OSPFv3 - Ipv6 BGP- Ipv6 EIGRP (GNS3)

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**Purpose**

The purpose of this lab was the introduction of bgp ipv6 with the program of GNS3. Using a new program of GNS3 to simulate or run the configurations of a real router on an online program that isn’t Packet Tracer. Using ospfv3 and eigrp ipv6 protocols to allow connection with bgp between each protocol.

**Background**

Older than IPv6, BGP is. Even the version we still use today, BGP-4, predates IPv6: in July 1994, the first BGP-4 RFC (RFC 1654) was released, although RFC 1883, the first IPv6 RFC, was not released until December 1995. And unlike protocols like RIP and OSPF, which have separate IPv4 and IPv6 variants, there's only one BGP: both IPv4 and IPv6 are managed by BGP-4. (VPNs, MPLS and more, as well.) The Border Gateway Protocol (BGP) is an Internet postal service. The postal service processes the piece of mail when someone drops a letter into a mailbox and selects a fast, efficient route to deliver that letter to its recipient. All interior gateway protocols (IGP) are RIP, EIGRP and OSPF, while BGP is an exterior gateway protocol (EGP). Interior protocols are essentially intended to route data dynamically through a network that you monitor and manage entirely. Exterior routing protocols are used to share routes that you have no administrative power over between distinctly different networks. The Routing Protocol used on the Internet is BGP; therefore, the most common enterprise use is to run BGP on your internet edge when connecting to your ISP. Similarly, BGP is responsible for looking at all the available routes that data might take and choosing the best route when someone submits data over the Internet, which typically involves hopping between autonomous systems. The Internet is a network of networks, divided into hundreds of thousands of smaller networks called autonomous systems (AS). In essence, each of these networks is a big pool of routers operated by a single entity. If we continue to think of BGP as the Internet's postal service, AS's are like separate branches of post offices. A town may have hundreds of mailboxes, but before being routed to another destination, the mail in those boxes must go through the local postal branch. Only when an advantage in traffic control can be realized should BGP be favored over static routes. Separately, consider the incoming and outgoing traffic. Use BGP to advertise routes to your provider if it is only necessary to monitor your incoming traffic, while still advertising only a default route to your AS. Like mailboxes, the internal routers within an AS forward their outbound transmissions to the AS, which then uses BGP routing to get these transmissions to their destinations. Routes are shared and traffic uses external BGP or eBGP to be transmitted over the Internet. An internal variant of BGP can also be used by autonomous systems to route across their internal networks, which is known as internal BGP, or iBGP for short. It should be noted that it is not a prerequisite for the use of external BGP to use internal BGP. From a variety of internal protocols, autonomous systems can choose to connect the routers on their internal network.

**Lab Summary**

Seven routers, two on the left of the topology are OSPF. The next three are the two border routers of BGP and the next two are EIGRP. From left to right, the ipv6 address goes 1::/64 to 6::/64. From left to right the first BGP router has an AS of 3 with the following BGP routers having AS’s of 4 and 5. To be able to ping from R1, which is OSPFv3 across the topology to R7, which is EIGRP ipv6. Using BGP as a connector between protocols.

**Lab Commands**

show run - show configuration of selected device

show ipv6 route - show ipv6 route table of selected device

show ipv6 neighbor - show ipv6 neighbor connection of selected device

router bgp [AS #] - enables bgp

ipv6 router eigrp [Process-id] - enables eigrp

router ospf [Process-id] - enables ospf

address family ipv6 - enter the ipv6 address family command mode

network [Network Address] - announces bgp on network

neighbor [Neighbor Address] remote-as [AS #] - set neighbor as a member of remote AS

neighbor [Neighbor Address] ebgp-multihop [AS #] - set neighbor on another network using EBGP multi-hop

neighbor [Neighbor Address] activate - activate neighbor address family ipv6 mode

neighbor [Neighbor Address] route-reflector-client - configure the local router as the route reflector and the specified neighbor as one of its clients

