**Elaine Y. Zhang**

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**Education**

***Newport High School* – Bellevue, WA *Expected graduation June 2021***

Pursuing High School Diploma with GPA: 3.91; 13 AP classes

* National Honor Society Member: *2019-present*

**Work Experience**

*Teacher* – Northwest Chinese School, Bellevue, WA *2019 – present*

* Teach weekly math enrichment classes during school year, designed yearly curriculum, communicate with parents on weekly basis via email
* Tailor lesson plans to address individual student needs
* Taught weekly Science and English classes to K-5 students to support summer learning
* Adjusted to remote learning model, editing lesson plans and teaching style accordingly

**Extracurricular Activities**

*Newport High School DECA 2018 – present*

* Competed in Business Team Decision Making event using understanding of supply chain management, market segmentation, and 7 step selling process to design business marketing campaigns in roleplay scenarios
* Competed in Integrated Marketing Campaign event, designed 3-month long social media marketing campaign for Steve Madden’sBellevue Square location
* Implemented and executed a week-long *Business and entrepreneurship* summer camp for 20+ middle school students in greater Seattle area; taught lessons covering marketing, teamwork, and finance concepts
* Co-authored 20-page paper analyzing curriculum quality, community outreach, student satisfaction, logistical coordination, used in winning third at DECA state
* Qualified to compete at DECA International Career Development Conference for two consecutive years (2019 & 2020)

*Newport High School* ***Cisco Project Club*** *–* Bellevue, WA *2019 – present*

* Reimage and restore school district laptops for elementary school students in Antigua

*Newport High School* ***Knights Who Code Club****, Vice President (2019-present) –* Bellevue, WA *2018 – present*

* Preside over weekly club meetings, assist students with code, coordinate tech industry guest speakers

*Newport High School Built by Girls Club, President (2020-present)* – Bellevue, WA *2018 – present*

* Manage social media account (@builtbygirlsnhs), post club updates, gained 100+ followers
* Lead club meetings, promote Built by Girls career resources to club members and coordinate guest speakers from organization’s HQ

*Newport High School Orchestra, Class Manager (2017-2019)* – Bellevue, WA *2017 – present*

* Cellist, Member of Chamber, highest level of orchestra/symphony
* Organized concerts, fundraisers, and other orchestra events

*Private Cello Lessons, Ensembles*– Bellevue, WA *2014 – present*

* Play in Bellevue Youth Symphony Orchestra, Newport High School Theater, Bloodworks Northwest fundraisers, auditioned and participated in Washington Music Educators Association honors orchestra

**Community Volunteer Experience**

*Marketing Director* – Mission InspirEd – Bellevue, WA *2018 - present*

* Fundraised $25k+, reached 2000+ students
* Promote programs – Email outreach, community events, PTSA newsletters, social media profiles
* Utilize Hubspot application to track progress of online outreach
* Manage Instagram account (@mission.inspired): gained 400+ followers, post educational resources and career advice, network with other educational nonprofits
* Design promotional flyers and graphics using Canva and photo editing software

*Junior Director –* The Science Squad *2019 - present*

* Coordinated 2020 Science Squad Symposium - advertised online, designed competition structure and questions, judged submissions, reached 20+ students.
* Building national club network – designing club curriculum, communicating with school administrations

***Girls STEM****, Camp Counselor*– Bellevue, WA *Summer 2020*

* Developed and presented lesson plans, taught classes, and provided support to develop STEM/career skills, reached 15+ students
* Adapted to online learning model

***PERIOD****, Chapter Board Member* –Bellevue, WA  *2019 – present*

* Identified gap in organizing donations with shelters
* Building online community message board website (sea-connect) to coordinate donations
* Held menstrual product drives for shelters in greater Seattle area, donated 1000+ menstrual products

**Awards and Achievements**

*Microsoft Certified Network Technician June 2020*

*2nd and 3rd in category, DECA SCDC (state level) –* Bellevue, WA *March 2020*

*Presidential Volunteer Service Award –* ***gold*** *medal*  *2020*

*Presidential Volunteer Service Award –* ***bronze*** *medal 2020*

*Presidential Volunteer Service Award –* ***gold*** *medal 2019*

*Finalist in category, DECA SCDC (state level) –* Bellevue, WA *March 2019*

*Eastshore Solo and Ensemble Festival, classical performance competition,* ***2nd*** *in cello performance –* Bellevue, WA *January 2019*

**Lab Experience**

*OSPF*

* Configuring OSPFv2
  + Applied the OSPFv2 routing protocols to connect four routers and four PCs for routers to share routing information and ping between networks.
* Configuring OSPFv3
  + Applied the OSPFv3 routing protocols to connect four routers and four PCs for routers to share routing information and ping between networks.
* Stubby, NSSA, totally stubby
  + Took nine routers and divided them into five different areas: Stubby, Totally Stubby, Not So Stubby, EIGRP, and backbone so that routers could successfully communicate within and across areas.

*BGP*

* eBGP
  + Divided a network of six routers into three different areas: OSPF, BGP, and EIGRP, so that routers could successfully communicate within and across areas operating with different IPv6 routing protocols.
* BGP in IPv4
  + Divided a network of six routers into three different areas: OSPF, BGP, and EIGRP, so that routers can successfully communicate within and across areas operating with different routing protocols.
* iBGP and eBGP
  + Divided five routers into a network using the iBGP, eBGP, and OSPF routing protocols so that they can successfully communicate with and redistribute information between one another.

*AWS*

* Lesson 1
  + Created an Amazon virtual private cloud accessible to public and private clients.
* Lesson 2
  + Launched and configured an Amazon EC2 instance using an S3 bucket.
* Lesson 3
  + Launched and configured a publicly accessible webserver for a company’s clients.
* Lesson 4
  + Configured a VPC using the VPC Wizard to support cloud infrastructure.
* Lesson 5
  + Utilize Amazon Cloudfront service to create a website.
* Lesson 6
  + Launched and configured an Amazon EC2 instance using a non-default VPC.
* Lesson 7
  + Utilize Amazon DynamoDB service to create a NoSQL database storing company information.
* Lesson 8
  + Utilize SSH to access EC2 cloud information.

