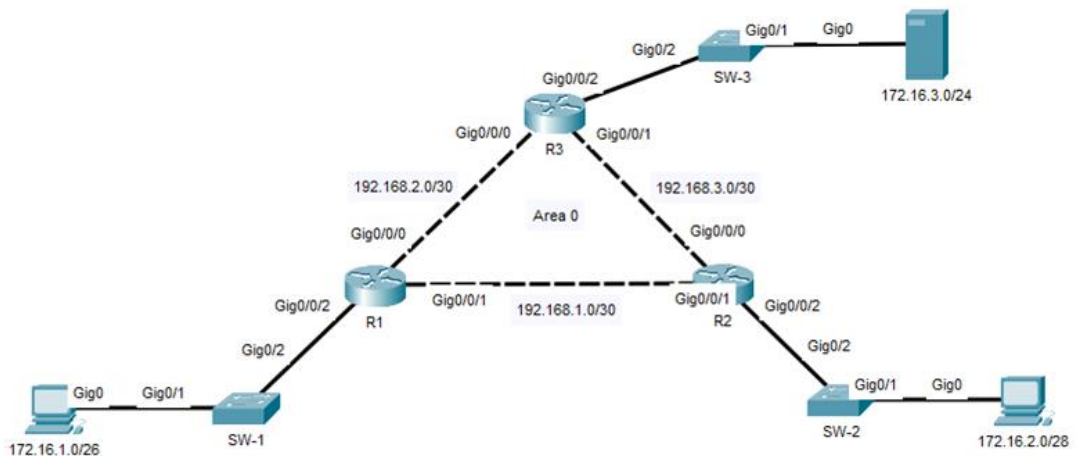


# OSPF Interface Method

## Lab Summary

Enable OSPF with a single area 0 for all routers based on interface configuration method. Advertise all connected routes and LAN segments to area 0.

**Figure 1** Lab Topology



## Lab Configuration

Start Packet Tracer File: **ospf interface.pkt**

Click on *R1* router and select *CLI* folder.

Step 1: Enter global configuration mode.

```
R1>enable
R1#configure terminal
```

Step 2: Enable OSPF on Loopback0 interface and advertise host route to area 0 via process identifier 1.

```
R1(config)#interface loopback0
R1(config-if)#ip ospf 1 area 0
```

Step 3: Enable OSPF on interface Gi0/0/0 and advertise the network address to area 0 via process identifier 1.

```
R1(config-if)#interface Gi0/0/0
R1(config-if)#ip ospf 1 area 0
```

Step 4: Enable OSPF on interface Gi0/0/1 and advertise the network address to area 0 via process identifier 1.

```
R1(config-if)#interface Gi0/0/1  
R1(config-if)#ip ospf 1 area 0
```

Step 5: Enable OSPF on interface Gi0/0/2 and advertise the network address to area 0 via process identifier 1.

```
R1(config-if)#interface Gi0/0/2  
R1(config-if)#ip ospf 1 area 0  
R1(config-if)#end  
R1#copy running-config startup-config
```

Click on *R2* router and select *CLI* folder.

Step 6: Enter global configuration mode.

```
R2>enable  
R2#configure terminal
```

Step 7: Enable OSPF on Loopback0 interface and advertise host route to area 0 via process identifier 1.

```
R2(config)#interface loopback0  
R2(config-if)#ip ospf 1 area 0
```

Step 8: Enable OSPF on interface Gi0/0/0 and advertise the network address to area 0 via process identifier 1.

```
R2(config-if)#interface Gi0/0/0  
R2(config-if)#ip ospf 1 area 0
```

Step 9: Enable OSPF on interface Gi0/0/1 and advertise the network address to area 0 via process identifier 1.

```
R2(config-if)#interface Gi0/0/1  
R2(config-if)#ip ospf 1 area 0
```

Step 10: Enable OSPF on interface Gi0/0/2 and advertise the network address to area 0 via process identifier 1.

```
R2(config-if)#interface Gi0/0/2  
R2(config-if)#ip ospf 1 area 0  
R2(config-if)#end  
R2#copy running-config startup-config
```

Click on *R3* router and select the *CLI* folder.

