2100 i
*>   200.21.10.0      11.11.11.2                    0        0 2100 i
*>   200.21.11.0      11.11.11.2                    0        0 2100 i
*>   200.21.12.0      11.11.11.2                    0        0 2100 i
*>   200.21.13.0      11.11.11.2                    0        0 2100 i
    Network          Next Hop            Metric LocPrf Weight Path
*>   200.21.14.0      11.11.11.2                    0        0 2100 i
*>   200.21.15.0      11.11.11.2                    0        0 2100 i
*>   200.22.1.0       11.11.11.2                             0 2100 2000 2200 i
*>   200.22.2.0       11.11.11.2                             0 2100 2000 2200 i
*>   200.22.3.0       11.11.11.2                             0 2100 2000 2200 i
*>   200.22.4.0       11.11.11.2                             0 2100 2000 2200 i
*>   200.22.5.0       11.11.11.2                             0 2100 2000 2200 i
*>   200.22.6.0       11.11.11.2                             0 2100 2000 2200 i
*>   200.22.7.0       11.11.11.2                             0 2100 2000 2200 i
*>   200.22.8.0       11.11.11.2                             0 2100 2000 2200 i
*>   200.22.9.0       11.11.11.2                             0 2100 2000 2200 i
*>   200.22.10.0      11.11.11.2                             0 2100 2000 2200 i
*>   200.22.11.0      11.11.11.2                             0 2100 2000 2200 i
*>   200.22.12.0      11.11.11.2                             0 2100 2000 2200 i
*>   200.22.13.0      11.11.11.2                             0 2100 2000 2200 i
*>   200.22.14.0      11.11.11.2                             0 2100 2000 2200 i
*>   200.22.15.0      11.11.11.2                             0 2100 2000 2200 i
*>   200.23.1.0       11.11.11.2                             0 2100 2000 2300 i
*>   200.23.2.0       11.11.11.2                             0 2100 2000 2300 i
*>   200.23.3.0       11.11.11.2                             0 2100 2000 2300 i
*>   200.23.4.0       11.11.11.2                             0 2100 2000 2300 i
*>   200.23.5.0       11.11.11.2                             0 2100 2000 2300 i
    Network          Next Hop            Metric LocPrf Weight Path
*>   200.23.6.0       11.11.11.2                             0 2100 2000 2300 i
*>   200.23.7.0       11.11.11.2                             0 2100 2000 2300 i
*>   200.23.8.0       11.11.11.2                             0 2100 2000 2300 i
*>   200.23.9.0       11.11.11.2                             0 2100 2000 2300 i
*>   200.23.10.0      11.11.11.2                             0 2100 2000 2300 i
```

```
 *>   200.23.11.0      11.11.11.2                             0 2100 2000 2300 i
 *>   200.23.12.0      11.11.11.2                             0 2100 2000 2300 i
 *>   200.23.13.0      11.11.11.2                             0 2100 2000 2300 i
 *>   200.23.14.0      11.11.11.2                             0 2100 2000 2300 i
 *>   200.23.15.0      11.11.11.2                             0 2100 2000 2300 i
```

S2_IX:

```
S2_IX(config)#do sh ip bgp
BGP table version is 122, local router ID is 172.16.22.1
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
              r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
              x best-external, a additional-path, c RIB-compressed,
              t secondary path,
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found

     Network          Next Hop            Metric LocPrf Weight Path
 *>   1.1.1.0/24       22.22.22.1                             0 1200 1000 ?
 *>   1.1.2.0/24       22.22.22.1                             0 1200 1000 ?
 *>   1.1.3.0/24       22.22.22.1                             0 1200 1000 ?
 *>   1.1.11.0/24      22.22.22.1                             0 1200 1000 ?
 *>   1.1.12.0/24      22.22.22.1                             0 1200 1000 ?
 *>   1.1.13.0/24      22.22.22.1                             0 1200 1000 ?
 *>   2.2.1.0/24       22.22.22.2                             0 2200 2000 ?
 *>   2.2.2.0/24       22.22.22.2                             0 2200 2000 ?
 *>   2.2.3.0/24       22.22.22.2                             0 2200 2000 ?
 *>   2.2.21.0/24      22.22.22.2                             0 2200 2000 ?
 *>   2.2.22.0/24      22.22.22.2                             0 2200 2000 ?
 *>   2.2.23.0/24      22.22.22.2                             0 2200 2000 ?
 *    10.0.11.0/24     22.22.22.2                             0 2200 2000 2100 1111
1100 i
     Network          Next Hop            Metric LocPrf Weight Path
 *>                    22.22.22.1                             0 1200 1000 1100 i
 *>   10.0.21.0/24     22.22.22.2                             0 2200 2000 2100 i
 *                     22.22.22.1                             0 1200 1000 1100 1111
2100 i
 *>   10.1.1.1/32      22.22.22.1                             0 1200 1000 ?
 *>   10.1.1.2/32      22.22.22.1                             0 1200 1000 ?
 *>   10.1.1.3/32      22.22.22.1                             0 1200 1000 ?
 *>   10.1.1.254/32    22.22.22.1                             0 1200 1000 ?
 *>   10.2.2.1/32      22.22.22.2                             0 2200 2000 ?
 *>   10.2.2.2/32      22.22.22.2                             0 2200 2000 ?
 *>   10.2.2.3/32      22.22.22.2                             0 2200 2000 ?
 *>   10.2.2.254/32    22.22.22.2                             0 2200 2000 ?
 *    10.10.10.0/24    22.22.22.2                             0 2200 2000 20 10 ?
 *>                    22.22.22.1                             0 1200 1000 ?
 *    10.123.123.1/32  22.22.22.2                             0 2200 2000 20 10 ?
 *>                    22.22.22.1                             0 1200 1000 10 ?
 *>   10.123.123.2/32  22.22.22.2                             0 2200 2000 20 ?
 *                     22.22.22.1                             0 1200 1000 10 20 ?
 *    12.12.12.0/24    22.22.22.2                             0 2200 2000 20 ?
     Network          Next Hop            Metric LocPrf Weight Path
 *>                    22.22.22.1                             0 1200 1000 10 ?
```

```
 *>   20.20.20.0/24    22.22.22.2                             0 2200 2000 ?
 *                     22.22.22.1                             0 1200 1000 10 20 ?
 *>   172.16.12.0/24   22.22.22.1               0             0 1200 i
 *>   172.16.22.0/24   22.22.22.2               0             0 2200 i
 *    192.168.13.0     22.22.22.2                             0 2200 2000 2300 3333
1300 i
 *>                    22.22.22.1                             0 1200 1000 1300 i
 *>   192.168.23.0     22.22.22.2                             0 2200 2000 2300 i
 *                     22.22.22.1                             0 1200 1000 1300 3333
2300 i
 *    200.11.1.0       22.22.22.2                             0 2200 2000 2100 1111
1100 i
 *>                    22.22.22.1                             0 1200 1000 1100 i
 *    200.11.2.0       22.22.22.2                             0 2200 2000 2100 1111
1100 i
 *>                    22.22.22.1                             0 1200 1000 1100 i
 *    200.11.3.0       22.22.22.2                             0 2200 2000 2100 1111
1100 i
 *>                    22.22.22.1                             0 1200 1000 1100 i
 *    200.11.4.0       22.22.22.2                             0 2200 2000 2100 1111
1100 i
     Network          Next Hop            Metric LocPrf Weight Path
 *>                    22.22.22.1                             0 1200 1000 1100 i
 *    200.11.5.0       22.22.22.2                             0 2200 2000 2100 1111
1100 i
 *>                    22.22.22.1                             0 1200 1000 1100 i
 *    200.11.6.0       22.22.22.2                             0 2200 2000 2100 1111
1100 i
 *>                    22.22.22.1                             0 1200 1000 1100 i
 *    200.11.7.0       22.22.22.2                             0 2200 2000 2100 1111
1100 i
 *>                    22.22.22.1                             0 1200 1000 1100 i
 *    200.11.8.0       22.22.22.2                             0 2200 2000 2100 1111
1100 i
 *>                    22.22.22.1                             0 1200 1000 1100 i
 *    200.11.9.0       22.22.22.2                             0 2200 2000 2100 1111
1100 i
 *>                    22.22.22.1                             0 1200 1000 1100 i
 *    200.11.10.0      22.22.22.2                             0 2200 2000 2100 1111
1100 i
 *>                    22.22.22.1                             0 1200 1000 1100 i
 *    200.11.11.0      22.22.22.2                             0 2200 2000 2100 1111
1100 i
 *>                    22.22.22.1                             0 1200 1000 1100 i
     Network          Next Hop            Metric LocPrf Weight Path
 *    200.11.12.0      22.22.22.2                             0 2200 2000 2100 1111
1100 i
 *>                    22.22.22.1                             0 1200 1000 1100 i
 *    200.11.13.0      22.22.22.2                             0 2200 2000 2100 1111
1100 i
 *>                    22.22.22.1                             0 1200 1000 1100 i
 *    200.11.14.0      22.22.22.2                             0 2200 2000 2100 1111
1100 i
 *>                    22.22.22.1                             0 1200 1000 1100 i
 *    200.11.15.0      22.22.22.2                             0 2200 2000 2100 1111
```