**Purpose:**

This lab requires students to apply the OSPFv2 routing protocols to connect four routers and four PCs in order for routers to share routing information and ping between networks.

**Background Information:**

“Open Shortest Path First,” or “OSPF”, is a highly efficient and popular routing protocol that sends information between routers. To execute its “Shortest Path First” or “SPF” algorithm, the router first sends out a “Link State Advertisement or “LSA.” This allows routers around the network to collect the same networking information about one another. Routers then store the information they have received from LSAs into a “Link State Database” or “LDSB.” Now that all router databases contain the same information, the SPF algorithm can automatically calculate the most efficient routes to connect all routers and end devices on the network.

**Lab Summary:**

Before connecting or configuring or anything, I created four PCs and four ISR4321 routers, then inserted a NIM-2T WAN network interface card into each router. To connect the PCs to routers, I inserted a copper straight through cable from each PC’s FastEthernet 0 interface to the router’s GigabitEthernet 0/0/0 interface. Adjacent routers were connected using a Serial DCE cable through the Serial 0/1/0 and 0/1/1 interfaces. I then configured each PC and router’s IPv4 addresses, providing a separate network for individual connections between routers and between routers and PCs. After configuring IPv4 addresses, I set clock rates on the DCE interfaces and configured OSPFv2 on each router. Finally, I checked by pinging around the network.

**Network Diagram (with IPs):**

Text

Description automatically generatedGraphical user interface, text

Description automatically generatedGraphical user interface, text

Description automatically generatedGraphical user interface, text

Description automatically generated

Text

Description automatically generatedGraphical user interface, text

Description automatically generated

**Configurations:**

**Router 0-**

***Show run***

Router# show run

Building configuration...

Current configuration : 821 bytes

version 15.4

no service timestamps log datetime msec

no service timestamps debug datetime msec

no service password-encryption

hostname Router

no ip cef

no ipv6 cef

spanning-tree mode pvst

interface GigabitEthernet0/0/0

ip address 11.0.0.1 255.255.255.0

duplex auto

speed auto

interface GigabitEthernet0/0/1

no ip address

duplex auto

speed auto

shutdown

interface Serial0/1/0

ip address 15.0.0.1 255.255.255.0

clock rate 56000

interface Serial0/1/1

no ip address

clock rate 2000000

interface Vlan1

no ip address

shutdown

router ospf 1

log-adjacency-changes

network 11.0.0.0 0.0.0.255 area 0

network 15.0.0.0 0.0.0.255 area 0

ip classless

ip flow-export version 9

line con 0

line aux 0

line vty 0 4

login

End

***Show IP route***

Router# show ip route

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP

D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2

E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP

i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area

\* - candidate default, U - per-user static route, o - ODR

P - periodic downloaded static route

Gateway of last resort is not set

11.0.0.0/8 is variably subnetted, 2 subnets, 2 masks

C 11.0.0.0/24 is directly connected, GigabitEthernet0/0/0

L 11.0.0.1/32 is directly connected, GigabitEthernet0/0/0

12.0.0.0/24 is subnetted, 1 subnets

O 12.0.0.0/24 [110/65] via 15.0.0.2, 00:50:39, Serial0/1/0

13.0.0.0/24 is subnetted, 1 subnets

O 13.0.0.0/24 [110/129] via 15.0.0.2, 00:50:29, Serial0/1/0

14.0.0.0/24 is subnetted, 1 subnets

O 14.0.0.0/24 [110/193] via 15.0.0.2, 00:50:29, Serial0/1/0

15.0.0.0/8 is variably subnetted, 2 subnets, 2 masks

C 15.0.0.0/24 is directly connected, Serial0/1/0

L 15.0.0.1/32 is directly connected, Serial0/1/0

16.0.0.0/24 is subnetted, 1 subnets

O 16.0.0.0/24 [110/128] via 15.0.0.2, 00:50:39, Serial0/1/0

17.0.0.0/24 is subnetted, 1 subnets

O 17.0.0.0/24 [110/192] via 15.0.0.2, 00:50:29, Serial0/1/0

***Show IP OSPF neighbor***

Router# show ip ospf neighbor

Neighbor ID Pri State Dead Time Address Interface

16.0.0.1 0 FULL/ - 00:00:37 15.0.0.2 Serial0/1/0

***Show IP OSPF interface***

Router# show ip ospf interface

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

Internet address is 11.0.0.1/24, Area 0

Process ID 1, Router ID 15.0.0.1, Network Type BROADCAST, Cost: 1

Transmit Delay is 1 sec, State DR, Priority 1

Designated Router (ID) 15.0.0.1, Interface address 11.0.0.1

No backup designated router on this network

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

Hello due in 00:00:03

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)

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

Internet address is 15.0.0.1/24, Area 0

Process ID 1, Router ID 15.0.0.1, 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 00:00:03

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 16.0.0.1

Suppress hello for 0 neighbor(s)

**Router 1-**

***Show run***

Router#show run

Building configuration...