redistribute connected - redistribute to all directly connected networks

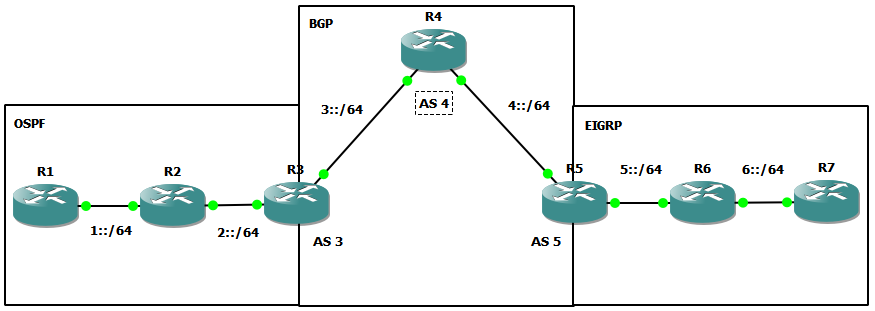
redistribute bgp [AS #] - redistribute bgp routes

redistribute ospf [Process-id] - redistribute ospf routes

redistribute eigrp [Process-id] - redistribute eigrp routes

ipv6 unicast-routing - enables ipv6

**Network Topology**



**Configuration**

**ONLY OSPF ROUTERS**

**R1**

R1#show run

Building configuration...

Current configuration : 1441 bytes

!

version 15.2

service timestamps debug datetime msec

service timestamps log datetime msec

!

hostname R1

!

ipv6 unicast-routing

!

interface GigabitEthernet1/0

no ip address

negotiation auto

ipv6 address 1::1/64

ipv6 ospf 1 area 0

!

ipv6 router ospf 1

router-id 1.1.1.1

!

end

R1#show ipv6 route

IPv6 Routing Table - default - 6 entries

Codes: C - Connected, L - Local, S - Static, U - Per-user Static route

B - BGP, R - RIP, H - NHRP, I1 - ISIS L1

I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary, D - EIGRP

EX - EIGRP external, ND - ND Default, NDp - ND Prefix, DCE - Destination

NDr - Redirect, O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1

OE2 - OSPF ext 2, ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2, l - LISP

C 1::/64 [0/0]

via GigabitEthernet1/0, directly connected

L 1::1/128 [0/0]

via GigabitEthernet1/0, receive

O 2::/64 [110/2]

via FE80::C802:9FF:FE58:38, GigabitEthernet1/0

OE2 4::/64 [110/1]

via FE80::C802:9FF:FE58:38, GigabitEthernet1/0

OE2 6::/64 [110/1]

via FE80::C802:9FF:FE58:38, GigabitEthernet1/0

L FF00::/8 [0/0]

via Null0, receive

R1#show ipv6 neigh

IPv6 Address Age Link-layer Addr State Interface

FE80::C802:9FF:FE58:38

R1#show ospf ipv6

OSPFv3 1 address-family ipv6

Router ID 1.1.1.1

Supports NSSA (compatible with RFC 3101)

Event-log enabled, Maximum number of events: 1000, Mode: cyclic

Router is not originating router-LSAs with maximum metric

Initial SPF schedule delay 5000 msecs

Minimum hold time between two consecutive SPFs 10000 msecs

Maximum wait time between two consecutive SPFs 10000 msecs

Minimum LSA interval 5 secs

Minimum LSA arrival 1000 msecs

LSA group pacing timer 240 secs

Interface flood pacing timer 33 msecs

Retransmission pacing timer 66 msecs

Retransmission limit dc 24 non-dc 24

Number of external LSA 2. Checksum Sum 0x001F06

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

Graceful restart helper support enabled

Reference bandwidth unit is 100 mbps

RFC1583 compatibility enabled

Area BACKBONE(0)

Number of interfaces in this area is 1

SPF algorithm executed 15 times

Number of LSA 9. Checksum Sum 0x03ACCC

Number of DCbitless LSA 0

Number of indication LSA 0

Number of DoNotAge LSA 0

Flood list length 0

**R2**

R2#show run

Building configuration...

