Packet Tracer Multiarea OSPFv3

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Purpose

The purpose of this lab was to setup and verify OSPFv3 with IPv4 and IPv6 addressing on several networks. After completing this lab, I learned how to use multiarea OSPFv3 between multiple networks and setting up IPV4 and IPv6 on all routers.

Background Information

OSPFv3 (Open Shortest Path First Version 3) is an IPV4 and IPv6 link-state routing protocol that supports IPv4 and IPv6 unicast addresses families. The state of a link is a description of that interface and its relationship to its neighboring networking devices. The information coming from the interface includes the IPv6 portion of the interface, the network mask, the type of network that it is connected to and more. The information is divided into link-state advertisements (LSA). The OSPFv3 max-metric router LSA feature enables OSPFv3 to advertise its locally router LSAs with a maximum metric. This feature allows OSPFv3 to work but not bring traffic through the device by going through different paths. The max metric LSA control places the OSPFv3 router into the stub router role using its LSA advertisement. When using OSPF, routers always form the boundaries between areas. Border routers move the IP routing and traffic on and off the thread network.

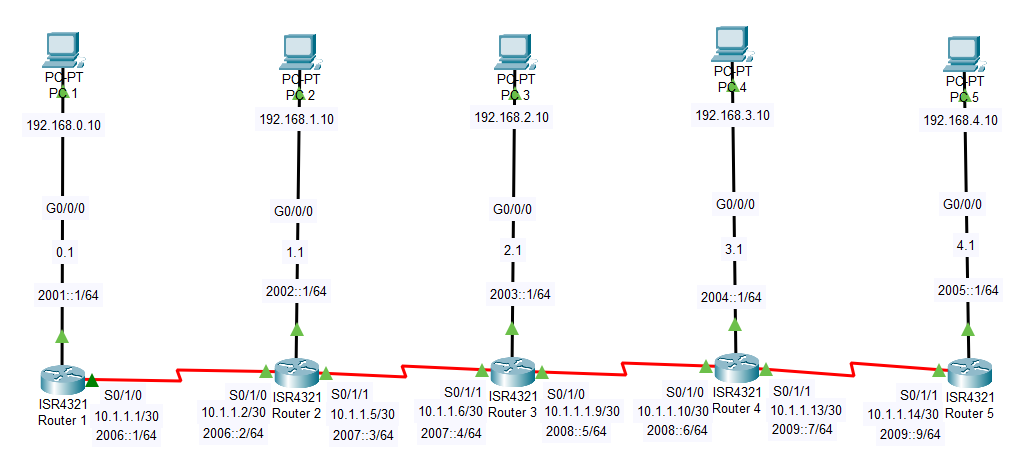
Lab Summary

In packet tracer, I setup a local area topology which includes 5 PC’s and 5 routers and in total there are eight networks. Five networks were connected to PC with the router G0/0/0 interface and other four serial ports. In this lab I setup OSPFv3 on each network and setup different IP addresses on the PC. I configured OSPFv3 with IPv4 and IPv6 on every network.

Lab Commands

* Router OSPF: Indicates the beginning of the OSPF configuration on the router
* Router-id: Assigns the router an OSPF ID to advertise to neighbor networks
* Network area: Advertise the interfaces whose addresses fill in the specified network command
* Show ip ospf interface: Displays the OSPF configuration for the certain interface
* Show ip route: Displays the IPv4 configurations and routes between the interfaces and routers
* Show ipv6 route: Displays the IPv6 configurations and routes between the interfaces and routers
* Show ipv6 ospf neighbors: Displays all the IPv6 OSPF neighbors and connections
* Interface: Allows you to configure a particular interface
* Clock rate: Synchronizing routers to connect to the same rate
* Ipv6 unicast-routing: allows you to enable IPv6 unicast forwarding
* Ipv6 router ospf id: allows you to enter OSPFv3 configuration mode

