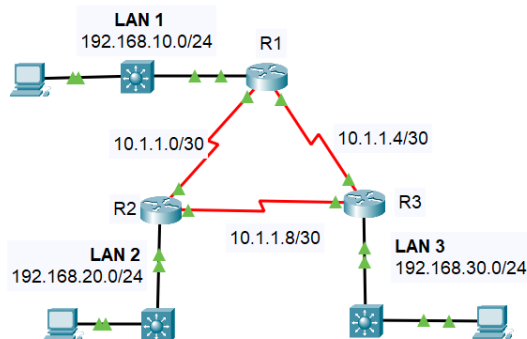


Packet Tracer - Point-to-Point Single-Area OSPFv2 Configuration



Addressing Table

Device	Interface	IP Address	Subnet Mask
R1	G0/0/0	192.168.10.1	/24
	S0/1/0	10.1.1.1	/30
	S0/1/1	10.1.1.5	/30
R2	G0/0/0	192.168.20.1	/24
	S0/1/0	10.1.1.2	/30
	S0/1/1	10.1.1.9	/30
R3	G0/0/0	192.168.30.1	/24
	S0/1/0	10.1.1.10	/30
	S0/1/1	10.1.1.6	/30
PC1	NIC	192.168.10.10	/24
PC2	NIC	192.168.20.10	/24
PC3	NIC	192.168.30.10	/24

Objectives

Part 1: Configure Router IDs.

Part 2: Configure Networks for OSPF Routing.

Part 3: Configure Passive Interfaces.

Part 4: Verify OSPF configuration.

Background

In this activity, you will activate OSPF routing using network statements and wildcard masks, configuring OSPF routing on interfaces, and by using network statements quad-zero masks. In addition, you will configure explicit router IDs and passive interfaces.

Instructions

Part 1: Configure router IDs.

- a. Start the OSPF routing process on all three routers. Use process ID **10**.

`Router(config)# router ospf process-id`

- b. Use the router-id command to set the OSPF IDs of the three routers as follows

- R1: **1.1.1.1**

- R2: 2.2.2.2
- R3: 3.3.3.3

Use the following command:

```
Router(config-router)# router-id rid
```

```
R1(config)# router ospf 10  
R1(config-router)# router-id 1.1.1.1
```

```
R2(config)# router ospf 10  
R2(config-router)# router-id 2.2.2.2
```

```
R3(config)# router ospf 10  
R3(config-router)# router-id 3.3.3.3
```

Part 2: Configure Networks for OSPF Routing

Step 1: Configure networks for OSPF routing using network commands and wildcard masks.

How many statements are required to configure OSPF to route all the networks attached to router R1?

3

The LAN attached to router R1 has a /24 mask. What is the equivalent of this mask in dotted decimal representation?

255.255.255.0

Subtract the dotted decimal subnet mask from 255.255.255.255. What is the result?

0.0.0.255

What is the dotted decimal equivalent of the /30 subnet mask?

255.255.255.252

Subtract the dotted decimal representation of the /30 mask from 255.255.255.255. What is the result?

0.0.0.3

- Configure the routing process on R1 with the network statements and wildcard masks that are required to activate OSPF routing for all the attached networks. The network statement values should be the network or subnet addresses of the configured networks.

```
Router(config-router)# network network-address wildcard-mask area area-id
```

```
R1(config)# router ospf 10
R1(config-router)# network 192.168.10.0 0.0.0.255 area 0
R1(config-router)# network 10.1.1.0 0.0.0.3 area 0
R1(config-router)# network 10.1.1.4 0.0.0.3 area 0
```

- b. Verify that OSPF has been configured properly by the displaying the running configuration. If you find an error, delete the network statement using the **no** command and reconfigure it.

Verified as shown below.

```
R1(config-router)# network 192.168.10.0 0.0.0.255 area 0
R1(config-router)# network 10.1.1.0 0.0.0.3 area 0
R1(config-router)# network 10.1.1.4 0.0.0.3 area 0
```

Step 2: Configure networks for OSPF routing using interface IP addresses and quad-zero masks.

On router R2, configure OSPF using network commands with the IP addresses of the interfaces and quad-zero masks. The syntax of the network command is the same as was used above.

```
R2(config-router)# network 192.168.20.1 0.0.0.0 area 0
R2(config-router)# network 10.1.1.2 0.0.0.0 area 0
R2(config-router)# network 10.1.1.9 0.0.0.0 area 0
```

Step 3: Configure OSPF routing on router interfaces

On router R3, configure the required interfaces with OSPF.

Which interfaces on R3 should be configured with OSPF?