Current configuration : 1473 bytes

!

version 15.2

service timestamps debug datetime msec

service timestamps log datetime msec

!

hostname R2

!

ipv6 unicast-routing

!

interface GigabitEthernet1/0

no ip address

negotiation auto

ipv6 address 2::1/64

ipv6 ospf 1 area 0

!

interface GigabitEthernet2/0

no ip address

negotiation auto

ipv6 address 1::2/64

ipv6 ospf 1 area 0

!

ipv6 router ospf 1

router-id 2.2.2.2

!

end

R2#show ipv6 route

IPv6 Routing Table - default - 7 entries

Codes: C - Connected, L - Local, S - Static, U - Per-user Static route

B - BGP, R - RIP, H - NHRP, I1 - ISIS L1

I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary, D - EIGRP

EX - EIGRP external, ND - ND Default, NDp - ND Prefix, DCE - Destination

NDr - Redirect, O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1

OE2 - OSPF ext 2, ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2, l - LISP

C 1::/64 [0/0]

via GigabitEthernet2/0, directly connected

L 1::2/128 [0/0]

via GigabitEthernet2/0, receive

C 2::/64 [0/0]

via GigabitEthernet1/0, directly connected

L 2::1/128 [0/0]

via GigabitEthernet1/0, receive

OE2 4::/64 [110/1]

via FE80::C803:24FF:FE98:38, GigabitEthernet1/0

OE2 6::/64 [110/1]

via FE80::C803:24FF:FE98:38, GigabitEthernet1/0

L FF00::/8 [0/0]

via Null0, receive

R2#show ipv6 neigh

IPv6 Address Age Link-layer Addr State Interface

2::2 7 ca03.2498.0038 STALE Gi1/0

1::1 1 ca01.03b8.001c STALE Gi2/0

FE80::C801:3FF:FEB8:1C 3 ca01.03b8.001c STALE Gi2/0

FE80::C803:24FF:FE98:38 1 ca03.2498.0038 STALE Gi1/0

R2#show ospf ipv6

OSPFv3 1 address-family ipv6

Router ID 2.2.2.2

Supports NSSA (compatible with RFC 3101)

Event-log enabled, Maximum number of events: 1000, Mode: cyclic

Router is not originating router-LSAs with maximum metric

Initial SPF schedule delay 5000 msecs

Minimum hold time between two consecutive SPFs 10000 msecs

Maximum wait time between two consecutive SPFs 10000 msecs

Minimum LSA interval 5 secs

Minimum LSA arrival 1000 msecs

LSA group pacing timer 240 secs

Interface flood pacing timer 33 msecs

Retransmission pacing timer 66 msecs

Retransmission limit dc 24 non-dc 24

Number of external LSA 2. Checksum Sum 0x001F06

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

Graceful restart helper support enabled

Reference bandwidth unit is 100 mbps

RFC1583 compatibility enabled

Area BACKBONE(0)

Number of interfaces in this area is 2

SPF algorithm executed 15 times

Number of LSA 11. Checksum Sum 0x05601A

Number of DCbitless LSA 0

Number of indication LSA 0

Number of DoNotAge LSA 0

Flood list length 0

**OSPF/BGP ROUTER**

**R3**

R3#show run

Building configuration...

Current configuration : 1738 bytes

!

version 15.2

service timestamps debug datetime msec

service timestamps log datetime msec

!

hostname R3

!

ipv6 unicast-routing

!

interface GigabitEthernet1/0

no ip address

negotiation auto

ipv6 address 3::1/64

!

interface GigabitEthernet2/0

no ip address

negotiation auto

ipv6 address 2::2/64

ipv6 ospf 1 area 0

!

router bgp 3

bgp router-id 3.3.3.3

bgp log-neighbor-changes

no bgp default ipv4-unicast

neighbor 3::2 remote-as 4

neighbor 3::2 ebgp-multihop 255

!

