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| 5 router ospf  Derek Liu |
| CCNP lab 1 – Mr. Mason & Mr. Hansen Periods 0,3,4 |

**Implementing OSPF (5 routers)***Derek Liu*

Purpose

The purpose of this lab is to refresh the skills needed to configure routers and set up OSPF. This touches upon the subjects of routing tables, partial mesh networks, and also interaction between Cisco equipment. In this lab, OSPF and OSPFv3 was configured for 5 routers in both ipv4 and ipv6.

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 a 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.

Lab Summary

We connected five Cisco 4321 routers together 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. We put the entire OSPF network in the backbone area 0 and with a process ID of 10. For routers 1 and 5 we created loopback interfaces on g0/0/1 and g0/0/0 respectively as to avoid creating a full mesh. 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

**Configuration for router 1: (bolded comments are not part of the commands used and are just comments)**

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config t

router ospf 10

router-id 1.1.1.1 **(router id will vary based on router. ID used for router 2 was 2.2.2.2, router 3 was 3.3.3.3, etc.)**

network 10.1.1.0 0.0.0.3 area 0

network 10.1.1.18 0.0.0.3 area 0

ipv6 unicast-routing

ipv6 router ospf 10

router-id 1.1.1.1

int g0/0/0

ip address 10.1.1.1 255.255.255.252 **(ipv4 address for each interface of the router is different, see network diagrams with ip for reference)**

ip ospf 10 area 0

no shut

ipv6 address 2001:db8:acad:1::1/64 **(ipv4 address for each interface of the router is different, see network diagrams with ip for reference)**

ipv6 address fe80::1 link-local **(link-local addresses will also vary. See network diagrams with ip)**

ipv6 ospf 10 area 0

int lo0

ip address 10.1.1.18 255.255.255.252

ip ospf 10 area 0

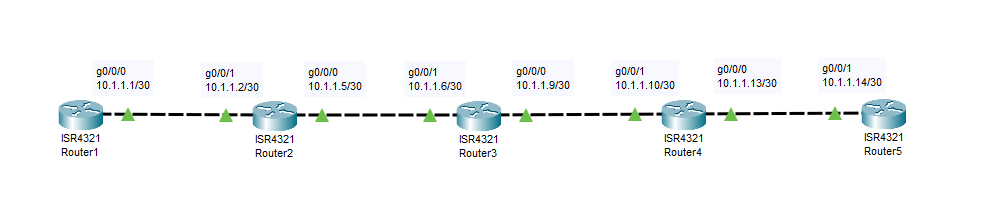
no shut

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

ipv6 address fe80::2 link-local

Network Diagrams with IP

IPv4



IPv6

R1:

g0/0/0 - 2001:db8:acad:1::1 fe80::1

Lo0 - 2001:db8:acad:5::2 fe80::2

R2:

g0/0/0 - 2001:db8:acad:2::1 fe80::1

g0/0/1 - 2001:db8:acad:1::2 fe80::2

R3:

g0/0/0 - 2001:db8:acad:3::1 fe80::1

g0/0/1 - 2001:db8:acad:2::2 fe80::2

R4:

g0/0/0 - 2001:db8:acad:4::1 fe80::1

g0/0/1 - 2001:db8:acad:3::2 fe80::2

R5:

Lo0 - 2001:db8:acad:5::1 fe80::1

g0/0/1 - 2001:db8:acad:4::2 fe80::2

Configurations

***Pings (ipv4):***

r1#ping 10.1.1.18

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 10.1.1.18, timeout is 2 seconds:

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

r1#ping 10.1.1.17

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 10.1.1.17, timeout is 2 seconds:

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

r1#ping 10.1.1.14

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 10.1.1.14, timeout is 2 seconds:

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

r1#ping 10.1.1.13

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 10.1.1.13, timeout is 2 seconds:

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

r1#ping 10.1.1.10

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 10.1.1.10, timeout is 2 seconds:

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

r1#ping 10.1.1.9

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 10.1.1.9, timeout is 2 seconds:

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

r1#ping 10.1.1.6

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 10.1.1.6, timeout is 2 seconds:

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

r1#ping 10.1.1.2

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 10.1.1.2, timeout is 2 seconds:

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

r1#ping 10.1.1.1

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 10.1.1.1, timeout is 2 seconds:

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

***Pings (ipv6):***

r1#ping 2001:DB8:ACAD:2::1

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 2001:DB8:ACAD:2::1, timeout is 2 seconds:

