GNS3 OSPF, EIGRP, and eBGP Redistribution

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Purpose

The purpose of this lab was to configure OSPFv2 on two networks, IPv6 eBGP on two networks, and EIGRP on two networks and then redistribute between the routing protocols. Additionally, I learned how to setup eBGP and redistribute the routing information between OSPF, BGP, and EIGRP. Additionally I learned how to setup neighbors and networks correctly for IPv6 eBGP.

Background Information

BGP (Border Gateway Protocol) is an IETF (Internet Engineering Task Force) standardized gateway protocol made to exchange routing and reachability information between autonomous systems (AS) on the internet. This protocol can be used to connect any internet work of autonomous systems. In this lab, the goal was to configure IPv6 eBGP. The IPv6 BGP can be configured between two IPv6 devices using link-local addresses. eBGP uses third-party next hoops for peering with multiple peers over IPv6 link-local addresses on the same interfaces. The main advantage of BGP includes having multiple paths in the network. All BGP routers on the internet are constantly updating each other and the BGP router is constantly calculating the best path. Overall, IPv4 and IPv6 BGP gives more control over what routes you advertise and accept from your neighbors and is very effective with traffic control.

Lab Summary

For this lab, I setup a topology with 7 routers interconnected on their ethernet interfaces. I setup OSPF on R1, R2, G0/0/1 on R3, eBGP on G0/0/0 on R3, R4, and G0/0/0 on R5 and lastly, I setup EIGRP on G0/0/01 on R5, R6, and R7. In this lab, I setup redistribution of the routing protocols on R3 and R5.

Lab Commands

* Router OSPF: Indicates the beginning of the OSPF configuration on the router
* Router-id: Assigns the router an OSPF ID to advertise to neighbor networks
* Network area: Advertise the interfaces whose addresses fill in the specified network command
* Show ip ospf interface: Displays the OSPF configuration for the certain interface
* Show ip route: Displays the IPv4 configurations and routes between the interfaces and routers
* Interface: Allows you to configure a particular interface
* Clock rate: Synchronizing routers to connect to the same rate
* Area # stub: Changes that area to be a stubby area
* Area # stub no-summary: Changes the area to be a totally stubby area
* Area # nssa: Changes the area to be an NSSA area
* Address-family ipv6: Places the router in address family configuration mode from which you can configure routing sessions that use standard IPv6 address prefixes
* Redistribute OSPF: Redistributes OPSF to be used with other routing protocols
* Redistribute EIGRP: Redistributes EIGRP to be used with other routing protocols
* Redistribute BGP: Redistributes BGP to be used with other routing protocols
* Router BGP: Allows you to go into the BGP configuration on the router
* Router EIGRP: Allows you to go into the EIGRP configuration on the router

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| R1 | Fa0/0 | 10.0.0.1/24 | 2001::1/64 | Area 0 |
| R2 | Fa0/0 | 10.0.0.2/24 | 2002::1/64 | Area 0 |
|  | Fa1/0 | 10.1.0.1/24 | 2007::1/64 | Area 0 |
| R3 | Fa0/0 | 10.2.0.1/24 | 2003::1/64 | BGP AS 3 |
|  | Fa1/0 | 10.1.0.2/24 | 2007::2/64 | Area 0 |
| R4 | Fa0/0 | 10.2.0.2/24 | 2004::1/64 | BGP AS 4 |
|  | Fa1/0 | 10.3.0.1/24 | 2008::5/64 | BGP AS 4 |
| R5 | Fa0/0 | 10.4.0.1/24 | 2005::1/64 | Autonomous System 5 |
|  | Fa1/0 | 10.3.0.2/24 | 2008::6/64 | BGP AS 5 |
| R6 | Fa0/0 | 10.4.0.2/24 | 2006::1/64 | Autonomous System 5 |
|  | Fa1/0 | 10.5.0.1/24 | 2009::7/64 | Autonomous System 5 |
| R7 | Fa1/0 | 10.5.0.2/24 | 2009::9/64 | Autonomous System 5 |