Network Diagram with IP’s



Configurations

Router 1

Show run

interface Loopback0

ip address 1.1.1.1 255.255.255.255

interface GigabitEthernet0/0/0

ip address 192.168.0.1 255.255.255.0

duplex auto

speed auto

ipv6 address 2001::1/64

ipv6 ospf 1 area 1

interface GigabitEthernet0/0/1

no ip address

duplex auto

speed auto

shutdown

interface Serial0/1/0

ip address 10.1.1.1 255.255.255.252

ipv6 address FE80::1 link-local

ipv6 address 2006::1/64

ipv6 ospf 1 area 1

ipv6 ospf neighbor FE80::2

clock rate 2000000

interface Serial0/1/1

no ip address

clock rate 2000000

shutdown

interface Vlan1

no ip address

shutdown

router ospf 1

log-adjacency-changes

network 192.168.0.0 0.0.0.255 area 1

network 10.1.1.0 0.0.0.3 area 1

ipv6 router ospf 1

router-id 1.1.1.1

log-adjacency-changes

Show ip ospf interface

GigabitEthernet0/0/0 is up, line protocol is up

Internet address is 192.168.0.1/24, Area 1

Process ID 1, Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1

Transmit Delay is 1 sec, State DR, Priority 1

Designated Router (ID) 1.1.1.1, Interface address 192.168.0.1

No backup designated router on this network

Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5

Hello due in 00:00:05

Index 1/1, flood queue length 0

Next 0x0(0)/0x0(0)

Last flood scan length is 1, maximum is 1

Last flood scan time is 0 msec, maximum is 0 msec

Neighbor Count is 0, Adjacent neighbor count is 0

Suppress hello for 0 neighbor(s)

Serial0/1/0 is up, line protocol is up

Internet address is 10.1.1.1/30, Area 1

Process ID 1, Router ID 1.1.1.1, Network Type POINT-TO-POINT, Cost: 64

Transmit Delay is 1 sec, State POINT-TO-POINT,

Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5

Hello due in 00:00:07

Index 2/2, flood queue length 0

Next 0x0(0)/0x0(0)

Last flood scan length is 1, maximum is 1

Last flood scan time is 0 msec, maximum is 0 msec

Neighbor Count is 1 , Adjacent neighbor count is 1

Adjacent with neighbor 2.2.2.2

Suppress hello for 0 neighbor(s)

Show ip ospf neighbor

Show ip protocols

Routing Protocol is "ospf 1"

Outgoing update filter list for all interfaces is not set

Incoming update filter list for all interfaces is not set

Router ID 1.1.1.1

Number of areas in this router is 1. 1 normal 0 stub 0 nssa

Maximum path: 4

Routing for Networks:

192.168.0.0 0.0.0.255 area 1

10.1.1.0 0.0.0.3 area 1

Routing Information Sources:

Gateway Distance Last Update

1.1.1.1 110 00:16:45

2.2.2.2 110 00:16:44

3.3.3.3 110 00:16:45

Distance: (default is 110)

Show ip ospf neighbor

Neighbor ID Pri State Dead Time Address Interface

2.2.2.2 0 FULL/ - 00:00:39 10.1.1.2 Serial0/1/0

Show ipv6 ospf neighbor

Neighbor ID Pri State Dead Time Interface ID Interface

2.2.2.2 0 FULL/ - 00:00:36 3 Serial0/1/0

Show ipv6 route

Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP

U - Per-user Static route, M - MIPv6

I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary

ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect

O - OSPF intra, OI - OSPF inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2

ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2

D - EIGRP, EX - EIGRP external

C 2001::/64 [0/0]

via GigabitEthernet0/0/0, directly connected

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

via GigabitEthernet0/0/0, receive

O 2002::/64 [110/65]

via FE80::2, Serial0/1/0

O 2003::/64 [110/129]

via FE80::2, Serial0/1/0

OI 2004::/64 [110/193]

via FE80::2, Serial0/1/0

OI 2005::/64 [110/257]

via FE80::2, Serial0/1/0

C 2006::/64 [0/0]

via Serial0/1/0, directly connected

L 2006::1/128 [0/0]

via Serial0/1/0, receive

O 2007::/64 [110/128]

via FE80::2, Serial0/1/0

OI 2008::/64 [110/192]

via FE80::2, Serial0/1/0

OI 2009::/64 [110/256]

via FE80::2, Serial0/1/0

L FF00::/8 [0/0]