```
1100 i
 *>                    22.22.22.1                               0 1200 1000 1100 i
 *>   200.12.1.0       22.22.22.1               0             0 1200 i
 *>   200.12.2.0       22.22.22.1               0             0 1200 i
 *>   200.12.3.0       22.22.22.1               0             0 1200 i
 *>   200.12.4.0       22.22.22.1               0             0 1200 i
 *>   200.12.5.0       22.22.22.1               0             0 1200 i
 *>   200.12.6.0       22.22.22.1               0             0 1200 i
 *>   200.12.7.0       22.22.22.1               0             0 1200 i
 *>   200.12.8.0       22.22.22.1               0             0 1200 i
 *>   200.12.9.0       22.22.22.1               0             0 1200 i
 *>   200.12.10.0      22.22.22.1               0             0 1200 i
     Network          Next Hop            Metric LocPrf Weight Path
 *>   200.12.11.0      22.22.22.1               0             0 1200 i
 *>   200.12.12.0      22.22.22.1               0             0 1200 i
 *>   200.12.13.0      22.22.22.1               0             0 1200 i
 *>   200.12.14.0      22.22.22.1               0             0 1200 i
 *>   200.12.15.0      22.22.22.1               0             0 1200 i
 *    200.13.1.0       22.22.22.2                             0 2200 2000 2300 3333
1300 i
 *>                    22.22.22.1                             0 1200 1000 1300 i
 *    200.13.2.0       22.22.22.2                             0 2200 2000 2300 3333
1300 i
 *>                    22.22.22.1                             0 1200 1000 1300 i
 *    200.13.3.0       22.22.22.2                             0 2200 2000 2300 3333
1300 i
 *>                    22.22.22.1                             0 1200 1000 1300 i
 *    200.13.4.0       22.22.22.2                             0 2200 2000 2300 3333
1300 i
 *>                    22.22.22.1                             0 1200 1000 1300 i
 *    200.13.5.0       22.22.22.2                             0 2200 2000 2300 3333
1300 i
 *>                    22.22.22.1                             0 1200 1000 1300 i
 *    200.13.6.0       22.22.22.2                             0 2200 2000 2300 3333
1300 i
     Network          Next Hop            Metric LocPrf Weight Path
 *>                    22.22.22.1                             0 1200 1000 1300 i
 *    200.13.7.0       22.22.22.2                             0 2200 2000 2300 3333
1300 i
 *>                    22.22.22.1                             0 1200 1000 1300 i
 *    200.13.8.0       22.22.22.2                             0 2200 2000 2300 3333
1300 i
 *>                    22.22.22.1                             0 1200 1000 1300 i
 *    200.13.9.0       22.22.22.2                             0 2200 2000 2300 3333
1300 i
 *>                    22.22.22.1                             0 1200 1000 1300 i
 *    200.13.10.0      22.22.22.2                             0 2200 2000 2300 3333
1300 i
 *>                    22.22.22.1                             0 1200 1000 1300 i
 *    200.13.11.0      22.22.22.2                             0 2200 2000 2300 3333
1300 i
 *>                    22.22.22.1                             0 1200 1000 1300 i
 *    200.13.12.0      22.22.22.2                             0 2200 2000 2300 3333
1300 i
 *>                    22.22.22.1                             0 1200 1000 1300 i
```

```
 *    200.13.13.0      22.22.22.2                             0 2200 2000 2300 3333
1300 i
 *>                    22.22.22.1                             0 1200 1000 1300 i
     Network          Next Hop            Metric LocPrf Weight Path
 *    200.13.14.0      22.22.22.2                             0 2200 2000 2300 3333
1300 i
 *>                    22.22.22.1                             0 1200 1000 1300 i
 *    200.13.15.0      22.22.22.2                             0 2200 2000 2300 3333
1300 i
 *>                    22.22.22.1                             0 1200 1000 1300 i
 *>   200.21.1.0       22.22.22.2                             0 2200 2000 2100 i
 *                     22.22.22.1                             0 1200 1000 1100 1111
2100 i
 *>   200.21.2.0       22.22.22.2                             0 2200 2000 2100 i
 *                     22.22.22.1                             0 1200 1000 1100 1111
2100 i
 *>   200.21.3.0       22.22.22.2                             0 2200 2000 2100 i
 *                     22.22.22.1                             0 1200 1000 1100 1111
2100 i
 *>   200.21.4.0       22.22.22.2                             0 2200 2000 2100 i
 *                     22.22.22.1                             0 1200 1000 1100 1111
2100 i
 *>   200.21.5.0       22.22.22.2                             0 2200 2000 2100 i
 *                     22.22.22.1                             0 1200 1000 1100 1111
2100 i
 *>   200.21.6.0       22.22.22.2                             0 2200 2000 2100 i
     Network          Next Hop            Metric LocPrf Weight Path
 *                     22.22.22.1                             0 1200 1000 1100 1111
2100 i
 *>   200.21.7.0       22.22.22.2                             0 2200 2000 2100 i
 *                     22.22.22.1                             0 1200 1000 1100 1111
2100 i
 *>   200.21.8.0       22.22.22.2                             0 2200 2000 2100 i
 *                     22.22.22.1                             0 1200 1000 1100 1111
2100 i
 *>   200.21.9.0       22.22.22.2                             0 2200 2000 2100 i
 *                     22.22.22.1                             0 1200 1000 1100 1111
2100 i
 *>   200.21.10.0      22.22.22.2                             0 2200 2000 2100 i
 *                     22.22.22.1                             0 1200 1000 1100 1111
2100 i
 *>   200.21.11.0      22.22.22.2                             0 2200 2000 2100 i
 *                     22.22.22.1                             0 1200 1000 1100 1111
2100 i
 *>   200.21.12.0      22.22.22.2                             0 2200 2000 2100 i
 *                     22.22.22.1                             0 1200 1000 1100 1111
2100 i
 *>   200.21.13.0      22.22.22.2                             0 2200 2000 2100 i
 *                     22.22.22.1                             0 1200 1000 1100 1111
2100 i
     Network          Next Hop            Metric LocPrf Weight Path
 *>   200.21.14.0      22.22.22.2                             0 2200 2000 2100 i
 *                     22.22.22.1                             0 1200 1000 1100 1111
2100 i
 *>   200.21.15.0      22.22.22.2                             0 2200 2000 2100 i
```

