Purpose:

The purpose of this lab is to configure areas of OSPF and EIGRP with an area of BGP in between those two areas. It was originally supposed to be using both IPv4 and IPv6 but configuring BGP IPv6 is impossible on packet tracer, so I did IPv4 across the areas and IPv6 in the OSPF and EIGRP areas.

Background:

BGP stands for Border Gateway Protocol and it is an Internet Engineering Task Force. BGP is used to exchange routing and reachability information between systems on the Internet. The Internet on this lab would be the OSPF area and the EIGRP area. BGP is used more in the real world because most of the time in the real world, it is better to have a route go the best way rather than the route going the fastest way. BGP determines the best route for the packet to go while OSPF chooses the fastest way. One way that speed is sometimes not better than the best way, is that sometimes the packet could get lost or the packet could be vulnerable to be able to be stolen by a man in the middle attack. A man in the middle attack is when someone steals a packet, takes the information, then sends it back to the person without the person knowing that they took it. With BGP, it may take longer to send the packet, but at least the packet will be safe from being stolen or lost. The reason we don’t always use BGP is because sometimes it doesn’t matter how safe it needs to be, it just needs to get there quickly. And, BGP usually isn’t the easiest thing to set up so things like OSPF and EIGRP are usually used by people who are first learning the routing protocols because they are the easiest to learn. BGP is not about how to get to the internet but telling how the clients can reach you and your specific server. BGP is also used for when you are hosting a website, and the link goes down, you can use the benefits of BGP to advertise the prefixes through another service provider so that your clients can access your services through them.

Lab Summary:

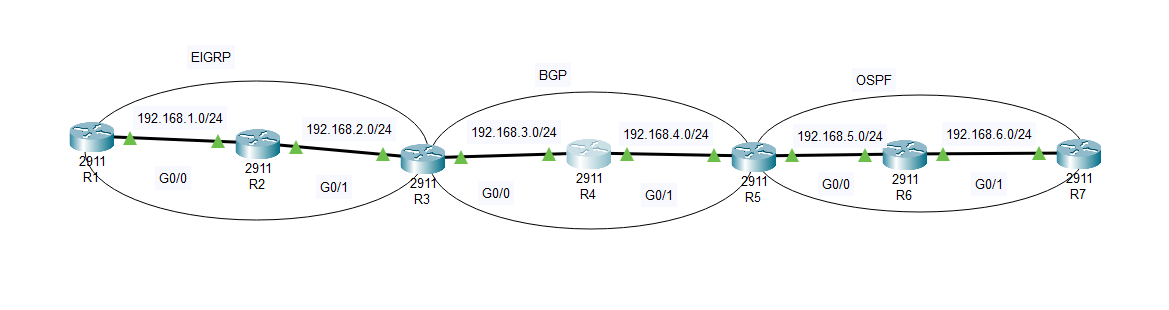
I set up a total of 7 routers and 3 areas. Each area had 3 routers in it. The first area was EIGRP, the second area was BGP and the third area was OSPF.

Lab Commands:

|  |  |
| --- | --- |
| Router BGP \_\_ | This command gets into the routing protocol of BGP |
| Neighbor \_\_ Remote-as \_\_ | This command manually sets the neighbor of a BGP router. |
| Redistribute eigrp 1 | This helps the EIGRP area connect with the BGP area by sharing the routes with the BGP area. |

Every other “unique” command has been done before

Network Diagram:



Configurations:

interface GigabitEthernet0/0

ip address 192.168.1.1 255.255.255.0

duplex auto

speed auto

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

ipv6 eigrp 1

interface GigabitEthernet0/1

no ip address

duplex auto

speed auto

shutdown

interface GigabitEthernet0/2

no ip address

duplex auto

speed auto

shutdown

interface Vlan1

no ip address

shutdown

router eigrp 1

network 192.168.1.0

ipv6 router eigrp 1

eigrp router-id 1.1.1.1

no shutdown

Gateway of last resort is not set

192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.1.0/24 is directly connected, GigabitEthernet0/0

L 192.168.1.1/32 is directly connected, GigabitEthernet0/0

D 192.168.2.0/24 [90/3072] via 192.168.1.2, 00:09:06, GigabitEthernet0/0

D EX 192.168.3.0/24 [170/2644992] via 192.168.1.2, 00:09:06, GigabitEthernet0/0

D EX 192.168.4.0/24 [170/2644992] via 192.168.1.2, 00:09:06, GigabitEthernet0/0

D EX 192.168.5.0/24 [170/2644992] via 192.168.1.2, 00:08:07, GigabitEthernet0/0

D EX 192.168.6.0/24 [170/2644992] via 192.168.1.2, 00:08:07, GigabitEthernet0/0

Router 2:

interface GigabitEthernet0/0

ip address 192.168.1.2 255.255.255.0

duplex auto

speed auto

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

ipv6 eigrp 1

interface GigabitEthernet0/1

ip address 192.168.2.1 255.255.255.0

duplex auto

speed auto

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

ipv6 eigrp 1

interface GigabitEthernet0/2

no ip address

duplex auto

speed auto

shutdown

interface Vlan1

no ip address

shutdown

router eigrp 1

network 192.168.1.0

network 192.168.2.0

ipv6 router eigrp 1

eigrp router-id 2.2.2.2

no shutdown

Gateway of last resort is not set

192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.1.0/24 is directly connected, GigabitEthernet0/0