Network Diagram with IP’s Diagram

Description automatically generated

Configurations

Router 1

Show run

interface FastEthernet0/0

ip address 10.0.0.1 255.255.255.0

duplex auto

speed auto

ipv6 address 2001::1/64

interface FastEthernet0/1

no ip address

shutdown

duplex auto

speed auto

interface FastEthernet1/0

no ip address

shutdown

duplex auto

speed auto

interface FastEthernet2/0

no ip address

shutdown

duplex auto

speed auto

interface FastEthernet3/0

no ip address

shutdown

duplex auto

speed auto

interface FastEthernet4/0

interface FastEthernet4/1

interface FastEthernet4/2

interface FastEthernet4/3

interface FastEthernet4/4

interface FastEthernet4/5

interface FastEthernet4/6

interface FastEthernet4/7

interface FastEthernet4/8

interface FastEthernet4/9

interface FastEthernet4/10

interface FastEthernet4/11

interface FastEthernet4/12

interface FastEthernet4/13

interface FastEthernet4/14

interface FastEthernet4/15

interface Vlan1

no ip address

router ospf 10

router-id 10.0.0.0

log-adjacency-changes

network 10.0.0.0 0.255.255.255 area 0

Show ip ospf interface

FastEthernet0/0 is up, line protocol is up

Internet Address 10.0.0.1/24, Area 0

Process ID 10, Router ID 10.0.0.0, Network Type BROADCAST, Cost: 1

Transmit Delay is 1 sec, State DR, Priority 1

Designated Router (ID) 10.0.0.0, Interface address 10.0.0.1

Backup Designated router (ID) 10.1.0.0, Interface address 10.0.0.2

Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5

oob-resync timeout 40

Hello due in 00:00:09

Supports Link-local Signaling (LLS)

Index 1/1, flood queue length 0

Next 0x0(0)/0x0(0)

Last flood scan length is 1, maximum is 1

Last flood scan time is 0 msec, maximum is 4 msec

Neighbor Count is 1, Adjacent neighbor count is 1

Adjacent with neighbor 10.1.0.0 (Backup Designated Router)

Suppress hello for 0 neighbor(s)

Show ip ospf neighbor

Neighbor ID Pri State Dead Time Address Interface

10.1.0.0 1 FULL/BDR 00:00:34 10.0.0.2 FastEthernet0/0

Show ip protocols

Routing Protocol is "ospf 10"

Outgoing update filter list for all interfaces is not set

Incoming update filter list for all interfaces is not set

Router ID 10.0.0.0

Number of areas in this router is 1. 1 normal 0 stub 0 nssa

Maximum path: 4

Routing for Networks:

10.0.0.0 0.255.255.255 area 0

Reference bandwidth unit is 100 mbps

Routing Information Sources:

Gateway Distance Last Update

10.2.0.0 110 03:46:23

10.1.0.0 110 03:46:23

Distance: (default is 110)

