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| Image result for cisco backgroun |
| Border Gateway Protocol (BGP)Derek Liu |
| Periods 0,3,4  Mr. Mason & Mr. Hansen  CCNP Lab 3 |

**Implementing BGP (6 routers)***Derek Liu*

Purpose

The purpose of this lab was the explore the functions of BGP and how to set it up. More specifically, learning how BGP can connecting two different routing protocols (EIGRP and OSPF) and allow them to share information and create both Ipv4 and Ipv6 routes.

Background Information

EIGRP is a routing protocol that was not implemented before in previous laps. EIGRP, also known as enhanced interior gateway routing protocol, is a routing protocol like OSPF as it allows rapid convergence of network topologies. It allows for scalability in a network. Routes in EIGRP are calculated using hop count and DUAL (diffusing update algorithm). The major difference between EIGRP and OSPF is that EIGRP is Cisco proprietary and EIGRP converges faster.

BGP or border gateway protocol is also a routing protocol that supports both Ipv4 and ipv6. However, it manages how packets get routed from network to network through the exchanging of routing and reachability information among edge routers. For example, as used in this lab, exchanging packets between OSPF and EIGRP. BGP allows for redundancy by guaranteeing routers can adapt to failures: if one path goes down, another path can be located. The difference between BGP and OSPF is that OSPF is used in internal networks while BGP is used for larger networks since it is the most scalable out of all the routing protocols. It can carry routes for multicast, Ipv6, VPNs, and a variety of other data. It uses a TCP connection on port number 179 to exchange update information.

The origin of this protocol came from a sketch on three napkins in 1989 and is still sometimes known as the three-napkin protocol. It was first applied as part of the internet in 1994.

BGP plays a very important role on the internet. For example, when Instagram went down for six hours on October 4th 2021, it was due to no working BGP routes into social media sites.

Different types of BGP networks can be formed. One of them is EBGP or external BGP which forms BGP connections between external peers (peers in a different autonomous system than the local system). There is also IBGP or internal BGP which forms BGP connections between internal peers.

Lab Summary

Using six Cisco 4321 routers connected linearly, we connected them using gigabit ethernet cables with ports g0/0/0 and g0/0/1. The g0/0/0 port of router 1 was connected to an end device (PC1) and the g0/0/1 port of router 6 was connected another end device (PC2). Using previously acquired skills of configuring OSPF, we configured OSPF and OSPFv3 on routers 1-3 in the backbone area 0. Routers 4-6 were configured with EIGRP for both Ipv4 and Ipv6. We then configured BGP on the network between router 3 and 4. We had OSPF and OSPFv3 redistribute information to BGP and vice versa on router 4. We then had EIGRP and EIGRP for ipv6 redistribute information to BGP and vice versa on router 3. Connection was tested through examining both ipv4 and ipv6 routes on the routers and pings were sent across the network from the two end devices.

Lab Commands

**BGP Commands**:

R3:

router bgp 100

router-id 3.3.3.3

no bgp default ipv4-unicast

neighbor 10.1.1.14 remote-as 200

neighbor 2001:db8:acad:4::2 remote-as 200

address-family ipv4

redistribute ospf 10

network 10.1.1.12

neighbor 10.1.1.14 activate

address-family ipv6

redistribute ospf 10

network 2001:db8:acad:4::/64

neighbor 2001:db8:acad:4::2 activate

R4:

router bgp 200

router-id 4.4.4.4

no bgp default ipv4-unicast

neighbor 10.1.1.13 remote-as 100

neighbor 2001:db8:acad:4::1 remote-as 100

address-family ipv4

network 10.1.1.12

neighbor 10.1.1.13 activate

redistribute eigrp 10

address-family ipv6

network 2001:db8:acad:4::/64

neighbor 2001:db8:acad:4::1 activate

redistribute eigrp 10

**EIGRP Commands**:

en

config t

hostname r5

router eigrp 10

network 10.1.1.18 0.0.0.3

network 10.1.1.21 0.0.0.3

ipv6 unicast-routing

ipv6 router eigrp 10

int g0/0/0

ip address 10.1.1.21 255.255.255.252

no shut

ipv6 address 2001:db8:acad:6::1/64

ipv6 address fe80::1 link-local

ipv6 eigrp 10

ipv6 enable

int g0/0/1

ip address 10.1.1.18 255.255.255.252

no shut

ipv6 address 2001:db8:acad:5::2/64

ipv6 address fe80::2 link-local

ipv6 eigrp 10

ipv6 enable

**OSPF Commands**:

en

config t

hostname r1

router ospf 10

router-id 1.1.1.1

network 10.1.1.0 0.0.0.3 area 1

network 10.1.1.4 0.0.0.3 area 1

ipv6 unicast-routing

ipv6 router ospf 10

router-id 1.1.1.1

int g0/0/0

ip address 10.1.1.5 255.255.255.252

ip ospf 10 area 1

no shut

ipv6 address 2001:db8:acad:2::1/64

ipv6 address fe80::1 link-local

ipv6 ospf 10 area 1

int g0/0/1

ip address 10.1.1.2 255.255.255.252

ip ospf 10 area 1

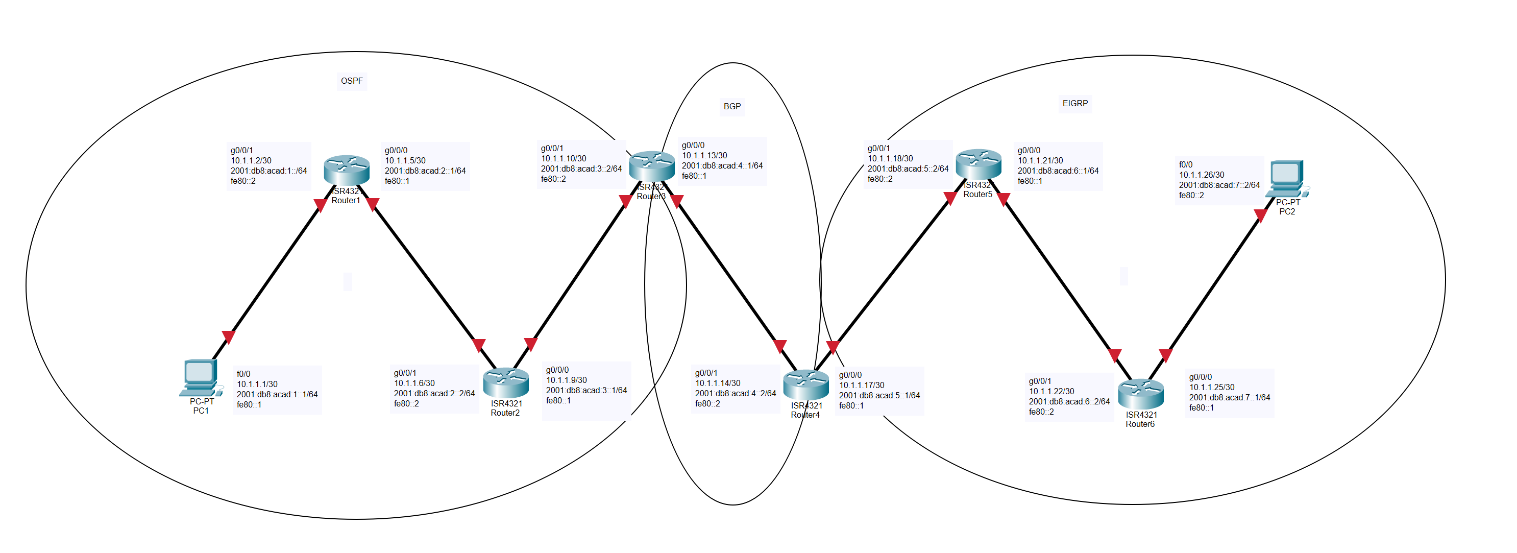
no shut

ipv6 address 2001:db8:acad:1::2/64

ipv6 address fe80::2 link-local

ipv6 ospf 10 area 1

Network Diagrams with IP



Configurations

***Pings (ipv4):***

C:\Users\user>ping 10.1.1.2

Pinging 10.1.1.2 with 32 bytes of data:

Reply from 10.1.1.2: bytes=32 time<1ms TTL=255

Reply from 10.1.1.2: bytes=32 time<1ms TTL=255

Reply from 10.1.1.2: bytes=32 time<1ms TTL=255

Reply from 10.1.1.2: bytes=32 time<1ms TTL=255

Ping statistics for 10.1.1.2:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\user>ping 10.1.1.5

Pinging 10.1.1.5 with 32 bytes of data:

Reply from 10.1.1.5: bytes=32 time<1ms TTL=255

Reply from 10.1.1.5: bytes=32 time<1ms TTL=255

Reply from 10.1.1.5: bytes=32 time<1ms TTL=255

Reply from 10.1.1.5: bytes=32 time<1ms TTL=255

Ping statistics for 10.1.1.5:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\user>ping 10.1.1.6

Pinging 10.1.1.6 with 32 bytes of data:

Reply from 10.1.1.6: bytes=32 time=1ms TTL=254

Reply from 10.1.1.6: bytes=32 time<1ms TTL=254

Reply from 10.1.1.6: bytes=32 time<1ms TTL=254

Reply from 10.1.1.6: bytes=32 time<1ms TTL=254

Ping statistics for 10.1.1.6:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\Users\user>ping 10.1.1.9

Pinging 10.1.1.9 with 32 bytes of data:

Reply from 10.1.1.9: bytes=32 time<1ms TTL=254

Reply from 10.1.1.9: bytes=32 time<1ms TTL=254

Reply from 10.1.1.9: bytes=32 time<1ms TTL=254

Reply from 10.1.1.9: bytes=32 time<1ms TTL=254

Ping statistics for 10.1.1.9:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\user>ping 10.1.1.10

Pinging 10.1.1.10 with 32 bytes of data:

Reply from 10.1.1.10: bytes=32 time=1ms TTL=253

Reply from 10.1.1.10: bytes=32 time<1ms TTL=253

Reply from 10.1.1.10: bytes=32 time<1ms TTL=253

Reply from 10.1.1.10: bytes=32 time<1ms TTL=253

Ping statistics for 10.1.1.10:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\Users\user>ping 10.1.1.13

Pinging 10.1.1.13 with 32 bytes of data:

Reply from 10.1.1.13: bytes=32 time<1ms TTL=253

Reply from 10.1.1.13: bytes=32 time<1ms TTL=253

Reply from 10.1.1.13: bytes=32 time<1ms TTL=253

Reply from 10.1.1.13: bytes=32 time<1ms TTL=253

Ping statistics for 10.1.1.13:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\user>ping 10.1.1.14

Pinging 10.1.1.14 with 32 bytes of data:

Reply from 10.1.1.14: bytes=32 time=1ms TTL=252

Reply from 10.1.1.14: bytes=32 time<1ms TTL=252

Reply from 10.1.1.14: bytes=32 time<1ms TTL=252

Reply from 10.1.1.14: bytes=32 time<1ms TTL=252

Ping statistics for 10.1.1.14:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\Users\user>ping 10.1.1.17

Pinging 10.1.1.17 with 32 bytes of data:

Reply from 10.1.1.17: bytes=32 time=1ms TTL=252

Reply from 10.1.1.17: bytes=32 time<1ms TTL=252

Reply from 10.1.1.17: bytes=32 time<1ms TTL=252

Reply from 10.1.1.17: bytes=32 time<1ms TTL=252

Ping statistics for 10.1.1.17:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\Users\user>ping 10.1.1.18

Pinging 10.1.1.18 with 32 bytes of data:

Reply from 10.1.1.18: bytes=32 time=1ms TTL=251

Reply from 10.1.1.18: bytes=32 time=1ms TTL=251

Reply from 10.1.1.18: bytes=32 time=1ms TTL=251

Reply from 10.1.1.18: bytes=32 time=1ms TTL=251

Ping statistics for 10.1.1.18:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\Users\user>ping 10.1.1.21

Pinging 10.1.1.21 with 32 bytes of data:

Reply from 10.1.1.21: bytes=32 time=1ms TTL=251

Reply from 10.1.1.21: bytes=32 time=1ms TTL=251

Reply from 10.1.1.21: bytes=32 time<1ms TTL=251

Reply from 10.1.1.21: bytes=32 time=1ms TTL=251

Ping statistics for 10.1.1.21:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\Users\user>ping 10.1.1.22

Pinging 10.1.1.22 with 32 bytes of data:

Reply from 10.1.1.22: bytes=32 time=1ms TTL=250

Reply from 10.1.1.22: bytes=32 time=1ms TTL=250

Reply from 10.1.1.22: bytes=32 time=1ms TTL=250

Reply from 10.1.1.22: bytes=32 time=1ms TTL=250

Ping statistics for 10.1.1.22:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\Users\user>ping 10.1.1.25

Pinging 10.1.1.25 with 32 bytes of data:

Reply from 10.1.1.25: bytes=32 time=1ms TTL=250

Reply from 10.1.1.25: bytes=32 time=1ms TTL=250

Reply from 10.1.1.25: bytes=32 time=1ms TTL=250

Reply from 10.1.1.25: bytes=32 time=1ms TTL=250

Ping statistics for 10.1.1.25:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\Users\user>ping 10.1.1.26

