LAB9: BGP – IPv6

Disclaimer

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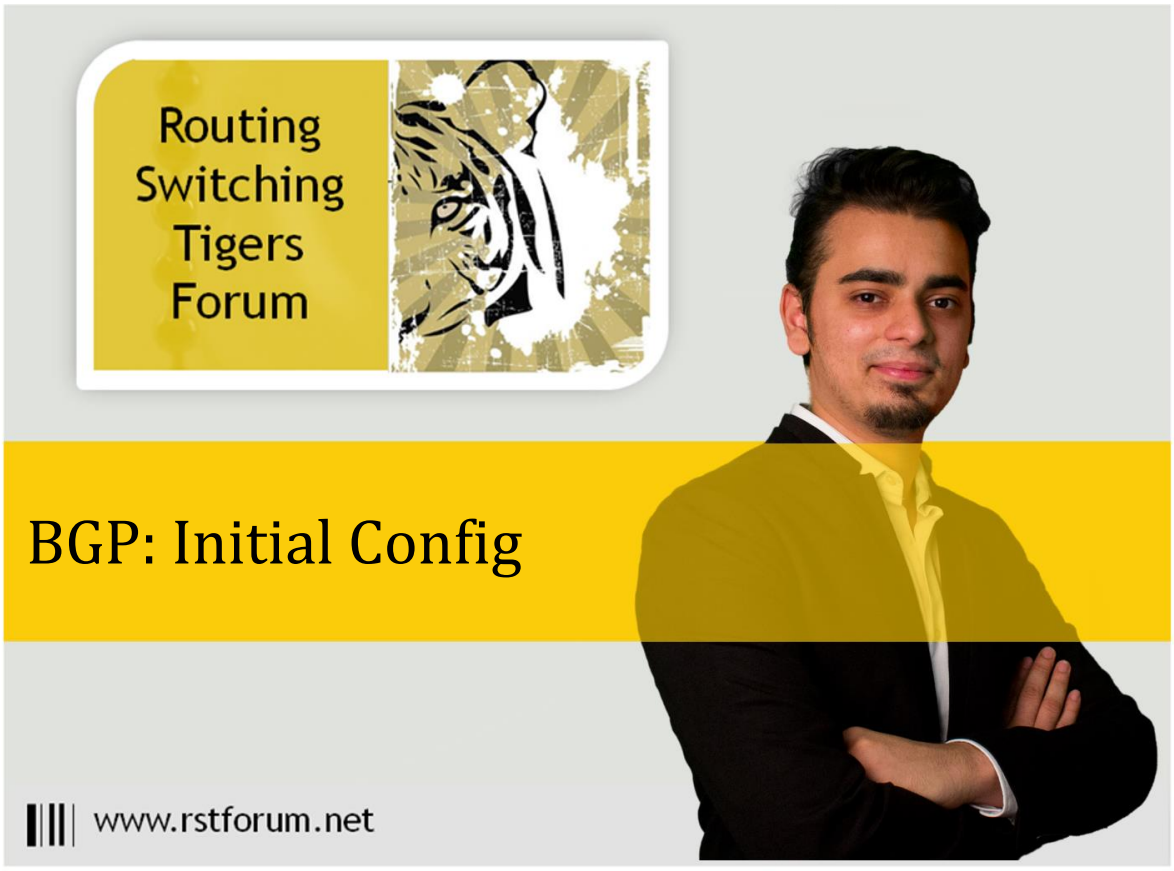
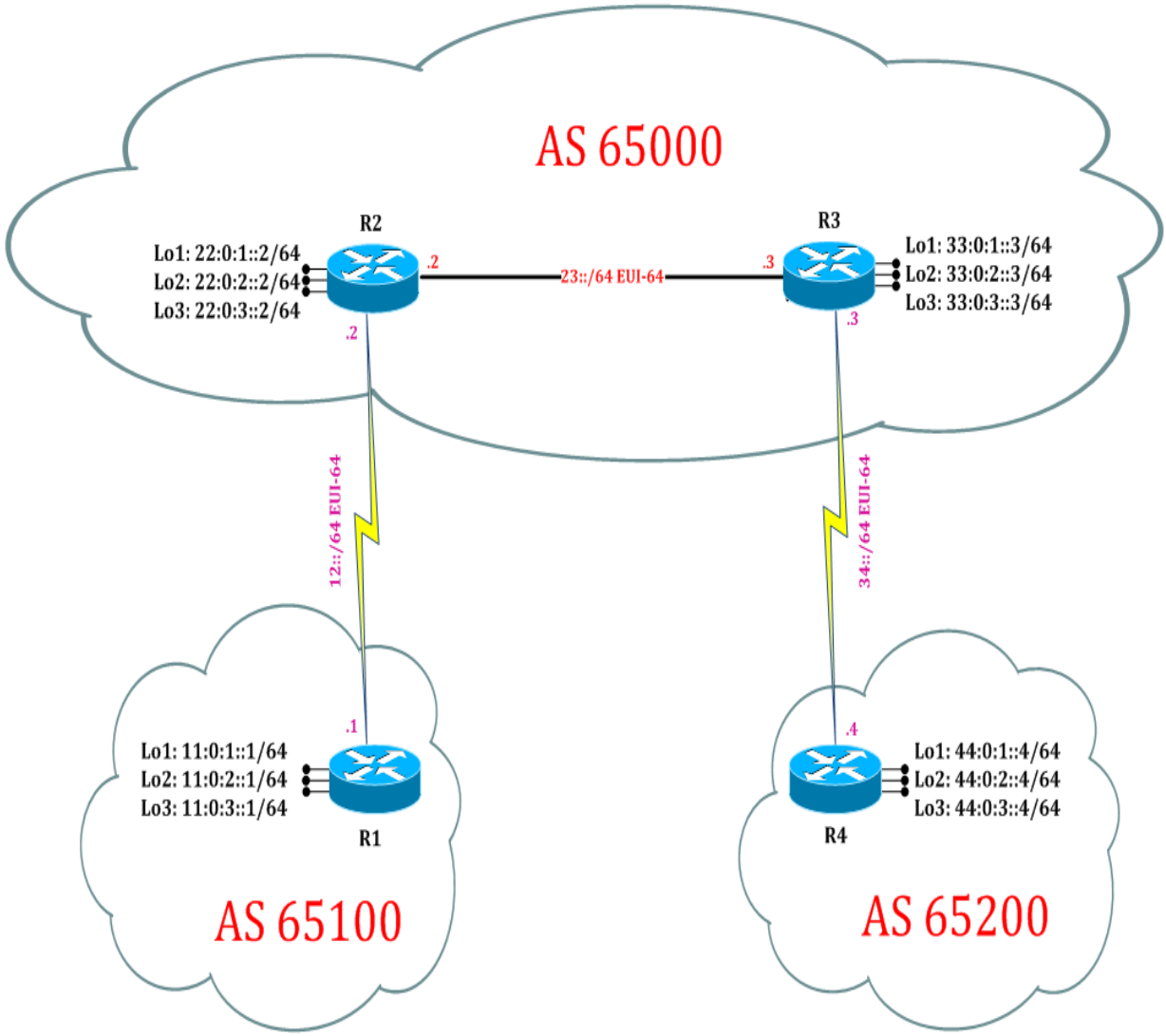


