

LAB1: BGP – IPv4

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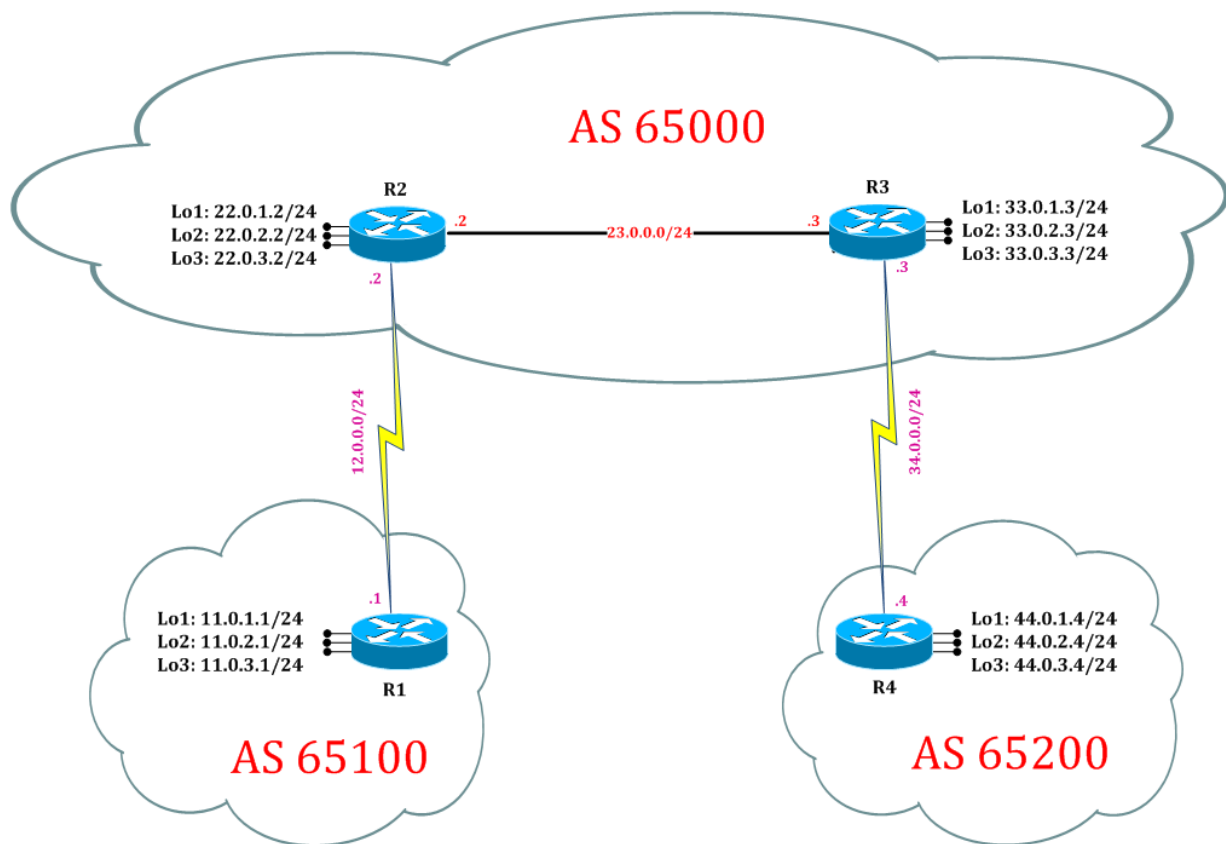
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BGP: Initial Config

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LAB 1: Diagram

Note: This Lab was developed on Cisco IOS Version 15.2(4) M1 ADVENTERPRISEK9-M.



