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| Multi Area OSPF  Derek Liu |
| CCNP lab 2 – Mr. Mason & Mr. Hansen Periods 0,3,4 |

**Implementing multi-area OSPF (6 router)***Derek Liu*

Purpose

The purpose of this lab was to expand upon the process of implementing OSPF specifically by also incorporating OSPF areas for OSPFv2 and OSPFv3. This type of configuration of OSPF would work better for larger networks but may not necessarily required for SOHO networks.

Background Information

OSPF or Open Shortest Path First is a protocol used to fill out the routing table of a router. In other words, it will automatically recognize and document paths within a network within a few seconds. It is more efficient than creating static routes on each router and allows the network to be easily expandable such as when adding new routers to the network. OSPF uses the shorted path first which means the routes will be shorter. OSPF is also not Cisco proprietary which means that it can be implemented in a large variety of networks. During OSPF, each router communicates with other routers or neighbors to create a routing table that looks the same. Originally, each router only has knowledge of networks directly connected to it but with algorithms they are shared so routers can know about networks not directly connected. This also allows different routes to be created using the shortest path to different networks. OSPF was created by the IETF in order to have an open vendor protocol that can be used to create routing tables. OSPF is a very useful protocol, and it is essential to recognizing its use.

The major differences between single area OSPF and multi area OSPF is that in single area OSPF, all routers are placed into the backbone area (area 0) while in multi area OSPF, there are multiple areas connected to the backbone area with area border routers (ABR). This allows for reduced frequency of OSPF calculations, smaller routing tables and reduced LSU overhead. This means that if a routing problem occurs in an area such as a link going down, the other areas will not be affected. Routing tables, as seen in the IP routes section of this lab will be separated into intra area OSPF routes. Multi area OSPF is usually used in larger networks since it would allow for easier scalability as well as faster convergence speeds. While the configuration of multi area OSPF is not much different from single OSPF as in the commands are very similar, multi area OSPF is not necessary for smaller networks. A good way to know how many routers should be in each area would be to refer to OSPF best practices which states that there should be no more than 50 routers in each area, including the backbone area.

Lab Summary

Using six Cisco 4321 routers connected in a linear fashion using the gigabit ethernet interface g0/0/0 and g0/0/1/ We set router IDs for OSPF on each router and assigned different subnets of /30 between each router. Rather than placing all the routers in backbone area, we implemented the backbone area (area 0) between routers 3 and 4 and configured routers 1-3 to be in area 1 and routers 4-6 in area 2. They all had a process ID of 10 and for routers 1 and 6 we connected it to end devices (PC) to avoid creating a full mesh and allow pings to go across the network. The networks that each router was connected to was created using “network” statements under OSPF and advertised across the network. OSPFv3 was created in a similar manner however it required the command of “ipv6 unicast-routing” in order to enable ipv6 routing. Another difference was that “network” statement weren’t required for OSPF but link-local addressed need to be configured. Once OSPF and OSPFv3 were set up, pings were sent across the network to confirm functionality.

Lab Commands (**comments in parathesis**)

en

config t

hostname r1 (**hostname will vary based on router e.g. r2 for router 2**)

router ospf 10

router-id 1.1.1.1 (**router id will vary based on router e.g. 2.2.2.2 for router 2**)

network 10.1.1.0 0.0.0.3 area 1 (**network and area will vary based on interface and router, see network diagrams with IP for more information**)

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 addresses will vary based on router and interface. See network diagrams with IP for more information**)