address-family ipv6

network 3::/64

neighbor 3::2 activate

exit-address-family

!

ipv6 router ospf 1

router-id 3.3.3.3

!

end

R3#show ipv6 route

IPv6 Routing Table - default - 8 entries

Codes: C - Connected, L - Local, S - Static, U - Per-user Static route

B - BGP, R - RIP, H - NHRP, I1 - ISIS L1

I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary, D - EIGRP

EX - EIGRP external, ND - ND Default, NDp - ND Prefix, DCE - Destination

NDr - Redirect, O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1

OE2 - OSPF ext 2, ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2, l - LISP

O 1::/64 [110/2]

via FE80::C802:9FF:FE58:1C, GigabitEthernet2/0

C 2::/64 [0/0]

via GigabitEthernet2/0, directly connected

L 2::2/128 [0/0]

via GigabitEthernet2/0, receive

C 3::/64 [0/0]

via GigabitEthernet1/0, directly connected

L 3::1/128 [0/0]

via GigabitEthernet1/0, receive

B 4::/64 [20/0]

via 3::2

B 6::/64 [20/0]

via 3::2

L FF00::/8 [0/0]

via Null0, receive

R3#show ipv6 neigh

IPv6 Address Age Link-layer Addr State Interface

3::2 0 ca04.21a4.0038 REACH Gi1/0

2::1 2 ca02.0958.001c STALE Gi2/0

FE80::C802:9FF:FE58:1C 1 ca02.0958.001c STALE Gi2/0

R3#show ospf ipv6

OSPFv3 1 address-family ipv6

Router ID 3.3.3.3

Supports NSSA (compatible with RFC 3101)

Event-log enabled, Maximum number of events: 1000, Mode: cyclic

It is an autonomous system boundary router

Redistributing External Routes from,

bgp 3

Router is not originating router-LSAs with maximum metric

Initial SPF schedule delay 5000 msecs

Minimum hold time between two consecutive SPFs 10000 msecs

Maximum wait time between two consecutive SPFs 10000 msecs

Minimum LSA interval 5 secs

Minimum LSA arrival 1000 msecs

LSA group pacing timer 240 secs

Interface flood pacing timer 33 msecs

Retransmission pacing timer 66 msecs

Retransmission limit dc 24 non-dc 24

Number of external LSA 2. Checksum Sum 0x001F06

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

Graceful restart helper support enabled

Reference bandwidth unit is 100 mbps

RFC1583 compatibility enabled

Area BACKBONE(0)

Number of interfaces in this area is 1

SPF algorithm executed 3 times

Number of LSA 9. Checksum Sum 0x047CEC

Number of DCbitless LSA 0

Number of indication LSA 0

Number of DoNotAge LSA 0

Flood list length 0

R3#show bgp ipv6 unicast

BGP table version is 12, local router ID is 3.3.3.3

Status codes: s suppressed, d damped, h history, \* valid, > best, i - internal,

r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,

x best-external, a additional-path, c RIB-compressed,

Origin codes: i - IGP, e - EGP, ? - incomplete

RPKI validation codes: V valid, I invalid, N Not found

Network Next Hop Metric LocPrf Weight Path

\*> 1::/64 FE80::C802:9FF:FE58:1C

2 32768 ?

\*> 2::/64 :: 0 32768 ?

\* 3::/64 3::2 0 0 4 i

\*> :: 0 32768 i

\*> 4::/64 3::2 0 0 4 i

\*> 6::/64 3::2 0 4 5 ?

**ONLY BGP**

**R4**

R4#show run

Building configuration...