LAB 1: Configure BGP FOR IPv4:

Task 1: Configure IPv4 BGP process for Autonomous

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

R1:

```
router bgp 65100
neighbor 22.0.1.2 remote-as 65000
neighbor 22.0.1.2 ebgp-multihop 5
neighbor 22.0.1.2 update-source loopback 1
neighbor 22.0.1.2 soft-reconfiguration inbound
exit
```

! (Initiate BGP process for AS 65100)
! (Creates a BGP peer group)
! (To form Loop to Loop indirect peering)
! (To store fresh incoming updated from neighbor)

R2:

```
router bgp 65000
neighbor 11.0.1.1 remote-as 65100
neighbor 11.0.1.1 ebgp-multihop 5
neighbor 11.0.1.1 update-source loopback 1
neighbor 11.0.1.1 soft-reconfiguration inbound
neighbor 33.0.1.3 remote-as 65000
neighbor 33.0.1.3 update-source loopback 1
neighbor 33.0.1.3 soft-reconfiguration inbound
exit
```

! (BGP connections to external peers residing on networks that are not directly connected.)

R3:

```
router bgp 65000
neighbor 22.0.1.2 remote-as 65000
neighbor 22.0.1.2 update-source loopback 1
neighbor 22.0.1.2 soft-reconfiguration inbound
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 44.0.1.4 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
neighbor 33.0.1.3 soft-reconfiguration inbound
exit
```

Step 2 In the configuration mode of router configure IPv4 OSPF Process by following command:

R1:

```
router ospf 1
network 0.0.0.0 0.0.0.0 area 0
exit
```

! (Initiate OSPF process with process id 1)
! (Send updates on any ip with any mask)

R2:

```
router ospf 1
network 0.0.0.0 0.0.0.0 area 0
exit
```

R3:

```
router ospf 1
network 0.0.0.0 0.0.0.0 area 0
exit
```

R4:

```
router ospf 1
network 0.0.0.0 0.0.0.0 area 0
exit
```

Step 3 Announce the network in BGP Process

R1:

```
router bgp 65100
address-family ipv4
network 11.0.1.0 mask 255.255.255.0
network 11.0.2.0 mask 255.255.255.0
network 11.0.3.0 mask 255.255.255.0
exit
```

! (Enable address family for IPv4 BGP)
! (Announce the network in BGP process)

R2:

```
router bgp 65000
address-family ipv4
network 22.0.1.0 mask 255.255.255.0
network 22.0.2.0 mask 255.255.255.0
network 22.0.3.0 mask 255.255.255.0
exit
```

R3:

```
router bgp 65000
address-family ipv4
network 33.0.1.0 mask 255.255.255.0
network 33.0.2.0 mask 255.255.255.0
network 33.0.3.0 mask 255.255.255.0
exit
```

```
R4:
router bgp 65200
address-family ipv4
network 44.0.1.0 mask 255.255.255.0
network 44.0.2.0 mask 255.255.255.0
network 44.0.3.0 mask 255.255.255.0
exit
```

Task 2: Verification:

Step 1 Verify IPv4 routes in routing table by following command:

```
R2#show ip route
```

! (Shows router's routing table and IPv4 routes entries)

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
 + - replicated route, % - next hop override

