Module 13 – IXP Workshop Lab

Objective: The focus of this lab is to connect 8 customers with IXP. Customers are already connected with AS17821 as transit and received customer prefixes. Participants will do necessary interface configuration for IXP and related configurationss

Prerequisites: Intermediate routing concept (OSPF/IS-IS, iBGP), Cisco router CLI, Telnet/SSH software etc.

The following will be the common topology and IP address plan used for the labs.

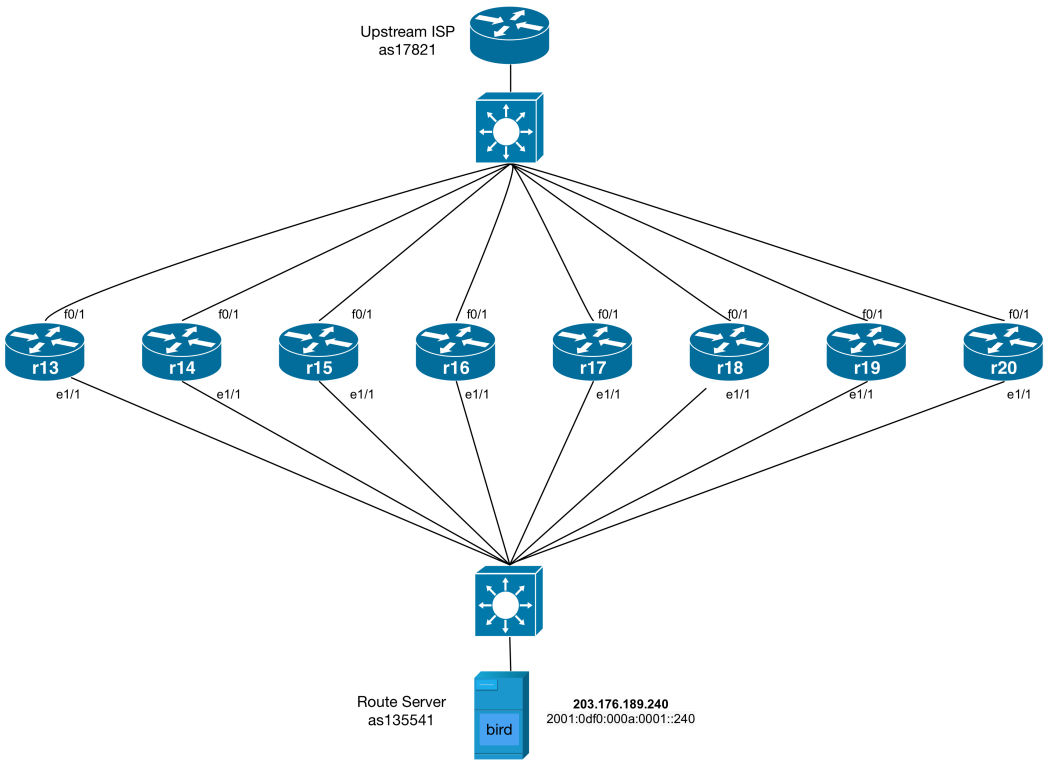

Figure 1 – IXP Lab Topology

Lab Notes

This workshop is intended to be run on a real cisco routers or Dynamips server with the above lab topologies set up. The routers are using both IPv4 and IPv6 supported IOS software. There will be one route server (running on BIRD) will be configured by the instructors. Participants should do their workshop module four configuration to achieve following goals.

1. In Module 4 exercise we have successfully connect all 8 customers with AS17821. Now customer routers are receiving each other prefixes via AS17821.
2. In this module we will connect our customer routers to the IXP infrastructure. After finishing the required configuration in this module we will be able to see eight external prefixes which is coming via IXP.
3. For the security and scalability, customer will do necessary prefix filtering to avoid necessary route leakage.
4. The IXP route server has been configured in such way that it removes it's on ASN from the AS PATH. So that the prefixes received via IXP will be shortest one.
5. Each team will need to configure customer routers which involves following steps:
    a. Customer side interface configuration
    b. Connectivity testing
    c. eBGP peering configuration
    d. Prefix filtering
6. After finishing eBGP configuration on all CPE routers we would like to see following 8 new prefixes received via IXP. So there will be two path for each prefixes; one via upstream AS17821 and one via IXP (AS135541)