Current configuration : 856 bytes

version 15.4

no service timestamps log datetime msec

no service timestamps debug datetime msec

no service password-encryption

hostname Router

no ip cef

no ipv6 cef

spanning-tree mode pvst

interface GigabitEthernet0/0/0

ip address 12.0.0.1 255.255.255.0

duplex auto

speed auto

interface GigabitEthernet0/0/1

no ip address

duplex auto

speed auto

shutdown

interface Serial0/1/0

ip address 15.0.0.2 255.255.255.0

interface Serial0/1/1

ip address 16.0.0.1 255.255.255.0

clock rate 56000

interface Vlan1

no ip address

shutdown

router ospf 1

log-adjacency-changes

network 12.0.0.0 0.0.0.255 area 0

network 15.0.0.0 0.0.0.255 area 0

network 16.0.0.0 0.0.0.255 area 0

ip classless

ip flow-export version 9

line con 0

line aux 0

line vty 0 4

login

end

***Show IP route***

Router#show ip route

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP

D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2

E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP

i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area

\* - candidate default, U - per-user static route, o - ODR

P - periodic downloaded static route

Gateway of last resort is not set

11.0.0.0/24 is subnetted, 1 subnets

O 11.0.0.0/24 [110/65] via 15.0.0.1, 00:53:24, Serial0/1/0

12.0.0.0/8 is variably subnetted, 2 subnets, 2 masks

C 12.0.0.0/24 is directly connected, GigabitEthernet0/0/0

L 12.0.0.1/32 is directly connected, GigabitEthernet0/0/0

13.0.0.0/24 is subnetted, 1 subnets

O 13.0.0.0/24 [110/65] via 16.0.0.2, 00:53:24, Serial0/1/1

14.0.0.0/24 is subnetted, 1 subnets

O 14.0.0.0/24 [110/129] via 16.0.0.2, 00:53:14, Serial0/1/1

15.0.0.0/8 is variably subnetted, 2 subnets, 2 masks

C 15.0.0.0/24 is directly connected, Serial0/1/0

L 15.0.0.2/32 is directly connected, Serial0/1/0

16.0.0.0/8 is variably subnetted, 2 subnets, 2 masks

C 16.0.0.0/24 is directly connected, Serial0/1/1

L 16.0.0.1/32 is directly connected, Serial0/1/1

17.0.0.0/24 is subnetted, 1 subnets

O 17.0.0.0/24 [110/128] via 16.0.0.2, 00:53:24, Serial0/1/1

***Show IP OSPF neighbor***

Router#show ip ospf neighbor

Neighbor ID Pri State Dead Time Address Interface

17.0.0.1 0 FULL/ - 00:00:31 16.0.0.2 Serial0/1/1

15.0.0.1 0 FULL/ - 00:00:32 15.0.0.1 Serial0/1/0

***Show IP OSPF interface***

Router#show ip ospf interface

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

Internet address is 12.0.0.1/24, Area 0

Process ID 1, Router ID 16.0.0.1, Network Type BROADCAST, Cost: 1

Transmit Delay is 1 sec, State DR, Priority 1

Designated Router (ID) 16.0.0.1, Interface address 12.0.0.1

No backup designated router on this network

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

Hello due in 00:00:07

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 16.0.0.1/24, Area 0

Process ID 1, Router ID 16.0.0.1, 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 17.0.0.1

Suppress hello for 0 neighbor(s)

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

Internet address is 15.0.0.2/24, Area 0

Process ID 1, Router ID 16.0.0.1, 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 00:00:06

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 15.0.0.1

Suppress hello for 0 neighbor(s)

**Router 2-**

***Show run***

Router#show run

Building configuration...

Current configuration : 856 bytes

version 15.4

no service timestamps log datetime msec

no service timestamps debug datetime msec

no service password-encryption

hostname Router

no ip cef

no ipv6 cef

spanning-tree mode pvst

interface GigabitEthernet0/0/0

ip address 13.0.0.1 255.255.255.0

duplex auto

speed auto

interface GigabitEthernet0/0/1

no ip address

duplex auto

speed auto

shutdown

interface Serial0/1/0

ip address 16.0.0.2 255.255.255.0

interface Serial0/1/1

ip address 17.0.0.1 255.255.255.0

clock rate 56000

interface Vlan1

no ip address

shutdown

router ospf 1

log-adjacency-changes

network 13.0.0.0 0.0.0.255 area 0

network 16.0.0.0 0.0.0.255 area 0

network 17.0.0.0 0.0.0.255 area 0

ip classless

ip flow-export version 9

line con 0

line aux 0

line vty 0 4

login

end

***Show IP route***

Router#show ip route

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP

D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2

E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP

i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area

\* - candidate default, U - per-user static route, o - ODR

P - periodic downloaded static route

Gateway of last resort is not set

11.0.0.0/24 is subnetted, 1 subnets

O 11.0.0.0/24 [110/129] via 16.0.0.1, 00:55:49, Serial0/1/0

12.0.0.0/24 is subnetted, 1 subnets

O 12.0.0.0/24 [110/65] via 16.0.0.1, 00:55:49, Serial0/1/0

13.0.0.0/8 is variably subnetted, 2 subnets, 2 masks

C 13.0.0.0/24 is directly connected, GigabitEthernet0/0/0

L 13.0.0.1/32 is directly connected, GigabitEthernet0/0/0

14.0.0.0/24 is subnetted, 1 subnets

O 14.0.0.0/24 [110/65] via 17.0.0.2, 00:55:49, Serial0/1/1

15.0.0.0/24 is subnetted, 1 subnets

O 15.0.0.0/24 [110/128] via 16.0.0.1, 00:55:49, Serial0/1/0

16.0.0.0/8 is variably subnetted, 2 subnets, 2 masks

C 16.0.0.0/24 is directly connected, Serial0/1/0

L 16.0.0.2/32 is directly connected, Serial0/1/0

17.0.0.0/8 is variably subnetted, 2 subnets, 2 masks

C 17.0.0.0/24 is directly connected, Serial0/1/1

L 17.0.0.1/32 is directly connected, Serial0/1/1

***Show IP OSPF neighbor***

Router#show ip ospf neighbor

Neighbor ID Pri State Dead Time Address Interface

17.0.0.2 0 FULL/ - 00:00:35 17.0.0.2 Serial0/1/1

16.0.0.1 0 FULL/ - 00:00:38 16.0.0.1 Serial0/1/0

***Show IP OSPF interface***

Router#show ip ospf interface

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

Internet address is 13.0.0.1/24, Area 0

Process ID 1, Router ID 17.0.0.1, Network Type BROADCAST, Cost: 1

Transmit Delay is 1 sec, State DR, Priority 1

Designated Router (ID) 17.0.0.1, Interface address 13.0.0.1

No backup designated router on this network

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

Hello due in 00:00:04

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 17.0.0.1/24, Area 0

Process ID 1, Router ID 17.0.0.1, 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 00:00:04

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 17.0.0.2

Suppress hello for 0 neighbor(s)

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

Internet address is 16.0.0.2/24, Area 0

Process ID 1, Router ID 17.0.0.1, 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 00:00:03

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 16.0.0.1

Suppress hello for 0 neighbor(s)

**Router 2-**

***Show run***

Router#show run

Building configuration...