LAB 9: Diagram

Note: This Lab was developed on Cisco IOS Version15.2(4) M1 ADVENTERPRISEK9-M.



LAB 9: Configure BGP FOR IPv6:

Task 1: Configure IPv6 BGP process for Autonomous

Step 1 In the configuration mode of router configure IPv6 BGP Process by following command:

R1:

```
router bgp 65100                                  ! (Initiate BGP process for AS 65100)
neighbor 22:0:1::2 remote-as 65000                ! (Creates a IPv6 BGP peer group)
neighbor 22:0:1::2 ebgp-multihop 5
neighbor 22:0:1::2 update- loopback 1             ! (To form loop to loop indirect peering
address-family ipv6                               ! (Enable address family IPv6)
neighbor 22:0:1::2 activate                       ! (Enables the exchange of information with
neighbor 22:0:1::2 soft-reconfiguration inbound   a IPv6 BGP neighboring router)
exit
```

R2:

```
router bgp 65000
neighbor 11:0:1::1 remote-as 65100
neighbor 11:0:1::1 ebgp-multihop 5                ! (IPv6 BGP connections to external
neighbor 11:0:1::1 update-source loopback 1       peers residing on networks that are not
neighbor 33:0:1::3 remote-as 65000                   directly connected.)
neighbor 33:0:1::3 update-source loopback 1
address-family ipv6
neighbor 11:0:1::1 activate
neighbor 11:0:1::1 soft-reconfiguration inbound       ! (To store fresh incoming updated
neighbor 33:0:1::3 activate                        from neighbor.)
neighbor 33:0:1::3 soft-reconfiguration inbound
exit
```