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

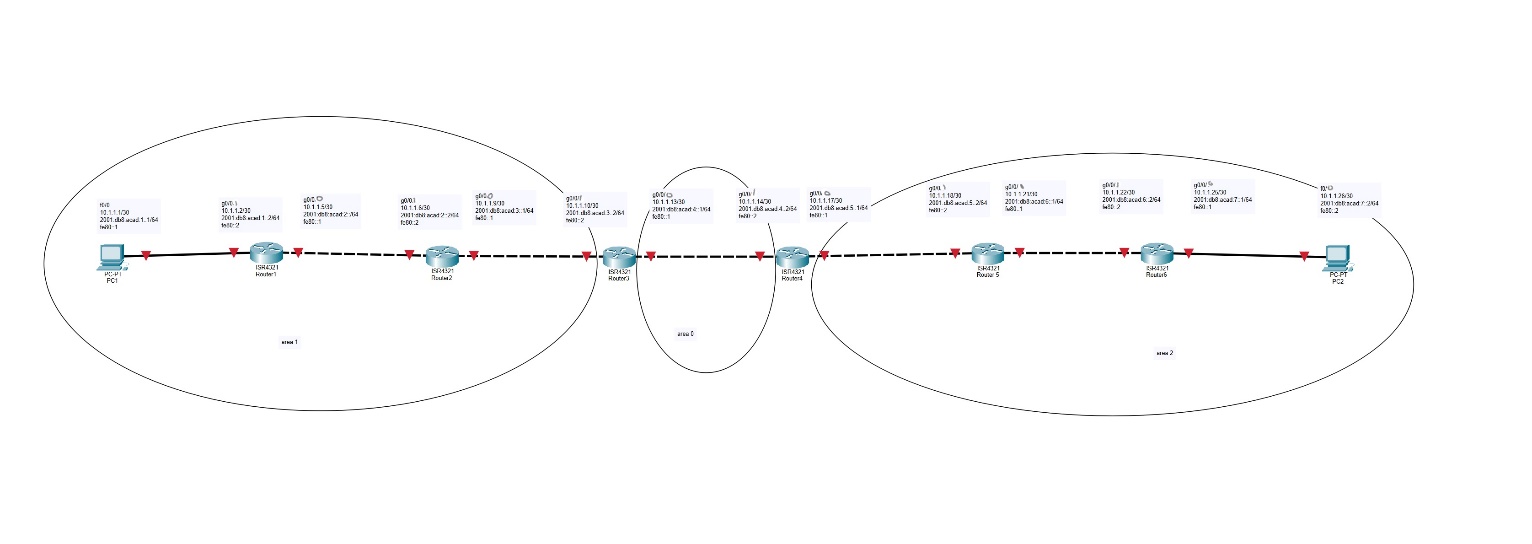
no shut

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 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 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