via Null0, receive

Router 2

Show run

interface Loopback0

ip address 2.2.2.2 255.255.255.255

interface GigabitEthernet0/0/0

ip address 192.168.1.1 255.255.255.0

duplex auto

speed auto

ipv6 address 2002::1/64

ipv6 ospf 1 area 1

interface GigabitEthernet0/0/1

no ip address

duplex auto

speed auto

shutdown

interface Serial0/1/0

ip address 10.1.1.2 255.255.255.252

ipv6 address FE80::2 link-local

ipv6 address 2006::2/64

ipv6 ospf 1 area 1

ipv6 ospf neighbor FE80::1

interface Serial0/1/1

ip address 10.1.1.5 255.255.255.252

ipv6 address FE80::1 link-local

ipv6 address 2007::3/64

ipv6 ospf 1 area 1

ipv6 ospf neighbor FE80::2

clock rate 2000000

interface Vlan1

no ip address

shutdown

router ospf 1

log-adjacency-changes

network 192.168.1.0 0.0.0.255 area 1

network 10.1.1.0 0.0.0.3 area 1

network 10.1.1.4 0.0.0.3 area 1

ipv6 router ospf 1

router-id 2.2.2.2

log-adjacency-changes

Show ip ospf interface

GigabitEthernet0/0/0 is up, line protocol is up

Internet address is 192.168.1.1/24, Area 1

Process ID 1, Router ID 2.2.2.2, Network Type BROADCAST, Cost: 1

Transmit Delay is 1 sec, State DR, Priority 1

Designated Router (ID) 2.2.2.2, Interface address 192.168.1.1

No backup designated router on this network

Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5

Hello due in 00:00:03

Index 1/1, flood queue length 0

Next 0x0(0)/0x0(0)

Last flood scan length is 1, maximum is 1

Last flood scan time is 0 msec, maximum is 0 msec

Neighbor Count is 0, Adjacent neighbor count is 0

Suppress hello for 0 neighbor(s)

Serial0/1/1 is up, line protocol is up

Internet address is 10.1.1.5/30, Area 1

Process ID 1, Router ID 2.2.2.2, Network Type POINT-TO-POINT, Cost: 64

Transmit Delay is 1 sec, State POINT-TO-POINT,

Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5

Hello due in 00:00:00

Index 2/2, flood queue length 0

Next 0x0(0)/0x0(0)

Last flood scan length is 1, maximum is 1

Last flood scan time is 0 msec, maximum is 0 msec

Neighbor Count is 1 , Adjacent neighbor count is 1

Adjacent with neighbor 3.3.3.3

Suppress hello for 0 neighbor(s)

Serial0/1/0 is up, line protocol is up

Internet address is 10.1.1.2/30, Area 1

Process ID 1, Router ID 2.2.2.2, Network Type POINT-TO-POINT, Cost: 64

Transmit Delay is 1 sec, State POINT-TO-POINT,

Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5

Hello due in 00:00:03

Index 3/3, flood queue length 0

Next 0x0(0)/0x0(0)

Last flood scan length is 1, maximum is 1

Last flood scan time is 0 msec, maximum is 0 msec

Neighbor Count is 1 , Adjacent neighbor count is 1

Adjacent with neighbor 1.1.1.1

Suppress hello for 0 neighbor(s)

Show ip ospf neighbor

Neighbor ID Pri State Dead Time Address Interface

1.1.1.1 0 FULL/ - 00:00:30 10.1.1.1 Serial0/1/0

3.3.3.3 0 FULL/ - 00:00:30 10.1.1.6 Serial0/1/1

Show ipv6 ospf neighbor

Neighbor ID Pri State Dead Time Interface ID Interface

1.1.1.1 0 FULL/ - 00:00:38 3 Serial0/1/0

3.3.3.3 0 FULL/ - 00:00:38 4 Serial0/1/1

Show ip protocols

Routing Protocol is "ospf 1"

Outgoing update filter list for all interfaces is not set

Incoming update filter list for all interfaces is not set

Router ID 2.2.2.2

Number of areas in this router is 1. 1 normal 0 stub 0 nssa

Maximum path: 4

Routing for Networks:

192.168.1.0 0.0.0.255 area 1

10.1.1.0 0.0.0.3 area 1

10.1.1.4 0.0.0.3 area 1

Routing Information Sources:

Gateway Distance Last Update

1.1.1.1 110 00:08:27

2.2.2.2 110 00:08:27

3.3.3.3 110 00:08:28

Distance: (default is 110)

Show ipv6 route

IPv6 Routing Table - 13 entries

Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP

U - Per-user Static route, M - MIPv6

I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary

ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect

O - OSPF intra, OI - OSPF inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2

ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2

D - EIGRP, EX - EIGRP external

O 2001::/64 [110/65]

via FE80::1, Serial0/1/0

C 2002::/64 [0/0]

via GigabitEthernet0/0/0, directly connected

L 2002::1/128 [0/0]

via GigabitEthernet0/0/0, receive

O 2003::/64 [110/65]

via FE80::2, Serial0/1/1

OI 2004::/64 [110/129]

via FE80::2, Serial0/1/1

OI 2005::/64 [110/193]

via FE80::2, Serial0/1/1

C 2006::/64 [0/0]

via Serial0/1/0, directly connected

L 2006::2/128 [0/0]

via Serial0/1/0, receive

C 2007::/64 [0/0]

via Serial0/1/1, directly connected

L 2007::3/128 [0/0]

via Serial0/1/1, receive

OI 2008::/64 [110/128]

via FE80::2, Serial0/1/1

OI 2009::/64 [110/192]

via FE80::2, Serial0/1/1

L FF00::/8 [0/0]

via Null0, receive

Router 3

Show run

interface Loopback0

ip address 3.3.3.3 255.255.255.255

interface GigabitEthernet0/0/0

ip address 192.168.2.1 255.255.255.0

duplex auto

speed auto

ipv6 address 2003::1/64

ipv6 ospf 1 area 1

interface GigabitEthernet0/0/1

no ip address

duplex auto

speed auto

shutdown

interface Serial0/1/0

ip address 10.1.1.9 255.255.255.252

ipv6 address FE80::1 link-local

ipv6 address 2008::5/64

ipv6 ospf 1 area 0

ipv6 ospf neighbor FE80::2

clock rate 2000000

interface Serial0/1/1

ip address 10.1.1.6 255.255.255.252

ipv6 address FE80::2 link-local

ipv6 address 2007::4/64

ipv6 ospf 1 area 1

ipv6 ospf neighbor FE80::1

interface Vlan1

no ip address

shutdown

router ospf 1

router-id 3.3.3.3

log-adjacency-changes

network 192.168.2.0 0.0.0.255 area 1

network 10.1.1.4 0.0.0.3 area 1

network 10.1.1.8 0.0.0.3 area 0

ipv6 router ospf 1

log-adjacency-changes

Show ip ospf interface

GigabitEthernet0/0/0 is up, line protocol is up

Internet address is 192.168.2.1/24, Area 1

Process ID 1, Router ID 3.3.3.3, Network Type BROADCAST, Cost: 1

Transmit Delay is 1 sec, State DR, Priority 1

Designated Router (ID) 3.3.3.3, Interface address 192.168.2.1

No backup designated router on this network

Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5

Hello due in 00:00:08

Index 1/1, flood queue length 0

Next 0x0(0)/0x0(0)

Last flood scan length is 1, maximum is 1

Last flood scan time is 0 msec, maximum is 0 msec

Neighbor Count is 0, Adjacent neighbor count is 0

Suppress hello for 0 neighbor(s)

Serial0/1/1 is up, line protocol is up

Internet address is 10.1.1.6/30, Area 1

Process ID 1, Router ID 3.3.3.3, Network Type POINT-TO-POINT, Cost: 64

Transmit Delay is 1 sec, State POINT-TO-POINT,

Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5

Hello due in 00:00:08

Index 2/2, flood queue length 0

Next 0x0(0)/0x0(0)

Last flood scan length is 1, maximum is 1

Last flood scan time is 0 msec, maximum is 0 msec

Neighbor Count is 1 , Adjacent neighbor count is 1

Adjacent with neighbor 2.2.2.2

Suppress hello for 0 neighbor(s)

Serial0/1/0 is up, line protocol is up

Internet address is 10.1.1.9/30, Area 0

Process ID 1, Router ID 3.3.3.3, Network Type POINT-TO-POINT, Cost: 64

Transmit Delay is 1 sec, State POINT-TO-POINT,

Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5

Hello due in 00:00:08

Index 3/3, flood queue length 0

Next 0x0(0)/0x0(0)

Last flood scan length is 1, maximum is 1

Last flood scan time is 0 msec, maximum is 0 msec

Neighbor Count is 1 , Adjacent neighbor count is 1

Adjacent with neighbor 4.4.4.4

Suppress hello for 0 neighbor(s)

