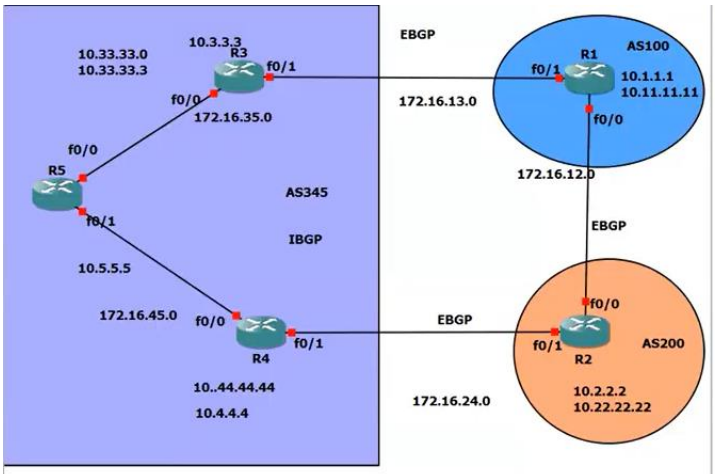
BGP (Border Gateway Protocol)

Basic BGP



BGP:

IGP: RIPV2 EIGRP OSPF :

EGP: BGP

TCP PORT NO 179.

NEI : PEER

AS NO: 1 65535

64512 65535 PRIVATE AS NO

1- 64511 PUBLIC AS NO

Note =>

1)R5 is having the both EBGP & IBGP routes their we need to config the next-hop off-self on R3 and R4 to inform that *if u want to reach as200 I'm ur next-hop like that.

2) if router want to share loopback with neighbor that must be in df ASN number (R5 doesn't share R3 loop with R4)

3)we have 2 CMD in BGP :

- *** Neighbor = (where to advertise and who is going to become my neighbor)**
- *** Network = (what to advertise)**

Config=>

#R1

```
R1(config)#router bgp ?
  <1-65535>  Autonomous system number

R1(config)#router bgp 100
R1(config-router)#nei 172.16.12.2 remote-as 200
R1(config-router)#nei 172.16.13.3 remote-as 345
R1(config-router)#net 172.16.12.0 mask 255.255.255.0
R1(config-router)#net 172.16.13.0 mask 255.255.255.0
R1(config-router)#net 10.1.1.1 mask 255.255.255.255
R1(config-router)#net 10.11.11.11 mask 255.255.255.255
R1(config-router)#
```

**** on ver 12.0 we have 2^ 16 | on 15.0 we have 2^32 ASN number**

by default

```
router bgp 100
 no synchronization
 bgp log-neighbor-changes
 network 10.1.1.1 mask 255.255.255.255
 network 10.11.11.11 mask 255.255.255.255
 network 172.16.12.0 mask 255.255.255.0
 network 172.16.13.0 mask 255.255.255.0
 neighbor 172.16.12.2 remote-as 200
 neighbor 172.16.13.3 remote-as 345
 no auto-summary
```

1-do sh ip bgp summary

```
Neighbor        V    AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxR
172.16.12.2     4   200       0       0        0    0    0 never    Active
172.16.13.3     4   345       0       0        0    0    0 never    Active
R1#
```

#R2

```
R2(config)#router bgp 200
R2(config-router)#nei 172.16.12.1 remote-as 100
R2(config-router)#nei 172.16.24.4 remote-as 345
R2(config-router)#
*Mar  1 00:31:54.015: %BGP-5-ADJCHANGE: neighbor 172.16.12.1 Up
R2(config-router)#net 172.16.12.0 mask 255.255.255.0
R2(config-router)#net 172.16.24.0 mask 255.255.255.0
R2(config-router)#net 10.2.2.2 mask 255.255.255.255
R2(config-router)#net 10.22.22.22 mask 255.255.255.255
R2(config-router)#^Z
R2#
```

#R3

```
R3(config)#router bgp 345
R3(config-router)#nei 172.16.13.1 remote-as 100
R3(config-router)#nei 172.16.35.5 remote-as 345
R3(config-router)#nei 172.16.35.0 mask 255.255.255.0
                                  ^
% Invalid input detected at '^' marker.

R3(config-router)#nei 172.16.35.0 mask 255.255.255.0
*Mar  1 00:34:24.591: %BGP-5-ADJCHANGE: neighbor 172.16.13.1 Up
R3(config-router)#net 172.16.35.0 mask 255.255.255.0
R3(config-router)#net 10.3.3.3 mask 255.255.255.255
```