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

r1#ping 2001:DB8:ACAD:1::2

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 2001:DB8:ACAD:1::2, timeout is 2 seconds:

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

r1#ping 2001:DB8:ACAD:3::1

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 2001:DB8:ACAD:3::1, timeout is 2 seconds:

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

r1#ping 2001:DB8:ACAD:2::2

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 2001:DB8:ACAD:2::2, timeout is 2 seconds:

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

r1#ping 2001:DB8:ACAD:4::1

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 2001:DB8:ACAD:4::1, timeout is 2 seconds:

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

r1#ping 2001:DB8:ACAD:3::2

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 2001:DB8:ACAD:3::2, timeout is 2 seconds:

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

r1#ping 2001:DB8:ACAD:5::1

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 2001:DB8:ACAD:5::1, timeout is 2 seconds:

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

r1#ping 2001:DB8:ACAD:4::2

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 2001:DB8:ACAD:4::2, timeout is 2 seconds:

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

***Ip routes:***

IPV4 Routes:

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R1:

10.0.0.0/8 is variably subnetted, 7 subnets, 2 masks

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

L 10.1.1.1/32 is directly connected, GigabitEthernet0/0/0

O 10.1.1.4/30 [110/2] via 10.1.1.2, 00:50:49, GigabitEthernet0/0/0

O 10.1.1.8/30 [110/3] via 10.1.1.17, 00:38:10, GigabitEthernet0/0/1

[110/3] via 10.1.1.2, 00:35:33, GigabitEthernet0/0/0

O 10.1.1.12/30 [110/2] via 10.1.1.17, 00:38:50, 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

R2:

10.0.0.0/8 is variably subnetted, 7 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, 00:32:03, GigabitEthernet0/0/0

O 10.1.1.12/30 [110/3] via 10.1.1.6, 00:32:03, GigabitEthernet0/0/0

[110/3] via 10.1.1.1, 00:35:20, GigabitEthernet0/0/1

O 10.1.1.16/30 [110/2] via 10.1.1.1, 00:47:19, GigabitEthernet0/0/1

R3:

10.0.0.0/8 is variably subnetted, 7 subnets, 2 masks

O 10.1.1.0/30 [110/2] via 10.1.1.5, 00:31:17, 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 10.1.1.12/30 [110/2] via 10.1.1.10, 00:33:25, GigabitEthernet0/0/0

O 10.1.1.16/30 [110/3] via 10.1.1.10, 00:33:25, GigabitEthernet0/0/0

[110/3] via 10.1.1.5, 00:31:17, GigabitEthernet0/0/1

R4:

10.0.0.0/8 is variably subnetted, 7 subnets, 2 masks

O 10.1.1.0/30 [110/2] via 10.1.1.18, 00:40:13, GigabitEthernet0/0/0

O 10.1.1.4/30 [110/3] via 10.1.1.18, 00:40:13, GigabitEthernet0/0/0

[110/3] via 10.1.1.13, 00:25:40, GigabitEthernet0/0/1

O 10.1.1.8/30 [110/2] via 10.1.1.13, 00:28:15, 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

R5:

10.0.0.0/8 is variably subnetted, 7 subnets, 2 masks

O 10.1.1.0/30 [110/2] via 10.1.1.18, 00:40:13, GigabitEthernet0/0/0

O 10.1.1.4/30 [110/3] via 10.1.1.18, 00:40:13, GigabitEthernet0/0/0

[110/3] via 10.1.1.13, 00:25:40, GigabitEthernet0/0/1

O 10.1.1.8/30 [110/2] via 10.1.1.13, 00:28:15, 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

IPV6 Routes:

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R1:

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

via GigabitEthernet0/0/0, directly connected

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

via GigabitEthernet0/0/0, receive

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

via FE80::2, GigabitEthernet0/0/0

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

via FE80::2, GigabitEthernet0/0/0

via FE80::1, GigabitEthernet0/0/1

O 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

L FF00::/8 [0/0]

via Null0, receive

R2:

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

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

via FE80::1, GigabitEthernet0/0/1

via FE80::2, GigabitEthernet0/0/0

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

via FE80::1, GigabitEthernet0/0/1

L FF00::/8 [0/0]

via Null0, receive

R3:

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

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

via FE80::2, GigabitEthernet0/0/0

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

via FE80::1, GigabitEthernet0/0/1

via FE80::2, GigabitEthernet0/0/0

L FF00::/8 [0/0]

via Null0, receive

R4:

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

via FE80::2, GigabitEthernet0/0/0

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

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

via FE80::2, GigabitEthernet0/0/0

L FF00::/8 [0/0]

via Null0, receive

R5:

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

via FE80::2, GigabitEthernet0/0/0

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

via FE80::2, GigabitEthernet0/0/0

via FE80::1, GigabitEthernet0/0/1

O 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

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

--More--

\*Sep 8 18:06:29.863: %SYS-5-CONFIG\_I: Configured from console e

no aaa new-model

ipv6 unicast-routing

subscriber templating

multilink bundle-name authenticated

license udi pid ISR4321/K9 sn FDO21400XZX

spanning-tree extend system-id

redundancy

mode none

vlan internal allocation policy ascending

interface Loopback0

ip address 10.1.1.18 255.255.255.252

ip ospf 10 area 0

ipv6 address FE80::2 link-local

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

ipv6 ospf 10 area 0

interface GigabitEthernet0/0/0

ip address 10.1.1.1 255.255.255.252

ip ospf 10 area 0

negotiation auto

ipv6 address FE80::1 link-local

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

ipv6 ospf 10 area 0

interface GigabitEthernet0/0/1

no ip address

ip ospf 10 area 0

negotiation auto

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

network 10.1.1.0 0.0.0.3 area 0

network 10.1.1.16 0.0.0.3 area 0

ip forward-protocol nd

no ip http server

no ip http secure-server

ip tftp source-interface GigabitEthernet0

ipv6 route 2001:DB8:ACAD:5::/64 GigabitEthernet0/0/1

ipv6 route ::/0 GigabitEthernet0/0/1

ipv6 router ospf 1

router-id 1.1.1.1

ipv6 router ospf 10

router-id 1.1.1.1

control-plane

line con 0

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 FDO21491FHX

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 0

negotiation auto

ipv6 address FE80::1 link-local

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

ipv6 ospf 10 area 0

interface GigabitEthernet0/0/1

ip address 10.1.1.2 255.255.255.252

ip ospf 10 area 0

negotiation auto

ipv6 address FE80::2 link-local

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

ipv6 ospf 10 area 0

interface GigabitEthernet0/1/0

no ip address

shutdown

negotiation auto

interface GigabitEthernet0/1/1

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 1

router-id 2.2.2.2

network 192.168.10.0 0.0.0.3 area 0

network 192.168.10.8 0.0.0.3 area 0

router ospf 10

network 10.1.1.0 0.0.0.3 area 0

network 10.1.1.4 0.0.0.3 area 0

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 FDO214421CU

spanning-tree extend system-id

redundancy

mode none

vlan internal allocation policy ascending

vlan 10,20

interface GigabitEthernet0/0/0

ip address 10.1.1.9 255.255.255.252

ip ospf 10 area 0

negotiation auto

ipv6 address FE80::1 link-local

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

ipv6 ospf 10 area 0

interface GigabitEthernet0/0/1

ip address 10.1.1.6 255.255.255.252

ip ospf 10 area 0

negotiation auto

ipv6 address FE80::2 link-local

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

ipv6 ospf 10 area 0

interface Serial0/1/0

interface Serial0/1/1

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 10.1.1.4 0.0.0.3 area 0

network 10.1.1.8 0.0.0.3 area 0

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

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 FDO214420G3

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 0

negotiation auto

ipv6 address FE80::2 link-local

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

ipv6 ospf 10 area 0

interface Serial0/1/0

interface Serial0/1/1

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 10.1.1.8 0.0.0.3 area 0

network 10.1.1.12 0.0.0.3 area 0

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

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-3458782570

enrollment selfsigned

subject-name cn=IOS-Self-Signed-Certificate-3458782570

revocation-check none

rsakeypair TP-self-signed-3458782570

crypto pki certificate chain TP-self-signed-3458782570

certificate self-signed 01

30820330 30820218 A0030201 02020101 300D0609 2A864886 F70D0101 05050030

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