Pinging 10.1.1.26 with 32 bytes of data:

Reply from 10.1.1.26: bytes=32 time=1ms TTL=122

Reply from 10.1.1.26: bytes=32 time=1ms TTL=122

Reply from 10.1.1.26: bytes=32 time=1ms TTL=122

Reply from 10.1.1.26: bytes=32 time=1ms TTL=122

Ping statistics for 10.1.1.26:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 1ms, Maximum = 1ms, Average = 1ms

***Pings (ipv6):***

C:\Users\user>ping 2001:db8:acad:1::2

Pinging 2001:db8:acad:1::2 with 32 bytes of data:

Reply from 2001:db8:acad:1::2: time<1ms

Reply from 2001:db8:acad:1::2: time<1ms

Reply from 2001:db8:acad:1::2: time<1ms

Reply from 2001:db8:acad:1::2: time<1ms

Ping statistics for 2001:db8:acad:1::2:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\user>ping 2001:db8:acad:2::1

Pinging 2001:db8:acad:2::1 with 32 bytes of data:

Reply from 2001:db8:acad:2::1: time=2ms

Reply from 2001:db8:acad:2::1: time<1ms

Reply from 2001:db8:acad:2::1: time<1ms

Reply from 2001:db8:acad:2::1: time<1ms

Ping statistics for 2001:db8:acad:2::1:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 2ms, Average = 0ms

C:\Users\user>ping 2001:db8:acad:2::2

Pinging 2001:db8:acad:2::2 with 32 bytes of data:

Reply from 2001:db8:acad:2::2: time=6ms

Reply from 2001:db8:acad:2::2: time<1ms

Reply from 2001:db8:acad:2::2: time<1ms

Reply from 2001:db8:acad:2::2: time<1ms

Ping statistics for 2001:db8:acad:2::2:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 6ms, Average = 1ms

C:\Users\user>ping 2001:db8:acad:3::1

Pinging 2001:db8:acad:3::1 with 32 bytes of data:

Reply from 2001:db8:acad:3::1: time<1ms

Reply from 2001:db8:acad:3::1: time<1ms

Reply from 2001:db8:acad:3::1: time=1ms

Reply from 2001:db8:acad:3::1: time<1ms

Ping statistics for 2001:db8:acad:3::1:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\Users\user>ping 2001:db8:acad:3::2

Pinging 2001:db8:acad:3::2 with 32 bytes of data:

Reply from 2001:db8:acad:3::2: time=8ms

Reply from 2001:db8:acad:3::2: time<1ms

Reply from 2001:db8:acad:3::2: time<1ms

Reply from 2001:db8:acad:3::2: time<1ms

Ping statistics for 2001:db8:acad:3::2:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 8ms, Average = 2ms

C:\Users\user>ping 2001:db8:acad:4::1

Pinging 2001:db8:acad:4::1 with 32 bytes of data:

Reply from 2001:db8:acad:4::1: time<1ms

Reply from 2001:db8:acad:4::1: time=1ms

Reply from 2001:db8:acad:4::1: time<1ms

Reply from 2001:db8:acad:4::1: time<1ms

Ping statistics for 2001:db8:acad:4::1:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\Users\user>ping 2001:db8:acad:4::2

Pinging 2001:db8:acad:4::2 with 32 bytes of data:

Reply from 2001:db8:acad:4::2: time=8ms

Reply from 2001:db8:acad:4::2: time=1ms

Reply from 2001:db8:acad:4::2: time=1ms

Reply from 2001:db8:acad:4::2: time=1ms

Ping statistics for 2001:db8:acad:4::2:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 1ms, Maximum = 8ms, Average = 2ms

C:\Users\user>ping 2001:db8:acad:5::1

Pinging 2001:db8:acad:5::1 with 32 bytes of data:

Reply from 2001:db8:acad:5::1: time=1ms

Reply from 2001:db8:acad:5::1: time<1ms

Reply from 2001:db8:acad:5::1: time=1ms

Reply from 2001:db8:acad:5::1: time=1ms

Ping statistics for 2001:db8:acad:5::1:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\Users\user>ping 2001:db8:acad:5::2

Pinging 2001:db8:acad:5::2 with 32 bytes of data:

Reply from 2001:db8:acad:5::2: time=8ms

Reply from 2001:db8:acad:5::2: time=1ms

Reply from 2001:db8:acad:5::2: time=1ms

Reply from 2001:db8:acad:5::2: time=1ms

Ping statistics for 2001:db8:acad:5::2:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 1ms, Maximum = 8ms, Average = 2ms

C:\Users\user>ping 2001:db8:acad:6::1

Pinging 2001:db8:acad:6::1 with 32 bytes of data:

Reply from 2001:db8:acad:6::1: time=1ms

Reply from 2001:db8:acad:6::1: time=1ms

Reply from 2001:db8:acad:6::1: time=1ms

Reply from 2001:db8:acad:6::1: time=1ms

Ping statistics for 2001:db8:acad:6::1:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\Users\user>ping 2001:db8:acad:6::2

Pinging 2001:db8:acad:6::2 with 32 bytes of data:

Reply from 2001:db8:acad:6::2: time=5ms

Reply from 2001:db8:acad:6::2: time=1ms

Reply from 2001:db8:acad:6::2: time=1ms

Reply from 2001:db8:acad:6::2: time=1ms

Ping statistics for 2001:db8:acad:6::2:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 1ms, Maximum = 5ms, Average = 2ms

C:\Users\user>ping 2001:db8:acad:7::1

Pinging 2001:db8:acad:7::1 with 32 bytes of data:

Reply from 2001:db8:acad:7::1: time=1ms

Reply from 2001:db8:acad:7::1: time=1ms

Reply from 2001:db8:acad:7::1: time=1ms

Reply from 2001:db8:acad:7::1: time=1ms

Ping statistics for 2001:db8:acad:7::1:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\Users\user>ping 2001:db8:acad:7::2

Pinging 2001:db8:acad:7::2 with 32 bytes of data:

Reply from 2001:db8:acad:7::2: time=4ms

Reply from 2001:db8:acad:7::2: time=1ms

Reply from 2001:db8:acad:7::2: time=1ms

Reply from 2001:db8:acad:7::2: time=1ms

Ping statistics for 2001:db8:acad:7::2:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 1ms, Maximum = 4ms, Average = 1ms

***Ip routes:***

IPv4

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R1:

10.0.0.0/8 is variably subnetted, 9 subnets, 2 masks

C 10.1.1.0/30 is directly connected, GigabitEthernet0/0/1

L 10.1.1.2/32 is directly connected, GigabitEthernet0/0/1

C 10.1.1.4/30 is directly connected, GigabitEthernet0/0/0

L 10.1.1.5/32 is directly connected, GigabitEthernet0/0/0

O 10.1.1.8/30 [110/2] via 10.1.1.6, 00:14:41, GigabitEthernet0/0/0

O IA 10.1.1.12/30 [110/3] via 10.1.1.6, 00:14:16, GigabitEthernet0/0/0

O IA 10.1.1.16/30 [110/4] via 10.1.1.6, 00:11:36, GigabitEthernet0/0/0

O IA 10.1.1.20/30 [110/5] via 10.1.1.6, 00:09:03, GigabitEthernet0/0/0

O IA 10.1.1.24/30 [110/6] via 10.1.1.6, 00:08:18, GigabitEthernet0/0/0

R2:

10.0.0.0/8 is variably subnetted, 9 subnets, 2 masks

O 10.1.1.0/30 [110/2] via 10.1.1.5, 00:17:48, GigabitEthernet0/0/1

C 10.1.1.4/30 is directly connected, GigabitEthernet0/0/1

L 10.1.1.6/32 is directly connected, GigabitEthernet0/0/1

C 10.1.1.8/30 is directly connected, GigabitEthernet0/0/0

L 10.1.1.9/32 is directly connected, GigabitEthernet0/0/0

O IA 10.1.1.12/30 [110/2] via 10.1.1.10, 00:15:28, GigabitEthernet0/0/0

O IA 10.1.1.16/30 [110/3] via 10.1.1.10, 00:12:48, GigabitEthernet0/0/0

O IA 10.1.1.20/30 [110/4] via 10.1.1.10, 00:10:15, GigabitEthernet0/0/0

O IA 10.1.1.24/30 [110/5] via 10.1.1.10, 00:09:30, GigabitEthernet0/0/0

R3:

10.0.0.0/8 is variably subnetted, 9 subnets, 2 masks

O 10.1.1.0/30 [110/3] via 10.1.1.9, 00:16:45, GigabitEthernet0/0/1

O 10.1.1.4/30 [110/2] via 10.1.1.9, 00:16:45, GigabitEthernet0/0/1

C 10.1.1.8/30 is directly connected, GigabitEthernet0/0/1

L 10.1.1.10/32 is directly connected, GigabitEthernet0/0/1

C 10.1.1.12/30 is directly connected, GigabitEthernet0/0/0

L 10.1.1.13/32 is directly connected, GigabitEthernet0/0/0

O IA 10.1.1.16/30 [110/2] via 10.1.1.14, 00:13:55, GigabitEthernet0/0/0

O IA 10.1.1.20/30 [110/3] via 10.1.1.14, 00:11:22, GigabitEthernet0/0/0

O IA 10.1.1.24/30 [110/4] via 10.1.1.14, 00:10:37, GigabitEthernet0/0/0

R4:

10.0.0.0/8 is variably subnetted, 9 subnets, 2 masks

O IA 10.1.1.0/30 [110/4] via 10.1.1.13, 00:16:57, GigabitEthernet0/0/1

O IA 10.1.1.4/30 [110/3] via 10.1.1.13, 00:16:57, GigabitEthernet0/0/1

O IA 10.1.1.8/30 [110/2] via 10.1.1.13, 00:16:57, GigabitEthernet0/0/1

C 10.1.1.12/30 is directly connected, GigabitEthernet0/0/1

L 10.1.1.14/32 is directly connected, GigabitEthernet0/0/1

C 10.1.1.16/30 is directly connected, GigabitEthernet0/0/0

L 10.1.1.17/32 is directly connected, GigabitEthernet0/0/0

O 10.1.1.20/30 [110/2] via 10.1.1.18, 00:13:29, GigabitEthernet0/0/0

O 10.1.1.24/30 [110/3] via 10.1.1.18, 00:13:29, GigabitEthernet0/0/0

R5:

10.0.0.0/8 is variably subnetted, 9 subnets, 2 masks

O IA 10.1.1.0/30 [110/5] via 10.1.1.17, 00:17:09, GigabitEthernet0/0/1

O IA 10.1.1.4/30 [110/4] via 10.1.1.17, 00:17:09, GigabitEthernet0/0/1

O IA 10.1.1.8/30 [110/3] via 10.1.1.17, 00:17:09, GigabitEthernet0/0/1

O IA 10.1.1.12/30 [110/2] via 10.1.1.17, 00:17:09, GigabitEthernet0/0/1

C 10.1.1.16/30 is directly connected, GigabitEthernet0/0/1

L 10.1.1.18/32 is directly connected, GigabitEthernet0/0/1

C 10.1.1.20/30 is directly connected, GigabitEthernet0/0/0

L 10.1.1.21/32 is directly connected, GigabitEthernet0/0/0

O 10.1.1.24/30 [110/2] via 10.1.1.22, 00:14:31, GigabitEthernet0/0/0

R6:

10.0.0.0/8 is variably subnetted, 9 subnets, 2 masks

O IA 10.1.1.0/30 [110/6] via 10.1.1.21, 00:15:44, GigabitEthernet0/0/1

O IA 10.1.1.4/30 [110/5] via 10.1.1.21, 00:15:44, GigabitEthernet0/0/1

O IA 10.1.1.8/30 [110/4] via 10.1.1.21, 00:15:44, GigabitEthernet0/0/1

O IA 10.1.1.12/30 [110/3] via 10.1.1.21, 00:15:44, GigabitEthernet0/0/1

O 10.1.1.16/30 [110/2] via 10.1.1.21, 00:15:44, GigabitEthernet0/0/1

C 10.1.1.20/30 is directly connected, GigabitEthernet0/0/1

L 10.1.1.22/32 is directly connected, GigabitEthernet0/0/1

C 10.1.1.24/30 is directly connected, GigabitEthernet0/0/0

L 10.1.1.25/32 is directly connected, GigabitEthernet0/0/0

IPv6

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R1:

C 2001:DB8:ACAD:1::/64 [0/0]

via GigabitEthernet0/0/1, directly connected

L 2001:DB8:ACAD:1::2/128 [0/0]

via GigabitEthernet0/0/1, receive

C 2001:DB8:ACAD:2::/64 [0/0]

via GigabitEthernet0/0/0, directly connected

L 2001:DB8:ACAD:2::1/128 [0/0]

via GigabitEthernet0/0/0, receive

O 2001:DB8:ACAD:3::/64 [110/2]

via FE80::2, GigabitEthernet0/0/0

OI 2001:DB8:ACAD:4::/64 [110/3]

via FE80::2, GigabitEthernet0/0/0

OI 2001:DB8:ACAD:5::/64 [110/4]

via FE80::2, GigabitEthernet0/0/0

OI 2001:DB8:ACAD:6::/64 [110/5]

via FE80::2, GigabitEthernet0/0/0

OI 2001:DB8:ACAD:7::/64 [110/6]

via FE80::2, GigabitEthernet0/0/0

L FF00::/8 [0/0]

via Null0, receive

R2:

O 2001:DB8:ACAD:1::/64 [110/2]

via FE80::1, GigabitEthernet0/0/1

C 2001:DB8:ACAD:2::/64 [0/0]

via GigabitEthernet0/0/1, directly connected

L 2001:DB8:ACAD:2::2/128 [0/0]

via GigabitEthernet0/0/1, receive

C 2001:DB8:ACAD:3::/64 [0/0]

via GigabitEthernet0/0/0, directly connected

L 2001:DB8:ACAD:3::1/128 [0/0]

via GigabitEthernet0/0/0, receive

OI 2001:DB8:ACAD:4::/64 [110/2]

via FE80::2, GigabitEthernet0/0/0

OI 2001:DB8:ACAD:5::/64 [110/3]

via FE80::2, GigabitEthernet0/0/0

OI 2001:DB8:ACAD:6::/64 [110/4]

via FE80::2, GigabitEthernet0/0/0

OI 2001:DB8:ACAD:7::/64 [110/5]

via FE80::2, GigabitEthernet0/0/0

L FF00::/8 [0/0]

via Null0, receive

R3:

O 2001:DB8:ACAD:1::/64 [110/3]

via FE80::1, GigabitEthernet0/0/1

O 2001:DB8:ACAD:2::/64 [110/2]

via FE80::1, GigabitEthernet0/0/1

C 2001:DB8:ACAD:3::/64 [0/0]

via GigabitEthernet0/0/1, directly connected

L 2001:DB8:ACAD:3::2/128 [0/0]

via GigabitEthernet0/0/1, receive

C 2001:DB8:ACAD:4::/64 [0/0]

via GigabitEthernet0/0/0, directly connected

L 2001:DB8:ACAD:4::1/128 [0/0]

via GigabitEthernet0/0/0, receive

OI 2001:DB8:ACAD:5::/64 [110/2]

via FE80::2, GigabitEthernet0/0/0

OI 2001:DB8:ACAD:6::/64 [110/3]

via FE80::2, GigabitEthernet0/0/0

OI 2001:DB8:ACAD:7::/64 [110/4]

via FE80::2, GigabitEthernet0/0/0

L FF00::/8 [0/0]

via Null0, receive

R4:

OI 2001:DB8:ACAD:1::/64 [110/4]

via FE80::1, GigabitEthernet0/0/1

OI 2001:DB8:ACAD:2::/64 [110/3]

via FE80::1, GigabitEthernet0/0/1

OI 2001:DB8:ACAD:3::/64 [110/2]

via FE80::1, GigabitEthernet0/0/1

C 2001:DB8:ACAD:4::/64 [0/0]

via GigabitEthernet0/0/1, directly connected

L 2001:DB8:ACAD:4::2/128 [0/0]

via GigabitEthernet0/0/1, receive

C 2001:DB8:ACAD:5::/64 [0/0]

via GigabitEthernet0/0/0, directly connected

L 2001:DB8:ACAD:5::1/128 [0/0]

via GigabitEthernet0/0/0, receive

O 2001:DB8:ACAD:6::/64 [110/2]

via FE80::2, GigabitEthernet0/0/0

O 2001:DB8:ACAD:7::/64 [110/3]

via FE80::2, GigabitEthernet0/0/0

L FF00::/8 [0/0]

via Null0, receive

R5:

OI 2001:DB8:ACAD:1::/64 [110/5]

via FE80::1, GigabitEthernet0/0/1

OI 2001:DB8:ACAD:2::/64 [110/4]

via FE80::1, GigabitEthernet0/0/1

OI 2001:DB8:ACAD:3::/64 [110/3]

via FE80::1, GigabitEthernet0/0/1

OI 2001:DB8:ACAD:4::/64 [110/2]

via FE80::1, GigabitEthernet0/0/1

C 2001:DB8:ACAD:5::/64 [0/0]

via GigabitEthernet0/0/1, directly connected

L 2001:DB8:ACAD:5::2/128 [0/0]

via GigabitEthernet0/0/1, receive

C 2001:DB8:ACAD:6::/64 [0/0]

via GigabitEthernet0/0/0, directly connected

L 2001:DB8:ACAD:6::1/128 [0/0]

via GigabitEthernet0/0/0, receive

O 2001:DB8:ACAD:7::/64 [110/2]

via FE80::2, GigabitEthernet0/0/0

L FF00::/8 [0/0]

via Null0, receive

R6:

OI 2001:DB8:ACAD:1::/64 [110/6]

via FE80::1, GigabitEthernet0/0/1

OI 2001:DB8:ACAD:2::/64 [110/5]

via FE80::1, GigabitEthernet0/0/1

OI 2001:DB8:ACAD:3::/64 [110/4]

via FE80::1, GigabitEthernet0/0/1

OI 2001:DB8:ACAD:4::/64 [110/3]

via FE80::1, GigabitEthernet0/0/1

O 2001:DB8:ACAD:5::/64 [110/2]

via FE80::1, GigabitEthernet0/0/1

C 2001:DB8:ACAD:6::/64 [0/0]

via GigabitEthernet0/0/1, directly connected

L 2001:DB8:ACAD:6::2/128 [0/0]

via GigabitEthernet0/0/1, receive

C 2001:DB8:ACAD:7::/64 [0/0]

via GigabitEthernet0/0/0, directly connected

L 2001:DB8:ACAD:7::1/128 [0/0]

via GigabitEthernet0/0/0, receive

L FF00::/8 [0/0]