*we wont advertise 172.16.13.0 on R2

#R4

```
R4(config)#router bgp 345
R4(config-router)#nei 172.16.24.2
R4(config-router)#nei 172.16.24.2 remote-as 200
R4(config-router)#nei 172.16.45.5 remote
*Mar  1 00:35:32.619: %BGP-5-ADJCHANGE: neighbor 172.16.24.2 Up
R4(config-router)#nei 172.16.45.5 remote-as 345
R4(config-router)#net 172.16.45.0 mask 255.255.255.0
R4(config-router)#net 10.4.4.4 mask 255.255.255.255
R4(config-router)#^Z
```

*we wont advertise 172.16.24.0 on R2

#R5

```
R5(config)#router bgp 345
R5(config-router)#nei 172.16.35.3 remote-as 345
R5(config-router)#nei 172.16.45.4 remote-as 345
R5(config-router)#net 172.16.35.0 mask 255.255.25
*Mar  1 00:37:15.755: %BGP-5-ADJCHANGE: neighbor 172.16.35.3 Up
R5(config-router)#net 172.16.35.0 mask 255.255.255.0
R5(config-router)#net 172.16.45.0 mask 255.255.255.0
R5(config-router)#net 10.5.5.5 mask 255.255.255.255
R5(config-router)#
*Mar  1 00:37:34.991: %BGP-5-ADJCHANGE: neighbor 172.16.45.4 Up
R5(config-router)#^Z
```

#R5

```
   Network          Next Hop            Metric LocPrf Weight Path
* i10.1.1.1/32     172.16.24.2              0    100      0 200 100 i
* i                172.16.13.1              0    100      0 100 i
* i10.2.2.2/32     172.16.24.2              0    100      0 200 i
* i                172.16.13.1              0    100      0 100 200 i
*>i10.3.3.3/32     172.16.35.3              0    100      0 i
*>i10.4.4.4/32     172.16.45.4              0    100      0 i
*> 10.5.5.5/32     0.0.0.0                  0         32768 i
* i10.11.11.11/32  172.16.24.2              0    100      0 200 100 i
* i                172.16.13.1              0    100      0 100 i
* i10.22.22.22/32  172.16.24.2              0    100      0 200 i
* i                172.16.13.1              0    100      0 100 200 i
* i172.16.12.0/24  172.16.24.2              0    100      0 200 i
* i                172.16.13.1              0    100      0 100 i
* i172.16.13.0/24  172.16.24.2              0    100      0 200 100 i
* i                172.16.13.1              0    100      0 100 i
* i172.16.24.0/24  172.16.24.2              0    100      0 200 i
* i                172.16.13.1              0    100      0 100 200 i
 --More--
```

*valid *>best

? = what if have only * why we have only *ip

Sol= bcz we don't have route for this ip in routing-table

```
R5#sh ip rou bgp
     10.0.0.0/32 is subnetted, 3 subnets
B       10.3.3.3 [200/0] via 172.16.35.3, 00:02:47
B       10.4.4.4 [200/0] via 172.16.45.4, 00:02:47
```

*it's a control-plain issue

#R4

```
            r RIB-failure, S Stale
Origin codes: i - IGP, e - EGP, ? - incomplete

   Network          Next Hop            Metric LocPrf Weight Path
*> 10.1.1.1/32      172.16.24.2                            0 200 100 i
*> 10.2.2.2/32      172.16.24.2              0             0 200 i
*> 10.4.4.4/32      0.0.0.0                  0         32768 i
*>i10.5.5.5/32      172.16.45.5              0    100      0 i
*> 10.11.11.11/32   172.16.24.2                            0 200 100 i
*> 10.22.22.22/32   172.16.24.2              0             0 200 i
*> 172.16.12.0/24   172.16.24.2              0             0 200 i
*> 172.16.13.0/24   172.16.24.2                            0 200 100 i
r> 172.16.24.0/24   172.16.24.2              0             0 200 i
*>i172.16.35.0/24   172.16.45.5              0    100      0 i
* i172.16.45.0/24   172.16.45.5              0    100      0 i
*>                  0.0.0.0                  0         32768 i
R4# sh run
```

*we have to advertise network that we are advertised in the neighbor command (if not the RIB-failure will occur bcz that ad-value chnages) * we have not advertised (24.0)