Customer	AS Number	Prefix
r-13-CAR1	135533	2406:6400:8000::/48
r-14-CBR1	135534	2406:6400:9800::/48
r-15-CAR2	135535	2406:6400:a000::/48
r-16-CBR2	135536	2406:6400:b800::/48
r-17-CAR3	135537	2406:6400:c000::/48
r-18-CBR3	135538	2406:6400:d800::/48
r-19-CAR4	135539	2406:6400:e000::/48
r-20-CBR4	135540	2406:6400:f800::/48

Address Plannings

	Io0	f0/1 Connected with upstream	e1/1 Connected with IX	Prefixes
r13 AS135533	172.16.16.254/32 2406:6400:8000:0000::1/128	172.16.11.2/30 2406:6400:0010:0000::2/64	203.176.189.13/24 2001:0df0:000a:0001::13/64	172.16.16.0/23 2406:6400:8000::/48
r14 AS135534	172.16.18.254/32 2406:6400:9800:0000::1/128	172.16.11.34/30 2406:6400:0014:0000::2/64	203.176.189.14/24 2001:0df0:000a:0001::14/64	172.16.18.0/23 2406:6400:9800::/48
r15 AS135535	172.16.20.254/32 2406:6400:A000:0000::1/128	172.16.11.66/30 2406:6400:0018:0000::2/64	203.176.189.15/24 2001:0df0:000a:0001::15/64	172.16.20.0/23 2406:6400:a000::/48
r16 AS135536	172.16.22.254/32 2406:6400:B800:0000::1/128	172.16.11.98/30 2406:6400:001C:0000::2/64	203.176.189.16/24 2001:0df0:000a:0001::16/64	172.16.22.0/23 2406:6400:b800::/48
r17 AS135537	172.16.24.254/32 2406:6400:C000:0000::1/128	172.16.11.130/30 2406:6400:0020:0000::2/64	203.176.189.17/24 2001:0df0:000a:0001::17/64	172.16.24.0/23 2406:6400:c000::/48
r18	172.16.26.254/32	172.16.11.162/30	203.176.189.18/24	172.16.26.0/23

AS135538	2406:6400:D800:0000::1/128	2406:6400:0024:0000::2/64	2001:0df0:000a:0001::18/64	2406:6400:d800::/48
r19 AS135539	172.16.28.254/32 2406:6400:E000:0000::1/128	172.16.11.194/30 2406:6400:0028:0000::2/64	203.176.189.19/24 2001:0df0:000a:0001::19/64	172.16.28.0/23 2406:6400:e000::/48
r20 AS135540	172.16.30.254/32 2406:6400:F800:0000::1/128	172.16.11.226/30 2406:6400:002C:0000::2/64	203.176.189.20/24 2001:0df0:000a:0001::20/64	172.16.30.0/23 2406:6400:f800::/48

7. Due to time restriction in workshop eBGP analysis and example will cover IPv6 prefixes only. You can check IPv4 prefixes for your own understanding purpose.

Lab Exercise

1. **Customer Router Configuration:** In general IXP are classified under peer-group on the Customer router to scale the growing number of IXP. In our workshop case we have created a single peer-group for our IXP. This peer-group will inherit common set of attribute for all our customer. Individual command for each IXP (i.e remote-AS) need to apply outside the peer group.

   Step one example interface config:

```
config t
interface Ethernet1/1
description IX Router
no ip redirects
no ip unreachables
no clns route-cache
ip address 203.176.189.13 255.255.255.0
ipv6 address 2001:0df0:000a:0001::13/64
duplex full
no shut
!
exit
exit
wr
```

   Step two example interface connectivity verification:

```
ping 2001:0df0:000a:0001::240
```

   IXP router server IP address

   Step three example eBGP peering config:

```
config t
!
router bgp 135533
```

```
no bgp enforce-first-as
```

