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# Module 4 – eBGP (Customer Router)



## ***Lab Tasks:***

After completing Module-3 (iBGP Lab), your network is setup to propagate externally learned routes to all internal routers, as well as internal routes to external networks (different ASNs).

In this lab, we will configure eBGP with customer routers (R13-R20).

Take note of the following for eBGP:

1. eBGP neighbour relationship is normally established over directly connected interface addresses. Remember, BGP relies on TCP, and that eBGP has a TTL of 1.
2. If you want to use some other interface addresses (loopbacks) for eBGP neighbour session, then you will need to have a static route pointing to each other’s loopbacks, as well as modify the eBGP TTL to a value greater than 1 using “e-bgp-multihop <TTL>**”** command
3. When an eBGP router receives external routes/prefixes from its eBGP peers, the next-hop address is retained when it announces those routes to its iBGP peers. Since the iBGP routers would not have a route to the external next-hop, they will not install those routes in their routing table (next-hop reachability is a necessity). Hence, we need to change this default behaviour using the “next-hop-self” command on the eBGP routers, so that next-hop for those routes points to itself when announcing to iBGP peers.
4. It is not necessary to send the full-internet route to customers (if they have inexpensive routers with limited memory and CPU). Hence, in this lab, each upstream router will originate a default route towards their downstream customers with “default-originate” command.
5. Each team will need to configure both side – upstream and downstream routers, as follows:
   1. Steps involved in POP side are:
      1. Customer side interface configuration
      2. Connectivity testing
      3. eBGP configuration
      4. Change the eBGP next hop behaviour using next-hop-self
      5. Inject a default route towards customer
   2. Steps involved in CPE side are:
      1. Basic interface configuration (to the upstream as well as best practices)
      2. Connectivity testing
      3. eBGP peering with upstream routers
      4. Prefix advertisement
6. After finishing eBGP configuration, we should see the following 8 new prefixes on our infrastructure routers:

|  |  |  |
| --- | --- | --- |
| **Customer** | **AS Number** | **Prefix** |
| R13 | 65001 | 2406:6400:8000::/48 |
| R14 | 65002 | 2406:6400:9800::/48 |
| R15 | 65003 | 2406:6400:a000::/48 |
| R16 | 65004 | 2406:6400:b800::/48 |
| R17 | 65005 | 2406:6400:c000::/48 |
| R18 | 65006 | 2406:6400:d800::/48 |
| R19 | 65007 | 2406:6400:e000::/48 |
| R20 | 65008 | 2406:6400:f800::/48 |

## ***Lab Exercise***

1. **Upstream Router Configuration:**

On each of the upstream POP routers (that aggregate downstream customers), we will configure eBGP sessions with downstream customers.

**Example R1-Config:**

**Step-1 (interface config):**

config t

interface fa0/0

description Link to Customer-R13

ipv6 address 2406:6400:10::1/64

no shutdown

exit

exit

wr

**Step-2 (eBGP peering with downstream router):**

config t

router bgp 17821

address-family ipv6 unicast

neighbor 2406:6400:10::2 remote-as 65001

neighbor 2406:6400:10::2 default-originate ! Originate default [::/0] to customer router.

neighbor 2406:6400:10::2 activate

neighbor 2406:6400:10::2 next-hop-self ! Point next-hop to self

exit

exit

exit

wr

1. **Downstream Customer Router Configuration:**

We will establish eBGP relationship with upstream routers.

**Step-1 (basic config):**

Make sure you configure all the best practices you configured earlier.

**Step-2 (interface config):**

Configure the interface addresses, along with interface best practices as you did earlier for Module-1

**Step-3 (eBGP peering with upstream):**

**Example R15 config:**

config t

router bgp 65002

no bgp default ipv4-unicast

address-family ipv6 unicast

neighbor 2406:6400:14::1 remote-as 17821

neighbor 2406:6400:0014::1 activate

exit

exit

exit

wr

**Step-4 (announce customer prefix):**

**Example R16 config:**

config t

router bgp 65004

address-family ipv6 unicat

network 2406:6400:b800::/48

exit

exit

ipv6 route 2406:6400:b800::/48 null 0

exit

wr

1. **Verify eBGP Configuration:**

sh bgp ipv4/ipv6 unicast summary ! List your peers

sh bgp ipv4/ipv6 unicast ! List routes in your BGP Table

sh bgp ipv4/ipv6 unicast <prefix/length> ! List specific routes

sh ip/ipv6 route bgp ! Check routes learned via BGP

sh ip/ipv6 route ! Check your routing table (best paths)

sh bgp ipv6 unicast neighbors <neighbour-address> advertised-routes

! Check routes advertised to your neighbour

sh bgp ipv6 unicast neighbors <neighbour-address> routes

! Check routes learned from your neighbour

END OF MODULE-4……