```
 *                   22.22.22.1                             0 1200 1000 1100 1111
2100 i
 *>   200.22.1.0       22.22.22.2               0             0 2200 i
 *>   200.22.2.0       22.22.22.2               0             0 2200 i
 *>   200.22.3.0       22.22.22.2               0             0 2200 i
 *>   200.22.4.0       22.22.22.2               0             0 2200 i
 *>   200.22.5.0       22.22.22.2               0             0 2200 i
 *>   200.22.6.0       22.22.22.2               0             0 2200 i
 *>   200.22.7.0       22.22.22.2               0             0 2200 i
 *>   200.22.8.0       22.22.22.2               0             0 2200 i
 *>   200.22.9.0       22.22.22.2               0             0 2200 i
 *>   200.22.10.0      22.22.22.2               0             0 2200 i
 *>   200.22.11.0      22.22.22.2               0             0 2200 i
 *>   200.22.12.0      22.22.22.2               0             0 2200 i
 *>   200.22.13.0      22.22.22.2               0             0 2200 i
 *>   200.22.14.0      22.22.22.2               0             0 2200 i
 *>   200.22.15.0      22.22.22.2               0             0 2200 i
 *>   200.23.1.0       22.22.22.2                             0 2200 2000 2300 i
     Network          Next Hop            Metric LocPrf Weight Path
 *                   22.22.22.1                             0 1200 1000 1300 3333
2300 i
 *>   200.23.2.0       22.22.22.2                             0 2200 2000 2300 i
 *                   22.22.22.1                             0 1200 1000 1300 3333
2300 i
 *>   200.23.3.0       22.22.22.2                             0 2200 2000 2300 i
 *                   22.22.22.1                             0 1200 1000 1300 3333
2300 i
 *>   200.23.4.0       22.22.22.2                             0 2200 2000 2300 i
 *                   22.22.22.1                             0 1200 1000 1300 3333
2300 i
 *>   200.23.5.0       22.22.22.2                             0 2200 2000 2300 i
 *                   22.22.22.1                             0 1200 1000 1300 3333
2300 i
 *>   200.23.6.0       22.22.22.2                             0 2200 2000 2300 i
 *                   22.22.22.1                             0 1200 1000 1300 3333
2300 i
 *>   200.23.7.0       22.22.22.2                             0 2200 2000 2300 i
 *                   22.22.22.1                             0 1200 1000 1300 3333
2300 i
 *>   200.23.8.0       22.22.22.2                             0 2200 2000 2300 i
 *                   22.22.22.1                             0 1200 1000 1300 3333
2300 i
     Network          Next Hop            Metric LocPrf Weight Path
 *>   200.23.9.0       22.22.22.2                             0 2200 2000 2300 i
 *                   22.22.22.1                             0 1200 1000 1300 3333
2300 i
 *>   200.23.10.0      22.22.22.2                             0 2200 2000 2300 i
 *                   22.22.22.1                             0 1200 1000 1300 3333
2300 i
 *>   200.23.11.0      22.22.22.2                             0 2200 2000 2300 i
 *                   22.22.22.1                             0 1200 1000 1300 3333
2300 i
 *>   200.23.12.0      22.22.22.2                             0 2200 2000 2300 i
 *                   22.22.22.1                             0 1200 1000 1300 3333
2300 i
```

```
 *>   200.23.13.0      22.22.22.2                             0 2200 2000 2300 i
 *                     22.22.22.1                             0 1200 1000 1300 3333
2300 i
 *>   200.23.14.0      22.22.22.2                             0 2200 2000 2300 i
 *                     22.22.22.1                             0 1200 1000 1300 3333
2300 i
 *>   200.23.15.0      22.22.22.2                             0 2200 2000 2300 i
 *                     22.22.22.1                             0 1200 1000 1300 3333
2300 i
```

S3_IX:

```
S3_IX(config)#do sh ip bgp
BGP table version is 182, local router ID is 172.16.33.1
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
              r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
              x best-external, a additional-path, c RIB-compressed,
              t secondary path,
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found

     Network          Next Hop            Metric LocPrf Weight Path
 *>   1.1.1.0/24       33.33.33.1                             0 1300 1000 ?
 *>   1.1.2.0/24       33.33.33.1                             0 1300 1000 ?
 *>   1.1.3.0/24       33.33.33.1                             0 1300 1000 ?
 *>   1.1.11.0/24      33.33.33.1                             0 1300 1000 ?
 *>   1.1.12.0/24      33.33.33.1                             0 1300 1000 ?
 *>   1.1.13.0/24      33.33.33.1                             0 1300 1000 ?
 *>   2.2.1.0/24       33.33.33.2                             0 2300 2000 ?
 *>   2.2.2.0/24       33.33.33.2                             0 2300 2000 ?
 *>   2.2.3.0/24       33.33.33.2                             0 2300 2000 ?
 *>   2.2.21.0/24      33.33.33.2                             0 2300 2000 ?
 *>   2.2.22.0/24      33.33.33.2                             0 2300 2000 ?
 *>   2.2.23.0/24      33.33.33.2                             0 2300 2000 ?
 *    10.0.11.0/24     33.33.33.2                             0 2300 2000 2100 1111
1100 i
     Network          Next Hop            Metric LocPrf Weight Path
 *>                    33.33.33.1                             0 1300 1000 1100 i
 *>   10.0.21.0/24     33.33.33.2                             0 2300 2000 2100 i
 *                     33.33.33.1                             0 1300 1000 1100 1111
2100 i
 *>   10.1.1.1/32      33.33.33.1                             0 1300 1000 ?
 *>   10.1.1.2/32      33.33.33.1                             0 1300 1000 ?
 *>   10.1.1.3/32      33.33.33.1                             0 1300 1000 ?
 *>   10.1.1.254/32    33.33.33.1                             0 1300 1000 ?
 *>   10.2.2.1/32      33.33.33.2                             0 2300 2000 ?
 *>   10.2.2.2/32      33.33.33.2                             0 2300 2000 ?
 *>   10.2.2.3/32      33.33.33.2                             0 2300 2000 ?
 *>   10.2.2.254/32    33.33.33.2                             0 2300 2000 ?
 *    10.10.10.0/24    33.33.33.2                             0 2300 2000 20 10 ?
 *>                    33.33.33.1                             0 1300 1000 ?
 *    10.123.123.1/32  33.33.33.2                             0 2300 2000 20 10 ?
 *>                    33.33.33.1                             0 1300 1000 10 ?
 *>   10.123.123.2/32  33.33.33.2                             0 2300 2000 20 ?
```

```
 *                    33.33.33.1                             0 1300 1000 10 20 ?
 *    12.12.12.0/24   33.33.33.2                             0 2300 2000 20 ?
     Network          Next Hop            Metric LocPrf Weight Path
 *>                   33.33.33.1                             0 1300 1000 10 ?
 *>   20.20.20.0/24   33.33.33.2                             0 2300 2000 ?
 *                    33.33.33.1                             0 1300 1000 10 20 ?
 *>   172.16.12.0/24  33.33.33.1                             0 1300 1000 1200 i
 *>   172.16.22.0/24  33.33.33.2                             0 2300 2000 2200 i
 *>   192.168.13.0    33.33.33.1                   0         0 1300 i
 *>   192.168.23.0    33.33.33.2                   0         0 2300 i
 *    200.11.1.0      33.33.33.2                             0 2300 2000 2100 1111
1100 i
 *>                   33.33.33.1                             0 1300 1000 1100 i
 *    200.11.2.0      33.33.33.2                             0 2300 2000 2100 1111
1100 i
 *>                   33.33.33.1                             0 1300 1000 1100 i
 *    200.11.3.0      33.33.33.2                             0 2300 2000 2100 1111
1100 i
 *>                   33.33.33.1                             0 1300 1000 1100 i
 *    200.11.4.0      33.33.33.2                             0 2300 2000 2100 1111
1100 i
 *>                   33.33.33.1                             0 1300 1000 1100 i
 *    200.11.5.0      33.33.33.2                             0 2300 2000 2100 1111
1100 i
     Network          Next Hop            Metric LocPrf Weight Path
 *>                   33.33.33.1                             0 1300 1000 1100 i
 *    200.11.6.0      33.33.33.2                             0 2300 2000 2100 1111
1100 i
 *>                   33.33.33.1                             0 1300 1000 1100 i
 *    200.11.7.0      33.33.33.2                             0 2300 2000 2100 1111
1100 i
 *>                   33.33.33.1                             0 1300 1000 1100 i
 *    200.11.8.0      33.33.33.2                             0 2300 2000 2100 1111
1100 i
 *>                   33.33.33.1                             0 1300 1000 1100 i
 *    200.11.9.0      33.33.33.2                             0 2300 2000 2100 1111
1100 i
 *>                   33.33.33.1                             0 1300 1000 1100 i
 *    200.11.10.0     33.33.33.2                             0 2300 2000 2100 1111
1100 i
 *>                   33.33.33.1                             0 1300 1000 1100 i
 *    200.11.11.0     33.33.33.2                             0 2300 2000 2100 1111
1100 i
 *>                   33.33.33.1                             0 1300 1000 1100 i
 *    200.11.12.0     33.33.33.2                             0 2300 2000 2100 1111
1100 i
 *>                   33.33.33.1                             0 1300 1000 1100 i
     Network          Next Hop            Metric LocPrf Weight Path
 *    200.11.13.0     33.33.33.2                             0 2300 2000 2100 1111
1100 i
 *>                   33.33.33.1                             0 1300 1000 1100 i
 *    200.11.14.0     33.33.33.2                             0 2300 2000 2100 1111
1100 i
 *>                   33.33.33.1                             0 1300 1000 1100 i
 *    200.11.15.0     33.33.33.2                             0 2300 2000 2100 1111
```