As we will remove IXP AS for AS PATH; this command will not enforce that the first ASN in the AS path matches the peering ASN

```
neighbor IPV4-eBGP-IX peer-group
neighbor IPV6-eBGP-IX peer-group
!
address-family ipv4
neighbor 203.176.189.240 remote-as 135541
neighbor 203.176.189.240 peer-group IPV4-eBGP-IX
neighbor 203.176.189.240 activate
exit-address-family
!
address-family ipv6
neighbor 2001:0df0:000a:0001::240 remote-as 135541
neighbor 2001:0df0:000a:0001::240 peer-group IPV6-eBGP-IX
neighbor 2001:0df0:000a:0001::240 activate
!
exit
exit
exit
wr
```

Define the peering group and add the neighbor for both IPv4 & IPv6

Step four example prefix filtering config:

```
config t
!
ip prefix-list ANNOUNCE-PREFIX-IPv4 seq 5 permit 172.16.16.0/23 le 24
ip prefix-list ANNOUNCE-PREFIX-IPv4 seq 100 deny 0.0.0.0/0 le 32
!
ipv6 prefix-list ANNOUNCE-PREFIX-IPv6 seq 5 permit 2406:6400:8000::/48
ipv6 prefix-list ANNOUNCE-PREFIX-IPv6 seq 100 deny ::/0 le 48
!
```

First we define the prefixes which we would announce to our upstream & IXP.

```
router bgp 135533
address-family ipv4
neighbor IPV4-eBGP-IX prefix-list ANNOUNCE-PREFIX-IPv4 out
neighbor IPV4-eBGP-UPSTREAM prefix-list ANNOUNCE-PREFIX-IPv4 out
exit-address-family
!
address-family ipv6
```

```
neighbor IPV6-eBGP-IX prefix-list ANNOUNCE-PREFIX-IPv6 out
neighbor IPV6-eBGP-UPSTREAM prefix-list ANNOUNCE-PREFIX-IPv6 out
```

Add those prefix filter with associated neighbor.

2. Verify iBGP Configuration:

Example IPv6 protocol verification on a Router:

After eBGP Peering Config:
`sh bgp ipv6 unicast summary` [To check bgp peering status in summary]
`sh bgp ipv6 unicast` [To check detail bgp table]
`sh ipv6 route bgp` [To check the routing table prefixes learned by BGP]

After prefix announcement:
`sh bgp ipv6 unicast neighbors [router 13……router20] advertised-routes` [To check prefixes advertised to eBGP peers]
`sh bgp ipv6 unicast neighbors [router 13……router20] routes` [To check prefixes learn from eBGP peers]
`sh ipv6 route [R13, R14, R15, R16, R17, R18, R19, R20]` [To check prefixes in routing table]

Note: Please make sure all 8 customer prefixes outlined in page 2 of this document is visible in BGP and routing table.

You will see two route for each customer prefix. One via upstream and one via IXP. As the IXP has the shorter AS PATH; it will be loaded in your routing table.

Example IPv4 protocol verification on a Router:

After eBGP Peering Config:
`sh bgp ipv4 unicast summary` [To check bgp peering status in summary]
`sh bgp ipv4 unicast` [To check detail bgp table]
`sh ipv4 route bgp` [To check the routing table prefixes learned by BGP]

After prefix announcement:
`sh bgp ipv4 unicast neighbors [router 13……router20] advertised-routes` [To check prefixes advertised to iBGP peers]
`sh bgp ipv4 unicast neighbors [router 13……router20] routes` [To check prefixes learn from iBGP peers]
`sh ip route [R13, R14, R15, R16, R17, R18, R19, R20] [`To check prefixes in routing table]

END OF MODULE THRITEEN……
Next pages for reference template used on different routers….

Workshop templates for reference purpose only:

R13 Configuration

Interface Configuration

```
config t
interface Ethernet1/1
description IX Router
no ip redirects
no ip unreachables
speed auto
no clns route-cache
ip address 203.176.189.13 255.255.255.0
ipv6 address 2001:0df0:000a:0001::13/64
duplex full
no shut
```

eBGP Configuration

```
router bgp 135533
! Not enforce that the first ASN in the AS path matches the peering ASN
no bgp enforce-first-as
neighbor IPV4-eBGP-IX peer-group
neighbor IPV6-eBGP-IX peer-group
!
address-family ipv4
neighbor 203.176.189.240 remote-as 135541
neighbor 203.176.189.240 peer-group IPV4-eBGP-IX
neighbor 203.176.189.240 activate
exit-address-family
!
address-family ipv6
neighbor 2001:0df0:000a:0001::240 remote-as 135541
neighbor 2001:0df0:000a:0001::240 peer-group IPV6-eBGP-IX
neighbor 2001:0df0:000a:0001::240 activate
!
exit
exis
wr
```