L 192.168.1.2/32 is directly connected, GigabitEthernet0/0

192.168.2.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.2.0/24 is directly connected, GigabitEthernet0/1

L 192.168.2.1/32 is directly connected, GigabitEthernet0/1

D EX 192.168.3.0/24 [170/2644736] via 192.168.2.2, 00:11:38, GigabitEthernet0/1

D EX 192.168.4.0/24 [170/2644736] via 192.168.2.2, 00:11:37, GigabitEthernet0/1

D EX 192.168.5.0/24 [170/2644736] via 192.168.2.2, 00:10:38, GigabitEthernet0/1

D EX 192.168.6.0/24 [170/2644736] via 192.168.2.2, 00:10:38, GigabitEthernet0/1

Router 3:

interface GigabitEthernet0/0

ip address 192.168.3.1 255.255.255.0

duplex auto

speed auto

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

interface GigabitEthernet0/1

ip address 192.168.2.2 255.255.255.0

duplex auto

speed auto

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

ipv6 eigrp 1

interface GigabitEthernet0/2

no ip address

duplex auto

speed auto

shutdown

interface Vlan1

no ip address

shutdown

router eigrp 1

redistribute bgp 100 metric 1000 33 255 1 1500

network 192.168.2.0

router bgp 100

bgp router-id 1.1.1.1

bgp log-neighbor-changes

no synchronization

neighbor 192.168.3.2 remote-as 200

network 192.168.3.0

redistribute eigrp 1

ipv6 router eigrp 1

eigrp router-id 3.3.3.3

no shutdown

Gateway of last resort is not set

D 192.168.1.0/24 [90/3072] via 192.168.2.1, 00:12:50, GigabitEthernet0/1

192.168.2.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.2.0/24 is directly connected, GigabitEthernet0/1

L 192.168.2.2/32 is directly connected, GigabitEthernet0/1

192.168.3.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.3.0/24 is directly connected, GigabitEthernet0/0

L 192.168.3.1/32 is directly connected, GigabitEthernet0/0

B 192.168.4.0/24 [20/0] via 192.168.3.2, 00:00:00

B 192.168.5.0/24 [20/0] via 192.168.3.2, 00:00:00

B 192.168.6.0/24 [20/0] via 192.168.3.2, 00:00:00

Router 4:

interface GigabitEthernet0/0

ip address 192.168.3.2 255.255.255.0

duplex auto

speed auto

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

interface GigabitEthernet0/1

ip address 192.168.4.1 255.255.255.0

duplex auto

speed auto

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

interface GigabitEthernet0/2

no ip address

duplex auto

speed auto

shutdown

interface Vlan1

no ip address

shutdown

router bgp 200

bgp log-neighbor-changes

no synchronization

neighbor 192.168.3.1 remote-as 100

neighbor 192.168.4.2 remote-as 300

network 192.168.3.0

network 192.168.4.0

Gateway of last resort is not set

B 192.168.1.0/24 [20/3072] via 192.168.3.1, 00:00:00

B 192.168.2.0/24 [20/2816] via 192.168.3.1, 00:00:00

192.168.3.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.3.0/24 is directly connected, GigabitEthernet0/0

L 192.168.3.2/32 is directly connected, GigabitEthernet0/0

192.168.4.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.4.0/24 is directly connected, GigabitEthernet0/1

L 192.168.4.1/32 is directly connected, GigabitEthernet0/1

B 192.168.5.0/24 [20/1] via 192.168.4.2, 00:00:00

B 192.168.6.0/24 [20/2] via 192.168.4.2, 00:00:00

Router 5:

interface GigabitEthernet0/0

ip address 192.168.5.1 255.255.255.0

ip ospf 1 area 3

duplex auto

speed auto

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

ipv6 ospf 1 area 3

interface GigabitEthernet0/1

ip address 192.168.4.2 255.255.255.0

duplex auto

speed auto

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

interface GigabitEthernet0/2

no ip address

duplex auto

speed auto

shutdown

router ospf 1

router-id 5.5.5.5

log-adjacency-changes

redistribute bgp 300 subnets

router bgp 300

bgp log-neighbor-changes

no synchronization

neighbor 192.168.4.1 remote-as 200

network 192.168.4.0

redistribute ospf 1

ipv6 router ospf 1

router-id 5.5.5.5

log-adjacency-changes

Gateway of last resort is not set

B 192.168.1.0/24 [20/0] via 192.168.4.1, 00:00:00

B 192.168.2.0/24 [20/0] via 192.168.4.1, 00:00:00

B 192.168.3.0/24 [20/0] via 192.168.4.1, 00:00:00

192.168.4.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.4.0/24 is directly connected, GigabitEthernet0/1