Gateway of last resort is not set

```

11.0.0.0/8 is variably subnetted, 6 subnets, 2 masks
B   11.0.1.0/24 [20/0] via 11.0.1.1, 00:07:49
O   11.0.1.1/32 [110/65] via 12.0.0.1, 00:17:07, Serial2/0
B   11.0.2.0/24 [20/0] via 11.0.1.1, 00:07:19
O   11.0.2.1/32 [110/65] via 12.0.0.1, 00:17:07, Serial2/0
B   11.0.3.0/24 [20/0] via 11.0.1.1, 00:07:19
O   11.0.3.1/32 [110/65] via 12.0.0.1, 00:17:07, Serial2/0
12.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C   12.0.0.0/24 is directly connected, Serial2/0
L   12.0.0.2/32 is directly connected, Serial2/0
22.0.0.0/8 is variably subnetted, 6 subnets, 2 masks
C   22.0.1.0/24 is directly connected, Loopback1
L   22.0.1.2/32 is directly connected, Loopback1
C   22.0.2.0/24 is directly connected, Loopback2
L   22.0.2.2/32 is directly connected, Loopback2
C   22.0.3.0/24 is directly connected, Loopback3
L   22.0.3.2/32 is directly connected, Loopback3
23.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C   23.0.0.0/24 is directly connected, Ethernet0/0
L   23.0.0.2/32 is directly connected, Ethernet0/0
33.0.0.0/8 is variably subnetted, 6 subnets, 2 masks
```

```

B 33.0.1.0/24 [200/0] via 33.0.1.3, 00:04:04
O 33.0.1.3/32 [110/11] via 23.0.0.3, 00:16:08, Ethernet0/0
B 33.0.2.0/24 [200/0] via 33.0.1.3, 00:04:00
O 33.0.2.3/32 [110/11] via 23.0.0.3, 00:16:08, Ethernet0/0
B 33.0.3.0/24 [200/0] via 33.0.1.3, 00:03:56
O 33.0.3.3/32 [110/11] via 23.0.0.3, 00:16:08, Ethernet0/0
  34.0.0.0/24 is subnetted, 1 subnets
O 34.0.0.0 [110/74] via 23.0.0.3, 00:16:08, Ethernet0/0
  44.0.0.0/8 is variably subnetted, 6 subnets, 2 masks
B 44.0.1.0/24 [200/0] via 44.0.1.4, 00:03:03
O 44.0.1.4/32 [110/75] via 23.0.0.3, 00:16:08, Ethernet0/0
B 44.0.2.0/24 [200/0] via 44.0.1.4, 00:02:33
O 44.0.2.4/32 [110/75] via 23.0.0.3, 00:16:08, Ethernet0/0
B 44.0.3.0/24 [200/0] via 44.0.1.4, 00:02:33
O 44.0.3.4/32 [110/75] via 23.0.0.3, 00:16:08, Ethernet0/0

```

Step 2 Verify IPv4 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 ipv4 unicast neighbor
```

! (Shows details of IPv4 BGP 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 00:15:57
```

```
Last read 00:00:23, last write 00:00:13, hold time is 180, keepalive interval is 60
seconds
```

```
Neighbor sessions:
```

```
1 active, is not multiseession capable (disabled)
```

```
-----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 00:22:10
```

```
Last read 00:00:07, last write 00:00:43, hold time is 180, keepalive interval is 60
seconds
```

```
Neighbor sessions:
```

```
1 active, is not multiseession capable (disabled)
```

```
-----Output Omitted-----
```

Step 3 Verify IPv4 BGP routes and its details by following command:

```
R2#show ip bgp
```

! (Shows IPv4 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 |
|-----------------|----------|--------|--------|--------|---------|
| *> 11.0.1.0/24 | 11.0.1.1 | 0 | | 0 | 65100 i |
| *> 11.0.2.0/24 | 11.0.1.1 | 0 | | 0 | 65100 i |
| *> 11.0.3.0/24 | 11.0.1.1 | 0 | | 0 | 65100 i |
| *> 22.0.1.0/24 | 0.0.0.0 | 0 | | 32768 | i |
| *> 22.0.2.0/24 | 0.0.0.0 | 0 | | 32768 | i |
| *> 22.0.3.0/24 | 0.0.0.0 | 0 | | 32768 | i |
| *>i 33.0.1.0/24 | 33.0.1.3 | 0 | 100 | 0 | i |
| *>i 33.0.2.0/24 | 33.0.1.3 | 0 | 100 | 0 | i |
| *>i 33.0.3.0/24 | 33.0.1.3 | 0 | 100 | 0 | i |
| *>i 44.0.1.0/24 | 44.0.1.4 | 0 | 100 | 0 | 65200 i |
| *>i 44.0.2.0/24 | 44.0.1.4 | 0 | 100 | 0 | 65200 i |
| *>i 44.0.3.0/24 | 44.0.1.4 | 0 | 100 | 0 | 65200 i |