Current configuration : 813 bytes

version 15.4

no service timestamps log datetime msec

no service timestamps debug datetime msec

no service password-encryption

hostname Router

no ip cef

no ipv6 cef

spanning-tree mode pvst

interface GigabitEthernet0/0/0

ip address 14.0.0.1 255.255.255.0

duplex auto

speed auto

interface GigabitEthernet0/0/1

no ip address

duplex auto

speed auto

shutdown

interface Serial0/1/0

ip address 17.0.0.2 255.255.255.0

interface Serial0/1/1

no ip address

clock rate 2000000

shutdown

interface Vlan1

no ip address

shutdown

router ospf 1

log-adjacency-changes

network 14.0.0.0 0.0.0.255 area 0

network 17.0.0.0 0.0.0.255 area 0

ip classless

ip flow-export version 9

line con 0

line aux 0

line vty 0 4

login

end

***Show IP route***

Router#show ip route

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP

D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2

E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP

i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area

\* - candidate default, U - per-user static route, o - ODR

P - periodic downloaded static route

Gateway of last resort is not set

11.0.0.0/24 is subnetted, 1 subnets

O 11.0.0.0/24 [110/193] via 17.0.0.1, 00:56:27, Serial0/1/0

12.0.0.0/24 is subnetted, 1 subnets

O 12.0.0.0/24 [110/129] via 17.0.0.1, 00:56:27, Serial0/1/0

13.0.0.0/24 is subnetted, 1 subnets

O 13.0.0.0/24 [110/65] via 17.0.0.1, 00:56:37, Serial0/1/0

14.0.0.0/8 is variably subnetted, 2 subnets, 2 masks

C 14.0.0.0/24 is directly connected, GigabitEthernet0/0/0

L 14.0.0.1/32 is directly connected, GigabitEthernet0/0/0

15.0.0.0/24 is subnetted, 1 subnets

O 15.0.0.0/24 [110/192] via 17.0.0.1, 00:56:27, Serial0/1/0

16.0.0.0/24 is subnetted, 1 subnets

O 16.0.0.0/24 [110/128] via 17.0.0.1, 00:56:37, Serial0/1/0

17.0.0.0/8 is variably subnetted, 2 subnets, 2 masks

C 17.0.0.0/24 is directly connected, Serial0/1/0

L 17.0.0.2/32 is directly connected, Serial0/1/0

***Show IP OSPF neighbor***

Router#show ip ospf neighbor

Neighbor ID Pri State Dead Time Address Interface

17.0.0.1 0 FULL/ - 00:00:39 17.0.0.1 Serial0/1/0

***Show IP OSPF interface***

Router#show ip ospf interface

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

Internet address is 14.0.0.1/24, Area 0

Process ID 1, Router ID 17.0.0.2, Network Type BROADCAST, Cost: 1

Transmit Delay is 1 sec, State DR, Priority 1

Designated Router (ID) 17.0.0.2, Interface address 14.0.0.1

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 17.0.0.2/24, Area 0

Process ID 1, Router ID 17.0.0.2, 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 00:00:01

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 17.0.0.1

Suppress hello for 0 neighbor(s)

**Problem Section:**

After the summer break, I had forgotten some important commands and aspects of network planning. As a result, I made several errors with my IP addressing scheme. At first, I had put the network between PC0 and R0 on the same subnet as the network between R0 and R1. However, I was able to collaborate with my peers and this issue was quickly resolved. Working with my classmates also allowed me to recall multiple configuration commands for OSPF.

**Conclusion:**

This lab helped me practice configuring OSPF on a network of four routers and four switches. I was able to refresh my memory of other networking concepts as well: physical connections between devices and IP addressing. However, for future projects, I will be sure to plan out IP addressing schemes by hand or with Microsoft Excel. Overall, I was able to gain a more complete understanding of OSPF’s purpose and the process of configuring it.

Elaine Zhang

Completed 10/8/2020

Single-Area OSPFv3

**Purpose:**

This lab requires students to apply the OSPFv3 routing protocols to connect four routers and four PCs in order for routers to share routing information and ping between networks.

**Background Information:**

“Open Shortest Path First,” or “OSPF”, is a highly efficient and popular routing protocol that sends information between routers. To execute its “Shortest Path First” or “SPF” algorithm, the router first sends out a “Link State Advertisement or “LSA.” This allows routers around the network to collect the same networking information about one another. Routers then store the information they have received from LSAs into a “Link State Database” or “LDSB.” Now that all router databases contain the same information, the SPF algorithm can automatically calculate the most efficient routes to connect all routers and end devices on the network. OSPFv3 specifically uses IPv6 addresses to configure routers and end devices, as opposed to the use of IPv4 addresses in the OSPFv2 routing protocol.

**Lab Summary:**

For this lab, I built upon the same configuration and topology from the previous OSPFv2 lab and added an additional router and PC to create five of each in total. I then configured each PC and router’s IPv6 addresses, providing a separate network for individual connections between routers and between routers and PCs. After configuring each router interface and PC’s IPv6 addresses, I then configured the OSPFv3 routing protocol on each router interface as well, also splitting the network into two separate areas (area 0 and area 1). For router 2, which overlapped between area 0 and area 1, I configured each router interface for its respective area. Finally, I checked by pinging around the network to verify connectivity and that OSPFv3 had been configured correctly.



Text

Description automatically generatedText

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Description automatically generated**Network Diagram:**

Graphical user interface, text

Description automatically generatedGraphical user interface, text

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Description automatically generatedDiagram

Description automatically generated

**Configurations:**

**Router 0-**

***Show run***

Router#show run

Building configuration...