Note =>

#R5

```
R5#sh ip rou bgp
     172.16.0.0/24 is subnetted, 5 subnets
B       172.16.24.0 [200/0] via 172.16.45.4, 00:00:48
B       172.16.12.0 [200/0] via 172.16.24.2, 00:00:13
B       172.16.13.0 [200/0] via 172.16.24.2, 00:00:13
     10.0.0.0/32 is subnetted, 7 subnets
B       10.11.11.11 [200/0] via 172.16.24.2, 00:00:13
B       10.2.2.2 [200/0] via 172.16.24.2, 00:00:43
B       10.3.3.3 [200/0] via 172.16.35.3, 00:10:06
B       10.1.1.1 [200/0] via 172.16.24.2, 00:00:13
B       10.4.4.4 [200/0] via 172.16.45.4, 00:10:06
B       10.22.22.22 [200/0] via 172.16.24.2, 00:00:43
```

*we r receiving 10.11.11.11 via 172.16.24.2 its wrong It should from 172.16.13.1

** this will occur due to without using next-hop self before network CMD

#R4

```
R4(config-router)#
R4(config-router)#nei 172.16.45.5 next-hop-self
R4(config-router)#
```

#R3

```
R3(config)#router bgp 345
R3(config-router)#nei 172.16.
% Incomplete command.

R3(config-router)#nei 172.16.35.5 next-hop-self
R3(config-router)#net 172.16.35.0 mask 255.255.255.0
R3(config-router)#^Z
R3#cle
*Mar  1 00:52:23.607: %SYS-5-CONFIG_I: Configured from console by console
R3#clear ip bgp * soft
R3#clear ip bgp * soft
```

It should be 13.0 not 35.0

** to make it fast we use ## clear ip bgp * soft (basically it takes 180 sec to alter)

** R4 (wont have route of 10.3.3.3 bcz R1 wont share external route to IBGP member)

```
   Network          Next Hop            Metric LocPrf Weight Path
*> 10.1.1.1/32      172.16.24.2                            0 200 100 i
*> 10.2.2.2/32      172.16.24.2              0             0 200 i
*> 10.4.4.4/32      0.0.0.0                  0         32768 i
*>i10.5.5.5/32      172.16.45.5              0    100      0 i
*> 10.11.11.11/32   172.16.24.2                            0 200 100 i
*> 10.22.22.22/32   172.16.24.2              0             0 200 i
*> 172.16.12.0/24   172.16.24.2              0             0 200 i
*> 172.16.13.0/24   172.16.24.2                            0 200 100 i
*> 172.16.24.0/24   0.0.0.0                  0         32768 i
*                   172.16.24.2              0             0 200 i
*>i172.16.35.0/24   172.16.45.5              0    100      0 i
* i172.16.45.0/24   172.16.45.5              0    100      0 i
*>                  0.0.0.0                  0         32768 i
```

** same on R3 we don't have 10.4.4.4 (EBGP wont share route with IBGP)

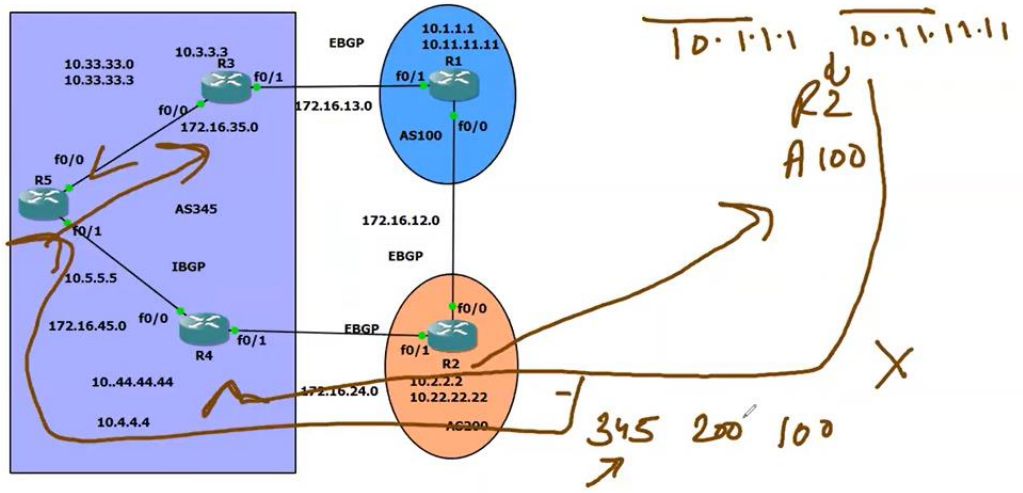
SOLUTION=

** we required route-reflector-client On R5

#R5

```
R5(config)#router bgp 345
R5(config-router)#nei 172.16.35.3 route-reflector-client
R5(config-router)#nei 172.16.45.4 route-reflector-client
R5(config-router)#exit
```