69666963 6174652D 33343538 37383235 3730301E 170D3232 30393038 31353335

35345A17 0D333030 31303130 30303030 305A3031 312F302D 06035504 03132649

4F532D53 656C662D 5369676E 65642D43 65727469 66696361 74652D33 34353837

38323537 30308201 22300D06 092A8648 86F70D01 01010500 0382010F 00308201

0A028201 0100B44B F4278297 DA1BFB79 6B524933 4F0DC4F8 3ADB865E 073D2A73

1E877AFE FDEE8044 A476D5A2 5FE6FA8C 55BC1A5E 41EA0416 0C67B96D 4D568EEE

E83D193F 7AC6B208 19A35706 4E6D96E7 722E8163 E279BC82 FA826DA2 452F08A0

23CEF075 76C668A7 23CD9F3C D891225D 5EF1ECE4 4AD51EAC 0A5D737E D9C59EE2

32F3983A 336846B5 941686D2 628DEC7E 6748B33C 24651C09 ED241C35 FB196C4A

67991767 05FA2D5F 6EC4E5BA 1E463E2E 15449CA1 FF99A45A 3AC96DE6 FD95C5D8

CF0568D0 1E2184F2 AFACFD4D 118A9AC0 D1B23D75 3A5EB199 2D55AB18 DB847BE6

753F99FC 0FE65DCC 7B1D9A88 D457DAFF BCA3105D 25671AE7 989724A9 2DC22D6C

E3AE572A C5A50203 010001A3 53305130 0F060355 1D130101 FF040530 030101FF

301F0603 551D2304 18301680 14A4142F 49009CBD 6FF5914B F68AF0D3 74946CF2

19301D06 03551D0E 04160414 A4142F49 009CBD6F F5914BF6 8AF0D374 946CF219

300D0609 2A864886 F70D0101 05050003 82010100 55A7C631 B6E189DE 539ABBFE

AF64F1C0 73C4883D 96C30F9D 7FF10FDB 71DF75A8 E9885421 68C6088D 223AA75A

5DAF3FE0 1FE7B045 54483484 EFD0744D 067926D8 A938E202 2AA3F245 DB0412B6

8717D55C 25452986 886EBAC1 17CE6094 42885BF8 BF28AEB6 7F3932AE 19E6DF39

3972370E 61C28A4B 60DDC770 43170CD7 446FEE7E FDB70A21 C9A3461D E5660D78

D81291ED A4900DDD 6CE43EB3 03D73DA1 0960365C 1801C369 7E80A444 01B2287C

11990900 DF44FEB3 FD1706E5 037D0025 BDD1FF51 60C351D4 3B8D1FE1 5FCAE1ED

52385CE6 3DAD8B72 FE9CE6C9 F2D4D3D3 76E3501F A8244B83 F351F6AB 653AA8B2

A6EBFABA C7753BFF E4CDAC4D 4BC7F57E 632760C8

quit

license udi pid ISR4321/K9 sn FLM240800D6

no license smart enable

diagnostic bootup level minimal

spanning-tree extend system-id

redundancy

mode none

interface Loopback0

ip address 10.1.1.17 255.255.255.252

ip ospf 10 area 0

ipv6 address FE80::1 link-local

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

ipv6 ospf 10 area 0

interface GigabitEthernet0/0/0

no ip address

ip ospf 10 area 0

negotiation auto

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

vrf forwarding Mgmt-intf

no ip address

shutdown

negotiation auto

router ospf 10

network 10.1.1.12 0.0.0.3 area 0

network 10.1.1.16 0.0.0.3 area 0

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

transport input none

stopbits 1

line aux 0

stopbits 1

line vty 0 4

login

End

Problems

Originally made a full mesh network with the routers, meaning that we connected router 1 to router 5 making a circle. This will not work well as it meant that we couldn’t ping with OSPFv3 in the 2001:db8:acad:5::/64 network. We solved this by disconnecting the loop and then creating loopback interfaces rather than a directly connected one. These loopback interfaces can also be configured to connect to two end devices and allow them to ping across the network. OSPF works best in a partial mesh. Another problem we had was with subnets. Early in the lab, we created subnets that overlapped, and error messages appeared on the terminal warning of overlapping subnets. We recreated our subnets to both a smaller size and made them non overlapping. The networks between each router have to be in different subnets in order for it to work.

Conclusion

In this lab, we created a OSPF and OSPFv3 network with 5 routers. All of it was placed into the backbone area 0 for simplicity and then pings were sent across the network to confirm functionality. Things that originally went wrong was a full mesh network created by linking router 1 and router 5 and also overlapping subnets between routers. We learned that OSPF will function under a full mesh network but will not completely function (some pings will not go through). I relearned how to set up OSPF and OSPFv3 again and also more detailed ideas such as the simplicity of setting up OSPF but also the complexity it can allow for with different process IDs, router IDs, and area numbers. I also learned that when creating a full mesh network, OSPF will function but is not the best option to use when filling out a routing table. In the end, we were successful in configuring OSPF and functionality was confirmed through successful pings throughout the network.