Current configuration : 1068 bytes

version 15.4

no service timestamps log datetime msec

no service timestamps debug datetime msec

no service password-encryption

hostname Router

no ip cef

ipv6 unicast-routing

no ipv6 cef

spanning-tree mode pvst

interface GigabitEthernet0/0/0

ip address 11.0.0.1 255.255.255.0

duplex auto

speed auto

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

ipv6 enable

ipv6 ospf 10 area 0

interface GigabitEthernet0/0/1

no ip address

duplex auto

speed auto

shutdown

interface Serial0/1/0

ip address 15.0.0.1 255.255.255.0

ipv6 address 2001:DB8:1:5::1/127

ipv6 enable

ipv6 ospf 10 area 0

clock rate 56000

interface Serial0/1/1

no ip address

clock rate 2000000

interface Vlan1

no ip address

shutdown

router ospf 1

log-adjacency-changes

network 11.0.0.0 0.0.0.255 area 0

network 15.0.0.0 0.0.0.255 area 0

ipv6 router ospf 10

log-adjacency-changes

ipv6 router ospf 1

log-adjacency-changes

ip classless

ip flow-export version 9

line con 0

line aux 0

line vty 0 4

login

End

***Show IPv6 route***

Router#show ipv6 route

IPv6 Routing Table - 16 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

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:DB8:1:1::/64 [0/0]

via GigabitEthernet0/0/0, directly connected

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

via GigabitEthernet0/0/0, receive

O 2001:DB8:1:2::/64 [110/65]

via FE80::20A:F3FF:FED5:801, Serial0/1/0

OI 2001:DB8:1:3::/64 [110/129]

via FE80::20A:F3FF:FED5:801, Serial0/1/0

OI 2001:DB8:1:4::/64 [110/193]

via FE80::20A:F3FF:FED5:801, Serial0/1/0

C 2001:DB8:1:5::/127 [0/0]

via Serial0/1/0, directly connected

L 2001:DB8:1:5::1/128 [0/0]

via Serial0/1/0, receive

O 2001:DB8:1:5::2/127 [110/128]

via FE80::20A:F3FF:FED5:801, Serial0/1/0

O 2001:DB8:1:6::/127 [110/128]

via FE80::20A:F3FF:FED5:801, Serial0/1/0

O 2001:DB8:1:6::2/127 [110/192]

via FE80::20A:F3FF:FED5:801, Serial0/1/0

OI 2001:DB8:1:7::/127 [110/192]

via FE80::20A:F3FF:FED5:801, Serial0/1/0

OI 2001:DB8:1:7::2/127 [110/256]

via FE80::20A:F3FF:FED5:801, Serial0/1/0

OI 2001:DB8:1:8::/127 [110/256]

via FE80::20A:F3FF:FED5:801, Serial0/1/0

OI 2001:DB8:1:8::2/127 [110/320]

via FE80::20A:F3FF:FED5:801, Serial0/1/0

OI 2001:DB8:1:9::/64 [110/257]

via FE80::20A:F3FF:FED5:801, Serial0/1/0

L FF00::/8 [0/0]

via Null0, receive

***Show IPv6 OSPF neighbor***

Router#show ipv6 ospf neighbor

Neighbor ID Pri State Dead Time Interface ID Interface

16.0.0.1 0 FULL/ - 00:00:37 3 Serial0/1/0

***Show IPv6 OSPF interface***

Router#show ipv6 ospf neighbor

Neighbor ID Pri State Dead Time Interface ID Interface

16.0.0.1 0 FULL/ - 00:00:37 3 Serial0/1/0

Router#show ipv6 ospf interface

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

Link Local Address FE80::260:47FF:FE0D:5C01, Interface ID 1

Area 0, Process ID 10, Instance ID 0, Router ID 15.0.0.1

Network Type BROADCAST, Cost: 1

Transmit Delay is 1 sec, State DR, Priority 1

Designated Router (ID) 15.0.0.1, local address FE80::260:47FF:FE0D:5C01

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

Link Local Address FE80::260:47FF:FE0D:5C01, Interface ID 3

Area 0, Process ID 10, Instance ID 0, Router ID 15.0.0.1

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 00:00:06

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 16.0.0.1

Suppress hello for 0 neighbor(s)

**Router 1-**

***Show run***

Router#show run

Building configuration...

Current configuration : 1171 bytes

version 15.4

no service timestamps log datetime msec

no service timestamps debug datetime msec

no service password-encryption

hostname Router

no ip cef

ipv6 unicast-routing

no ipv6 cef

spanning-tree mode pvst

interface GigabitEthernet0/0/0

ip address 12.0.0.1 255.255.255.0

duplex auto

speed auto

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

ipv6 enable

ipv6 ospf 10 area 0

interface GigabitEthernet0/0/1

no ip address

duplex auto

speed auto

shutdown

interface Serial0/1/0

ip address 15.0.0.2 255.255.255.0

ipv6 address 2001:DB8:1:5::2/127

ipv6 enable

ipv6 ospf 10 area 0

interface Serial0/1/1

ip address 16.0.0.1 255.255.255.0

ipv6 address 2001:DB8:1:6::1/127

ipv6 enable

ipv6 ospf 10 area 0

clock rate 56000

interface Vlan1

no ip address

shutdown

router ospf 1

log-adjacency-changes

network 12.0.0.0 0.0.0.255 area 0

network 15.0.0.0 0.0.0.255 area 0

network 16.0.0.0 0.0.0.255 area 0

ipv6 router ospf 10

log-adjacency-changes

ipv6 router ospf 1

log-adjacency-changes

ip classless

ip flow-export version 9

line con 0

line aux 0

line vty 0 4

login

End

***Show IPv6 route***

Router#show ipv6 route

IPv6 Routing Table - 17 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

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:DB8:1:1::/64 [110/65]

via FE80::260:47FF:FE0D:5C01, Serial0/1/0

C 2001:DB8:1:2::/64 [0/0]

via GigabitEthernet0/0/0, directly connected

L 2001:DB8:1:2::1/128 [0/0]

