

BGP Message Types:

BGP basically uses four message types in its operations:

1. Open:

- Open message is sent after Border Gateway Protocol neighbor is configured.
- Exchanges Dynamic Border Gateway Protocol (BGP) values and capabilities.
- Open message is sent to establish or form peering with that BGP neighbor.
- Contains information such as Version, AS Number, Router ID and the Hold-Time.

2. Update:

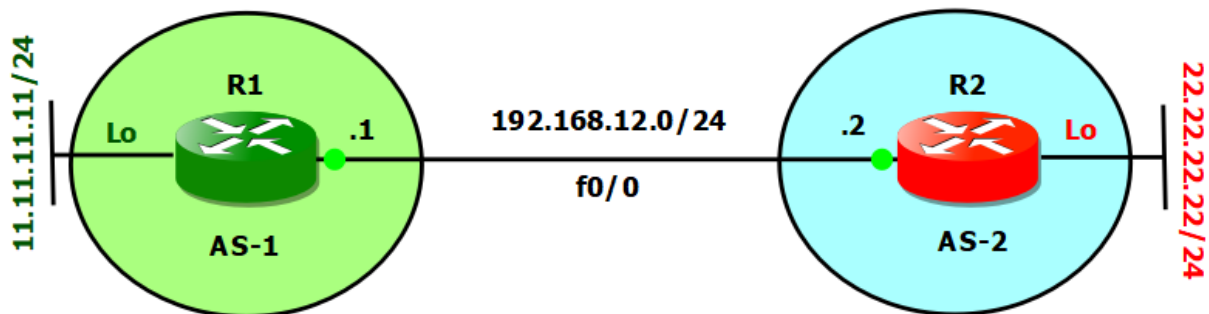
- Routing information between peers is transferred using the Update message.
- Update message include, new routes, withdrawn routes and the path attributes.

3. Keepalive:

- Keepalive message is similar to Hellos message in other routing protocols.
- BGP uses keepalives message which help in keeping peering session active.
- Keepalive messages are sent periodically to maintain neighbor relationship.
- The BGP peers exchange Keepalive messages are after every 60 seconds.
- The Border Gateway Protocol Peers Hold Timer is 180 seconds by default.

4. Notification:

- In event of a problem which causes the router to end the BGP peering session.
- The BGP neighbor send a notification message and the connection is closed.
- Border Gateway Protocol use notification to resets the neighbor relationship.
- Such ad Bad peer AS Number, bad BGP Identifier, unacceptable hold time etc.



R1 Basic Configuration

```
R1(config)#interface f0/0
R1(config-if)#ip add 192.168.12.1 255.255.255.0
R1(config-if)#no shut
R1(config-if)#exit
R1(config)#interface loopback 1
R1(config-if)#ip add 11.11.11.11 255.255.255.0
```

R2 Basic Configuration

```
R2(config)#interface f0/0
R2(config-if)#ip add 192.168.12.2 255.255.255.0
R2(config-if)#no shut
R2(config-if)#exit
R2(config)#interface loopback 2
R2(config-if)#ip add 22.22.22.22 255.255.255.0
```

R1 Configuration

```
R1(config)#router bgp 1
R1(config-router)#neighbor 192.168.12.2 remote-as 2
R1(config-router)#network 11.11.11.0 mask 255.255.255.0
```

R2 Configuration

```
R2(config)#router bgp 2
R2(config-router)#neighbor 192.168.12.1 remote-as 1
R2(config-router)#network 22.22.22.0 mask 255.255.255.0
```

Wireshark capture of an open message between R1 and R2.

```
> Internet Protocol Version 4, Src: 192.168.12.2, Dst: 192.168.12.1
> Transmission Control Protocol, Src Port: 20420, Dst Port: 179, Seq: 1, Ack: 1, Len: 58
  ✓ Border Gateway Protocol - OPEN Message
    Marker: ffffffffffffffffffffffffffffffffff
    Length: 58
    Type: OPEN Message (1)
      Version: 4
      My AS: 2
      Hold Time: 180
      BGP Identifier: 22.22.22.22
      Optional Parameters Length: 29
    > Optional Parameters
```

Wireshark capture of Update message between R1 and R2.

- ▼ **Border Gateway Protocol - UPDATE Message**
 - Marker: ffffffffffffffffffffffffffffffffff
 - Length: 54
 - Type: UPDATE Message (2)
 - Withdrawn Routes Length: 0
 - Total Path Attribute Length: 27
 - ▼ Path attributes
 - > Path Attribute - ORIGIN: IGP
 - > Path Attribute - AS PATH: 1
 - > Path Attribute - NEXT_HOP: 192.168.12.1
 - > Path Attribute - MULTI_EXIT DISC: 0
 - ▼ Network Layer Reachability Information (NLRI)
 - ▼ 11.11.11.0/24
 - NLRI prefix length: 24
 - NLRI prefix: 11.11.11.0
- ▼ Border Gateway Protocol - UPDATE Message

Wireshark capture of Keepalive message between R1 and R2.

- ▼ **Border Gateway Protocol - KEEPALIVE Message**
 - Marker: ffffffffffffffffffffffffffffffffff
 - Length: 19
 - Type: KEEPALIVE Message (4)

Change BGP AS Number

```
R2(config-router)#no router bgp 2
R2(config)#router bgp 22
R2(config-router)#neighbor 192.168.12.1 remote-as 1
```

- ▼ **Border Gateway Protocol - NOTIFICATION Message**
 - Marker: ffffffffffffffffffffffffffffffffff
 - Length: 23
 - Type: NOTIFICATION Message (3)
 - Major error Code: OPEN Message Error (2)
 - Minor error Code (Open Message): Bad Peer AS (2)
 - Bad Peer AS: 22