G0/0/0, S0/1/0, S0/1/1

Configure each interface using the command syntax shown below:

```
Router(config-if)# ip ospf process-id area area-id
```

```
R3(config)# interface GigabitEthernet0/0/0
R3(config-if)# ip ospf 10 area 0
R3(config-if)# interface Serial0/1/0
R3(config-if)# ip ospf 10 area 0
R3(config-if)# interface Serial0/1/1
R3(config-if)# ip ospf 10 area 0
```

Part 3: Configure Passive Interfaces

OSPF will send its protocol traffic out of all interfaces that are participating in the OSPF process. On links that are not configured to other networks, such as LANs, this unnecessary traffic consumes resources. The passive-interface command will prevent the OSPF process from sending unnecessary routing protocol traffic out LAN interfaces.

Which interfaces on R1, R2, and R3 are a LAN interfaces?

G0/0/0 on all three routers

Configure the OSPF process on each of the three routers with the **passive-interface** command.

```
Router(config-router)# passive-interface interface
```

```
R1(config)# router ospf 10
```

```
R1(config-router)# passive-interface GigabitEthernet0/0/0
```

```
R2(config)# router ospf 10
```

```
R2(config-router)# passive-interface GigabitEthernet0/0/0
```

```
R3(config)# router ospf 10
```

```
R3(config-router)# passive-interface GigabitEthernet0/0/0
```

Part 4: Verify OSPF Configuration

Use **show** commands to verify the network and passive interface configuration of the OSPF process on each router.

show ip route (verify routes have been exchanged for network reachability)

R1

```
R1#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

    10.0.0.0/8 is variably subnetted, 5 subnets, 2 masks
C       10.1.1.0/30 is directly connected, Serial0/1/0
L       10.1.1.1/32 is directly connected, Serial0/1/0
C       10.1.1.4/30 is directly connected, Serial0/1/1
L       10.1.1.5/32 is directly connected, Serial0/1/1
O       10.1.1.8/30 [110/128] via 10.1.1.2, 00:03:00,
Serial0/1/0
Serial0/1/0 [110/128] via 10.1.1.6, 00:03:00,
Serial0/1/1
    192.168.10.0/24 is variably subnetted, 2 subnets, 2
masks
C       192.168.10.0/24 is directly connected,
GigabitEthernet0/0/0
L       192.168.10.1/32 is directly connected,
GigabitEthernet0/0/0
O       192.168.20.0/24 [110/65] via 10.1.1.2, 00:05:55,
Serial0/1/0
O       192.168.30.0/24 [110/65] via 10.1.1.6, 00:03:00,
Serial0/1/1
```

R2

```
R2#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

    10.0.0.0/8 is variably subnetted, 5 subnets, 2 masks
C       10.1.1.0/30 is directly connected, Serial0/1/0
L       10.1.1.2/32 is directly connected, Serial0/1/0
O       10.1.1.4/30 [110/128] via 10.1.1.1, 00:04:52,
```

```
Serial0/1/0
[110/128] via 10.1.1.10, 00:04:52,
Serial0/1/1
C 10.1.1.8/30 is directly connected, Serial0/1/1
L 10.1.1.9/32 is directly connected, Serial0/1/1
O 192.168.10.0/24 [110/65] via 10.1.1.1, 00:10:37,
Serial0/1/0
192.168.20.0/24 is variably subnetted, 2 subnets, 2
masks
C 192.168.20.0/24 is directly connected,
GigabitEthernet0/0/0
L 192.168.20.1/32 is directly connected,
GigabitEthernet0/0/0
O 192.168.30.0/24 [110/65] via 10.1.1.10, 00:05:24,
Serial0/1/1
```

R3

```
R3#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

10.0.0.0/8 is variably subnetted, 5 subnets, 2 masks
O 10.1.1.0/30 [110/128] via 10.1.1.9, 00:06:05,
Serial0/1/0
[110/128] via 10.1.1.5, 00:06:05,
Serial0/1/1
C 10.1.1.4/30 is directly connected, Serial0/1/1
L 10.1.1.6/32 is directly connected, Serial0/1/1
C 10.1.1.8/30 is directly connected, Serial0/1/0
L 10.1.1.10/32 is directly connected, Serial0/1/0
O 192.168.10.0/24 [110/65] via 10.1.1.5, 00:06:05,
Serial0/1/1
O 192.168.20.0/24 [110/65] via 10.1.1.9, 00:06:47,
Serial0/1/0
192.168.30.0/24 is variably subnetted, 2 subnets, 2
masks
C 192.168.30.0/24 is directly connected,
GigabitEthernet0/0/0
L 192.168.30.1/32 is directly connected,
GigabitEthernet0/0/0
```