Show ip ospf neighbor

Neighbor ID Pri State Dead Time Address Interface

2.2.2.2 0 FULL/ - 00:00:35 10.1.1.5 Serial0/1/1

4.4.4.4 0 FULL/ - 00:00:35 10.1.1.10 Serial0/1/0

Show ipv6 ospf neighbor

Neighbor ID Pri State Dead Time Interface ID Interface

2.2.2.2 0 FULL/ - 00:00:36 4 Serial0/1/1

4.4.4.4 0 FULL/ - 00:00:36 3 Serial0/1/0

Show ip protocols

Routing Protocol is "ospf 1"

Outgoing update filter list for all interfaces is not set

Incoming update filter list for all interfaces is not set

Router ID 3.3.3.3

Number of areas in this router is 2. 2 normal 0 stub 0 nssa

Maximum path: 4

Routing for Networks:

192.168.2.0 0.0.0.255 area 1

10.1.1.4 0.0.0.3 area 1

10.1.1.8 0.0.0.3 area 0

Routing Information Sources:

Gateway Distance Last Update

1.1.1.1 110 00:21:49

2.2.2.2 110 00:21:49

3.3.3.3 110 00:21:48

4.4.4.4 110 00:21:47

5.5.5.5 110 00:21:47

Distance: (default is 110)

Show ipv6 route

IPv6 Routing Table - 13 entries

Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP

U - Per-user Static route, M - MIPv6

I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary

ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect

O - OSPF intra, OI - OSPF inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2

ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2

D - EIGRP, EX - EIGRP external

O 2001::/64 [110/129]

via FE80::1, Serial0/1/1

O 2002::/64 [110/65]

via FE80::1, Serial0/1/1

C 2003::/64 [0/0]

via GigabitEthernet0/0/0, directly connected

L 2003::1/128 [0/0]

via GigabitEthernet0/0/0, receive

OI 2004::/64 [110/65]

via FE80::2, Serial0/1/0

OI 2005::/64 [110/129]

via FE80::2, Serial0/1/0

O 2006::/64 [110/128]

via FE80::1, Serial0/1/1

C 2007::/64 [0/0]

via Serial0/1/1, directly connected

L 2007::4/128 [0/0]

via Serial0/1/1, receive

C 2008::/64 [0/0]

via Serial0/1/0, directly connected

L 2008::5/128 [0/0]

via Serial0/1/0, receive

O 2009::/64 [110/128]

via FE80::2, Serial0/1/0

L FF00::/8 [0/0]

via Null0, receive

Router 4

Show run

interface Loopback0

ip address 4.4.4.4 255.255.255.255

interface GigabitEthernet0/0/0

ip address 192.168.3.1 255.255.255.0

duplex auto

speed auto

ipv6 address 2004::1/64

ipv6 ospf 1 area 2

interface GigabitEthernet0/0/1

no ip address

duplex auto

speed auto

shutdown

interface Serial0/1/0

ip address 10.1.1.10 255.255.255.252

ipv6 address FE80::2 link-local

ipv6 address 2008::6/64

ipv6 ospf 1 area 0

ipv6 ospf neighbor FE80::1

interface Serial0/1/1

ip address 10.1.1.13 255.255.255.252

ipv6 address FE80::1 link-local

ipv6 address 2009::7/64

ipv6 ospf 1 area 0

clock rate 2000000

interface Vlan1

no ip address

shutdown

router ospf 1

router-id 4.4.4.4

log-adjacency-changes

network 192.168.3.0 0.0.0.255 area 2

network 10.1.1.8 0.0.0.3 area 0

network 10.1.1.12 0.0.0.3 area 0

ipv6 router ospf 1

log-adjacency-changes

Show ip ospf interface

GigabitEthernet0/0/0 is up, line protocol is up

Internet address is 192.168.3.1/24, Area 2

Process ID 1, Router ID 4.4.4.4, Network Type BROADCAST, Cost: 1

Transmit Delay is 1 sec, State DR, Priority 1

Designated Router (ID) 4.4.4.4, Interface address 192.168.3.1

No backup designated router on this network

Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5

Hello due in 00:00:03

Index 1/1, flood queue length 0

Next 0x0(0)/0x0(0)

Last flood scan length is 1, maximum is 1

Last flood scan time is 0 msec, maximum is 0 msec

Neighbor Count is 0, Adjacent neighbor count is 0

Suppress hello for 0 neighbor(s)

