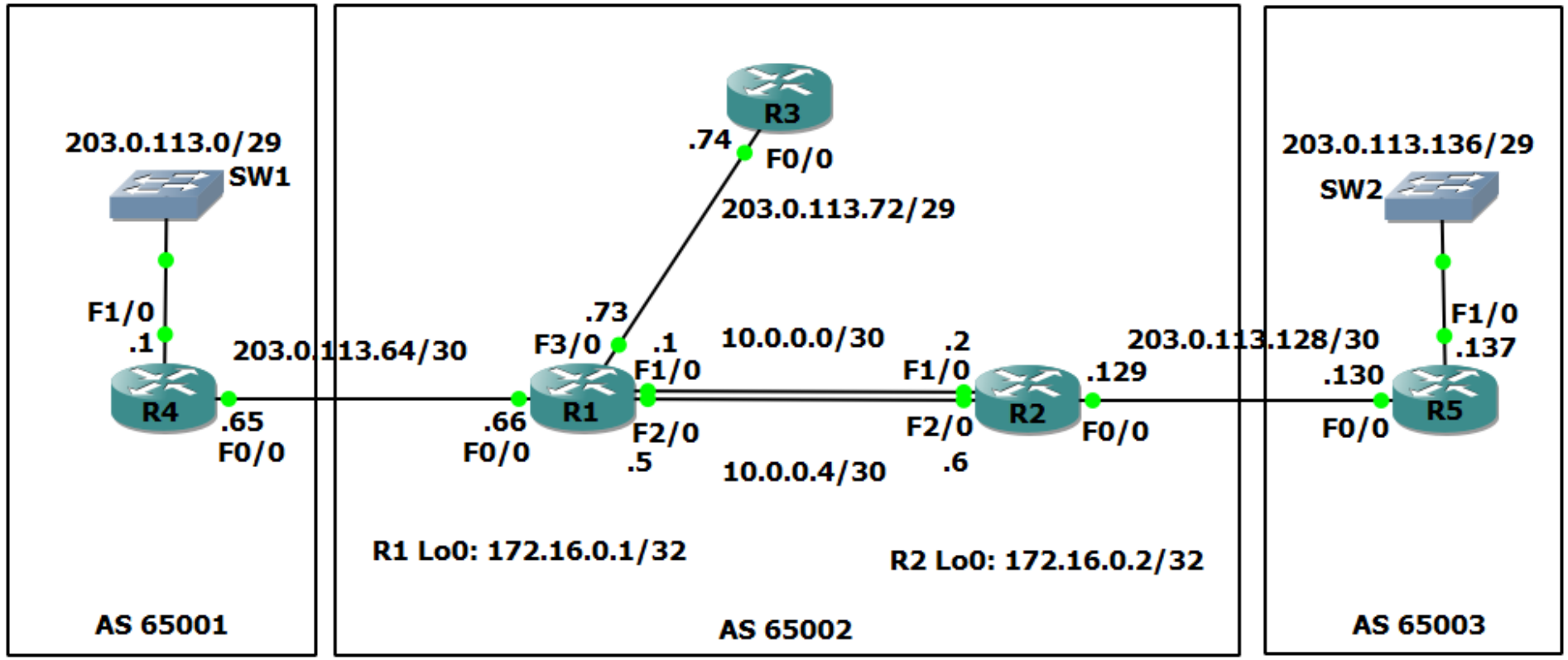
Lab

- We will configure AS 65002
- OSPF is already configured as the IGP, R3 is not running BGP
- iBGP between R1 and R2, eBGP from R1 – R4, and R2 – R5



iBGP and eBGP

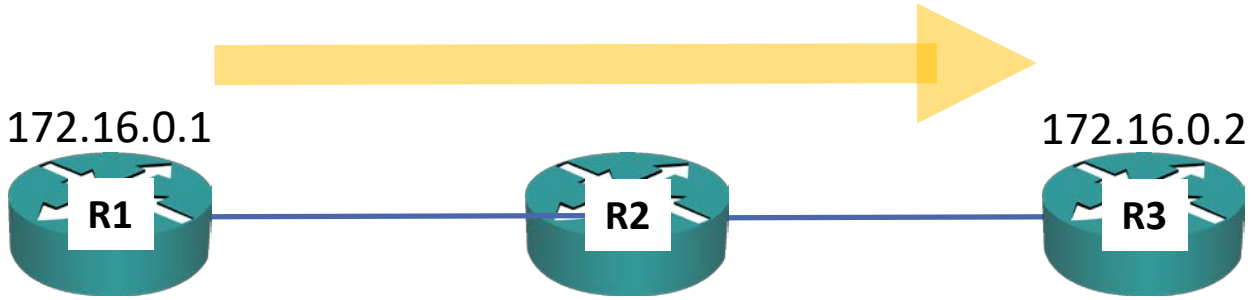
- iBGP Internal BGP sessions are used for peering with other BGP routers in the same AS
- eBGP External BGP sessions are used for peering with other BGP routers in a different AS
- There are some different rules for how iBGP and eBGP behave but they are both part of the same BGP routing process and routes are shared between both iBGP and eBGP neighbours