Show ip route

Codes: 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

Gateway of last resort is not set

10.0.0.0/24 is subnetted, 3 subnets

O 10.2.0.0 [110/3] via 10.0.0.2, 03:46:52, FastEthernet0/0

C 10.0.0.0 is directly connected, FastEthernet0/0

O 10.1.0.0 [110/2] via 10.0.0.2, 03:46:52, FastEthernet0/0

Router 2

Show run

interface FastEthernet0/0

ip address 10.0.0.2 255.255.255.0

duplex auto

speed auto

ipv6 address 2002::1/64

interface FastEthernet0/1

no ip address

shutdown

duplex auto

speed auto

interface FastEthernet1/0

ip address 10.1.0.1 255.255.255.0

duplex auto

speed auto

ipv6 address 2007::1/64

interface FastEthernet2/0

no ip address

shutdown

duplex auto

speed auto

interface FastEthernet3/0

no ip address

shutdown

duplex auto

speed auto

interface FastEthernet4/0

interface FastEthernet4/1

interface FastEthernet4/2

interface FastEthernet4/3

interface FastEthernet4/4

interface FastEthernet4/5

interface FastEthernet4/6

interface FastEthernet4/7

interface FastEthernet4/8

interface FastEthernet4/9

interface FastEthernet4/10

interface FastEthernet4/11

interface FastEthernet4/12

interface FastEthernet4/13

interface FastEthernet4/14

interface FastEthernet4/15

interface Vlan1

no ip address

router ospf 10

router-id 10.1.0.0

log-adjacency-changes

network 10.0.0.0 0.255.255.255 area 0

Show ip ospf interface

FastEthernet1/0 is up, line protocol is up

Internet Address 10.1.0.1/24, Area 0

Process ID 10, Router ID 10.1.0.0, Network Type BROADCAST, Cost: 1

Transmit Delay is 1 sec, State DR, Priority 1

Designated Router (ID) 10.1.0.0, Interface address 10.1.0.1

Backup Designated router (ID) 10.2.0.0, Interface address 10.1.0.2

Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5

oob-resync timeout 40

Hello due in 00:00:03

Supports Link-local Signaling (LLS)

Index 2/2, flood queue length 0

Next 0x0(0)/0x0(0)

Last flood scan length is 1, maximum is 1

Last flood scan time is 0 msec, maximum is 4 msec

Neighbor Count is 1, Adjacent neighbor count is 1

Adjacent with neighbor 10.2.0.0 (Backup Designated Router)

Suppress hello for 0 neighbor(s)

FastEthernet0/0 is up, line protocol is up

Internet Address 10.0.0.2/24, Area 0

Process ID 10, Router ID 10.1.0.0, Network Type BROADCAST, Cost: 1

Transmit Delay is 1 sec, State BDR, Priority 1

Designated Router (ID) 10.0.0.0, Interface address 10.0.0.1

Backup Designated router (ID) 10.1.0.0, Interface address 10.0.0.2

Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5

oob-resync timeout 40

Hello due in 00:00:09

Supports Link-local Signaling (LLS)

Index 1/1, flood queue length 0

Next 0x0(0)/0x0(0)

Last flood scan length is 1, maximum is 1

Last flood scan time is 0 msec, maximum is 0 msec

Neighbor Count is 1, Adjacent neighbor count is 1

Adjacent with neighbor 10.0.0.0 (Designated Router)

Suppress hello for 0 neighbor(s)

Show ip ospf neighbor

Neighbor ID Pri State Dead Time Address Interface

10.0.0.0 1 FULL/BDR 00:00:38 10.0.0.1 GigabitEthernet0/0/0

10.2.0.0 1 FULL/DR 00:00:38 10.1.0.2 GigabitEthernet0/0/1

Show ip protocols

Routing Protocol is "ospf 10"

Outgoing update filter list for all interfaces is not set

Incoming update filter list for all interfaces is not set

Router ID 10.1.0.0

Number of areas in this router is 1. 1 normal 0 stub 0 nssa

Maximum path: 4

Routing for Networks:

10.0.0.0 0.255.255.255 area 0

Reference bandwidth unit is 100 mbps

Routing Information Sources:

Gateway Distance Last Update

10.2.0.0 110 03:52:58

Distance: (default is 110)