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 GigabitEthernet0/0/0

ip address 10.1.1.13 255.255.255.252

ip ospf 10 area 0

negotiation auto

ipv6 address FE80::1 link-local

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

ipv6 ospf 10 area 0

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

network 10.1.1.8 0.0.0.3 area 0

network 10.1.1.12 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 3.3.3.3

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 GigabitEthernet0/0/0

ip address 10.1.1.17 255.255.255.252

ip ospf 10 area 2

negotiation auto

ipv6 address FE80::1 link-local

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

ipv6 ospf 10 area 2

interface GigabitEthernet0/0/1

ip address 10.1.1.14 255.255.255.252

ip ospf 10 area 0

negotiation auto

ipv6 address FE80::2 link-local

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

ipv6 ospf 10 area 0

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 ospf 10

router-id 4.4.4.4

network 10.1.1.12 0.0.0.3 area 0

network 10.1.1.16 0.0.0.3 area 2

ip forward-protocol nd

no ip http server

no ip http secure-server

ip tftp source-interface GigabitEthernet0

ipv6 router ospf 10

router-id 4.4.4.4

control-plane

line con 0

logging synchronous

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 30393134 31373030

30345A17 0D333030 31303130 30303030 305A3031 312F302D 06035504 03132649

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

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

0A028201 0100AD37 2C831684 9C5FCA8D D4881B1F 60442411 2A5BFE41 0E81FF19

7BD588FD 65181375 5773AEFA 4B22659E 378C23C6 85E962FC 908FDC43 14A29AB2

F1CD2719 0A541976 9E74AE51 1B2064C8 83D46B00 D29ED427 DEAA4FDD F97FD3E2

84A57367 7E69AEFA 3E41F022 600CA211 887E6C71 5A0A6184 2DE0904A 557887E8

488A66D4 91CD5992 C408FDA0 C791A87C AA3BC27E C09CA618 2A433988 64F1601D

5443D021 F8030CA2 E4C4D7BF 54D2B808 E17466C0 FEEB5F7E 163D34E9 3CCC1B11

3D431E43 45801671 C8182A71 21A7436F BEB10128 24600E9A 2822218C 08A9A852

38F849D5 61D9101F 83FF596A 67C41938 976CF5D0 4669A2F1 6C990656 E7BBC52E

F00E3251 466B0203 010001A3 53305130 0F060355 1D130101 FF040530 030101FF

301F0603 551D2304 18301680 14E3ED39 291D0D78 2523924E 40A4970F 3E5EB403

EF301D06 03551D0E 04160414 E3ED3929 1D0D7825 23924E40 A4970F3E 5EB403EF

300D0609 2A864886 F70D0101 05050003 82010100 6F0F53E3 61F6BABB 7F1BE097

73E588FD 3237381C 1D0BA707 93F1E96F DCFEA5D6 77AE4E58 41B54537 AB8556D3

CAC41029 AB2000E7 20F5A0FF 67071B31 81FB2D4F 22C38FB9 E6D26506 F09F4384

8D21B149 D0DD064F 02293ED3 E82981DF 45730B57 A31E4DFE D0CB322C 640D8022

4459C080 E81D004B 589DF043 AD7A1786 C64EF69C B7D27A35 5784C9E2 D4772CA5

EE985C24 2A7C9E82 50086DBB 5B18E45A 54527023 5B576E04 2382BA7E 57AE690B

EA659045 6156E48B D2219C2C AF4F5DE4 8ECC5B6B 170CB1A6 3717B128 F342F279

9A6B425C 19542113 2CEE22AA CA3173C5 185BEE9E 0F24BA30 6646C7AB 63BB8357

CC6FA1FF 1EBDEA11 4B5AF3B6 718B202A 95D45A60

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 GigabitEthernet0/0/0

ip address 10.1.1.21 255.255.255.252

ip ospf 10 area 2

negotiation auto

ipv6 address FE80::1 link-local

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

ipv6 ospf 10 area 2

interface GigabitEthernet0/0/1

ip address 10.1.1.18 255.255.255.252

ip ospf 10 area 2

negotiation auto

ipv6 address FE80::2 link-local

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

ipv6 ospf 10 area 2

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 ospf 10

router-id 5.5.5.5

network 10.1.1.16 0.0.0.3 area 2

network 10.1.1.20 0.0.0.3 area 2

ip forward-protocol nd

ip http server

ip http authentication local

ip http secure-server

ip tftp source-interface GigabitEthernet0

ipv6 router ospf 10

router-id 5.5.5.5

control-plane

line con 0

logging synchronous

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 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-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 30393134 31363439