Serial0/1/1 is up, line protocol is up

Internet address is 10.1.1.13/30, Area 0

Process ID 1, Router ID 4.4.4.4, Network Type POINT-TO-POINT, Cost: 64

Transmit Delay is 1 sec, State POINT-TO-POINT,

Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5

Hello due in 00:00:03

Index 2/2, flood queue length 0

Next 0x0(0)/0x0(0)

Last flood scan length is 1, maximum is 1

Last flood scan time is 0 msec, maximum is 0 msec

Neighbor Count is 1 , Adjacent neighbor count is 1

Adjacent with neighbor 5.5.5.5

Suppress hello for 0 neighbor(s)

Serial0/1/0 is up, line protocol is up

Internet address is 10.1.1.10/30, Area 0

Process ID 1, Router ID 4.4.4.4, Network Type POINT-TO-POINT, Cost: 64

Transmit Delay is 1 sec, State POINT-TO-POINT,

Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5

Hello due in 00:00:09

Index 3/3, flood queue length 0

Next 0x0(0)/0x0(0)

Last flood scan length is 1, maximum is 1

Last flood scan time is 0 msec, maximum is 0 msec

Neighbor Count is 1 , Adjacent neighbor count is 1

Adjacent with neighbor 3.3.3.3

Suppress hello for 0 neighbor(s)

Show ip ospf neighbor

Neighbor ID Pri State Dead Time Address Interface

3.3.3.3 0 FULL/ - 00:00:32 10.1.1.9 Serial0/1/0

5.5.5.5 0 FULL/ - 00:00:38 10.1.1.14 Serial0/1/1

Show ipv6 ospf neighbor

Neighbor ID Pri State Dead Time Interface ID Interface

3.3.3.3 0 FULL/ - 00:00:33 3 Serial0/1/0

5.5.5.5 0 FULL/ - 00:00:39 4 Serial0/1/1

Show ip protocols

Routing Protocol is "ospf 1"

Outgoing update filter list for all interfaces is not set

Incoming update filter list for all interfaces is not set

Router ID 4.4.4.4

Number of areas in this router is 2. 2 normal 0 stub 0 nssa

Maximum path: 4

Routing for Networks:

192.168.3.0 0.0.0.255 area 2

10.1.1.8 0.0.0.3 area 0

10.1.1.12 0.0.0.3 area 0

Routing Information Sources:

Gateway Distance Last Update

3.3.3.3 110 00:04:33

4.4.4.4 110 00:04:33

5.5.5.5 110 00:04:33

Distance: (default is 110)

Show ipv6 route

IPv6 Routing Table - 13 entries

Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP

U - Per-user Static route, M - MIPv6

I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary

ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect

O - OSPF intra, OI - OSPF inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2

ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2

D - EIGRP, EX - EIGRP external

OI 2001::/64 [110/193]

via FE80::1, Serial0/1/0

OI 2002::/64 [110/129]

via FE80::1, Serial0/1/0

OI 2003::/64 [110/65]

via FE80::1, Serial0/1/0

C 2004::/64 [0/0]

via GigabitEthernet0/0/0, directly connected

L 2004::1/128 [0/0]

via GigabitEthernet0/0/0, receive

OI 2005::/64 [110/65]

via FE80::2, Serial0/1/1

OI 2006::/64 [110/192]

via FE80::1, Serial0/1/0

OI 2007::/64 [110/128]

via FE80::1, Serial0/1/0

C 2008::/64 [0/0]

via Serial0/1/0, directly connected

L 2008::6/128 [0/0]

via Serial0/1/0, receive

C 2009::/64 [0/0]

via Serial0/1/1, directly connected

L 2009::7/128 [0/0]

via Serial0/1/1, receive

L FF00::/8 [0/0]

via Null0, receive

Router 5

Show run

interface Loopback0

ip address 5.5.5.5 255.255.255.255

interface GigabitEthernet0/0/0

ip address 192.168.4.1 255.255.255.0

duplex auto

speed auto

ipv6 address 2005::1/64

ipv6 ospf 1 area 3

interface GigabitEthernet0/0/1

no ip address

duplex auto

speed auto

shutdown

interface Serial0/1/0

no ip address

clock rate 2000000

shutdown

interface Serial0/1/1

ip address 10.1.1.14 255.255.255.252

ipv6 address FE80::2 link-local

ipv6 address 2009::9/64

ipv6 ospf 1 area 0

interface Vlan1

no ip address

shutdown

router ospf 1

router-id 5.5.5.5

log-adjacency-changes

network 10.1.1.12 0.0.0.3 area 0

network 192.168.4.0 0.0.0.255 area 3

ipv6 router ospf 1

log-adjacency-changes

Show ip ospf interface

Serial0/1/1 is up, line protocol is up

Internet address is 10.1.1.14/30, Area 0

Process ID 1, Router ID 5.5.5.5, Network Type POINT-TO-POINT, Cost: 64

Transmit Delay is 1 sec, State POINT-TO-POINT,

Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5

Hello due in 00:00:05

Index 1/1, flood queue length 0

Next 0x0(0)/0x0(0)