The Neighbor Command

- Peering between routers works differently for BGP than IGPs
- BGP routers within an AS are often not directly physically connected
- Link-local multicast Hello messages cannot be used to form adjacencies
- You have to manually specify BGP neighbours
- Targeted TCP sessions using port 179 are used to establish peering and exchange routes

How BGP Works

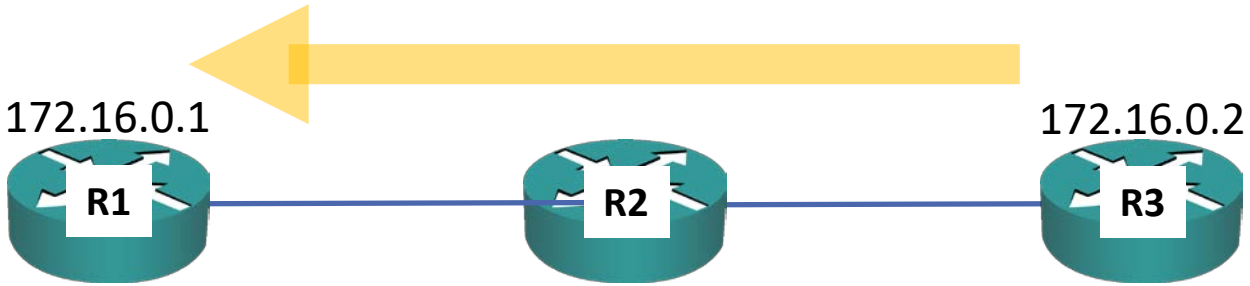
- Administrator configures BGP and specifies the neighbour IP address
- There must be a route to the neighbour IP address in the routing table
- The neighbour relationship is set up using a unicast TCP session on port 179



R1: “I’m 172.16.0.1, I want to form a BGP peer relationship with you 172.16.0.2”

How BGP Works

- R3 replies within the TCP session and agrees to set up the BGP peer relationship if it has a matching neighbour statement for R1
- The routers exchange routes advertised in BGP, as configured by the administrator



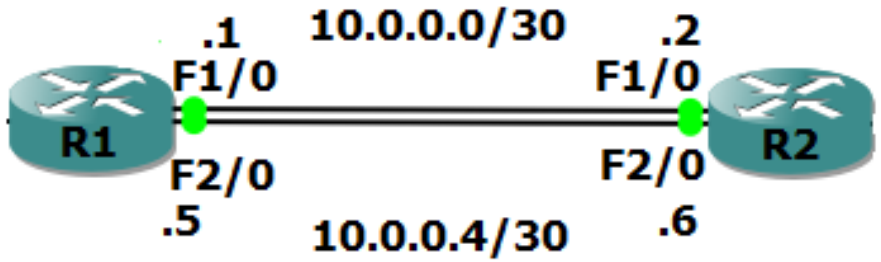
iBGP Neighbors

- iBGP neighbours can be multiple physical hops apart and/or have multiple redundant paths to reach each other
- If the IP address of a physical interface is used for the BGP session, if that physical interface goes down so will the BGP session even though there is an alternate path to the router
- Loopback addresses (which are advertised in the IGP) are typically used as the address in the neighbour statement
- This way BGP peers can continue to reach each other if a physical interface goes down

iBGP Neighbors


```
R1(config)#router bgp 65002
R1(config-router)#neighbor 172.16.0.2 remote-as 65002

R2(config)#router bgp 65002
R2(config-router)#neighbor 172.16.0.1 remote-as 65002
```



R1 Lo0: 172.16.0.1/32

R2 Lo0: 172.16.0.2/32

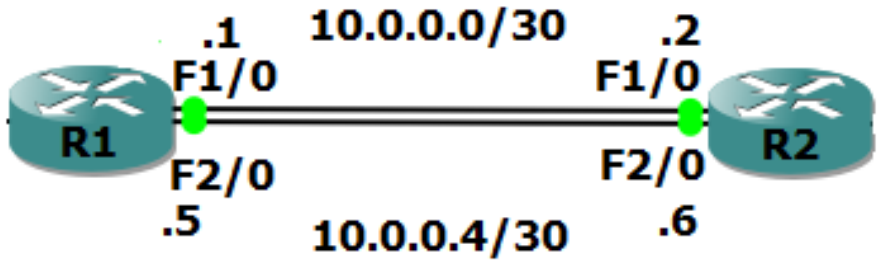
BGP between Loopback Addresses

- BGP has a security mechanism where it will only peer with another router if it has a matching neighbour statement for that peer
- The source address of packets received from the neighbour must match the exact IP address in the neighbour statement
- When a router sends packets from itself it uses the IP address of the exit interface as the source address by default
- This will cause BGP peering to fail between loopback addresses

iBGP Neighbors


```
R1(config)#router bgp 65002
R1(config-router)#neighbor 172.16.0.2 remote-as 65002

R2(config)#router bgp 65002
R2(config-router)#neighbor 172.16.0.1 remote-as 65002
```