33395A17 0D333030 31303130 30303030 305A3031 312F302D 06035504 03132649

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

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

0A028201 0100CCFC 6E2220E1 93956DC6 5E773AC2 B25126DF 1F533987 4770D4F2

5C5D887D 4DA1B02C 48269BD0 2BC4ACB2 BDD05959 BCFC4A73 E7ACBC82 1674B948

13B98F92 206F03EA 0D2E10A4 3E0966B9 EC926C9C 009BFB1F C2498968 10341BFB

43F71DFF EB883A17 C5A95169 94C59844 4D1B02FF 2C5FA356 97ECB734 95484613

0C06A29C 7F59B35A B4091FDC 0E00BEB7 64EAEC35 AEAF101E 85D01754 DA0D689A

17F726CF 849731E7 5F7C9A3E 05C4B072 FC6FB2AE 6B5668FD D34B1481 6F375EE7

21EF65DA E1F6C5CF 9DA4C34B 982A35EE 9F0D5F14 4B919A47 6EF46DAA D1A8D3AA

087B04DD 506BF7B8 5F73D919 D6C66F64 BB499BF4 F41EBB97 1C33F37A C9BA2B14

C8F3AD25 3ECB0203 010001A3 53305130 0F060355 1D130101 FF040530 030101FF

301F0603 551D2304 18301680 1419AC83 C50741EF 51D6578F 04A6FE55 55441C58

95301D06 03551D0E 04160414 19AC83C5 0741EF51 D6578F04 A6FE5555 441C5895

300D0609 2A864886 F70D0101 05050003 82010100 AD8E5DE2 BFBD529C E4F704A4

6D069DF9 C8A98356 FF2543FF 89D4D880 60ED8465 B80C0FE9 FF241FA8 4B3A73CB

00DD845B D9D0BE2C 1AF573DC CE192909 9092A588 86E15D9A 298FCB42 F34B1EB7

9D9BF334 A4CE35A7 C686B8BD 16AA2402 091D1ABD 7B52A79D A5D26C56 2F6CE52A

8CA49442 3343C6E9 BB5FF37F B16C3766 6F53DA5C 43F18FD2 2FCBE250 60F977AF

4E4B2137 A883AAC5 66A3B921 A4AE105B 043C06C2 9C81F0D2 A027B78E 0FC1FF9A

24021FF6 2E2A5F3F 7EA676CE 935CF95B C3BA4AF1 AB1B1B21 F2205D8F 37514CBB

AD893919 56167B92 C0DE9DCF B313E9CD 8656F62E 09C6A9A9 07559E28 07DE9933

3359BDA3 5854FFC1 5FE4F6D1 A7E4C49B 2BDE0A98

quit

crypto pki certificate chain TP-self-signed-2270144787

license udi pid ISR4321/K9 sn FLM2408005M

no license smart enable

diagnostic bootup level minimal

spanning-tree extend system-id

redundancy

mode none

interface GigabitEthernet0/0/0

ip address 10.1.1.25 255.255.255.252

ip ospf 10 area 2

negotiation auto

ipv6 address FE80::1 link-local

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

ipv6 ospf 10 area 2

interface GigabitEthernet0/0/1

ip address 10.1.1.22 255.255.255.252

ip ospf 10 area 2

negotiation auto

ipv6 address FE80::2 link-local

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

ipv6 ospf 10 area 2

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 ospf 10

router-id 6.6.6.6

network 10.1.1.20 0.0.0.3 area 2

network 10.1.1.24 0.0.0.3 area 2

ip forward-protocol nd

ip http server

ip http authentication local

ip http secure-server

ip tftp source-interface GigabitEthernet0

ip route 0.0.0.0 0.0.0.0 GigabitEthernet0/0/1

ipv6 router ospf 10

router-id 6.6.6.6

control-plane

line con 0

logging synchronous

transport input none

stopbits 1

line aux 0

stopbits 1

line vty 0 4

login

end

Problems

Due to having previous experience in configuring single area OSPF the lab went rather smoothly for the most part. The major difference was planning out areas and implementing the area command. We encountered a problem when there weren’t any adjacencies being formed for OSPFv3 between routers 4 and 5. We found out that the problem was due to configuring link local addresses on the wrong interfaces. When the link-local addresses were fixed, the connection was formed. The other problems that we encountered was that the host could ping across the network with IPv4 but were unable to ping across the network with IPv6. Originally, we tried setting passive interfaces and checked over our configuration’s multiple times, but we couldn’t find any errors. This was solved by shutting down the failing interface and restarting it and it fixed the problem.

Conclusion

In this lab, we created a OSPF and OSPFv3 network with 6 routers with interfaces between routers 3 and 4 in area 0 and the interfaces between routers 1 to 3 in area 1 and the interfaces between routers 4 to 6 in area 2. Pings were sent across the network from PCs to confirm functionality. Things that originally went wrong were misconfigurations of link-local addresses for OSPFv3 and a stubborn interface that we had to restart. We learned that the reason why OSPFv3 does not require network statements is due to the existence of link local addresses which share crucial information between routers for OSPFv3. I learned how to set up OSPF and OSPFv3 while planning and exploring with different OSPF areas. In the end, we were successful in configuring OSPF and functionality was confirmed through successful pings throughout the network.