```
1100 i
 *>                  33.33.33.1                             0 1300 1000 1100 i
 *>   200.12.1.0     33.33.33.1                             0 1300 1000 1200 i
 *>   200.12.2.0     33.33.33.1                             0 1300 1000 1200 i
 *>   200.12.3.0     33.33.33.1                             0 1300 1000 1200 i
 *>   200.12.4.0     33.33.33.1                             0 1300 1000 1200 i
 *>   200.12.5.0     33.33.33.1                             0 1300 1000 1200 i
 *>   200.12.6.0     33.33.33.1                             0 1300 1000 1200 i
 *>   200.12.7.0     33.33.33.1                             0 1300 1000 1200 i
 *>   200.12.8.0     33.33.33.1                             0 1300 1000 1200 i
 *>   200.12.9.0     33.33.33.1                             0 1300 1000 1200 i
 *>   200.12.10.0    33.33.33.1                             0 1300 1000 1200 i
 *>   200.12.11.0    33.33.33.1                             0 1300 1000 1200 i
 *>   200.12.12.0    33.33.33.1                             0 1300 1000 1200 i
 *>   200.12.13.0    33.33.33.1                             0 1300 1000 1200 i
     Network          Next Hop            Metric LocPrf Weight Path
 *>   200.12.14.0    33.33.33.1                             0 1300 1000 1200 i
 *>   200.12.15.0    33.33.33.1                             0 1300 1000 1200 i
 *>   200.13.1.0     33.33.33.1                  0          0 1300 i
 *>   200.13.2.0     33.33.33.1                  0          0 1300 i
 *>   200.13.3.0     33.33.33.1                  0          0 1300 i
 *>   200.13.4.0     33.33.33.1                  0          0 1300 i
 *>   200.13.5.0     33.33.33.1                  0          0 1300 i
 *>   200.13.6.0     33.33.33.1                  0          0 1300 i
 *>   200.13.7.0     33.33.33.1                  0          0 1300 i
 *>   200.13.8.0     33.33.33.1                  0          0 1300 i
 *>   200.13.9.0     33.33.33.1                  0          0 1300 i
 *>   200.13.10.0    33.33.33.1                  0          0 1300 i
 *>   200.13.11.0    33.33.33.1                  0          0 1300 i
 *>   200.13.12.0    33.33.33.1                  0          0 1300 i
 *>   200.13.13.0    33.33.33.1                  0          0 1300 i
 *>   200.13.14.0    33.33.33.1                  0          0 1300 i
 *>   200.13.15.0    33.33.33.1                  0          0 1300 i
 *>   200.21.1.0     33.33.33.2                             0 2300 2000 2100 i
 *                   33.33.33.1                             0 1300 1000 1100 1111
2100 i
 *>   200.21.2.0     33.33.33.2                             0 2300 2000 2100 i
 *                   33.33.33.1                             0 1300 1000 1100 1111
2100 i
     Network          Next Hop            Metric LocPrf Weight Path
 *>   200.21.3.0     33.33.33.2                             0 2300 2000 2100 i
 *                   33.33.33.1                             0 1300 1000 1100 1111
2100 i
 *>   200.21.4.0     33.33.33.2                             0 2300 2000 2100 i
 *                   33.33.33.1                             0 1300 1000 1100 1111
2100 i
 *>   200.21.5.0     33.33.33.2                             0 2300 2000 2100 i
 *                   33.33.33.1                             0 1300 1000 1100 1111
2100 i
 *>   200.21.6.0     33.33.33.2                             0 2300 2000 2100 i
 *                   33.33.33.1                             0 1300 1000 1100 1111
2100 i
 *>   200.21.7.0     33.33.33.2                             0 2300 2000 2100 i
 *                   33.33.33.1                             0 1300 1000 1100 1111
2100 i
```

```
 *>   200.21.8.0       33.33.33.2                             0 2300 2000 2100 i
 *                     33.33.33.1                             0 1300 1000 1100 1111
2100 i
 *>   200.21.9.0       33.33.33.2                             0 2300 2000 2100 i
 *                     33.33.33.1                             0 1300 1000 1100 1111
2100 i
 *>   200.21.10.0      33.33.33.2                             0 2300 2000 2100 i
     Network          Next Hop            Metric LocPrf Weight Path
 *                     33.33.33.1                             0 1300 1000 1100 1111
2100 i
 *>   200.21.11.0      33.33.33.2                             0 2300 2000 2100 i
 *                     33.33.33.1                             0 1300 1000 1100 1111
2100 i
 *>   200.21.12.0      33.33.33.2                             0 2300 2000 2100 i
 *                     33.33.33.1                             0 1300 1000 1100 1111
2100 i
 *>   200.21.13.0      33.33.33.2                             0 2300 2000 2100 i
 *                     33.33.33.1                             0 1300 1000 1100 1111
2100 i
 *>   200.21.14.0      33.33.33.2                             0 2300 2000 2100 i
 *                     33.33.33.1                             0 1300 1000 1100 1111
2100 i
 *>   200.21.15.0      33.33.33.2                             0 2300 2000 2100 i
 *                     33.33.33.1                             0 1300 1000 1100 1111
2100 i
 *>   200.22.1.0       33.33.33.2                             0 2300 2000 2200 i
 *>   200.22.2.0       33.33.33.2                             0 2300 2000 2200 i
 *>   200.22.3.0       33.33.33.2                             0 2300 2000 2200 i
 *>   200.22.4.0       33.33.33.2                             0 2300 2000 2200 i
 *>   200.22.5.0       33.33.33.2                             0 2300 2000 2200 i
     Network          Next Hop            Metric LocPrf Weight Path
 *>   200.22.6.0       33.33.33.2                             0 2300 2000 2200 i
 *>   200.22.7.0       33.33.33.2                             0 2300 2000 2200 i
 *>   200.22.8.0       33.33.33.2                             0 2300 2000 2200 i
 *>   200.22.9.0       33.33.33.2                             0 2300 2000 2200 i
 *>   200.22.10.0      33.33.33.2                             0 2300 2000 2200 i
 *>   200.22.11.0      33.33.33.2                             0 2300 2000 2200 i
 *>   200.22.12.0      33.33.33.2                             0 2300 2000 2200 i
 *>   200.22.13.0      33.33.33.2                             0 2300 2000 2200 i
 *>   200.22.14.0      33.33.33.2                             0 2300 2000 2200 i
 *>   200.22.15.0      33.33.33.2                             0 2300 2000 2200 i
 *>   200.23.1.0       33.33.33.2                    0        0 2300 i
 *>   200.23.2.0       33.33.33.2                    0        0 2300 i
 *>   200.23.3.0       33.33.33.2                    0        0 2300 i
 *>   200.23.4.0       33.33.33.2                    0        0 2300 i
 *>   200.23.5.0       33.33.33.2                    0        0 2300 i
 *>   200.23.6.0       33.33.33.2                    0        0 2300 i
 *>   200.23.7.0       33.33.33.2                    0        0 2300 i
 *>   200.23.8.0       33.33.33.2                    0        0 2300 i
 *>   200.23.9.0       33.33.33.2                    0        0 2300 i
 *>   200.23.10.0      33.33.33.2                    0        0 2300 i
 *>   200.23.11.0      33.33.33.2                    0        0 2300 i
 *>   200.23.12.0      33.33.33.2                    0        0 2300 i
     Network          Next Hop            Metric LocPrf Weight Path
 *>   200.23.13.0      33.33.33.2                    0        0 2300 i
```