via Null0, receive

***Router 1 Config:***

hostname r1

boot-start-marker

boot-end-marker

vrf definition Mgmt-intf

address-family ipv4

exit-address-family

address-family ipv6

exit-address-family

no aaa new-model

ipv6 unicast-routing

subscriber templating

multilink bundle-name authenticated

license udi pid ISR4321/K9 sn FDO214421CF

spanning-tree extend system-id

redundancy

mode none

vlan internal allocation policy ascending

interface Loopback0

ip address 192.168.1.1 255.255.255.0

ip ospf 10 area 0

ipv6 address 2001:DB8:1::1/64

ipv6 ospf 10 area 0

interface GigabitEthernet0/0/0

ip address 10.1.1.5 255.255.255.252

ip ospf 10 area 1

negotiation auto

ipv6 address FE80::1 link-local

ipv6 address 2001:DB8:ACAD:2::1/64

ipv6 ospf 10 area 1

interface GigabitEthernet0/0/1

ip address 10.1.1.2 255.255.255.252

ip ospf 10 area 1

negotiation auto

ipv6 address 2001:DB8:ACAD:1::2/64

ipv6 ospf 10 area 1

interface Serial0/1/0

no ip address

interface Serial0/1/1

no ip address

interface GigabitEthernet0

vrf forwarding Mgmt-intf

no ip address

negotiation auto

interface Vlan1

no ip address

router ospf 10

router-id 1.1.1.1

network 10.1.1.0 0.0.0.3 area 1

network 10.1.1.4 0.0.0.3 area 1

ip forward-protocol nd

no ip http server

no ip http secure-server

ip tftp source-interface GigabitEthernet0

ip route 0.0.0.0 0.0.0.0 GigabitEthernet0/0/0

ipv6 router ospf 10

router-id 1.1.1.1

control-plane

line con 0

logging synchronous

stopbits 1

line aux 0

stopbits 1

line vty 0 4

login

End

***Router 2 Config:***

hostname r2

boot-start-marker

boot-end-marker

vrf definition Mgmt-intf

address-family ipv4

exit-address-family

address-family ipv6

exit-address-family

no aaa new-model

ipv6 unicast-routing

subscriber templating

multilink bundle-name authenticated

license udi pid ISR4321/K9 sn FDO211216BL

spanning-tree extend system-id

redundancy

mode none

vlan internal allocation policy ascending

interface Loopback0

ip address 192.168.2.1 255.255.255.0

ip ospf 10 area 0

ipv6 address 2001:DB8:2::1/64

ipv6 ospf 10 area 1

interface GigabitEthernet0/0/0

ip address 10.1.1.9 255.255.255.252

ip ospf 10 area 1

negotiation auto

ipv6 address FE80::1 link-local

ipv6 address 2001:DB8:ACAD:3::1/64

ipv6 ospf 10 area 1

interface GigabitEthernet0/0/1

ip address 10.1.1.6 255.255.255.252

ip ospf 10 area 1

negotiation auto

ipv6 address FE80::2 link-local

ipv6 address 2001:DB8:ACAD:2::2/64

ipv6 ospf 10 area 1

interface Serial0/1/0

no ip address

interface Serial0/1/1

no ip address

interface GigabitEthernet0

vrf forwarding Mgmt-intf

no ip address

negotiation auto

interface Vlan1

no ip address

router ospf 10

router-id 2.2.2.2

network 10.1.1.4 0.0.0.3 area 1

network 10.1.1.8 0.0.0.3 area 1

ip forward-protocol nd

no ip http server

no ip http secure-server

ip tftp source-interface GigabitEthernet0

ipv6 router ospf 10

router-id 2.2.2.2

control-plane

line con 0

logging synchronous

stopbits 1

line aux 0

stopbits 1

line vty 0 4

login

End

***Router 3 Config:***

hostname r3

boot-start-marker

boot-end-marker

vrf definition Mgmt-intf

address-family ipv4

exit-address-family

address-family ipv6

exit-address-family

no aaa new-model

ipv6 unicast-routing

subscriber templating

vtp domain cisco

vtp mode transparent

multilink bundle-name authenticated

license udi pid ISR4321/K9 sn FDO214420G7

spanning-tree extend system-id

redundancy

mode none

vlan internal allocation policy ascending

vlan 10,20

interface Loopback0

ip address 192.168.3.1 255.255.255.0

ipv6 address 2001:DB8:3::1/64

ipv6 ospf 10 area 1

interface GigabitEthernet0/0/0

ip address 10.1.1.13 255.255.255.252

ip ospf 10 area 1

negotiation auto

ipv6 address FE80::1 link-local

ipv6 address 2001:DB8:ACAD:4::1/64

ipv6 ospf 10 area 1

interface GigabitEthernet0/0/1

ip address 10.1.1.10 255.255.255.252

ip ospf 10 area 1

negotiation auto

ipv6 address FE80::2 link-local

ipv6 address 2001:DB8:ACAD:3::2/64

ipv6 ospf 10 area 1

interface Serial0/1/0

no ip address

shutdown

interface Serial0/1/1

no ip address

shutdown

interface GigabitEthernet0

vrf forwarding Mgmt-intf

no ip address

shutdown

negotiation auto

interface Vlan1

no ip address

shutdown

router ospf 10

router-id 3.3.3.3

redistribute bgp 100 subnets

network 10.1.1.8 0.0.0.3 area 1

network 10.1.1.12 0.0.0.3 area 1

network 192.168.4.0 0.0.0.255 area 1

router bgp 100

bgp router-id 3.3.3.3

bgp log-neighbor-changes

no bgp default ipv4-unicast

neighbor 10.1.1.14 remote-as 200

neighbor 2001:DB8:ACAD:4::2 remote-as 200

address-family ipv4

network 10.1.1.8

network 10.1.1.12

network 192.168.3.0

redistribute ospf 10

neighbor 10.1.1.14 activate

exit-address-family

address-family ipv6

redistribute ospf 10

network 2001:DB8:3::/64

network 2001:DB8:ACAD:3::/64

network 2001:DB8:ACAD:4::/64

neighbor 2001:DB8:ACAD:4::2 activate

exit-address-family

ip forward-protocol nd

no ip http server

no ip http secure-server

ip tftp source-interface GigabitEthernet0

ipv6 router ospf 10

redistribute bgp 100 metric 10000

control-plane

line con 0

logging synchronous

stopbits 1

line aux 0

stopbits 1

line vty 0 4

login

End

***Router 4 Config:***

hostname r4

boot-start-marker

boot-end-marker

vrf definition Mgmt-intf

address-family ipv4

exit-address-family

address-family ipv6

exit-address-family

no aaa new-model

ipv6 unicast-routing