Show ip route

Codes: 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

Gateway of last resort is not set

10.0.0.0/24 is subnetted, 3 subnets

O 10.2.0.0 [110/2] via 10.1.0.2, 03:53:22, FastEthernet1/0

C 10.0.0.0 is directly connected, FastEthernet0/0

C 10.1.0.0 is directly connected, FastEthernet1/0

Router 3

Show run

interface FastEthernet0/0

ip address 10.2.0.1 255.255.255.0

duplex auto

speed auto

ipv6 address 2003::1/64

interface FastEthernet0/1

no ip address

shutdown

duplex auto

speed auto

interface FastEthernet1/0

ip address 10.1.0.2 255.255.255.0

duplex auto

speed auto

ipv6 address 2007::2/64

interface FastEthernet2/0

no ip address

shutdown

duplex auto

speed auto

interface FastEthernet3/0

no ip address

shutdown

duplex auto

speed auto

interface FastEthernet4/0

interface FastEthernet4/1

interface FastEthernet4/2

interface FastEthernet4/3

interface FastEthernet4/4

interface FastEthernet4/5

interface FastEthernet4/6

interface FastEthernet4/7

interface FastEthernet4/8

interface FastEthernet4/9

interface FastEthernet4/10

interface FastEthernet4/11

interface FastEthernet4/12

interface FastEthernet4/13

interface FastEthernet4/14

interface FastEthernet4/15

interface Vlan1

no ip address

router ospf 10

router-id 10.2.0.0

log-adjacency-changes

network 10.0.0.0 0.255.255.255 area 0

router bgp 3

no bgp default ipv4-unicast

bgp log-neighbor-changes

neighbor 10.2.0.2 remote-as 4

neighbor 2004::1 remote-as 4

address-family ipv4

redistribute ospf 10

neighbor 10.2.0.2 activate

no auto-summary

no synchronization

network 10.0.0.0

exit-address-family

address-family ipv6

neighbor 2004::1 activate

redistribute connected

redistribute static

redistribute ospf 10

no synchronization

exit-address-family

Show ip ospf interface

FastEthernet1/0 is up, line protocol is up

Internet Address 10.1.0.2/24, Area 0

Process ID 10, Router ID 10.2.0.0, Network Type BROADCAST, Cost: 1

Transmit Delay is 1 sec, State BDR, Priority 1

Designated Router (ID) 10.1.0.0, Interface address 10.1.0.1

Backup Designated router (ID) 10.2.0.0, Interface address 10.1.0.2

Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5

oob-resync timeout 40

Hello due in 00:00:03

Supports Link-local Signaling (LLS)

Index 2/2, flood queue length 0

Next 0x0(0)/0x0(0)

Last flood scan length is 1, maximum is 1

Last flood scan time is 0 msec, maximum is 0 msec

Neighbor Count is 1, Adjacent neighbor count is 1

Adjacent with neighbor 10.1.0.0 (Designated Router)

Suppress hello for 0 neighbor(s)

FastEthernet0/0 is up, line protocol is up

Internet Address 10.2.0.1/24, Area 0

Process ID 10, Router ID 10.2.0.0, Network Type BROADCAST, Cost: 1

Transmit Delay is 1 sec, State DR, Priority 1

Designated Router (ID) 10.2.0.0, Interface address 10.2.0.1

No backup designated router on this network

Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5

oob-resync timeout 40

Hello due in 00:00:00

Supports Link-local Signaling (LLS)

Index 1/1, flood queue length 0

Next 0x0(0)/0x0(0)

Last flood scan length is 0, maximum is 0

Last flood scan time is 0 msec, maximum is 0 msec

Neighbor Count is 0, Adjacent neighbor count is 0

Suppress hello for 0 neighbor(s)

Show ip ospf neighbor

Neighbor ID Pri State Dead Time Address Interface

10.1.0.0 1 FULL/DR 00:00:39 10.1.0.1 FastEthernet1/0

Show ip protocols

Routing Protocol is "bgp 3"

Outgoing update filter list for all interfaces is not set

Incoming update filter list for all interfaces is not set

IGP synchronization is disabled

Automatic route summarization is disabled

Neighbor(s):

Address FiltIn FiltOut DistIn DistOut Weight RouteMap

10.2.0.2

Maximum path: 1

Routing Information Sources:

Gateway Distance Last Update

10.2.0.2 20 00:00:00

Distance: external 20 internal 200 local 200

Routing Protocol is "ospf 10"

Outgoing update filter list for all interfaces is not set

Incoming update filter list for all interfaces is not set

Router ID 10.2.0.0

It is an autonomous system boundary router

Redistributing External Routes from,

bgp 3

Number of areas in this router is 1. 1 normal 0 stub 0 nssa

Maximum path: 4

Routing for Networks:

10.0.0.0 0.255.255.255 area 0

Routing Information Sources:

Gateway Distance Last Update

10.0.0.0 110 00:07:03

10.1.0.0 110 00:07:03

10.2.0.0 110 00:07:03

Distance: (default is 110)