```
 *>   200.23.14.0      33.33.33.2               0             0 2300 i
 *>   200.23.15.0      33.33.33.2               0             0 2300 i
```

- Record the configurations in this task.

ISP_A-S1_CE:

```
ISP_A-S1_CE(config)#do sh run | s bgp
router bgp 1100
 bgp log-neighbor-changes
 network 10.0.11.0 mask 255.255.255.0
 network 200.11.1.0
 network 200.11.2.0
 network 200.11.3.0
 network 200.11.4.0
 network 200.11.5.0
 network 200.11.6.0
 network 200.11.7.0
 network 200.11.8.0
 network 200.11.9.0
 network 200.11.10.0
 network 200.11.11.0
 network 200.11.12.0
 network 200.11.13.0
 network 200.11.14.0
 network 200.11.15.0
 neighbor 1.1.1.254 remote-as 1000
 neighbor 11.11.11.254 remote-as 1111
```

ISP_A-S2_CE:

```
ISP_A-S2_CE(config)#do sh run | s bgp
router bgp 1200
 bgp log-neighbor-changes
 network 172.16.12.0 mask 255.255.255.0
 network 200.12.1.0
 network 200.12.2.0
 network 200.12.3.0
 network 200.12.4.0
 network 200.12.5.0
 network 200.12.6.0
 network 200.12.7.0
 network 200.12.8.0
 network 200.12.9.0
 network 200.12.10.0
 network 200.12.11.0
 network 200.12.12.0
 network 200.12.13.0
 network 200.12.14.0
 network 200.12.15.0
 neighbor 1.1.2.254 remote-as 1000
 neighbor 22.22.22.254 remote-as 2222
```

ISP_A-S3_CE:

```
ISP_A-S3_CE(config)#do sh run | s bgp
router bgp 1300
 bgp log-neighbor-changes
 network 192.168.13.0
 network 200.13.1.0
 network 200.13.2.0
 network 200.13.3.0
 network 200.13.4.0
 network 200.13.5.0
 network 200.13.6.0
 network 200.13.7.0
 network 200.13.8.0
 network 200.13.9.0
 network 200.13.10.0
 network 200.13.11.0
 network 200.13.12.0
 network 200.13.13.0
 network 200.13.14.0
 network 200.13.15.0
 neighbor 1.1.3.254 remote-as 1000
 neighbor 33.33.33.254 remote-as 3333
```

ISP_B-S1_CE:

```
ISP_B-S1_CE(config)#do sh run | s bgp
router bgp 2100
 bgp log-neighbor-changes
 network 10.0.21.0 mask 255.255.255.0
 network 200.21.1.0
 network 200.21.2.0
 network 200.21.3.0
 network 200.21.4.0
 network 200.21.5.0
 network 200.21.6.0
 network 200.21.7.0
 network 200.21.8.0
 network 200.21.9.0
 network 200.21.10.0
 network 200.21.11.0
 network 200.21.12.0
 network 200.21.13.0
 network 200.21.14.0
 network 200.21.15.0
 neighbor 2.2.1.254 remote-as 2000
 neighbor 11.11.11.254 remote-as 1111
```

ISP_B-S2_CE:

```
ISP_B-S2_CE(config)#do sh run | s bgp
router bgp 2200
 bgp log-neighbor-changes
 network 172.16.22.0 mask 255.255.255.0
 network 200.22.1.0
 network 200.22.2.0
```

```
 network 200.22.3.0
 network 200.22.4.0
 network 200.22.5.0
 network 200.22.6.0
 network 200.22.7.0
 network 200.22.8.0
 network 200.22.9.0
 network 200.22.10.0
 network 200.22.11.0
 network 200.22.12.0
 network 200.22.13.0
 network 200.22.14.0
 network 200.22.15.0
 neighbor 2.2.2.254 remote-as 2000
 neighbor 22.22.22.254 remote-as 2222
```

ISP_B-S3_CE:

```
ISP_B-S3_CE(config)#do sh run | s bgp
router bgp 2300
 bgp log-neighbor-changes
 network 192.168.23.0
 network 200.23.1.0
 network 200.23.2.0
 network 200.23.3.0
 network 200.23.4.0
 network 200.23.5.0
 network 200.23.6.0
 network 200.23.7.0
 network 200.23.8.0
 network 200.23.9.0
 network 200.23.10.0
 network 200.23.11.0
 network 200.23.12.0
 network 200.23.13.0
 network 200.23.14.0
 network 200.23.15.0
 neighbor 2.2.3.254 remote-as 2000
 neighbor 33.33.33.254 remote-as 3333
```

S1_IX:

```
!
interface GigabitEthernet0/1
 switchport access vlan 11
 switchport mode access
 negotiation auto
!
interface GigabitEthernet0/2
 switchport access vlan 11
 switchport mode access
 negotiation auto
!
!
```

```
router bgp 1111
 bgp log-neighbor-changes
 neighbor 11.11.11.1 remote-as 1100
 neighbor 11.11.11.2 remote-as 2100
!
```

S2_IX:

```
!
interface GigabitEthernet0/1
 switchport access vlan 22
 switchport mode access
 negotiation auto
!
interface GigabitEthernet0/2
 switchport access vlan 22
 switchport mode access
 negotiation auto
!
!
router bgp 2222
 bgp log-neighbor-changes
 neighbor 22.22.22.1 remote-as 1200
 neighbor 22.22.22.2 remote-as 2200
!
```

S3_IX:

```
!
interface GigabitEthernet0/1
 switchport access vlan 33
 switchport mode access
 negotiation auto
!
interface GigabitEthernet0/2
 switchport access vlan 33
 switchport mode access
 negotiation auto
!
!
router bgp 3333
 bgp log-neighbor-changes
 neighbor 33.33.33.1 remote-as 1300
 neighbor 33.33.33.2 remote-as 2300
!
```

Task 6: Fine tuning of BGP

A) Prevention of CE to become transit AS between ISPs via IX

- Record the BGP route 200.22.1.0 on all ISP-A CEs by "`show ip bgp 200.22.1.0`"

ISP_A-S1_CE:

```
ISP_A-S1_CE(config)#do sh ip bgp 200.22.1.0
```

```
BGP routing table entry for 200.22.1.0/24, version 59
Paths: (2 available, best #1, table default)
  Not advertised to any peer
  Refresh Epoch 2
  1111 2100 2000 2200
    11.11.11.2 from 11.11.11.254 (172.16.11.1)
      Origin IGP, localpref 100, valid, external, best
      rx pathid: 0, tx pathid: 0x0
  Refresh Epoch 1
  1000 10 20 2000 2200
    1.1.1.254 from 1.1.1.254 (10.1.1.1)
      Origin IGP, localpref 100, valid, external
      rx pathid: 0, tx pathid: 0
```

ISP_A-S2_CE:

```
ISP_A-S2_CE(config-router)#do show ip bgp 200.22.1.0
BGP routing table entry for 200.22.1.0/24, version 283
Paths: (2 available, best #2, table default)
  Not advertised to any peer
  Refresh Epoch 1
  1000 10 20 2000 2200
    1.1.2.254 from 1.1.2.254 (10.1.1.2)
      Origin IGP, localpref 100, valid, external
      rx pathid: 0, tx pathid: 0
  Refresh Epoch 1
  2222 2200
    22.22.22.2 from 22.22.22.254 (172.16.22.1)
      Origin IGP, localpref 100, valid, external, best
      rx pathid: 0, tx pathid: 0x0
```

ISP_A-S3_CE:

```
ISP_A-S3_CE(config-router)#do show ip bgp 200.22.1.0
BGP routing table entry for 200.22.1.0/24, version 215
Paths: (2 available, best #1, table default)
  Not advertised to any peer
  Refresh Epoch 1
  3333 2300 2000 2200
    33.33.33.2 from 33.33.33.254 (172.16.33.1)
      Origin IGP, localpref 100, valid, external, best
      rx pathid: 0, tx pathid: 0x0
  Refresh Epoch 1
  1000 10 20 2000 2200
    1.1.3.254 from 1.1.3.254 (10.1.1.3)
      Origin IGP, localpref 100, valid, external
      rx pathid: 0, tx pathid: 0
```

- Record the configurations in this task.

ISP_A-S1_CE:

```
ISP_A-S1_CE(config)#do sh run | s bgp
router bgp 1100
 bgp log-neighbor-changes
```

```
 network 10.0.11.0 mask 255.255.255.0
 network 200.11.1.0
 network 200.11.2.0
 network 200.11.3.0
 network 200.11.4.0
 network 200.11.5.0
 network 200.11.6.0
 network 200.11.7.0
 network 200.11.8.0
 network 200.11.9.0
 network 200.11.10.0
 network 200.11.11.0
 network 200.11.12.0
 network 200.11.13.0
 network 200.11.14.0
 network 200.11.15.0
 neighbor 1.1.1.254 remote-as 1000
 neighbor 1.1.1.254 filter-list 1 out
 neighbor 11.11.11.254 remote-as 1111
ISP_A-S1_CE(config)#do sh run | s access-list
ip as-path access-list 1 permit ^$
```

ISP_A-S2_CE:

```
ISP_A-S2_CE(config)#do sh run | s bgp
router bgp 1200
 bgp log-neighbor-changes
 network 172.16.12.0 mask 255.255.255.0
 network 200.12.1.0
 network 200.12.2.0
 network 200.12.3.0
 network 200.12.4.0
 network 200.12.5.0
 network 200.12.6.0
 network 200.12.7.0
 network 200.12.8.0
 network 200.12.9.0
 network 200.12.10.0
 network 200.12.11.0
 network 200.12.12.0
 network 200.12.13.0
 network 200.12.14.0
 network 200.12.15.0
 neighbor 1.1.2.254 remote-as 1000
 neighbor 1.1.2.254 filter-list 1 out
 neighbor 22.22.22.254 remote-as 2222
ISP_A-S2_CE(config)#do sh run | s access-list
ip as-path access-list 1 permit ^$
```

ISP_A-S3_CE:

```
ISP_A-S3_CE(config)#do sh run | s bgp
router bgp 1300
 bgp log-neighbor-changes
 network 192.168.13.0
```

```
 network 200.13.1.0
 network 200.13.2.0
 network 200.13.3.0
 network 200.13.4.0
 network 200.13.5.0
 network 200.13.6.0
 network 200.13.7.0
 network 200.13.8.0
 network 200.13.9.0
 network 200.13.10.0
 network 200.13.11.0
 network 200.13.12.0
 network 200.13.13.0
 network 200.13.14.0
 network 200.13.15.0
 neighbor 1.1.3.254 remote-as 1000
 neighbor 1.1.3.254 filter-list 1 out
 neighbor 33.33.33.254 remote-as 3333
ISP_A-S3_CE(config)#do sh run | s access-list
ip as-path access-list 1 permit ^$
```

ISP_B-S1_CE:

```
ISP_B-S1_CE(config)#do sh run | s bgp
router bgp 2100
 bgp log-neighbor-changes
 network 10.0.21.0 mask 255.255.255.0
 network 200.21.1.0
 network 200.21.2.0
 network 200.21.3.0
 network 200.21.4.0
 network 200.21.5.0
 network 200.21.6.0
 network 200.21.7.0
 network 200.21.8.0
 network 200.21.9.0
 network 200.21.10.0
 network 200.21.11.0
 network 200.21.12.0
 network 200.21.13.0
 network 200.21.14.0
 network 200.21.15.0
 neighbor 2.2.1.254 remote-as 2000
 neighbor 2.2.1.254 filter-list 1 out
 neighbor 11.11.11.254 remote-as 1111
ISP_B-S1_CE(config)#do sh run | s access-list
ip as-path access-list 1 permit ^$
```

ISP_B-S2_CE:

```
ISP_B-S2_CE(config)#do sh run | s bgp
router bgp 2200
 bgp log-neighbor-changes
 network 172.16.22.0 mask 255.255.255.0
 network 200.22.1.0
```

```
 network 200.22.2.0
 network 200.22.3.0
 network 200.22.4.0
 network 200.22.5.0
 network 200.22.6.0
 network 200.22.7.0
 network 200.22.8.0
 network 200.22.9.0
 network 200.22.10.0
 network 200.22.11.0
 network 200.22.12.0
 network 200.22.13.0
 network 200.22.14.0
 network 200.22.15.0
 neighbor 2.2.2.254 remote-as 2000
 neighbor 2.2.2.254 filter-list 1 out
 neighbor 22.22.22.254 remote-as 2222
ISP_B-S2_CE(config)#do sh run | s access-list
ip as-path access-list 1 permit ^$
```

ISP_B-S3_CE:

```
ISP_B-S3_CE(config)#do sh run | s bgp
router bgp 2300
 bgp log-neighbor-changes
 network 192.168.23.0
 network 200.23.1.0
 network 200.23.2.0
 network 200.23.3.0
 network 200.23.4.0
 network 200.23.5.0
 network 200.23.6.0
 network 200.23.7.0
 network 200.23.8.0
 network 200.23.9.0
 network 200.23.10.0
 network 200.23.11.0
 network 200.23.12.0
 network 200.23.13.0
 network 200.23.14.0
 network 200.23.15.0
 neighbor 2.2.3.254 remote-as 2000
 neighbor 2.2.3.254 filter-list 1 out
 neighbor 33.33.33.254 remote-as 3333
ISP_B-S3_CE(config)#do sh run | s access-list
ip as-path access-list 1 permit ^$
```

B) Prevention of IX to become transit AS between ISPs

By testing `show ip bgp 200.21.1.0` in S1-IX:

```
S1_IX(config)#do show ip bgp 200.21.1.0
BGP routing table entry for 200.21.1.0/24, version 147
Paths: (1 available, best #1, table default)
  Advertised to update-groups:
```

```
     1
  Refresh Epoch 3
  2100
    11.11.11.2 from 11.11.11.2 (10.0.21.254)
      Origin IGP, metric 0, localpref 100, valid, external, best
      rx pathid: 0, tx pathid: 0x0
```

- Record the configurations in this task.

S1_IX:

```
!
router bgp 1111
 bgp log-neighbor-changes
 neighbor 11.11.11.1 remote-as 1100
 neighbor 11.11.11.1 route-map AS_PATH_FILTER in
 neighbor 11.11.11.2 remote-as 2100
 neighbor 11.11.11.2 route-map AS_PATH_FILTER in
!
ip as-path access-list 2 permit ^1100$
ip as-path access-list 2 permit ^2100$
!
route-map AS_PATH_FILTER permit 10
 match as-path 2
!
```

S2_IX:

```
!
router bgp 2222
 bgp log-neighbor-changes
 neighbor 22.22.22.1 remote-as 1200
 neighbor 22.22.22.1 route-map AS_PATH_FILTER in
 neighbor 22.22.22.2 remote-as 2200
 neighbor 22.22.22.2 route-map AS_PATH_FILTER in
!
ip as-path access-list 2 permit ^1200$
ip as-path access-list 2 permit ^2200$
!
route-map AS_PATH_FILTER permit 10
 match as-path 2
!
```

S3_IX:

```
!
router bgp 3333
 bgp log-neighbor-changes
 neighbor 33.33.33.1 remote-as 1300
 neighbor 33.33.33.1 route-map AS_PATH_FILTER in
 neighbor 33.33.33.2 remote-as 2300
 neighbor 33.33.33.2 route-map AS_PATH_FILTER in
!
ip as-path access-list 2 permit ^1300$
ip as-path access-list 2 permit ^2300$
```