** now R3 is receiving 10.4.4.4 and R4 is receiving 10.3.3.3




```
   Network          Next Hop            Metric LocPrf Weight Path
*> 10.1.1.1/32      172.16.13.1              0             0 100 i
*>i10.2.2.2/32      172.16.45.4              0    100      0 200 i
*                   172.16.13.1                           0 100 200 i
*> 10.3.3.3/32      0.0.0.0                  0         32768 i
*>i10.4.4.4/32      172.16.45.4              0    100      0 i
*>i10.5.5.5/32      172.16.35.5              0    100      0 i
*> 10.11.11.11/32   172.16.13.1              0             0 100 i
*>i10.22.22.22/32   172.16.45.4              0    100      0 200 i
*                   172.16.13.1                           0 100 200 i
*> 172.16.12.0/24   172.16.13.1              0             0 100 i
*> 172.16.13.0/24   0.0.0.0                  0         32768 i
*                   172.16.13.1              0             0 100 i
*>i172.16.24.0/24   172.16.45.4              0    100      0 i
*                   172.16.13.1                           0 100 200 i
* i172.16.35.0/24   172.16.35.5              0    100      0 i
*>                  0.0.0.0                  0         32768 i
*>i172.16.45.0/24   172.16.35.5              0    100      0 i
R3#
```

** why we having this i at last

** R3 (it's not having 2 routes for EBGP == bcz when updates from R5, R1 will examine AS no if its directly connected with EBGP then it will discard the up date to prevent loops)

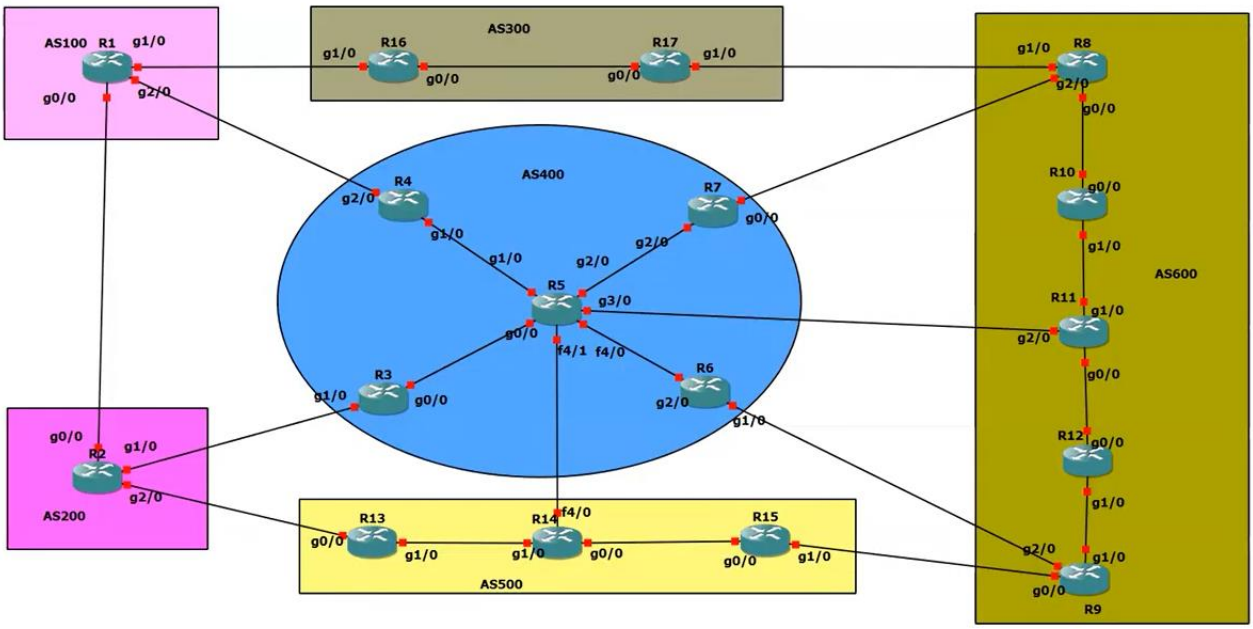
** that's way R3 has only one hop for 10.1.1.1 loop (same rule apply on R4)

CMD=>

sh ip bgp nei

sh ip rou bgp

sh Ip bgp



** apply logic