Show ip route

Codes: 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

Gateway of last resort is not set

10.0.0.0/24 is subnetted, 6 subnets

C 10.2.0.0 is directly connected, FastEthernet0/0

B 10.3.0.0 [20/0] via 10.2.0.2, 00:53:38

O 10.0.0.0 [110/2] via 10.1.0.1, 04:13:13, FastEthernet1/0

C 10.1.0.0 is directly connected, FastEthernet1/0

B 10.4.0.0 [20/0] via 10.2.0.2, 00:53:38

B 10.5.0.0 [20/0] via 10.2.0.2, 00:53:38

Router 4

Show run

interface FastEthernet0/0

ip address 10.2.0.2 255.255.255.0

duplex auto

speed auto

ipv6 address 2004::1/64

interface FastEthernet0/1

no ip address

shutdown

duplex auto

speed auto

interface FastEthernet1/0

ip address 10.3.0.1 255.255.255.0

duplex auto

speed auto

ipv6 address 2008::5/24

interface FastEthernet2/0

no ip address

shutdown

duplex auto

speed auto

interface FastEthernet3/0

no ip address

shutdown

duplex auto

speed auto

interface FastEthernet4/0

interface FastEthernet4/1

interface FastEthernet4/2

interface FastEthernet4/3

interface FastEthernet4/4

interface FastEthernet4/5

interface FastEthernet4/6

interface FastEthernet4/7

interface FastEthernet4/8

interface FastEthernet4/9

interface FastEthernet4/10

interface FastEthernet4/11

interface FastEthernet4/12

interface FastEthernet4/13

interface FastEthernet4/14

interface FastEthernet4/15

interface Vlan1

no ip address

router bgp 4

no synchronization

bgp log-neighbor-changes

network 10.0.0.0

neighbor 10.2.0.1 remote-as 3

neighbor 10.3.0.2 remote-as 5

neighbor 2003::1 remote-as 3

neighbor 2008::6 remote-as 5

no auto-summary

address-family ipv6

neighbor 2003::1 activate

neighbor 2008::6 activate

redistribute connected

redistribute static

redistribute ospf 10

no synchronization

exit-address-family

Show ip protocols

Routing Protocol is "bgp 4"

Outgoing update filter list for all interfaces is not set

Incoming update filter list for all interfaces is not set

IGP synchronization is disabled

Automatic route summarization is disabled

Neighbor(s):

Address

10.2.0.1

10.3.0.2

Maximum path: 1

Routing Information Sources:

Gateway Distance Last Update

10.2.0.1 20 00:00:00

10.3.0.2 20 00:00:00

Distance: external 20 internal 200 local 200

Show ip route

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, E - EGP

i - IS-IS, 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

Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 8 subnets, 2 masks

B 10.0.0.0/24 [20/2] via 10.2.0.1, 00:00:00

B 10.1.0.0/24 [20/20] via 10.2.0.1, 00:00:00

C 10.2.0.0/24 is directly connected, GigabitEthernet0/0/0

L 10.2.0.2/32 is directly connected, GigabitEthernet0/0/0

C 10.3.0.0/24 is directly connected, GigabitEthernet0/0/1

L 10.3.0.1/32 is directly connected, GigabitEthernet0/0/1

B 10.4.0.0/24 [20/2816] via 10.3.0.2, 00:00:00

B 10.5.0.0/24 [20/3072] via 10.3.0.2, 00:00:00

Router 5

Show run

interface GigabitEthernet0/0/0

ip address 10.4.0.1 255.255.255.0

duplex auto

speed auto

interface GigabitEthernet0/0/1

ip address 10.3.0.2 255.255.255.0

duplex auto

speed auto

interface GigabitEthernet0/0/2

no ip address

duplex auto

speed auto

shutdown

interface Vlan1

no ip address

shutdown

router eigrp 5

redistribute bgp 5 metric 10000 100 55 1 150

network 10.0.0.0

router bgp 5

bgp log-neighbor-changes

no synchronization

neighbor 10.3.0.1 remote-as 4

network 10.0.0.0

redistribute eigrp 5

Show ip protocols

Routing Protocol is "eigrp 5 "

Outgoing update filter list for all interfaces is not set

Incoming update filter list for all interfaces is not set

Default networks flagged in outgoing updates

Default networks accepted from incoming updates

EIGRP metric weight K1=1, K2=0, K3=1, K4=0, K5=0

EIGRP maximum hopcount 100

EIGRP maximum metric variance 1

Redistributing: eigrp 5, bpg 5

Automatic network summarization is not in effect

Maximum path: 4

Routing for Networks:

10.0.0.0

Routing Information Sources:

Gateway Distance Last Update

10.4.0.2 90 0

Distance: internal 90 external 170

Routing Protocol is "bgp 5"

Outgoing update filter list for all interfaces is not set

Incoming update filter list for all interfaces is not set

IGP synchronization is disabled

Automatic route summarization is disabled

Neighbor(s):

Address FiltIn FiltOut DistIn DistOut Weight RouteMap

10.3.0.1

Maximum path: 1

Routing Information Sources:

Gateway Distance Last Update

10.3.0.1 20 00:00:00

Distance: external 20 internal 200 local 200

Show ip route

Routing Protocol is "eigrp 5 "

Outgoing update filter list for all interfaces is not set

Incoming update filter list for all interfaces is not set

Default networks flagged in outgoing updates

Default networks accepted from incoming updates

EIGRP metric weight K1=1, K2=0, K3=1, K4=0, K5=0

EIGRP maximum hopcount 100

EIGRP maximum metric variance 1

Redistributing: eigrp 5, bpg 5

Automatic network summarization is not in effect

Maximum path: 4

Routing for Networks:

10.0.0.0

Routing Information Sources:

Gateway Distance Last Update

10.4.0.2 90 0

Distance: internal 90 external 170

Routing Protocol is "bgp 5"

Outgoing update filter list for all interfaces is not set

Incoming update filter list for all interfaces is not set

IGP synchronization is disabled

Automatic route summarization is disabled

Neighbor(s):

Address FiltIn FiltOut DistIn DistOut Weight RouteMap

10.3.0.1

Maximum path: 1

Routing Information Sources:

Gateway Distance Last Update

10.3.0.1 20 00:00:00

Distance: external 20 internal 200 local 200

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, E - EGP

i - IS-IS, 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

Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 8 subnets, 2 masks

B 10.0.0.0/24 [20/0] via 10.3.0.1, 00:00:00

B 10.1.0.0/24 [20/0] via 10.3.0.1, 00:00:00

B 10.2.0.0/24 [20/0] via 10.3.0.1, 00:00:00

C 10.3.0.0/24 is directly connected, GigabitEthernet0/0/1

L 10.3.0.2/32 is directly connected, GigabitEthernet0/0/1

C 10.4.0.0/24 is directly connected, GigabitEthernet0/0/0

L 10.4.0.1/32 is directly connected, GigabitEthernet0/0/0

D 10.5.0.0/24 [90/3072] via 10.4.0.2, 00:17:48, GigabitEthernet0/0/0

Show ip eigrp neighbor

IP-EIGRP neighbors for process 5

H Address Interface Hold Uptime SRTT RTO Q Seq

(sec) (ms) Cnt Num

0 10.4.0.2 Gig0/0/0 14 00:24:13 40 1000 0 4

Router 6

Show run

interface GigabitEthernet0/0/0

ip address 10.4.0.2 255.255.255.0

duplex auto

speed auto

interface GigabitEthernet0/0/1

ip address 10.5.0.1 255.255.255.0

duplex auto

speed auto

interface GigabitEthernet0/0/2

no ip address

duplex auto

speed auto

shutdown

interface Vlan1

no ip address

shutdown

router eigrp 5

network 10.0.0.0

Show ip protocols

Routing Protocol is "eigrp 5 "

Outgoing update filter list for all interfaces is not set

Incoming update filter list for all interfaces is not set

Default networks flagged in outgoing updates

Default networks accepted from incoming updates

EIGRP metric weight K1=1, K2=0, K3=1, K4=0, K5=0

EIGRP maximum hopcount 100

EIGRP maximum metric variance 1

Redistributing: eigrp 5

Automatic network summarization is not in effect

Maximum path: 4

Routing for Networks:

10.0.0.0

Routing Information Sources:

Gateway Distance Last Update

10.4.0.1 90 0

10.5.0.2 90 0

Distance: internal 90 external 170

Show ip route

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, E - EGP

i - IS-IS, 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

Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 5 subnets, 2 masks

D 10.3.0.0/24 [90/3072] via 10.4.0.1, 00:23:10, GigabitEthernet0/0/0

C 10.4.0.0/24 is directly connected, GigabitEthernet0/0/0

L 10.4.0.2/32 is directly connected, GigabitEthernet0/0/0

C 10.5.0.0/24 is directly connected, GigabitEthernet0/0/1

L 10.5.0.1/32 is directly connected, GigabitEthernet0/0/1

Show ip eigrp neighbor

IP-EIGRP neighbors for process 5

H Address Interface Hold Uptime SRTT RTO Q Seq

(sec) (ms) Cnt Num

0 10.4.0.1 Gig0/0/0 10 00:33:01 40 1000 0 3

1 10.5.0.2 Gig0/0/1 13 00:33:01 40 1000 0 5

Router 7

Show run

interface GigabitEthernet0/0/0

no ip address

duplex auto

speed auto

shutdown

interface GigabitEthernet0/0/1

ip address 10.5.0.2 255.255.255.0

duplex auto

speed auto

interface GigabitEthernet0/0/2

no ip address

duplex auto

speed auto

shutdown

interface Vlan1

no ip address

shutdown

router eigrp 5

network 10.0.0.0

Show ip protocols

Routing Protocol is "eigrp 5 "

Outgoing update filter list for all interfaces is not set

Incoming update filter list for all interfaces is not set

Default networks flagged in outgoing updates

Default networks accepted from incoming updates

EIGRP metric weight K1=1, K2=0, K3=1, K4=0, K5=0

EIGRP maximum hopcount 100

EIGRP maximum metric variance 1

Redistributing: eigrp 5

Automatic network summarization is not in effect

Maximum path: 4

Routing for Networks:

10.0.0.0

Routing Information Sources:

Gateway Distance Last Update

10.5.0.1 90 0

Distance: internal 90 external 170

Show ip route

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, E - EGP

i - IS-IS, 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

Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 4 subnets, 2 masks

D 10.3.0.0/24 [90/3328] via 10.5.0.1, 00:36:39, GigabitEthernet0/0/1

D 10.4.0.0/24 [90/3072] via 10.5.0.1, 00:36:39, GigabitEthernet0/0/1

C 10.5.0.0/24 is directly connected, GigabitEthernet0/0/1

L 10.5.0.2/32 is directly connected, GigabitEthernet0/0/1

Show ip eigrp neighbor

IP-EIGRP neighbors for process 5

H Address Interface Hold Uptime SRTT RTO Q Seq

(sec) (ms) Cnt Num

0 10.5.0.1 Gig0/0/1 14 00:37:26 40 1000 0 3

Problems

One problem I encountered that prevented me to start my lab was using GNS3 itself since on my device my firewall blocked certain routers to be added and configured on. I was not able to add specific routers to my topology or configure the networks. I solved that by retrying the lab again and doing it on a different device. Another issue I encountered included was configuring IPv6 eBGP. I had problems with my eBGP being configured since I was unsure where to configure IPv6 neighbors and router ids. At the start I configured most of the IPv6 configurations in router BGP mode and later I found out that I am supposed to configure it inside the IPv6 address-family configuration mode. Additionally, I double checked by researching and watching videos online to configure IPv6 addresses for eBGP. Overall, I learned how to properly configure IPv6 neighbors for eBGP and figured out what should be configured in the IPv6 address-family mode.

Conclusion

This lab helped me learn how to configure IPv6 eBGP and it was an important review of setting up EIGRP and BGP as well. I got to learn new commands that help me configure IPv6 eBGP on my network like address-family ipv6, and neighbor commands as well. Additionally, this helped me remember all the important EIGRP and OSPF Cisco Networking commands that has been used frequently in previous labs. Most importantly, I learned how to configure eBGP with OSPF and EIGRP networks. At the end of this lab, I was able to ping across all the networks and see different routes from the OSPF, eBGP, and EIGRP networks. I did have a couple issues with the eBGP configurations within the address family relating to the neighbor commands and where I should have configured it but in the end, I figured out where to configure all the IPv6 eBGP commands. In conclusion, this lab was an important refresher of setting up EIGRP and BGP while also learning and effectively understanding IPv6 eBGP.