R1 Lo0: 172.16.0.1/32

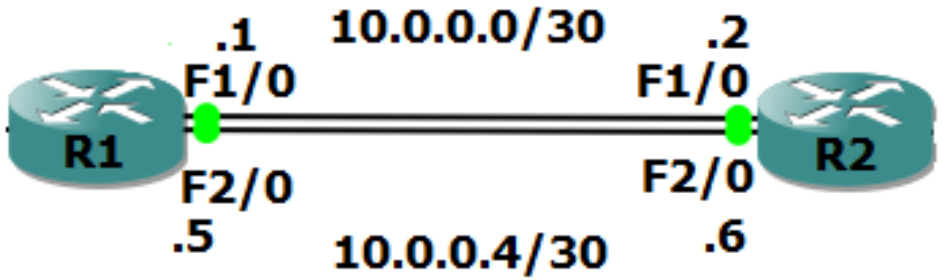
R2 Lo0: 172.16.0.2/32

BGP between Loopback Addresses

FLACKBOX
www.flackbox.com

```
R2#show ip bgp summary
BGP router identifier 172.16.0.2, local AS number 65002
BGP table version is 1, main routing table version 1

Neighbor        V           AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down
State/PfxRcd
172.16.0.1      4        65002       0       0        1    0    0 never    Idle
```



R1 Lo0: 172.16.0.1/32

R2 Lo0: 172.16.0.2/32

BGP between Loopback Addresses

FLACKBOX
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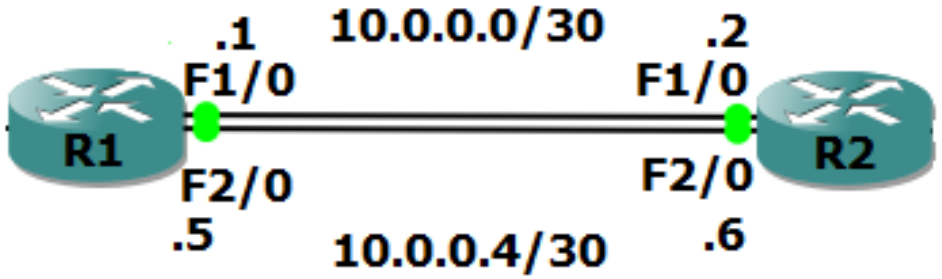
```
R1(config)#router bgp 65002
R1(config-router)#neighbor 172.16.0.2 remote-as 65002
R1(config-router)#neighbor 172.16.0.2 update-source loopback 0

R2(config)#router bgp 65002
R2(config-router)#neighbor 172.16.0.1 remote-as 65002
R2(config-router)#neighbor 172.16.0.1 update-source loopback 0
```



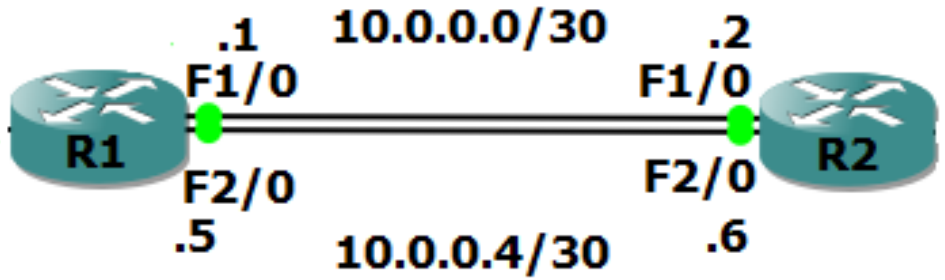
R1 Lo0: 172.16.0.1/32

R2 Lo0: 172.16.0.2/32

Verification – show ip bgp summary

```
R2#show ip bgp summary
BGP router identifier 172.16.0.2, local AS number 65002
BGP table version is 1, main routing table version 1

Neighbor        V           AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down
State/PfxRcd
172.16.0.1      4        65002       5       5        1    0    0 00:00:59
0
```



R1 Lo0: 172.16.0.1/32

R2 Lo0: 172.16.0.2/32

Verification – show ip bgp neighbors

```
R2#show ip bgp neighbors
BGP neighbor is 172.16.0.1,  remote AS 65002, internal link
  BGP version 4, remote router ID 172.16.0.1
  BGP state = Established, up for 00:03:05
  Last read 00:00:23, last write 00:00:25, 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: advertised and received
    Enhanced Refresh Capability: advertised and received
    Multisession Capability:
    Stateful switchover support enabled: NO for session 1
  Message statistics:
    InQ depth is 0
    OutQ depth is 0

                         Sent       Rcvd
    Opens:                  1          1
    Notifications:          0          0
    Updates:                1          1
    Keepalives:             5          5
    Route Refresh:          0          0
    Total:                  7          7
```

Configure eBGP Neighbours


```
R1(config)#router bgp 65002
R1(config-router)#neighbor 203.0.113.65 remote-as 65001

R2(config)#router bgp 65002
R2(config-router)#neighbor 203.0.113.130 remote-as 65003
```