R3:

```
router bgp 65000
neighbor 44:0:1::4 remote-as 65200
neighbor 44:0:1::4 ebgp-multihop 5
neighbor 44:0:1::4 update-source loopback 1
neighbor 22:0:1::2 remote-as 65000
neighbor 22:0:1::2 update-source loopback 1
address-family ipv6
neighbor 44:0:1::4 activate
neighbor 44:0:1::4 soft-reconfiguration inbound
neighbor 22:0:1::2 activate
neighbor 22:0:1::2 soft-reconfiguration inbound
exit
```

R4:

```
router bgp 65200
neighbor 33:0:1::3 remote-as 65000
neighbor 33:0:1::3 ebgp-multihop 5
neighbor 33:0:1::3 update-source loopback 1
address-family ipv6
neighbor 33:0:1::3 activate
neighbor 33:0:1::3 soft-reconfiguration inbound
exit
```

Step 1 In the configuration mode of router configure IPv4 OSPF Process by following command:

R1:

```
ipv6 router ospf 1                    ! (Initiate IPv6 OSPF process with process id 1)
interface serial 2/0
ipv6 ospf 1 area 0
interface loopback 1
ipv6 ospf 1 area 0
interface loopback 2
ipv6 ospf 1 area 0
interface loopback 3
ipv6 ospf 1 area 0
exit
```

R2:

```
ipv6 router ospf 1
interface serial 2/0
ipv6 ospf 1 area 0
interface ethernet 0/0
ipv6 ospf 1 area 0
interface loopback 1
ipv6 ospf 1 area 0
interface loopback 2
ipv6 ospf 1 area 0
interface loopback 3
ipv6 ospf 1 area 0
exit
```

R3:

```
ipv6 router ospf 1
interface serial2/0
ipv6 ospf 1 area 0
interface ethernet 0/0
ipv6 ospf 1 area 0
interface loopback 1
ipv6 ospf 1 area 0
interface loopback 2
ipv6 ospf 1 area 0
interface loopback 3
ipv6 ospf 1 area 0
exit
```

R4:

```
ipv6 router ospf 1
interface serial 2/0
ipv6 ospf 1 area 0
interface loopback 1
ipv6 ospf 1 area 0
interface loopback 2
ipv6 ospf 1 area 0
interface loopback 3
ipv6 ospf 1 area 0
exit
```

Step 2 Announce the network in BGP Process

R1:

```
router bgp 65100
address-family ipv6          ! (Enable address family for IPv6 BGP.)
network 11:0:1::0/64         ! (Announce the network in BGP process.)
network 11:0:2::0/64
network 11:0:3::0/64
exit
```

R2:

```
router bgp 65000
address-family ipv6
network 22:0:1::0/64
network 22:0:2::0/64
network 22:0:3::0/64
exit
```

R3:
router bgp 65000
address-family ipv6
network 33:0:1::0/64
network 33:0:2::0/64
network 33:0:3::0/64
exit

R4:
router bgp 65200
address-family ipv6
network 44:0:1::0/64
network 44:0:2::0/64
network 44:0:3::0/64
exit

Task 2: Verification:

Step 1 Verify IPv6 OSPF routes by following command:

R2#show ipv6 route
! (Shows router's routing table and IPv6 routes entries.)