show ip protocols

```
R1#show ip protocols

Routing Protocol is "ospf 10"
  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:
    192.168.10.0 0.0.0.255 area 0
    10.1.1.0 0.0.0.3 area 0
    10.1.1.4 0.0.0.3 area 0
  Passive Interface(s):
    GigabitEthernet0/0/0
  Routing Information Sources:
    Gateway         Distance      Last Update
    1.1.1.1          110          00:07:43
    2.2.2.2          110          00:08:21
    3.3.3.3          110          00:07:43
  Distance: (default is 110)
```

```
R2#show ip protocols
```

```
Routing Protocol is "ospf 10"
  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:
    192.168.10.0 0.0.0.255 area 0
    10.1.1.0 0.0.0.3 area 0
    10.1.1.4 0.0.0.3 area 0
    192.168.20.1 0.0.0.0 area 0
    10.1.1.2 0.0.0.0 area 0
    10.1.1.9 0.0.0.0 area 0
  Passive Interface(s):
    GigabitEthernet0/0/0
  Routing Information Sources:
    Gateway         Distance      Last Update
    1.1.1.1          110          00:08:20
    2.2.2.2          110          00:08:58
    3.3.3.3          110          00:08:20
  Distance: (default is 110)
```

```
R3#show ip protocols
```

```
Routing Protocol is "ospf 10"
  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 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
  Passive Interface(s):
    GigabitEthernet0/0/0
  Routing Information Sources:
    Gateway         Distance      Last Update
    1.1.1.1          110          00:08:54
    2.2.2.2          110          00:09:32
    3.3.3.3          110          00:08:54
  Distance: (default is 110)
```

show ip ospf neighbor (verify neighbour routers are detected)

```
R1#show ip ospf neighbor
```

Neighbor ID	Pri	State	Dead Time	Address
Interface				
2.2.2.2	0	FULL/ -	00:00:34	10.1.1.2
Serial0/1/0				
3.3.3.3	0	FULL/ -	00:00:32	10.1.1.6
Serial0/1/1				

```
R1#show ip ospf interface brief
```

Interface	PID	Area	IP Address/Mask
Cost State Nbrs F/C			
Gig0/0/0	10	0.0.0.0	
192.168.10.1/255.255.255.0	1	WAIT	0/0
Se0/1/0	10	0.0.0.0	
10.1.1.1/255.255.255.252	64	POINT	0/0
Se0/1/1	10	0.0.0.0	
10.1.1.5/255.255.255.252	64	POINT	0/0

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R2#show ip ospf neighbor

Neighbor ID	Pri	State	Dead Time	Address
Interface				
1.1.1.1	0	FULL/ -	00:00:34	10.1.1.1
Serial0/1/0				
3.3.3.3	0	FULL/ -	00:00:36	10.1.1.10
Serial0/1/1				

R2#show ip ospf interface brief

Interface	PID	Area	IP Address/Mask
Cost	State	Nbrs F/C	
Se0/1/0	10	0.0.0.0	
10.1.1.2/255.255.255.252	64	POINT	0/0
Gig0/0/0	10	0.0.0.0	
192.168.20.1/255.255.255.0	1	WAIT	0/0
Se0/1/1	10	0.0.0.0	
10.1.1.9/255.255.255.252	64	POINT	0/0

R3#show ip ospf neighbor

Neighbor ID	Pri	State	Dead Time	Address
Interface				
2.2.2.2	0	FULL/ -	00:00:36	10.1.1.9
Serial0/1/0				
1.1.1.1	0	FULL/ -	00:00:34	10.1.1.5
Serial0/1/1				

R3#show ip ospf interface brief

Interface	PID	Area	IP Address/Mask
Cost	State	Nbrs F/C	
Gig0/0/0	10	0	
192.168.30.1/255.255.255.0	1	WAIT	0/0
Se0/1/0	10	0	
10.1.1.10/255.255.255.252	64	POINT	0/0
Se0/1/1	10	0	
10.1.1.6/255.255.255.252	64	POINT	0/0

Packet Tracer - Point-to-Point Single-Area OSPFv2 Configuration

show ip ospf interface brief

R1#show ip ospf interface brief

Interface	PID	Area	IP Address/Mask	Cost	State	Nbrs	F/C
Gig0/0/0	10	0	192.168.10.1/255.255.255.0	1	WAIT	0/0	
Se0/1/0	10	0	10.1.1.1/255.255.255.252	64	POINT	0/0	
Se0/1/1	10	0	10.1.1.5/255.255.255.252	64	POINT	0/0	

R1#

R2#show ip ospf interface brief

Interface	PID	Area	IP Address/Mask	Cost	State	Nbrs	F/C
Gig0/0/0	10	0	192.168.20.1/255.255.255.0	1	WAIT	0/0	
Se0/1/0	10	0	10.1.1.2/255.255.255.252	64	POINT	0/0	
Se0/1/1	10	0	10.1.1.9/255.255.255.252	64	POINT	0/0	

R2#

R3#show ip ospf interface brief

Interface	PID	Area	IP Address/Mask	Cost	State	Nbrs	F/C
Gig0/0/0	10	0	192.168.30.1/255.255.255.0	1	WAIT	0/0	
Se0/1/0	10	0	10.1.1.10/255.255.255.252	64	POINT	0/0	
Se0/1/1	10	0	10.1.1.6/255.255.255.252	64	POINT	0/0	

R3#