Prefix Filter

```
config t
!
ip prefix-list ANNOUNCE-PREFIX-IPv4 seq 5 permit 172.16.16.0/23 le 24
ip prefix-list ANNOUNCE-PREFIX-IPv4 seq 100 deny 0.0.0.0/0 le 32
```

```
!
ipv6 prefix-list ANNOUNCE-PREFIX-IPv6 seq 5 permit 2406:6400:8000::/48
ipv6 prefix-list ANNOUNCE-PREFIX-IPv6 seq 100 deny ::/0 le 48
!
router bgp 135533
address-family ipv4
neighbor IPV4-eBGP-IX prefix-list ANNOUNCE-PREFIX-IPv4 out
neighbor IPV4-eBGP-UPSTREAM prefix-list ANNOUNCE-PREFIX-IPv4 out
exit-address-family
!
address-family ipv6
neighbor IPV6-eBGP-IX prefix-list ANNOUNCE-PREFIX-IPv6 out
neighbor IPV6-eBGP-UPSTREAM prefix-list ANNOUNCE-PREFIX-IPv6 out
```

R14 Configuration

Interface Configuration

```
config t
interface Ethernet1/1
description IX Router
no ip redirects
no ip unreachables
no clns route-cache
ip address 203.176.189.14 255.255.255.0
ipv6 address 2001:0df0:000a:0001::14/64
duplex full
no shut
!
exit
exit
wr
```

eBGP Configuration

```
config t
!
router bgp 135534
! Not enforce that the first ASN in the AS path matches the peering ASN
no bgp enforce-first-as
neighbor IPV4-eBGP-IX peer-group
neighbor IPV6-eBGP-IX peer-group
!
address-family ipv4
neighbor 203.176.189.240 remote-as 135541
neighbor 203.176.189.240 peer-group IPV4-eBGP-IX
```

```
neighbor 203.176.189.240 activate
exit-address-family
!
address-family ipv6
neighbor 2001:0df0:000a:0001::240 remote-as 135541
neighbor 2001:0df0:000a:0001::240 peer-group IPV6-eBGP-IX
neighbor 2001:0df0:000a:0001::240 activate
!
exit
exit
exit
wr
```

Prefix Filter

```
config t
!
ip prefix-list ANNOUNCE-PREFIX-IPv4 seq 5 permit 172.16.18.0/23 le 24
ip prefix-list ANNOUNCE-PREFIX-IPv4 seq 100 deny 0.0.0.0/0 le 32
!
ipv6 prefix-list ANNOUNCE-PREFIX-IPv6 seq 5 permit 2406:6400:9800::/48
ipv6 prefix-list ANNOUNCE-PREFIX-IPv6 seq 100 deny ::/0 le 48
!
router bgp 135534
address-family ipv4
neighbor IPV4-eBGP-IX prefix-list ANNOUNCE-PREFIX-IPv4 out
neighbor IPV4-eBGP-UPSTREAM prefix-list ANNOUNCE-PREFIX-IPv4 out
exit-address-family
!
address-family ipv6
neighbor IPV6-eBGP-IX prefix-list ANNOUNCE-PREFIX-IPv6 out
neighbor IPV6-eBGP-UPSTREAM prefix-list ANNOUNCE-PREFIX-IPv6 out
```