Current configuration : 1883 bytes

!

version 15.2

service timestamps debug datetime msec

service timestamps log datetime msec

!

hostname R4

!

ipv6 unicast-routing

!

interface GigabitEthernet1/0

no ip address

negotiation auto

ipv6 address 4::1/64

!

interface GigabitEthernet2/0

no ip address

negotiation auto

ipv6 address 3::2/64

!

router bgp 4

bgp router-id 4.4.4.4

bgp log-neighbor-changes

no bgp default ipv4-unicast

neighbor 3::1 remote-as 3

neighbor 3::1 ebgp-multihop 255

neighbor 4::2 remote-as 5

neighbor 4::2 ebgp-multihop 255

!

address-family ipv6

redistribute connected

network 3::/64

network 4::/64

neighbor 3::1 activate

neighbor 3::1 route-reflector-client

neighbor 4::2 activate

neighbor 4::2 route-reflector-client

exit-address-family

!

!

end

R4#show ipv6 route

IPv6 Routing Table - default - 8 entries

Codes: C - Connected, L - Local, S - Static, U - Per-user Static route

B - BGP, R - RIP, H - NHRP, I1 - ISIS L1

I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary, D - EIGRP

EX - EIGRP external, ND - ND Default, NDp - ND Prefix, DCE - Destination

NDr - Redirect, O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1

OE2 - OSPF ext 2, ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2, l - LISP

B 1::/64 [20/2]

via 3::1

B 2::/64 [20/0]

via 3::1

C 3::/64 [0/0]

via GigabitEthernet2/0, directly connected

L 3::2/128 [0/0]

via GigabitEthernet2/0, receive

C 4::/64 [0/0]

via GigabitEthernet1/0, directly connected

L 4::1/128 [0/0]

via GigabitEthernet1/0, receive

B 6::/64 [20/3072]

via 4::2

L FF00::/8 [0/0]

via Null0, receive

R4#show ipv6 neigh

IPv6 Address Age Link-layer Addr State Interface

3::1 0 ca03.2498.001c REACH Gi2/0

4::2 0 ca05.2f6c.0038 REACH Gi1/0

FE80::C805:2FFF:FE6C:38 1 ca05.2f6c.0038 STALE Gi1/0

R4#show bgp ipv6 unicast

BGP table version is 12, 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, m multipath, b backup-path, f RT-Filter,

x best-external, a additional-path, c RIB-compressed,

Origin codes: i - IGP, e - EGP, ? - incomplete

RPKI validation codes: V valid, I invalid, N Not found

Network Next Hop Metric LocPrf Weight Path

\*> 1::/64 3::1 2 0 3 ?

\*> 2::/64 3::1 0 0 3 ?

\* 3::/64 3::1 0 0 3 i

\*> :: 0 32768 i

\* 4::/64 4::2 0 0 5 i

\*> :: 0 32768 i

\*> 6::/64 4::2 3072 0 5 ?

**BGP/EIGRP ROUTER**

**R5**

R5#show run

Building configuration...

Current configuration : 1739 bytes

!

version 15.2

service timestamps debug datetime msec

service timestamps log datetime msec

!

hostname R5

!

ipv6 unicast-routing

!

interface GigabitEthernet1/0

no ip address

negotiation auto

ipv6 address 5::1/64

ipv6 eigrp 1

!

interface GigabitEthernet2/0

no ip address

negotiation auto

ipv6 address 4::2/64

!

router bgp 5

bgp router-id 5.5.5.5

bgp log-neighbor-changes

no bgp default ipv4-unicast

neighbor 4::1 remote-as 4

neighbor 4::1 ebgp-multihop 255

!

address-family ipv6

network 4::/64

neighbor 4::1 activate

exit-address-family

!

ipv6 router eigrp 1

eigrp router-id 5.5.5.5

!

end

R5#show ipv6 route

IPv6 Routing Table - default - 9 entries

Codes: C - Connected, L - Local, S - Static, U - Per-user Static route

B - BGP, R - RIP, H - NHRP, I1 - ISIS L1

I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary, D - EIGRP

EX - EIGRP external, ND - ND Default, NDp - ND Prefix, DCE - Destination

NDr - Redirect, O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1

OE2 - OSPF ext 2, ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2, l - LISP

