BASIC BGP - Next Hop Reachability

BGP monitors the next hop of installed routes to verify next-hop reachability and to select, install, and validate the BGP best path. By default, the BGP scanner is used to poll the RIB for this information every 60 seconds. During the 60 second time period between scan cycles, Interior Gateway Protocol (IGP) instability or other network failures can cause black holes and routing loops to temporarily form.

Configuration

The BGP next-hop attribute is the next IP address used to reach a destination. Normally, BGP chooses the next hop automatically. In networks where BGP neighbors may not have direct access to all other neighbors on the same subnet, BGP's automatic next hop selection can result in broken routing.

The BGP next hop attribute is the next hop IP address to use in order to reach a certain destination. For eBGP, the next hop is always the IP address of the neighbor that the neighbor command specifies. Since the next hop for prefixes learned from eBGP neighbors is the neighbor IP that subnet needs to be advertised throughout your network or the next hop needs to rewritten.

Next Hop Reachability

```
NetStepByStep-R6(config-router)# neighbor X.X.X.X next-hop-self
```

- Use to disable automatic next-hop selection.
- Updates meant for the specified system or peer group are forced to advertise this router as the next hop.
- The X.X.X.X stands for the ip-address parameter to configure a neighbor to specify this router as the next hop.

Verification

`show ip bgp`

- Use to display entries in the Border Gateway Protocol (BGP) routing table.
- Use this command in EXEC mode.
- The output can be filtered to display entries for a specific prefix, prefix length, and prefixes injected through a prefix list, route map, or conditional advertisement.
- BGP prefixes that are monitored and controlled by Optimized Edge Routing (OER) are displayed by entering the show ip bgp command with the oer-paths keyword.

```
NetStepByStep-R4# sh ip bgp
BGP table version is 20, local router ID is 4.4.4.4
Status codes: s suppressed, d damped, h history, * valid, > best, i -
internal,
              r RIB-failure, S Stale
Origin codes: i - IGP, e - EGP, ? - incomplete

   Network          Next Hop            Metric LocPrf Weight Path
*> 7.7.7.0/24       47.47.47.7              0               0 3 ?
* i                 6.6.6.6                 0    100        0 3 ?
*  11.11.11.0/25    47.47.47.7                               0 3 2 i
*>i                 12.12.12.1              0    100        0 2 i
*  11.11.11.128/25  47.47.47.7                               0 3 2 i
*>i                 12.12.12.1              0    100        0 2 i
*> 17.17.17.0/24    47.47.47.7              0               0 3 ?
* i                 6.6.6.6                 0    100        0 3 ?
*>i22.22.22.0/24    2.2.2.2                 0    100        0 i
*>i33.33.33.0/24    3.3.3.3                 0    100        0 i
*> 44.44.44.0/24    0.0.0.0                 0           32768 i
r> 47.47.47.0/24    47.47.47.7             0               0 3 ?
r i                 6.6.6.6                 0    100        0 3 ?
*>i55.55.55.0/24    5.5.5.5                 0    100        0 i
*>i66.66.66.0/24    6.6.6.6                 0    100        0 i
*> 67.67.67.0/24    47.47.47.7             0               0 3 ?
* i                 6.6.6.6                 0    100        0 3 ?
   Network          Next Hop            Metric LocPrf Weight Path
*> 77.77.77.0/24    47.47.47.7             0               0 3 ?
* i                 6.6.6.6                 0    100        0 3 ?
```

Troubleshoot

```
debug ip bgp X.X.X.X updates
```

- Use to display information related to updates of the Border Gateway Protocol (BGP).
- Use this command in privileged EXEC mode.
- To disable debugging output, use the no form of this command.
- X.X.X.X stands for BGP neighbor IP address.

Video Cheat Sheet

R2

```
router ospf 2
network 12.12.12.2 0.0.0.0 area 0
passive-interface e0/3
```

R6

```
router bgp 1
neighbor 4.4.4.4 next-hop-self
```