R15 Configuration

Interface Configuration

```
config t
!
interface Ethernet1/1
description IX Router
no ip redirects
no ip unreachables
no clns route-cache
ip address 203.176.189.15 255.255.255.0
ipv6 address 2001:0df0:000a:0001::15/64
```

```
duplex full
no shut
!
exit
exit
wr
```

eBGP Configuration

```
config t
!
router bgp 135535
! Not enforce that the first ASN in the AS path matches the peering ASN
no bgp enforce-first-as
neighbor IPV4-eBGP-IX peer-group
neighbor IPV6-eBGP-IX peer-group
!
address-family ipv4
neighbor 203.176.189.240 remote-as 135541
neighbor 203.176.189.240 peer-group IPV4-eBGP-IX
neighbor 203.176.189.240 activate
exit-address-family
!
address-family ipv6
neighbor 2001:0df0:000a:0001::240 remote-as 135541
neighbor 2001:0df0:000a:0001::240 peer-group IPV6-eBGP-IX
neighbor 2001:0df0:000a:0001::240 activate
!
exit
exit
exit
wr
```

Prefix Filter

```
config t
!
ip prefix-list ANNOUNCE-PREFIX-IPv4 seq 5 permit 172.16.20.0/23 le 24
ip prefix-list ANNOUNCE-PREFIX-IPv4 seq 100 deny 0.0.0.0/0 le 32
!
ipv6 prefix-list ANNOUNCE-PREFIX-IPv6 seq 5 permit 2406:6400:a000::/48
ipv6 prefix-list ANNOUNCE-PREFIX-IPv6 seq 100 deny ::/0 le 48
!
router bgp 135535
address-family ipv4
neighbor IPV4-eBGP-IX prefix-list ANNOUNCE-PREFIX-IPv4 out
neighbor IPV4-eBGP-UPSTREAM prefix-list ANNOUNCE-PREFIX-IPv4 out
```

```
exit-address-family
!
address-family ipv6
neighbor IPV6-eBGP-IX prefix-list ANNOUNCE-PREFIX-IPv6 out
neighbor IPV6-eBGP-UPSTREAM prefix-list ANNOUNCE-PREFIX-IPv6 out
```

R16 Configuration

Interface Configuration

```
config t
interface Ethernet1/1
description IX Router
no ip redirects
no ip unreachables
no clns route-cache
ip address 203.176.189.16 255.255.255.0
ipv6 address 2001:0df0:000a:0001::16/64
duplex full
no shut
!
exit
exit
wr
```

eBGP Configuration

```
config t
!
router bgp 135536
! Not enforce that the first ASN in the AS path matches the peering ASN
no bgp enforce-first-as
neighbor IPV4-eBGP-IX peer-group
neighbor IPV6-eBGP-IX peer-group
!
address-family ipv4
neighbor 203.176.189.240 remote-as 135541
neighbor 203.176.189.240 peer-group IPV4-eBGP-IX
neighbor 203.176.189.240 activate
exit-address-family
!
address-family ipv6
neighbor 2001:0df0:000a:0001::240 remote-as 135541
neighbor 2001:0df0:000a:0001::240 peer-group IPV6-eBGP-IX
neighbor 2001:0df0:000a:0001::240 activate
!
```

```
exit
exit
exit
wr
```

Prefix Filter

```
config t
!
ip prefix-list ANNOUNCE-PREFIX-IPv4 seq 5 permit 172.16.22.0/23 le 24
ip prefix-list ANNOUNCE-PREFIX-IPv4 seq 100 deny 0.0.0.0/0 le 32
!
ipv6 prefix-list ANNOUNCE-PREFIX-IPv6 seq 5 permit 2406:6400:b800::/48
ipv6 prefix-list ANNOUNCE-PREFIX-IPv6 seq 100 deny ::/0 le 48
!
router bgp 135536
address-family ipv4
neighbor IPV4-eBGP-IX prefix-list ANNOUNCE-PREFIX-IPv4 out
neighbor IPV4-eBGP-UPSTREAM prefix-list ANNOUNCE-PREFIX-IPv4 out
exit-address-family
!
address-family ipv6
neighbor IPV6-eBGP-IX prefix-list ANNOUNCE-PREFIX-IPv6 out
neighbor IPV6-eBGP-UPSTREAM prefix-list ANNOUNCE-PREFIX-IPv6 out
```