subscriber templating

vtp domain cisco

vtp mode transparent

multilink bundle-name authenticated

license udi pid ISR4321/K9 sn FDO21442B21

spanning-tree extend system-id

redundancy

mode none

vlan internal allocation policy ascending

vlan 10,20

interface Loopback0

ip address 192.168.4.1 255.255.255.0

ipv6 address 2001:DB8:4::1/64

ipv6 eigrp 10

interface GigabitEthernet0/0/0

ip address 10.1.1.17 255.255.255.252

negotiation auto

ipv6 address FE80::1 link-local

ipv6 address 2001:DB8:ACAD:5::1/64

ipv6 eigrp 10

interface GigabitEthernet0/0/1

ip address 10.1.1.14 255.255.255.252

negotiation auto

ipv6 address FE80::2 link-local

ipv6 address 2001:DB8:ACAD:4::2/64

ipv6 eigrp 10

interface Serial0/1/0

no ip address

shutdown

interface Serial0/1/1

no ip address

shutdown

interface GigabitEthernet0/2/0

no ip address

shutdown

negotiation auto

interface GigabitEthernet0/2/1

no ip address

shutdown

negotiation auto

interface GigabitEthernet0

vrf forwarding Mgmt-intf

no ip address

shutdown

negotiation auto

interface Vlan1

no ip address

shutdown

router eigrp 10

network 10.1.1.12 0.0.0.3

network 10.1.1.16 0.0.0.3

network 192.168.4.0

redistribute bgp 200 metric 10000 100 255 1 1500

eigrp router-id 4.4.4.4

router bgp 200

bgp router-id 4.4.4.4

bgp log-neighbor-changes

no bgp default ipv4-unicast

neighbor 10.1.1.13 remote-as 100

neighbor 2001:DB8:ACAD:4::1 remote-as 100

address-family ipv4

network 10.1.1.12

network 10.1.1.16

network 192.168.4.0

redistribute eigrp 10

neighbor 10.1.1.13 activate

exit-address-family

address-family ipv6

redistribute eigrp 10

network 2001:DB8:4::/64

network 2001:DB8:ACAD:4::/64

network 2001:DB8:ACAD:5::/64

neighbor 2001:DB8:ACAD:4::1 activate

exit-address-family

ip forward-protocol nd

no ip http server

no ip http secure-server

ip tftp source-interface GigabitEthernet0

ipv6 router eigrp 10

eigrp router-id 4.4.4.4

redistribute bgp 200 metric 10000 100 255 1 1500

control-plane

line con 0

stopbits 1

line aux 0

stopbits 1

line vty 0 4

login

End

***Router 5 Config:***

hostname r5

boot-start-marker

boot-end-marker

vrf definition Mgmt-intf

address-family ipv4

exit-address-family

address-family ipv6

exit-address-family

no aaa new-model

login on-success log

subscriber templating

ipv6 unicast-routing

multilink bundle-name authenticated

crypto pki trustpoint TP-self-signed-2270144787

enrollment selfsigned

subject-name cn=IOS-Self-Signed-Certificate-2270144787

revocation-check none

rsakeypair TP-self-signed-2270144787

crypto pki certificate chain TP-self-signed-2270144787

certificate self-signed 01

30820330 30820218 A0030201 02020101 300D0609 2A864886 F70D0101 05050030

31312F30 2D060355 04031326 494F532D 53656C66 2D536967 6E65642D 43657274

69666963 6174652D 32323730 31343437 3837301E 170D3232 31303034 31373131

31365A17 0D333030 31303130 30303030 305A3031 312F302D 06035504 03132649

4F532D53 656C662D 5369676E 65642D43 65727469 66696361 74652D32 32373031

34343738 37308201 22300D06 092A8648 86F70D01 01010500 0382010F 00308201

0A028201 010091E8 5CF43324 EA2305CE 23C2325C 83678A2D DE8D1401 51469202

59875EB1 5D8DE3CF 78D89071 548D190D 00EF5934 23590721 336301B4 1D88516A

0CA96593 95015667 8A26676F FC29D2F0 A0C2F8F5 0781577A A1563569 4C943075

0ECC2A3F D30346F5 6EC533EF 310E2F2B 5A8D9B48 969D6BB9 5F294C9D 63003545

39C20BE8 9125EA82 B3D08B5B 142B3057 9861A7BD A6D567B6 5189FCDA 330FB57A

F5D075DF AC71CD04 A13EC59F FE3C7467 1ACA7D98 04307A32 78706A1E 20038921

C1BE87EB A2D2A8CA AE0DFF11 5BF1C70F B9D68407 EB0DF639 ED576D60 3FD7AFAF

A51E5B93 5ACAA2C4 B6EC8888 1EA47A19 81FEDD41 B1488D92 2D151114 D28E7205

17F0A305 B01F0203 010001A3 53305130 0F060355 1D130101 FF040530 030101FF

301F0603 551D2304 18301680 14C7CF9E 415237A9 33310B8C E9409253 39567120

DF301D06 03551D0E 04160414 C7CF9E41 5237A933 310B8CE9 40925339 567120DF

300D0609 2A864886 F70D0101 05050003 82010100 87BE5C4F 6AA01F83 FA617820

AAE4775C FEBCCB11 2CC1E111 50F3D928 23F36BF7 3250F0B4 021A078E 64F7BDEF

42078020 3132A015 F4F7B8BE B8B83A84 ECD21655 09C22E00 0A9901AF 06BDDF71

D8271D7D 8EFB24FA 9F2F319D 9C14F6EB 7E903988 C79C7629 C405A8B5 A23AD369

45E9EEC8 F06C2EF2 B9F7BDEF 3074F3C4 2EC1CE63 C178FCFF 31A93952 A6F01595

31BFBBC7 79E0D03A 2826063A 029335F3 F6927134 18369249 A3811CDE 67490D79

5E978487 DB17F64C EAEAB46B 86ADCB1A 28BFC35D 175AE9E4 F45851E6 CDD19B87

2C44D926 B069E503 FA9E8BF0 7626C530 CD7560EB 60370D7E 57AD4E3D 3114B04C

68933BC5 3709FBE7 D787B776 A78BF200 AB3934D4

quit

license udi pid ISR4321/K9 sn FLM24060912

no license smart enable

diagnostic bootup level minimal

spanning-tree extend system-id

redundancy

mode none

interface Loopback0

ip address 192.168.5.1 255.255.255.0

ipv6 address 2001:DB8:5::1/64

ipv6 eigrp 10

interface GigabitEthernet0/0/0

ip address 10.1.1.21 255.255.255.252

negotiation auto

ipv6 address FE80::1 link-local

ipv6 address 2001:DB8:ACAD:6::1/64

ipv6 enable

ipv6 eigrp 10

interface GigabitEthernet0/0/1

ip address 10.1.1.18 255.255.255.252

negotiation auto

ipv6 address FE80::2 link-local

ipv6 address 2001:DB8:ACAD:5::2/64

ipv6 enable

ipv6 eigrp 10

interface GigabitEthernet0/2/0

no ip address

shutdown

negotiation auto

interface GigabitEthernet0/2/1

no ip address

shutdown

negotiation auto

interface GigabitEthernet0

vrf forwarding Mgmt-intf

no ip address

shutdown

negotiation auto

router eigrp 10