B 1::/64 [20/0]

via 4::1

B 2::/64 [20/0]

via 4::1

B 3::/64 [20/0]

via 4::1

C 4::/64 [0/0]

via GigabitEthernet2/0, directly connected

L 4::2/128 [0/0]

via GigabitEthernet2/0, receive

C 5::/64 [0/0]

via GigabitEthernet1/0, directly connected

L 5::1/128 [0/0]

via GigabitEthernet1/0, receive

D 6::/64 [90/3072]

via FE80::C806:BFF:FE50:38, GigabitEthernet1/0

L FF00::/8 [0/0]

via Null0, receive

R5#show ipv6 neigh

IPv6 Address Age Link-layer Addr State Interface

4::1 0 ca04.21a4.001c REACH Gi2/0

FE80::C806:BFF:FE50:38 9 ca06.0b50.0038 STALE Gi1/0

FE80::C804:21FF:FEA4:1C 9 ca04.21a4.001c STALE Gi2/0

R5#show bgp ipv6 unicast

BGP table version is 14, local router ID is 5.5.5.5

Status codes: s suppressed, d damped, h history, \* valid, > best, i - internal,

r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,

x best-external, a additional-path, c RIB-compressed,

Origin codes: i - IGP, e - EGP, ? - incomplete

RPKI validation codes: V valid, I invalid, N Not found

Network Next Hop Metric LocPrf Weight Path

\*> 1::/64 4::1 0 4 3 ?

\*> 2::/64 4::1 0 4 3 ?

\*> 3::/64 4::1 0 0 4 i

\* 4::/64 4::1 0 0 4 i

\*> :: 0 32768 i

\*> 6::/64 FE80::C806:BFF:FE50:38

3072 32768 ?

R5#show eigrp protocol

EIGRP-IPv6 Protocol for AS(1)

Metric weight K1=1, K2=0, K3=1, K4=0, K5=0

NSF-aware route hold timer is 240

Router-ID: 5.5.5.5

Topology : 0 (base)

Active Timer: 3 min

Distance: internal 90 external 170

Maximum path: 16

Maximum hopcount 100

Maximum metric variance 1

**ONLY EIGRP ROUTERS**

**R6**

R6#show run

Building configuration...

Current configuration : 1468 bytes

!

version 15.2

service timestamps debug datetime msec

service timestamps log datetime msec

!

hostname R6

!

ipv6 unicast-routing

!

interface GigabitEthernet1/0

no ip address

negotiation auto

ipv6 address 6::1/64

ipv6 eigrp 1

!

interface GigabitEthernet2/0

no ip address

negotiation auto

ipv6 address 5::2/64

ipv6 eigrp 1

!

ipv6 router eigrp 1

eigrp router-id 6.6.6.6

!

end

R6#show ipv6 route

IPv6 Routing Table - default - 8 entries

Codes: C - Connected, L - Local, S - Static, U - Per-user Static route

B - BGP, R - RIP, H - NHRP, I1 - ISIS L1

I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary, D - EIGRP

EX - EIGRP external, ND - ND Default, NDp - ND Prefix, DCE - Destination

NDr - Redirect, O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1

OE2 - OSPF ext 2, ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2, l - LISP

EX 1::/64 [170/25600512]

via FE80::C805:2FFF:FE6C:1C, GigabitEthernet2/0

EX 2::/64 [170/25600512]

via FE80::C805:2FFF:FE6C:1C, GigabitEthernet2/0

EX 3::/64 [170/25600512]

via FE80::C805:2FFF:FE6C:1C, GigabitEthernet2/0

C 5::/64 [0/0]

via GigabitEthernet2/0, directly connected

L 5::2/128 [0/0]

via GigabitEthernet2/0, receive

C 6::/64 [0/0]

via GigabitEthernet1/0, directly connected

L 6::1/128 [0/0]

via GigabitEthernet1/0, receive

L FF00::/8 [0/0]

via Null0, receive

R6#show ipv6 neigh

IPv6 Address Age Link-layer Addr State Interface

5::1 4 ca05.2f6c.001c STALE Gi2/0

6::2 1 ca07.19f0.0038 STALE Gi1/0

FE80::C805:2FFF:FE6C:1C 1 ca05.2f6c.001c STALE Gi2/0

FE80::C807:19FF:FEF0:38 1 ca07.19f0.0038 STALE Gi1/0

R6#show eigrp protocol

EIGRP-IPv6 Protocol for AS(1)