L 192.168.4.2/32 is directly connected, GigabitEthernet0/1

192.168.5.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.5.0/24 is directly connected, GigabitEthernet0/0

L 192.168.5.1/32 is directly connected, GigabitEthernet0/0

O 192.168.6.0/24 [110/2] via 192.168.5.2, 01:38:55, GigabitEthernet0/0

Router 6:

interface GigabitEthernet0/0

ip address 192.168.5.2 255.255.255.0

duplex auto

speed auto

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

ipv6 ospf 1 area 3

interface GigabitEthernet0/1

ip address 192.168.6.1 255.255.255.0

duplex auto

speed auto

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

ipv6 ospf 1 area 3

interface GigabitEthernet0/2

no ip address

duplex auto

speed auto

shutdown

interface Vlan1

no ip address

shutdown

router ospf 1

router-id 6.6.6.6

log-adjacency-changes

network 192.168.5.0 0.0.0.255 area 3

network 192.168.6.0 0.0.0.255 area 3

ipv6 router ospf 1

router-id 6.6.6.6

log-adjacency-changes

Gateway of last resort is not set

O E2 192.168.1.0/24 [110/20] via 192.168.5.1, 00:01:42, GigabitEthernet0/0

O E2 192.168.2.0/24 [110/20] via 192.168.5.1, 00:02:37, GigabitEthernet0/0

O E2 192.168.3.0/24 [110/20] via 192.168.5.1, 00:02:37, GigabitEthernet0/0

O E2 192.168.4.0/24 [110/20] via 192.168.5.1, 00:02:37, GigabitEthernet0/0

192.168.5.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.5.0/24 is directly connected, GigabitEthernet0/0

L 192.168.5.2/32 is directly connected, GigabitEthernet0/0

192.168.6.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.6.0/24 is directly connected, GigabitEthernet0/1

L 192.168.6.1/32 is directly connected, GigabitEthernet0/1

Router 7:

interface GigabitEthernet0/0

no ip address

duplex auto

speed auto

shutdown

interface GigabitEthernet0/1

ip address 192.168.6.2 255.255.255.0

ip ospf 1 area 3

duplex auto

speed auto

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

ipv6 ospf 1 area 3

interface GigabitEthernet0/2

no ip address

duplex auto

speed auto

shutdown

interface Vlan1

no ip address

shutdown

router ospf 1

router-id 7.7.7.7

log-adjacency-changes

ipv6 router ospf 1

router-id 7.7.7.7

log-adjacency-changes

Gateway of last resort is not set

O E2 192.168.1.0/24 [110/20] via 192.168.6.1, 00:02:45, GigabitEthernet0/1

O E2 192.168.2.0/24 [110/20] via 192.168.6.1, 01:40:56, GigabitEthernet0/1

O E2 192.168.3.0/24 [110/20] via 192.168.6.1, 01:40:56, GigabitEthernet0/1

O E2 192.168.4.0/24 [110/20] via 192.168.6.1, 01:41:12, GigabitEthernet0/1

O 192.168.5.0/24 [110/2] via 192.168.6.1, 01:41:12, GigabitEthernet0/1

192.168.6.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.168.6.0/24 is directly connected, GigabitEthernet0/1

L 192.168.6.2/32 is directly connected, GigabitEthernet0/1

Pings:

Ping from Router 7 to Router 1:

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 192.168.1.1, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/2/13 ms

Ping from Router 1 to Router 7

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 192.168.6.2, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/7/13 ms

Ping from Router 4 to Router 1:

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 192.168.1.1, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/2/11 ms

Ping from Router 4 to Router 7:

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 192.168.6.2, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

IPv6 ping from Router 1 to Router 3:

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 2001:acad:2::2, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/2/7 ms

IPv6 ping from Router 3 to Router 1:

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 2001:acad:1::1, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

IPv6 ping from Router 5 to Router 7:

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 2001:acad:6::2, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/3 ms

IPv6 ping from Router 7 to Router 5:

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 2001:acad:5::1, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/1/4 ms

Problems:

A problem I had was trying to get the IPv6 BGP to work. I looked up videos on how to do them, but when I put in the commands, they said that the command was unrecognized so now I know that Packet Tracer may not be the best simulation for the real world. Another problem I had was figuring out how to redistribute the routes. I tried to look back on the website that told me all of the metrics for the redistribution command, but the website was blocked. So, I had to look at the lab from before and do a show run on the correct router so I could find the metrics of the redistribute command so then I could do it with BGP. Other than that, it went pretty smoothly.

Conclusions:

This lab went smoothly and I was able to use my resources and was able to complete the lab with some ease. The only bumpy part was when I tried to do IPv6 BGP and the commands didn’t work. I was able to ping across areas with IPv4 and was able to ping within the EIGRP area and the OSPF area.