via GigabitEthernet0/0/0, receive

OI 2001:DB8:1:3::/64 [110/65]

via FE80::260:2FFF:FE8E:7A01, Serial0/1/1

OI 2001:DB8:1:4::/64 [110/129]

via FE80::260:2FFF:FE8E:7A01, Serial0/1/1

O 2001:DB8:1:5::/127 [110/128]

via FE80::260:47FF:FE0D:5C01, Serial0/1/0

C 2001:DB8:1:5::2/127 [0/0]

via Serial0/1/0, directly connected

L 2001:DB8:1:5::2/128 [0/0]

via Serial0/1/0, receive

C 2001:DB8:1:6::/127 [0/0]

via Serial0/1/1, directly connected

L 2001:DB8:1:6::1/128 [0/0]

via Serial0/1/1, receive

O 2001:DB8:1:6::2/127 [110/128]

via FE80::260:2FFF:FE8E:7A01, Serial0/1/1

OI 2001:DB8:1:7::/127 [110/128]

via FE80::260:2FFF:FE8E:7A01, Serial0/1/1

OI 2001:DB8:1:7::2/127 [110/192]

via FE80::260:2FFF:FE8E:7A01, Serial0/1/1

OI 2001:DB8:1:8::/127 [110/192]

via FE80::260:2FFF:FE8E:7A01, Serial0/1/1

OI 2001:DB8:1:8::2/127 [110/256]

via FE80::260:2FFF:FE8E:7A01, Serial0/1/1

OI 2001:DB8:1:9::/64 [110/193]

via FE80::260:2FFF:FE8E:7A01, Serial0/1/1

L FF00::/8 [0/0]

via Null0, receive

***Show IPv6 OSPF neighbor***

Router#show ipv6 ospf neighbor

Neighbor ID Pri State Dead Time Interface ID Interface

15.0.0.1 0 FULL/ - 00:00:35 3 Serial0/1/0

17.0.0.1 0 FULL/ - 00:00:31 3 Serial0/1/1

***Show IPv6 OSPF interface***

Router#show ipv6 ospf neighbor

Neighbor ID Pri State Dead Time Interface ID Interface

15.0.0.1 0 FULL/ - 00:00:35 3 Serial0/1/0

17.0.0.1 0 FULL/ - 00:00:31 3 Serial0/1/1

Router#show ipv6 ospf interface

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

Link Local Address FE80::20A:F3FF:FED5:801, Interface ID 1

Area 0, Process ID 10, Instance ID 0, Router ID 16.0.0.1

Network Type BROADCAST, Cost: 1

Transmit Delay is 1 sec, State DR, Priority 1

Designated Router (ID) 16.0.0.1, local address FE80::20A:F3FF:FED5:801

No backup designated router on this network

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

Hello due in 00:00:06

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

Link Local Address FE80::20A:F3FF:FED5:801, Interface ID 4

Area 0, Process ID 10, Instance ID 0, Router ID 16.0.0.1

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 00:00:06

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 17.0.0.1

Suppress hello for 0 neighbor(s)

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

Link Local Address FE80::20A:F3FF:FED5:801, Interface ID 3

Area 0, Process ID 10, Instance ID 0, Router ID 16.0.0.1

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 00:00:06

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 15.0.0.1

Suppress hello for 0 neighbor(s)

**Router 2-**

***Show run***

Router#show run

Building configuration...

Current configuration : 1171 bytes

version 15.4

no service timestamps log datetime msec

no service timestamps debug datetime msec

no service password-encryption

hostname Router

no ip cef

ipv6 unicast-routing

no ipv6 cef

spanning-tree mode pvst

interface GigabitEthernet0/0/0

ip address 13.0.0.1 255.255.255.0

duplex auto

speed auto

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

ipv6 enable

ipv6 ospf 10 area 1

interface GigabitEthernet0/0/1

no ip address

duplex auto

speed auto

shutdown

interface Serial0/1/0

ip address 16.0.0.2 255.255.255.0

ipv6 address 2001:DB8:1:6::2/127

ipv6 enable

ipv6 ospf 10 area 0

interface Serial0/1/1

ip address 17.0.0.1 255.255.255.0

ipv6 address 2001:DB8:1:7::1/127

ipv6 enable

ipv6 ospf 10 area 1

clock rate 56000

interface Vlan1

no ip address

shutdown

router ospf 1

log-adjacency-changes

network 13.0.0.0 0.0.0.255 area 0

network 16.0.0.0 0.0.0.255 area 0

network 17.0.0.0 0.0.0.255 area 0

ipv6 router ospf 10

log-adjacency-changes

ipv6 router ospf 1

log-adjacency-changes

ip classless

ip flow-export version 9

line con 0

line aux 0

line vty 0 4

login

End

***Show IPv6 route***

Router#show ipv6 route

IPv6 Routing Table - 17 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

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:DB8:1:1::/64 [110/129]

via FE80::20A:F3FF:FED5:801, Serial0/1/0

O 2001:DB8:1:2::/64 [110/65]

via FE80::20A:F3FF:FED5:801, Serial0/1/0

C 2001:DB8:1:3::/64 [0/0]

via GigabitEthernet0/0/0, directly connected

L 2001:DB8:1:3::1/128 [0/0]

via GigabitEthernet0/0/0, receive

O 2001:DB8:1:4::/64 [110/65]

via FE80::20A:41FF:FE9B:4101, Serial0/1/1

O 2001:DB8:1:5::/127 [110/192]

via FE80::20A:F3FF:FED5:801, Serial0/1/0

O 2001:DB8:1:5::2/127 [110/128]

via FE80::20A:F3FF:FED5:801, Serial0/1/0

O 2001:DB8:1:6::/127 [110/128]

via FE80::20A:F3FF:FED5:801, Serial0/1/0

C 2001:DB8:1:6::2/127 [0/0]

via Serial0/1/0, directly connected

L 2001:DB8:1:6::2/128 [0/0]

via Serial0/1/0, receive

C 2001:DB8:1:7::/127 [0/0]