R17 Configuration

Interface Configuration

```
config t
!
interface Ethernet1/1
description IX Router
no ip redirects
no ip unreachables
no clns route-cache
ip address 203.176.189.17 255.255.255.0
ipv6 address 2001:0df0:000a:0001::17/64
duplex full
no shut
!
exit
exit
wr
```

eBGP Configuration

```
config t
!
router bgp 135537
! Not enforce that the first ASN in the AS path matches the peering ASN
no bgp enforce-first-as
neighbor IPV4-eBGP-IX peer-group
neighbor IPV6-eBGP-IX peer-group
!
address-family ipv4
neighbor 203.176.189.240 remote-as 135541
neighbor 203.176.189.240 peer-group IPV4-eBGP-IX
neighbor 203.176.189.240 activate
exit-address-family
!
address-family ipv6
neighbor 2001:0df0:000a:0001::240 remote-as 135541
neighbor 2001:0df0:000a:0001::240 peer-group IPV6-eBGP-IX
neighbor 2001:0df0:000a:0001::240 activate
!
exit
exit
exit
wr
```

Prefix Filter

```
config t
!
ip prefix-list ANNOUNCE-PREFIX-IPv4 seq 5 permit 172.16.24.0/23 le 24
ip prefix-list ANNOUNCE-PREFIX-IPv4 seq 100 deny 0.0.0.0/0 le 32
!
ipv6 prefix-list ANNOUNCE-PREFIX-IPv6 seq 5 permit 2406:6400:c000::/48
ipv6 prefix-list ANNOUNCE-PREFIX-IPv6 seq 100 deny ::/0 le 48
!
router bgp 135537
address-family ipv4
neighbor IPV4-eBGP-IX prefix-list ANNOUNCE-PREFIX-IPv4 out
neighbor IPV4-eBGP-UPSTREAM prefix-list ANNOUNCE-PREFIX-IPv4 out
exit-address-family
!
address-family ipv6
neighbor IPV6-eBGP-IX prefix-list ANNOUNCE-PREFIX-IPv6 out
neighbor IPV6-eBGP-UPSTREAM prefix-list ANNOUNCE-PREFIX-IPv6 out
```

R18 Configuration

Interface Configuration

```
config t
!
interface Ethernet1/1
description IX Router
no ip redirects
no ip unreachables
no clns route-cache
ip address 203.176.189.18 255.255.255.0
ipv6 address 2001:0df0:000a:0001::18/64
duplex full
no shut
!
exit
exit
wr
```

eBGP Configuration

```
config t
!
router bgp 135538
! Not enforce that the first ASN in the AS path matches the peering ASN
no bgp enforce-first-as
neighbor IPV4-eBGP-IX peer-group
neighbor IPV6-eBGP-IX peer-group
!
address-family ipv4
neighbor 203.176.189.240 remote-as 135541
neighbor 203.176.189.240 peer-group IPV4-eBGP-IX
neighbor 203.176.189.240 activate
exit-address-family
!
address-family ipv6
neighbor 2001:0df0:000a:0001::240 remote-as 135541
neighbor 2001:0df0:000a:0001::240 peer-group IPV6-eBGP-IX
neighbor 2001:0df0:000a:0001::240 activate
!
exit
exit
!
exit
wr
```

Prefix Filter

```
config t
!
ip prefix-list ANNOUNCE-PREFIX-IPv4 seq 5 permit 172.16.26.0/23 le 24
ip prefix-list ANNOUNCE-PREFIX-IPv4 seq 100 deny 0.0.0.0/0 le 32
!
ipv6 prefix-list ANNOUNCE-PREFIX-IPv6 seq 5 permit 2406:6400:d800::/48
ipv6 prefix-list ANNOUNCE-PREFIX-IPv6 seq 100 deny ::/0 le 48
!
router bgp 135538
address-family ipv4
neighbor IPV4-eBGP-IX prefix-list ANNOUNCE-PREFIX-IPv4 out
neighbor IPV4-eBGP-UPSTREAM prefix-list ANNOUNCE-PREFIX-IPv4 out
exit-address-family
!
address-family ipv6
neighbor IPV6-eBGP-IX prefix-list ANNOUNCE-PREFIX-IPv6 out
neighbor IPV6-eBGP-UPSTREAM prefix-list ANNOUNCE-PREFIX-IPv6 out
```

