iBGP Lab

Purpose

For this lab, our goal was to set up iBGP on a network between OSPF and EIGRP. Through this lab, we learned a lot about iBGP and how it differs from eBGP in configuration and in use. By the end, we were able to successfully get iBGP, OSPF, and EIGRP working together and able to ping across the network.

Background Information

Lab Summary

In this lab, we set up OSPF, EIGRP, eBGP, and iBGP with IPv4 and IPv6. When we started this lab, the first step we took was to set up the PCs and each of the seven routers, with their respective IPv4 and IPv6 addresses. For OSPF, EIGRP, and eBGP, we started by setting up IPv4, testing to see if it works, and then setting up IPv6. We went and set up EIGRP on Routers 1 and 2, and Routers 6 and 7 with OSPF in Area 2. We then set up OSPF on the routers where we would configure iBGP, which were 3, 4, and 5. After this, we added Loopback interfaces to Router 3 and 5 and added them to OSPF. We tested that EIGRP and OSPF worked properly, and then we set up eBGP to connect Routers 1, 2, 6, and 7 to the iBGP network, with Router 2 being BGP 1, and Router 6 being BGP 5. Next, we began setup on iBGP with Routers 3, 4, and 5 in BGP 4, and made sure to add the Loopbacks to them. After initially setting it up, we then added redistribution lines to OSPF, EIGRP, and BGP, so they could all communicate with each other. After we tested that everything could ping each other, we then repeated the entire process for IPv6, which while not too different, gave us a lot of trouble. After that was set up and problem-free, we tested it again, and all the routers and PCs were able to ping each other.

Lab Commands

For this lab, we used many new commands to set up iBGP, while using others that we already knew to set up the routers, OSPF, and EIGRP. We started by using the “ip address” and “ipv6 address” commands to set up the ip addresses on each interface and the loopback interfaces, and then the “no shut” command to turn the interfaces on. After this, we used “router ospf 1” and “ipv6 router ospf 1” to set up OSPF, which were followed by “network” commands and setting up a router id with “router-id.” We then set up EIGRP with the command “router eigrp 100” and “ipv6 router eigrp 100,” and then its router id and networks with “eigrp router-id” and “network.” For IPv6 with OSPF and EIGRP, we made sure to add to each interface that needed it a “ipv6 router ospf 1” or “ipv6 eigrp 100” command. Next, we started with BGP by using “router bgp 2” on Router 2, “router bgp 4” on Routers 3 and 5, and “router bgp 5” on Router 6. Next, we created a router id by using “bgp router-id” and then we used “neighbor … remote-as” to let the router know about the other routers’ addresses. Next, we used the “neighbor … update-source Loopback0” command to set the source of where the BGP packets are being sent. We then set up an address family with “address-family ipv4” for IPv4 and “address-family ipv6” for IPv6. Under this, we added a network command “network” and we activated the neighbors with “neighbor … activate.” Next, we redistributed either OSPF or EIGRP depending on the router with “redistribute ospf” and “redistribute eigrp.” After this, we went into OSPF and EIGRP on the border routers of BGP and set up redistribution there with the “redistribute bgp” command. After setting up all these commands on the routers, we were able to get each area connected to each other with iBGP and eBGP and all the routers and PCs were able to ping each other.

Problems

In this lab, we started off very successfully with iBGP in iIPv4, but quickly ran into many problems with IPv6 that prevented the networks from connecting with one another. With IPv4, we only had one problem, which was a missing command. We were trying to figure out why our configurations were not working, so we looked online and found out that because we were using loopbacks, we had to add one extra command, which was “neighbor … update-source Loopback0.” After we set this command, iBGP was working with IPv4 and everything could ping across.

Because we had such an easy time with IPv4, we assumed that IPv6 would be just as easy, but we were wrong about that. One of our main problems was that almost nothing was connecting with each other through BGP. We were confused and looked through for a while, and we eventually found out that our problem was a very simple one. We had forgotten to add network statements to the IPv6 address family, and fixing that helped with most of our problems.

Our final problem that took a long time to figure out was that our middle router, or R4, could only see into one of the eBGP networks, but not the other. The PC on one side could ping through both eBGP networks, but the other could not ping the farther away one. We were able to quickly identify the problem for this, which was that R4 did not have a route to that network, but it was not as simple a problem as a missing network statement. After spending a lot of time struggling, we finally found the problem which was that the routers needed a neighbor to R4. We did not know we needed this at first, so that’s why it took a long time to figure out, but once we did that, R4 had an IPv6 route to both eBGP networks, and everything worked correctly.

Conclusion

Overall, I learned a lot in this lab. Mainly, I learned how to set up iBGP on a network to exchange BGP information between the border routers. Along the way, we made multiple silly mistakes that ended up causing problems overall, such as a missing network statement, missing neighbor, and general missing commands. Going through these silly mistakes and other problems hopefully helped us prepare for something similar when working on another lab in the future. Throughout the lab, we set up OSPF, EIGRP, iBGP, and eBGP, and it helped us learn a lot more about how BGP works and how it is used.