```
!
route-map AS_PATH_FILTER permit 10
 match as-path 2
!
```

C) Implementation of RFC 1918 in RSP, PE and IX

- Record the BGP table of the two P routers and the three IX routers by the command "`show ip bgp`"

ISP_A-P:

```
ISP_A-P(config)#do show ip bgp
BGP table version is 413, local router ID is 10.1.1.254
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
              r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
              x best-external, a additional-path, c RIB-compressed,
              t secondary path,
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found

     Network          Next Hop            Metric LocPrf Weight Path
 *>   1.1.11.0/24      0.0.0.0                  0         32768 ?
 *>   1.1.12.0/24      0.0.0.0                  0         32768 ?
 *>   1.1.13.0/24      0.0.0.0                  0         32768 ?
 *>   10.1.1.254/32    0.0.0.0                  0         32768 ?
 *>   10.10.10.0/24    0.0.0.0                  0         32768 ?
```

ISP_B-P:

```
ISP_B-P(config)#do show ip bgp
BGP table version is 397, local router ID is 10.2.2.254
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
              r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
              x best-external, a additional-path, c RIB-compressed,
              t secondary path,
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found

     Network          Next Hop            Metric LocPrf Weight Path
 *>   2.2.21.0/24      0.0.0.0                  0         32768 ?
 *>   2.2.22.0/24      0.0.0.0                  0         32768 ?
 *>   2.2.23.0/24      0.0.0.0                  0         32768 ?
 *>   10.2.2.254/32    0.0.0.0                  0         32768 ?
 *>   20.20.20.0/24    0.0.0.0                  0         32768 ?
```

S1_IX:

```
S1_IX(config-route-map)#do sh ip bgp
BGP table version is 273, local router ID is 172.16.11.1
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
              r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
              x best-external, a additional-path, c RIB-compressed,
              t secondary path,
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found
```

```
     Network          Next Hop            Metric LocPrf Weight Path
 *>   10.0.11.0/24     11.11.11.1               0             0 1100 i
 *>   10.0.21.0/24     11.11.11.2               0             0 2100 i
 *>   200.11.1.0       11.11.11.1               0             0 1100 i
 *>   200.11.2.0       11.11.11.1               0             0 1100 i
 *>   200.11.3.0       11.11.11.1               0             0 1100 i
 *>   200.11.4.0       11.11.11.1               0             0 1100 i
 *>   200.11.5.0       11.11.11.1               0             0 1100 i
 *>   200.11.6.0       11.11.11.1               0             0 1100 i
 *>   200.11.7.0       11.11.11.1               0             0 1100 i
 *>   200.11.8.0       11.11.11.1               0             0 1100 i
 *>   200.11.9.0       11.11.11.1               0             0 1100 i
 *>   200.11.10.0      11.11.11.1               0             0 1100 i
 *>   200.11.11.0      11.11.11.1               0             0 1100 i
 *>   200.11.12.0      11.11.11.1               0             0 1100 i
     Network          Next Hop            Metric LocPrf Weight Path
 *>   200.11.13.0      11.11.11.1               0             0 1100 i
 *>   200.11.14.0      11.11.11.1               0             0 1100 i
 *>   200.11.15.0      11.11.11.1               0             0 1100 i
 *>   200.21.1.0       11.11.11.2               0             0 2100 i
 *>   200.21.2.0       11.11.11.2               0             0 2100 i
 *>   200.21.3.0       11.11.11.2               0             0 2100 i
 *>   200.21.4.0       11.11.11.2               0             0 2100 i
 *>   200.21.5.0       11.11.11.2               0             0 2100 i
 *>   200.21.6.0       11.11.11.2               0             0 2100 i
 *>   200.21.7.0       11.11.11.2               0             0 2100 i
 *>   200.21.8.0       11.11.11.2               0             0 2100 i
 *>   200.21.9.0       11.11.11.2               0             0 2100 i
 *>   200.21.10.0      11.11.11.2               0             0 2100 i
 *>   200.21.11.0      11.11.11.2               0             0 2100 i
 *>   200.21.12.0      11.11.11.2               0             0 2100 i
 *>   200.21.13.0      11.11.11.2               0             0 2100 i
 *>   200.21.14.0      11.11.11.2               0             0 2100 i
 *>   200.21.15.0      11.11.11.2               0             0 2100 i
```

S2_IX:

```
S2_IX(config-router)#do sh ip bgp
BGP table version is 213, local router ID is 172.16.22.1
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
              r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
              x best-external, a additional-path, c RIB-compressed,
              t secondary path,
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found

     Network          Next Hop            Metric LocPrf Weight Path
 *>   172.16.12.0/24   22.22.22.1               0             0 1200 i
 *>   172.16.22.0/24   22.22.22.2               0             0 2200 i
 *>   200.12.1.0       22.22.22.1               0             0 1200 i
 *>   200.12.2.0       22.22.22.1               0             0 1200 i
 *>   200.12.3.0       22.22.22.1               0             0 1200 i
 *>   200.12.4.0       22.22.22.1               0             0 1200 i
 *>   200.12.5.0       22.22.22.1               0             0 1200 i
```

```
 *>   200.12.6.0       22.22.22.1               0             0 1200 i
 *>   200.12.7.0       22.22.22.1               0             0 1200 i
 *>   200.12.8.0       22.22.22.1               0             0 1200 i
 *>   200.12.9.0       22.22.22.1               0             0 1200 i
 *>   200.12.10.0      22.22.22.1               0             0 1200 i
 *>   200.12.11.0      22.22.22.1               0             0 1200 i
 *>   200.12.12.0      22.22.22.1               0             0 1200 i
     Network          Next Hop            Metric LocPrf Weight Path
 *>   200.12.13.0      22.22.22.1               0             0 1200 i
 *>   200.12.14.0      22.22.22.1               0             0 1200 i
 *>   200.12.15.0      22.22.22.1               0             0 1200 i
 *>   200.22.1.0       22.22.22.2               0             0 2200 i
 *>   200.22.2.0       22.22.22.2               0             0 2200 i
 *>   200.22.3.0       22.22.22.2               0             0 2200 i
 *>   200.22.4.0       22.22.22.2               0             0 2200 i
 *>   200.22.5.0       22.22.22.2               0             0 2200 i
 *>   200.22.6.0       22.22.22.2               0             0 2200 i
 *>   200.22.7.0       22.22.22.2               0             0 2200 i
 *>   200.22.8.0       22.22.22.2               0             0 2200 i
 *>   200.22.9.0       22.22.22.2               0             0 2200 i
 *>   200.22.10.0      22.22.22.2               0             0 2200 i
 *>   200.22.11.0      22.22.22.2               0             0 2200 i
 *>   200.22.12.0      22.22.22.2               0             0 2200 i
 *>   200.22.13.0      22.22.22.2               0             0 2200 i
 *>   200.22.14.0      22.22.22.2               0             0 2200 i
 *>   200.22.15.0      22.22.22.2               0             0 2200 i
```

S3_IX:

```
S3_IX(config-router)#do sh ip bgp
BGP table version is 273, local router ID is 172.16.33.1
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
              r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
              x best-external, a additional-path, c RIB-compressed,
              t secondary path,
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found

     Network          Next Hop            Metric LocPrf Weight Path
 *>   192.168.13.0     33.33.33.1               0             0 1300 i
 *>   192.168.23.0     33.33.33.2               0             0 2300 i
 *>   200.13.1.0       33.33.33.1               0             0 1300 i
 *>   200.13.2.0       33.33.33.1               0             0 1300 i
 *>   200.13.3.0       33.33.33.1               0             0 1300 i
 *>   200.13.4.0       33.33.33.1               0             0 1300 i
 *>   200.13.5.0       33.33.33.1               0             0 1300 i
 *>   200.13.6.0       33.33.33.1               0             0 1300 i
 *>   200.13.7.0       33.33.33.1               0             0 1300 i
 *>   200.13.8.0       33.33.33.1               0             0 1300 i
 *>   200.13.9.0       33.33.33.1               0             0 1300 i
 *>   200.13.10.0      33.33.33.1               0             0 1300 i
 *>   200.13.11.0      33.33.33.1               0             0 1300 i
 *>   200.13.12.0      33.33.33.1               0             0 1300 i
     Network          Next Hop            Metric LocPrf Weight Path
 *>   200.13.13.0      33.33.33.1               0             0 1300 i
```