IPv6 Routing Table - default - 30 entries
Codes: C - Connected, L - Local, S - Static, U - Per-user Static route
B - BGP, HA - Home Agent, MR - Mobile Router, R - RIP
H - NHRP, I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea
IS - ISIS summary, D - EIGRP, EX - EIGRP external, NM - NEMO
ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect
O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2
ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2, l - LISP
B 11:0:1::/64 [20/0]
via 11:0:1::1
O 11:0:1::1/128 [110/64]
via FE80::A8BB:CCFF:FE00:100, Serial2/0
B 11:0:2::/64 [20/0]
via 11:0:1::1
O 11:0:2::1/128 [110/64]
via FE80::A8BB:CCFF:FE00:100, Serial2/0
B 11:0:3::/64 [20/0]
via 11:0:1::1
O 11:0:3::1/128 [110/64]
via FE80::A8BB:CCFF:FE00:100, Serial2/0
C 12::/64 [0/0]
via Serial2/0, directly connected
L 12::A8BB:CCFF:FE00:200/128 [0/0]
via Serial2/0, receive
C 22:0:1::/64 [0/0]

```
    via Loopback1, directly connected
L   22:0:1::2/128 [0/0]
    via Loopback1, receive
C   22:0:2::/64 [0/0]
    via Loopback2, directly connected
L   22:0:2::2/128 [0/0]
    via Loopback2, receive
C   22:0:3::/64 [0/0]
    via Loopback3, directly connected
L   22:0:3::2/128 [0/0]
    via Loopback3, receive
C   23::/64 [0/0]
    via Ethernet0/0, directly connected
L   23::A8BB:CCFF:FE00:200/128 [0/0]
    via Ethernet0/0, receive
B   33:0:1::/64 [200/0]
    via 33:0:1::3
O   33:0:1::3/128 [110/10]
    via FE80::A8BB:CCFF:FE00:300, Ethernet0/0
B   33:0:2::/64 [200/0]
    via 33:0:1::3
O   33:0:2::3/128 [110/10]
    via FE80::A8BB:CCFF:FE00:300, Ethernet0/0
B   33:0:3::/64 [200/0]
    via 33:0:1::3
O   33:0:3::3/128 [110/10]
    via FE80::A8BB:CCFF:FE00:300, Ethernet0/0
O   34::/64 [110/74]
    via FE80::A8BB:CCFF:FE00:300, Ethernet0/0
B   44:0:1::/64 [200/0]
    via 44:0:1::4
O   44:0:1::4/128 [110/74]
    via FE80::A8BB:CCFF:FE00:300, Ethernet0/0
B   44:0:2::/64 [200/0]
    via 44:0:1::4
O   44:0:2::4/128 [110/74]
    via FE80::A8BB:CCFF:FE00:300, Ethernet0/0
B   44:0:3::/64 [200/0]
    via 44:0:1::4
O   44:0:3::4/128 [110/74]
    via FE80::A8BB:CCFF:FE00:300, Ethernet0/0
L   FF00::/8 [0/0]
    via Null0, receive
```

Step 2 Verify IPv6 BGP neighborship and its details by following command:

BGP neighbor states:
1. Idle – TCP connectivity issue
2. Active – Command configuration issue
3. Established – TCP connectivity established

R2#show bgp ipv6 unicast neighbor
! (show details of IPv6bgp neighbor)

BGP neighbor is 11:0:1::1, remote AS 65100, external link
BGP version 4, remote router ID 11.0.3.1
BGP state = Established, up for 01:41:39
Last read 00:00:45, last write 00:00:17, hold time is 180, keepalive interval is 60 seconds
Neighbor sessions:
1 active, is not multisession capable (disabled)
Neighbor capabilities:
Route refresh: advertised and received(new)
Four-octets ASN Capability: advertised and received
Address family IPv6 Unicast: advertised and received
Enhanced Refresh Capability: advertised and received
----------Output Omitted----------

BGP neighbor is 33:0:1::3, remote AS 65000, internal link
BGP version 4, remote router ID 33.0.3.3
BGP state = Established, up for 01:40:27
Last read 00:00:33, last write 00:00:19, hold time is 180, keepalive interval is 60 seconds
Neighbor sessions:
1 active, is not multisession capable (disabled)
Neighbor capabilities:
Route refresh: advertised and received(new)
Four-octets ASN Capability: advertised and received
Address family IPv4 Unicast: received
Address family IPv6 Unicast: advertised and received
Enhanced Refresh Capability: advertised and received
----------Output Omitted----------

Step 3 Verify IPv6 BGP routes and its details by following command:

```
R2#show bgp ipv6 unicast
! (Shows IPv6 BGP table where ">" shows best path.)

BGP table version is 13, local router ID is 22.0.3.2
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,
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found

   Network          Next Hop            Metric  LocPrf  Weight  Path
*>  11:0:1::/64     11:0:1::1                0               0  65100 i
*>  11:0:2::/64     11:0:1::1                0               0  65100 i
*>  11:0:3::/64     11:0:1::1                0               0  65100 i
*>  22:0:1::/64     ::                       0           32768  i
*>  22:0:2::/64     ::                       0           32768  i
*>  22:0:3::/64     ::                       0           32768  i
*>i 33:0:1::/64     33:0:1::3                0     100       0  i
*>i 33:0:2::/64     33:0:1::3                0     100       0  i
*>i 33:0:3::/64     33:0:1::3                0     100       0  i
*>i 44:0:1::/64     44:0:1::4                0     100       0  65200 i
*>i 44:0:2::/64     44:0:1::4                0     100       0  65200 i
*>i 44:0:3::/64     44:0:1::4                0     100       0  65200 i
```