Metric weight K1=1, K2=0, K3=1, K4=0, K5=0

NSF-aware route hold timer is 240

Router-ID: 6.6.6.6

Topology : 0 (base)

Active Timer: 3 min

Distance: internal 90 external 170

Maximum path: 16

Maximum hopcount 100

Maximum metric variance 1

**R7**

R7#show run

Building configuration...

Current configuration : 1442 bytes

!

version 15.2

service timestamps debug datetime msec

service timestamps log datetime msec

!

hostname R7

!

ipv6 unicast-routing

!

interface GigabitEthernet2/0

no ip address

negotiation auto

ipv6 address 6::2/64

ipv6 eigrp 1

!

ipv6 router eigrp 1

eigrp router-id 7.7.7.7

!

end

R7#show ipv6 route

IPv6 Routing Table - default - 7 entries

Codes: C - Connected, L - Local, S - Static, U - Per-user Static route

B - BGP, R - RIP, H - NHRP, I1 - ISIS L1

I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary, D - EIGRP

EX - EIGRP external, ND - ND Default, NDp - ND Prefix, DCE - Destination

NDr - Redirect, O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1

OE2 - OSPF ext 2, ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2, l - LISP

EX 1::/64 [170/25600768]

via FE80::C806:BFF:FE50:1C, GigabitEthernet2/0

EX 2::/64 [170/25600768]

via FE80::C806:BFF:FE50:1C, GigabitEthernet2/0

EX 3::/64 [170/25600768]

via FE80::C806:BFF:FE50:1C, GigabitEthernet2/0

D 5::/64 [90/3072]

via FE80::C806:BFF:FE50:1C, GigabitEthernet2/0

C 6::/64 [0/0]

via GigabitEthernet2/0, directly connected

L 6::2/128 [0/0]

via GigabitEthernet2/0, receive

L FF00::/8 [0/0]

via Null0, receive

R7#show ipv6 neigh

IPv6 Address Age Link-layer Addr State Interface

FE80::C806:BFF:FE50:1C 2 ca06.0b50.001c STALE Gi2/0

R7#show eigrp protocol

EIGRP-IPv6 Protocol for AS(1)

Metric weight K1=1, K2=0, K3=1, K4=0, K5=0

NSF-aware route hold timer is 240

Router-ID: 7.7.7.7

Topology : 0 (base)

Active Timer: 3 min

Distance: internal 90 external 170

Maximum path: 16

Maximum hopcount 100

Maximum metric variance 1

**Ping End Routers**

**R1 to R7**

R1#ping 6::2

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 6::2, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 160/178/188 ms

**R7 to R1**

R7#ping 1::1

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 1::1, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 160/180/188 ms

**Problems**

A problem that came up early on in the lab process of using GNS3, the save configuration function. After asking classmates and browsing the internet from youtube to websites, found that doing a copy run start on all devices could (with a strong emphasis on could) have a saved configuration when opening up GNS3. Another way that Mr. Mason suggested and that helped another student was to export the configuration and save each separate configuration on a notepad or different document. Next was the whole eBGP in ipv6 using address families across the topology. One problem was ping from R3 to the 4::/64 networks and R5 to the 3::/64 networks. With a group efforts from friends and classmates, we figured that our configuration was missing the network statements in the address-family and the command “route-reflector-client” allowing connection to each router.

**Conclusion**

In conclusion, the new program of GNS3 creates new problems that arose through the configuration of ipv6 eBGP. The lab allowed us to see the real-time of what eBGP would have been if we were in the cisco lab, doing the lab with real equipment with the help of GNS3.