R19 Configuration

Interface Configuration

```
config t
!
interface Ethernet1/1
description IX Router
no ip redirects
no ip unreachables
no clns route-cache
ip address 203.176.189.19 255.255.255.0
ipv6 address 2001:0df0:000a:0001::19/64
duplex full
no shut
!
exit
exit
wr
```

eBGP Configuration

```
config t
!
router bgp 135539
! Not enforce that the first ASN in the AS path matches the peering ASN
```

```
no bgp enforce-first-as
neighbor IPV4-eBGP-IX peer-group
neighbor IPV6-eBGP-IX peer-group
!
address-family ipv4
neighbor 203.176.189.240 remote-as 135541
neighbor 203.176.189.240 peer-group IPV4-eBGP-IX
neighbor 203.176.189.240 activate
exit-address-family
!
address-family ipv6
neighbor 2001:0df0:000a:0001::240 remote-as 135541
neighbor 2001:0df0:000a:0001::240 peer-group IPV6-eBGP-IX
neighbor 2001:0df0:000a:0001::240 activate
!
exit
exit
!
exit
wr
```

Prefix Filter

```
config t
!
ip prefix-list ANNOUNCE-PREFIX-IPv4 seq 5 permit 172.16.28.0/23 le 24
ip prefix-list ANNOUNCE-PREFIX-IPv4 seq 100 deny 0.0.0.0/0 le 32
!
ipv6 prefix-list ANNOUNCE-PREFIX-IPv6 seq 5 permit 2406:6400:e000::/48
ipv6 prefix-list ANNOUNCE-PREFIX-IPv6 seq 100 deny ::/0 le 48
!
router bgp 135539
address-family ipv4
neighbor IPV4-eBGP-IX prefix-list ANNOUNCE-PREFIX-IPv4 out
neighbor IPV4-eBGP-UPSTREAM prefix-list ANNOUNCE-PREFIX-IPv4 out
exit-address-family
!
address-family ipv6
neighbor IPV6-eBGP-IX prefix-list ANNOUNCE-PREFIX-IPv6 out
neighbor IPV6-eBGP-UPSTREAM prefix-list ANNOUNCE-PREFIX-IPv6 out
```

R20 Configuration

Interface Configuration

```
config t
!
interface Ethernet1/1
description IX Router
no ip redirects
no ip unreachables
no clns route-cache
ip address 203.176.189.20 255.255.255.0
ipv6 address 2001:0df0:000a:0001::20/64
duplex full
no shut
!
exit
exit
wr
```

eBGP Configuration

```
config t
!
router bgp 135540
! Not enforce that the first ASN in the AS path matches the peering ASN
no bgp enforce-first-as
neighbor IPV4-eBGP-IX peer-group
neighbor IPV6-eBGP-IX peer-group
!
address-family ipv4
neighbor 203.176.189.240 remote-as 135541
neighbor 203.176.189.240 peer-group IPV4-eBGP-IX
neighbor 203.176.189.240 activate
exit-address-family
!
address-family ipv6
neighbor 2001:0df0:000a:0001::240 remote-as 135541
neighbor 2001:0df0:000a:0001::240 peer-group IPV6-eBGP-IX
neighbor 2001:0df0:000a:0001::240 activate  !
exit
exit
!
exit
wr
```

Prefix Filter

```
config t
!
ip prefix-list ANNOUNCE-PREFIX-IPv4 seq 5 permit 172.16.30.0/23 le 24
ip prefix-list ANNOUNCE-PREFIX-IPv4 seq 100 deny 0.0.0.0/0 le 32
!
ipv6 prefix-list ANNOUNCE-PREFIX-IPv6 seq 5 permit 2406:6400:f800::/48
ipv6 prefix-list ANNOUNCE-PREFIX-IPv6 seq 100 deny ::/0 le 48
!
router bgp 135540
address-family ipv4
neighbor IPV4-eBGP-IX prefix-list ANNOUNCE-PREFIX-IPv4 out
neighbor IPV4-eBGP-UPSTREAM prefix-list ANNOUNCE-PREFIX-IPv4 out
exit-address-family
!
address-family ipv6
neighbor IPV6-eBGP-IX prefix-list ANNOUNCE-PREFIX-IPv6 out
neighbor IPV6-eBGP-UPSTREAM prefix-list ANNOUNCE-PREFIX-IPv6 out
```