Last flood scan length is 1, maximum is 1

Last flood scan time is 0 msec, maximum is 0 msec

Neighbor Count is 1 , Adjacent neighbor count is 1

Adjacent with neighbor 4.4.4.4

Suppress hello for 0 neighbor(s)

GigabitEthernet0/0/0 is up, line protocol is up

Internet address is 192.168.4.1/24, Area 3

Process ID 1, Router ID 5.5.5.5, Network Type BROADCAST, Cost: 1

Transmit Delay is 1 sec, State DR, Priority 1

Designated Router (ID) 5.5.5.5, Interface address 192.168.4.1

No backup designated router on this network

Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5

Hello due in 00:00:08

Index 2/2, flood queue length 0

Next 0x0(0)/0x0(0)

Last flood scan length is 1, maximum is 1

Last flood scan time is 0 msec, maximum is 0 msec

Neighbor Count is 0, Adjacent neighbor count is 0

Suppress hello for 0 neighbor(s)

Show ip ospf neighbor

Neighbor ID Pri State Dead Time Address Interface

4.4.4.4 0 FULL/ - 00:00:38 10.1.1.13 Serial0/1/1

Show ipv6 ospf neighbor

Neighbor ID Pri State Dead Time Interface ID Interface

4.4.4.4 0 FULL/ - 00:00:37 4 Serial0/1/1Show ip protocols

Show ipv6 route

IPv6 Routing Table - 12 entries

Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP

U - Per-user Static route, M - MIPv6

I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary

ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect

O - OSPF intra, OI - OSPF inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2

ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2

D - EIGRP, EX - EIGRP external

OI 2001::/64 [110/257]

via FE80::1, Serial0/1/1

OI 2002::/64 [110/193]

via FE80::1, Serial0/1/1

OI 2003::/64 [110/129]

via FE80::1, Serial0/1/1

OI 2004::/64 [110/65]

via FE80::1, Serial0/1/1

C 2005::/64 [0/0]

via GigabitEthernet0/0/0, directly connected

L 2005::1/128 [0/0]

via GigabitEthernet0/0/0, receive

OI 2006::/64 [110/256]

via FE80::1, Serial0/1/1

OI 2007::/64 [110/192]

via FE80::1, Serial0/1/1

O 2008::/64 [110/128]

via FE80::1, Serial0/1/1

C 2009::/64 [0/0]

via Serial0/1/1, directly connected

L 2009::9/128 [0/0]

via Serial0/1/1, receive

L FF00::/8 [0/0]

via Null0, receive

Problems

An issue I encountered during this lab was the areas that I assigned to each of the routers. I mixed up the area configurations for router 4 and router 5. I was wondering if I had to put router 4 and router 5 configured as the same area or two separate areas. In the end, I configured router 4 and router 5 with different areas. From the previous lab, I made sure to be careful of assigning the right ip addresses for each interface.

Another issue I went through was the IPv4 OSPF setup. I forgot to include each of the networks when I configured the OSPF id, so it took me by surprise later, since I could not communicate and ping from each router. I typed the **“show run”** command on each router I figured out that I need to include each network address that is on the network. After that, I was able to configure all the networks and was able to ping each router.

Conclusion

This lab was an important review and learning of setting up and verifying OSPFv3 with IPv4 and IPv6 configurations on multiple networks. This lab helped me remember all the important OSPF Cisco Networking commands that are frequently used when configuring OSPF on each network. By the end of this lab, I was able to ping across all the networks and setup OSPF with IPv4 and IPv6 addressing. I did have some small issues with the area configurations on router 4 and 5 along with the OSPF configurations on the routers and interfaces. To summarize, this lab was a necessary refresher of setting up IPv4 and IPv6 multiarea OSPFv3 on many networks.