network 10.1.1.16 0.0.0.3

network 10.1.1.20 0.0.0.3

ip forward-protocol nd

ip http server

ip http authentication local

ip http secure-server

ip tftp source-interface GigabitEthernet0

ipv6 router eigrp 10

eigrp router-id 5.5.5.5

control-plane

line con 0

transport input none

stopbits 1

line aux 0

stopbits 1

line vty 0 4

login

End

***Router 6 Config:***

hostname r6

boot-start-marker

boot-end-marker

vrf definition Mgmt-intf

address-family ipv4

exit-address-family

address-family ipv6

exit-address-family

no aaa new-model

login on-success log

subscriber templating

ipv6 unicast-routing

multilink bundle-name authenticated

crypto pki trustpoint TP-self-signed-4144679456

enrollment selfsigned

subject-name cn=IOS-Self-Signed-Certificate-4144679456

revocation-check none

rsakeypair TP-self-signed-4144679456

crypto pki certificate chain TP-self-signed-4144679456

certificate self-signed 01

30820330 30820218 A0030201 02020101 300D0609 2A864886 F70D0101 05050030

31312F30 2D060355 04031326 494F532D 53656C66 2D536967 6E65642D 43657274

69666963 6174652D 34313434 36373934 3536301E 170D3232 31303034 31373138

31365A17 0D333030 31303130 30303030 305A3031 312F302D 06035504 03132649

4F532D53 656C662D 5369676E 65642D43 65727469 66696361 74652D34 31343436

37393435 36308201 22300D06 092A8648 86F70D01 01010500 0382010F 00308201

0A028201 010087CC 266FCB7F CBF7B4EE 138D3485 B2401F70 519C8EDA B5D1E5EC

D3C8D992 21065BCF 869991E0 795A9990 E7E8D247 1D55DCF8 EF12BE1F F6C8CB1E

17C6FEEE 8E10B242 D2C0E98D 679DC16A 9D5D11C6 9617EA8C 2845DC66 21251470

59442738 719AB69D C0F3311E DF116EB7 C6C223E4 A6C06D3D A822AAB8 91369FC1

679B9582 E8BFC5EE 070945EC 4E6E2D5C C4820706 F40E5C42 A0F02B86 7A471330

516082A5 91C02659 F5591812 1B85EDEF 58693D0E 3D1334D8 AA3010BA 12CBB929

E1D7B9B3 2FD29D3E 15A7F473 42A17035 05FE7F9E CA973314 389BADD9 04910E99

EE3904C5 4B5D4BE0 47D895EE 91B0A71A 77181933 A2F0AECB 740E5100 3414F677

5D86C36F 5C7B0203 010001A3 53305130 0F060355 1D130101 FF040530 030101FF

301F0603 551D2304 18301680 14BEAF09 270773AD 4353C83A 6020F1BC 0A05B90D

5E301D06 03551D0E 04160414 BEAF0927 0773AD43 53C83A60 20F1BC0A 05B90D5E

300D0609 2A864886 F70D0101 05050003 82010100 8142B8C1 5EA90A17 2A9D2B3E

C44BA6C1 F460EB6E 1F465E6E 8F0A8EEB 3DB59EDC 80AEDC55 4C38F05A 6CA34F3B

E9CB5D16 B072846A F56E988F 7535D239 77595A89 C828E3AF AA8BF4E2 A796B46F

9819500F 69A36EC0 579C9FB1 971AB1AA 090EF2A7 B9ECA02B E1E64147 03ADAB1A

256F3FD4 E9D768D7 0FED6A34 4825B486 F874025A 3952BA2D FC251D67 216E38CB

B45C6CCD 7B15BB04 6656DA4E 381FE2F5 1F5467E5 172B3945 D3F40EC0 9F2623AB

BD73FFAC EC51537D CF073BF9 41C32E30 78EFBDB9 FEA8D7D1 5C205F0F F68822B6

5FED0266 1060C191 1427F936 DD2076EC 389828DF 819BB112 FF2F4814 3D208BDF

A38EABA2 87CA8C8E 4000A356 413FCE86 0D7415F9

quit

license udi pid ISR4321/K9 sn FLM2408005M

no license smart enable

diagnostic bootup level minimal

spanning-tree extend system-id

redundancy

mode none

interface Loopback0

ip address 192.168.6.1 255.255.255.0

ipv6 address 2001:DB8:6::1/64

ipv6 eigrp 10

interface GigabitEthernet0/0/0

ip address 10.1.1.25 255.255.255.252

negotiation auto

ipv6 address FE80::1 link-local

ipv6 address 2001:DB8:ACAD:7::1/64

ipv6 enable

ipv6 eigrp 10

interface GigabitEthernet0/0/1

ip address 10.1.1.22 255.255.255.252

negotiation auto

ipv6 address FE80::2 link-local

ipv6 address 2001:DB8:ACAD:6::2/64

ipv6 enable

ipv6 eigrp 10

interface GigabitEthernet0/2/0

no ip address

shutdown

negotiation auto

interface GigabitEthernet0/2/1

no ip address

shutdown

negotiation auto

interface GigabitEthernet0

vrf forwarding Mgmt-intf

no ip address

shutdown

negotiation auto

router eigrp 10

network 10.1.1.20 0.0.0.3

network 10.1.1.24 0.0.0.3

eigrp router-id 6.6.6.6

ip forward-protocol nd

ip http server

ip http authentication local

ip http secure-server

ip tftp source-interface GigabitEthernet0

ipv6 router eigrp 10

eigrp router-id 6.6.6.6

control-plane

line con 0

transport input none

stopbits 1

line aux 0

stopbits 1

line vty 0 4

login

End

Problems

While setting up BGP for Ipv4 went very smoothly, we ran into a lot of problems when configuring BGP for Ipv6. This was because we only configured BGP on the interfaces between routers 3 and 4. This was fixed by configuring OSPF on the g0/0/1 interface of router 3 and EIGRP on the interface g0/0/0 of router 4. Another problem that we had was we realized that BGP has Ipv4 unicast on by default which is another reason why Ipv6 routes weren’t being shared across BGP. This was fixed by using the command “no bgp default ipv4-unicast”. The problem that we had with EIGRP was the use of metrics which wasn’t something that was configured for OSPF. This was fixed by learning how metrics worked and configuring a metric for EIGRP routes.

Conclusion

In this lab, we connected an OSPF and EIGRP network together using BPG for both Ipv4 and Ipv6. Six routers were connected linearly and routers 1 through 3 were configured with OSPF while routers 4 through 6 were configured with EIGRP. BGP was configured on routers 3 and 4 to redistribute OSPF and EIGRP information to BGP and vice versa. The main problem we ran into in this lab was configuring BGP for Ipv6. Functionality of the network was confirmed at the end by checking the IP routes on each router as well as pinging across the network by connecting end devices on separate ends of the network.