via Serial0/1/1, directly connected

L 2001:DB8:1:7::1/128 [0/0]

via Serial0/1/1, receive

O 2001:DB8:1:7::2/127 [110/128]

via FE80::20A:41FF:FE9B:4101, Serial0/1/1

O 2001:DB8:1:8::/127 [110/128]

via FE80::20A:41FF:FE9B:4101, Serial0/1/1

O 2001:DB8:1:8::2/127 [110/192]

via FE80::20A:41FF:FE9B:4101, Serial0/1/1

O 2001:DB8:1:9::/64 [110/129]

via FE80::20A:41FF:FE9B:4101, Serial0/1/1

L FF00::/8 [0/0]

via Null0, receive

***Show IPv6 OSPF neighbor***

Router#show ipv6 ospf neighbor

Neighbor ID Pri State Dead Time Interface ID Interface

18.0.0.1 0 FULL/ - 00:00:38 3 Serial0/1/1

16.0.0.1 0 FULL/ - 00:00:39 4 Serial0/1/0

***Show IPv6 OSPF interface***

Router#show ipv6 ospf neighbor

Neighbor ID Pri State Dead Time Interface ID Interface

18.0.0.1 0 FULL/ - 00:00:38 3 Serial0/1/1

16.0.0.1 0 FULL/ - 00:00:39 4 Serial0/1/0

Router#show ipv6 ospf interface

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

Link Local Address FE80::260:2FFF:FE8E:7A01, Interface ID 1

Area 1, Process ID 10, Instance ID 0, Router ID 17.0.0.1

Network Type BROADCAST, Cost: 1

Transmit Delay is 1 sec, State DR, Priority 1

Designated Router (ID) 17.0.0.1, local address FE80::260:2FFF:FE8E:7A01

No backup designated router on this network

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

Hello due in 00:00:06

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

Link Local Address FE80::260:2FFF:FE8E:7A01, Interface ID 4

Area 1, Process ID 10, Instance ID 0, Router ID 17.0.0.1

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 18.0.0.1

Suppress hello for 0 neighbor(s)

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

Link Local Address FE80::260:2FFF:FE8E:7A01, Interface ID 3

Area 0, Process ID 10, Instance ID 0, Router ID 17.0.0.1

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 00:00:03

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 16.0.0.1

Suppress hello for 0 neighbor(s)

**Router 3-**

***Show run***

Router#show run

Building configuration...

Current configuration : 1138 bytes

version 15.4

no service timestamps log datetime msec

no service timestamps debug datetime msec

no service password-encryption

hostname Router

no ip cef

ipv6 unicast-routing

no ipv6 cef

spanning-tree mode pvst

interface GigabitEthernet0/0/0

ip address 14.0.0.1 255.255.255.0

duplex auto

speed auto

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

ipv6 enable

ipv6 ospf 10 area 1

interface GigabitEthernet0/0/1

no ip address

duplex auto

speed auto

shutdown

interface Serial0/1/0

ip address 17.0.0.2 255.255.255.0

ipv6 address 2001:DB8:1:7::2/127

ipv6 enable

ipv6 ospf 10 area 1

interface Serial0/1/1

ip address 18.0.0.1 255.255.255.0

ipv6 address 2001:DB8:1:8::1/127

ipv6 enable

ipv6 ospf 10 area 1

clock rate 2000000

interface Vlan1

no ip address

shutdown

router ospf 1

log-adjacency-changes

network 14.0.0.0 0.0.0.255 area 0

network 17.0.0.0 0.0.0.255 area 0

ipv6 router ospf 10

log-adjacency-changes

ipv6 router ospf 1

log-adjacency-changes

ip classless

ip flow-export version 9

line con 0

line aux 0

line vty 0 4

login

End

***Show IPv6 route***

Router#show ipv6 route

IPv6 Routing Table - 17 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

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:DB8:1:1::/64 [110/193]

via FE80::260:2FFF:FE8E:7A01, Serial0/1/0

OI 2001:DB8:1:2::/64 [110/129]

via FE80::260:2FFF:FE8E:7A01, Serial0/1/0

O 2001:DB8:1:3::/64 [110/65]

via FE80::260:2FFF:FE8E:7A01, Serial0/1/0

C 2001:DB8:1:4::/64 [0/0]

via GigabitEthernet0/0/0, directly connected

L 2001:DB8:1:4::1/128 [0/0]

via GigabitEthernet0/0/0, receive

OI 2001:DB8:1:5::/127 [110/256]

via FE80::260:2FFF:FE8E:7A01, Serial0/1/0

OI 2001:DB8:1:5::2/127 [110/192]

via FE80::260:2FFF:FE8E:7A01, Serial0/1/0

OI 2001:DB8:1:6::/127 [110/192]

via FE80::260:2FFF:FE8E:7A01, Serial0/1/0

OI 2001:DB8:1:6::2/127 [110/128]

via FE80::260:2FFF:FE8E:7A01, Serial0/1/0

O 2001:DB8:1:7::/127 [110/128]

via FE80::260:2FFF:FE8E:7A01, Serial0/1/0

C 2001:DB8:1:7::2/127 [0/0]

via Serial0/1/0, directly connected

L 2001:DB8:1:7::2/128 [0/0]

via Serial0/1/0, receive

C 2001:DB8:1:8::/127 [0/0]

via Serial0/1/1, directly connected

L 2001:DB8:1:8::1/128 [0/0]

via Serial0/1/1, receive

O 2001:DB8:1:8::2/127 [110/128]

via FE80::20A:41FF:FE6A:5801, Serial0/1/1

O 2001:DB8:1:9::/64 [110/65]

via FE80::20A:41FF:FE6A:5801, Serial0/1/1

L FF00::/8 [0/0]

via Null0, receive

***Show IPv6 OSPF neighbor***

Router#show ipv6 ospf neighbor

Neighbor ID Pri State Dead Time Interface ID Interface

17.0.0.1 0 FULL/ - 00:00:33 4 Serial0/1/0

19.0.0.1 0 FULL/ - 00:00:39 3 Serial0/1/1

***Show IPv6 OSPF interface***

Router#show ipv6 ospf interface

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

Link Local Address FE80::20A:41FF:FE9B:4101, Interface ID 1

Area 1, Process ID 10, Instance ID 0, Router ID 18.0.0.1

Network Type BROADCAST, Cost: 1

Transmit Delay is 1 sec, State DR, Priority 1

Designated Router (ID) 18.0.0.1, local address FE80::20A:41FF:FE9B:4101

No backup designated router on this network

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

Hello due in 00:00:07

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

Link Local Address FE80::20A:41FF:FE9B:4101, Interface ID 4

Area 1, Process ID 10, Instance ID 0, Router ID 18.0.0.1

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 19.0.0.1

Suppress hello for 0 neighbor(s)