```
 *>   200.13.14.0      33.33.33.1               0             0 1300 i
 *>   200.13.15.0      33.33.33.1               0             0 1300 i
 *>   200.23.1.0       33.33.33.2               0             0 2300 i
 *>   200.23.2.0       33.33.33.2               0             0 2300 i
 *>   200.23.3.0       33.33.33.2               0             0 2300 i
 *>   200.23.4.0       33.33.33.2               0             0 2300 i
 *>   200.23.5.0       33.33.33.2               0             0 2300 i
 *>   200.23.6.0       33.33.33.2               0             0 2300 i
 *>   200.23.7.0       33.33.33.2               0             0 2300 i
 *>   200.23.8.0       33.33.33.2               0             0 2300 i
 *>   200.23.9.0       33.33.33.2               0             0 2300 i
 *>   200.23.10.0      33.33.33.2               0             0 2300 i
 *>   200.23.11.0      33.33.33.2               0             0 2300 i
 *>   200.23.12.0      33.33.33.2               0             0 2300 i
 *>   200.23.13.0      33.33.33.2               0             0 2300 i
 *>   200.23.14.0      33.33.33.2               0             0 2300 i
 *>   200.23.15.0      33.33.33.2               0             0 2300 i
```

- Record the configurations in this task.

I added filter list on every router except CE routers:

```
ip prefix-list PRIVATE-NETWORKS seq 5 deny 10.0.0.0/8
ip prefix-list PRIVATE-NETWORKS seq 10 deny 172.16.0.0/12
ip prefix-list PRIVATE-NETWORKS seq 15 deny 192.168.0.0/16
route-map PRIVATE-NETWORKS permit 10
match ip address prefix-list PRIVATE-NETWORKS
```

ISP_A-S1_PE:

```
ISP_A-S1_PE(config)#do sh run | s bgp
router bgp 1000
 bgp log-neighbor-changes
 redistribute connected
 neighbor 1.1.1.1 remote-as 1100
 neighbor 1.1.1.1 route-map PRIVATE-NETWORKS out
 neighbor 10.1.1.254 remote-as 1000
 neighbor 10.1.1.254 update-source Loopback0
 neighbor 10.1.1.254 next-hop-self
 neighbor 10.1.1.254 route-map PRIVATE-NETWORKS out
```

ISP_A-S2_PE:

```
ISP_A-S2_PE(config)#do sh run | s bgp
router bgp 1000
 bgp log-neighbor-changes
 redistribute connected
 neighbor 1.1.2.1 remote-as 1200
 neighbor 1.1.2.1 route-map PRIVATE-NETWORKS out
 neighbor 10.1.1.254 remote-as 1000
 neighbor 10.1.1.254 update-source Loopback0
 neighbor 10.1.1.254 next-hop-self
 neighbor 10.1.1.254 route-map PRIVATE-NETWORKS out
```

ISP_A-S3_PE:

```
ISP_A-S3_PE(config)#do sh run | s bgp
router bgp 1000
 bgp log-neighbor-changes
 redistribute connected
 neighbor 1.1.3.1 remote-as 1300
 neighbor 1.1.3.1 route-map PRIVATE-NETWORKS out
 neighbor 10.1.1.254 remote-as 1000
 neighbor 10.1.1.254 update-source Loopback0
 neighbor 10.1.1.254 next-hop-self
 neighbor 10.1.1.254 route-map PRIVATE-NETWORKS out
```

ISP_B-S1_PE:

```
ISP_B-S1_PE(config)#do sh run | s bgp
router bgp 2000
 bgp log-neighbor-changes
 redistribute connected
 neighbor 2.2.1.1 remote-as 2100
 neighbor 2.2.1.1 route-map PRIVATE-NETWORKS out
 neighbor 10.2.2.254 remote-as 2000
 neighbor 10.2.2.254 update-source Loopback0
 neighbor 10.2.2.254 next-hop-self
 neighbor 10.2.2.254 route-map PRIVATE-NETWORKS out
```

ISP_B-S2_PE:

```
ISP_B-S2_PE(config)#do sh run | s bgp
router bgp 2000
 bgp log-neighbor-changes
 redistribute connected
 neighbor 2.2.2.1 remote-as 2200
 neighbor 2.2.2.1 route-map PRIVATE-NETWORKS out
 neighbor 10.2.2.254 remote-as 2000
 neighbor 10.2.2.254 update-source Loopback0
 neighbor 10.2.2.254 next-hop-self
 neighbor 10.2.2.254 route-map PRIVATE-NETWORKS out
```

ISP_B-S3_PE:

```
ISP_B-S3_PE(config)#do sh run | s bgp
router bgp 2000
 bgp log-neighbor-changes
 redistribute connected
 neighbor 2.2.3.1 remote-as 2300
 neighbor 2.2.3.1 route-map PRIVATE-NETWORKS out
 neighbor 10.2.2.254 remote-as 2000
 neighbor 10.2.2.254 update-source Loopback0
 neighbor 10.2.2.254 next-hop-self
 neighbor 10.2.2.254 route-map PRIVATE-NETWORKS out
```

RSP1:

```
RSP1(config)#do sh run | s bgp
router bgp 10
```

```
 bgp log-neighbor-changes
 redistribute connected
 neighbor 10.10.10.1 remote-as 1000
 neighbor 10.10.10.1 route-map PRIVATE-NETWORKS out
 neighbor 12.12.12.2 remote-as 20
 neighbor 12.12.12.2 route-map PRIVATE-NETWORKS out
```

RSP2:

```
RSP2(config)#do sh run | s bgp
router bgp 20
 bgp log-neighbor-changes
 redistribute connected
 neighbor 12.12.12.1 remote-as 10
 neighbor 12.12.12.1 route-map PRIVATE-NETWORKS out
 neighbor 20.20.20.1 remote-as 2000
 neighbor 20.20.20.1 route-map PRIVATE-NETWORKS out
```

S1_IX:

```
S1_IX(config)#do sh run | s bgp
router bgp 1111
 bgp log-neighbor-changes
 neighbor 11.11.11.1 remote-as 1100
 neighbor 11.11.11.1 route-map AS_PATH_FILTER in
 neighbor 11.11.11.1 route-map PRIVATE-NETWORKS out
 neighbor 11.11.11.2 remote-as 2100
 neighbor 11.11.11.2 route-map AS_PATH_FILTER in
 neighbor 11.11.11.2 route-map PRIVATE-NETWORKS out
```

S2_IX:

```
S2_IX(config)#do sh run | s bgp
router bgp 2222
 bgp log-neighbor-changes
 neighbor 22.22.22.1 remote-as 1200
 neighbor 22.22.22.1 route-map AS_PATH_FILTER in
 neighbor 22.22.22.1 route-map PRIVATE-NETWORKS out
 neighbor 22.22.22.2 remote-as 2200
 neighbor 22.22.22.2 route-map AS_PATH_FILTER in
 neighbor 22.22.22.2 route-map PRIVATE-NETWORKS out
```

S3_IX:

```
S3_IX(config)#do sh run | s bgp
router bgp 3333
 bgp log-neighbor-changes
 neighbor 33.33.33.1 remote-as 1300
 neighbor 33.33.33.1 route-map AS_PATH_FILTER in
 neighbor 33.33.33.1 route-map PRIVATE-NETWORKS out
 neighbor 33.33.33.2 remote-as 2300
 neighbor 33.33.33.2 route-map AS_PATH_FILTER in
 neighbor 33.33.33.2 route-map PRIVATE-NETWORKS out
```