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

Link Local Address FE80::20A:41FF:FE9B:4101, Interface ID 3

Area 1, Process ID 10, Instance ID 0, Router ID 18.0.0.1

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 00:00:05

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 17.0.0.1

Suppress hello for 0 neighbor(s)

**Router 4-**

***Show run***

Router#show run

Building configuration...

Current configuration : 951 bytes

version 15.4

no service timestamps log datetime msec

no service timestamps debug datetime msec

no service password-encryption

hostname Router

no ip cef

ipv6 unicast-routing

no ipv6 cef

spanning-tree mode pvst

interface GigabitEthernet0/0/0

ip address 19.0.0.1 255.255.255.0

duplex auto

speed auto

ipv6 address 2001:DB8:1:9::1/64

ipv6 enable

ipv6 ospf 10 area 1

interface GigabitEthernet0/0/1

no ip address

duplex auto

speed auto

shutdown

interface Serial0/1/0

ip address 18.0.0.2 255.255.255.0

ipv6 address 2001:DB8:1:8::2/127

ipv6 enable

ipv6 ospf 10 area 1

interface Serial0/1/1

no ip address

clock rate 2000000

shutdown

interface Vlan1

no ip address

shutdown

ipv6 router ospf 10

log-adjacency-changes

ipv6 router ospf 1

log-adjacency-changes

ip classless

ip flow-export version 9

line con 0

line aux 0

line vty 0 4

login

End

***Show IPv6 route***

Router#show ipv6 route

IPv6 Routing Table - 16 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

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:DB8:1:1::/64 [110/257]

via FE80::20A:41FF:FE9B:4101, Serial0/1/0

OI 2001:DB8:1:2::/64 [110/193]

via FE80::20A:41FF:FE9B:4101, Serial0/1/0

O 2001:DB8:1:3::/64 [110/129]

via FE80::20A:41FF:FE9B:4101, Serial0/1/0

O 2001:DB8:1:4::/64 [110/65]

via FE80::20A:41FF:FE9B:4101, Serial0/1/0

OI 2001:DB8:1:5::/127 [110/320]

via FE80::20A:41FF:FE9B:4101, Serial0/1/0

OI 2001:DB8:1:5::2/127 [110/256]

via FE80::20A:41FF:FE9B:4101, Serial0/1/0

OI 2001:DB8:1:6::/127 [110/256]

via FE80::20A:41FF:FE9B:4101, Serial0/1/0

OI 2001:DB8:1:6::2/127 [110/192]

via FE80::20A:41FF:FE9B:4101, Serial0/1/0

O 2001:DB8:1:7::/127 [110/192]

via FE80::20A:41FF:FE9B:4101, Serial0/1/0

O 2001:DB8:1:7::2/127 [110/128]

via FE80::20A:41FF:FE9B:4101, Serial0/1/0

O 2001:DB8:1:8::/127 [110/128]

via FE80::20A:41FF:FE9B:4101, Serial0/1/0

C 2001:DB8:1:8::2/127 [0/0]

via Serial0/1/0, directly connected

L 2001:DB8:1:8::2/128 [0/0]

via Serial0/1/0, receive

C 2001:DB8:1:9::/64 [0/0]

via GigabitEthernet0/0/0, directly connected

L 2001:DB8:1:9::1/128 [0/0]

via GigabitEthernet0/0/0, receive

L FF00::/8 [0/0]

via Null0, receive

***Show IPv6 OSPF neighbor***

Router#show ipv6 ospf neighbor

Neighbor ID Pri State Dead Time Interface ID Interface

18.0.0.1 0 FULL/ - 00:00:36 4 Serial0/1/0

***Show IPv6 OSPF interface***

Router#show ipv6 ospf interface

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

Link Local Address FE80::20A:41FF:FE6A:5801, Interface ID 1

Area 1, Process ID 10, Instance ID 0, Router ID 19.0.0.1

Network Type BROADCAST, Cost: 1

Transmit Delay is 1 sec, State DR, Priority 1

Designated Router (ID) 19.0.0.1, local address FE80::20A:41FF:FE6A:5801

No backup designated router on this network

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

Hello due in 00:00:07

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

Link Local Address FE80::20A:41FF:FE6A:5801, Interface ID 3

Area 1, Process ID 10, Instance ID 0, Router ID 19.0.0.1

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 00:00:04

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 18.0.0.1

Suppress hello for 0 neighbor(s)

**Problem Section:**

Because I was building upon the topology I had previously created, it was difficult at first to plan additional subnets for the fifth PC and router. Another issue was dividing the devices into two separate areas. Because router 2 overlapped between area 0 and area 1, I was unsure how to configure each respective interface. However, after discussing as a class wide group, I realized that the correct course of action would be to configure each serial interface on either side of the router as part of a different area.

**Conclusion:**

This lab helped me practice configuring OSPFv3 on a network of five routers and five switches. I was able to refresh my memory of IPv6 addressing and the commands used to configure OSPFv3 specifically. In future projects involving OSPFv3, I will be sure to draw a network diagram before issuing any configuration commands in order to divide each device into its correct area. In the process of planning my IPv6 addressing scheme, I will continue using IPv6 addresses that are similar to their corresponding IPv4 addresses for increased clarity.

**Teacher signoff:**