Step 11: Enter global configuration mode.

```
R3>enable  
R3#configure terminal
```

Step 12: Enable OSPF on Loopback0 interface and advertise host route to area 0 via process identifier 1.

```
R3(config)#interface loopback0  
R3(config-if)#ip ospf 1 area 0
```

Step 13: Enable OSPF on interface Gi0/0/0 and advertise the network address to area 0 via process identifier 1.

```
R3(config-if)#interface Gi0/0/0  
R3(config-if)#ip ospf 1 area 0
```

Step 14: Enable OSPF on interface Gi0/0/1 and advertise the network address to area 0 via process identifier 1.

```
R3(config-if)#interface Gi0/0/1  
R3(config-if)#ip ospf 1 area 0
```

Step 15: Enable OSPF on interface Gi0/0/2 and advertise the network address to area 0 via process identifier 1.

```
R3(config-if)#interface Gi0/0/2  
R3(config-if)#ip ospf 1 area 0  
R3(config-if)#end  
R3#copy running-config startup-config
```

Step 16: Verify Lab

Verify all OSPF neighbor adjacencies and routes advertised from neighbors are installed in the routing table.

R1#**show ip interface brief**

Interface	IP-Address	OK?	Method	Status	Protocol
GigabitEthernet0/0/0	192.168.2.1	YES	manual	up	up
GigabitEthernet0/0/1	192.168.1.1	YES	manual	up	up
GigabitEthernet0/0/2	172.16.1.60	YES	manual	up	up
Loopback0	192.168.255.1	YES	manual	up	up

**R2#show ip interface brief**

Interface	IP-Address	OK?	Method	Status	Protocol
GigabitEthernet0/0/0	192.168.3.1	YES	NVRAM	up	up
GigabitEthernet0/0/1	192.168.1.2	YES	NVRAM	up	up
GigabitEthernet0/0/2	172.16.2.14	YES	manual	up	up
Loopback0	192.168.255.2	YES	manual	up	up

**R3#show ip interface brief**

Interface	IP-Address	OK?	Method	Status	Protocol
GigabitEthernet0/0/0	192.168.2.2	YES	manual	up	up
GigabitEthernet0/0/1	192.168.3.2	YES	manual	up	up
GigabitEthernet0/0/2	172.16.3.254	YES	manual	up	up
Loopback0	192.168.255.3	YES	manual	up	up

**R1#show ip ospf neighbor**

Neighbor ID	Pri	State	Dead Time	Address	Interface
192.168.255.3	1	FULL/DR	00:00:35	192.168.2.2	GigabitEthernet0/0/0
192.168.255.2	1	FULL/DR	00:00:35	192.168.1.2	GigabitEthernet0/0/1

**R2#show ip ospf neighbor**

Neighbor ID	Pri	State	Dead Time	Address	Interface
192.168.255.3	1	FULL/DR	00:00:37	192.168.3.2	GigabitEthernet0/0/0
192.168.255.1	1	FULL/BDR	00:00:37	192.168.1.1	GigabitEthernet0/0/1

**R1#show ip ospf interface brief**

Interface	PID	Area	IP Address/Mask	Cost	State	Nbrs F/C
Lo0	1	0	192.168.255.1/255.255.255.255	1	WAIT	0/0
Gig0/0/0	1	0	192.168.2.1/255.255.255.252	1	BDR	0/0
Gig0/0/1	1	0	192.168.1.1/255.255.255.252	1	BDR	0/0
Gig0/0/2	1	0	172.16.1.60/255.255.255.192	1	DR	0/0

## R1#show ip route

172.16.0.0/16 is variably subnetted, 4 subnets, 4 masks

- C 172.16.1.0/26 is directly connected, GigabitEthernet0/0/2
- L 172.16.1.60/32 is directly connected, GigabitEthernet0/0/2
- O **172.16.2.0/28** [110/2] via 192.168.1.2, 00:10:52, GigabitEthernet0/0/1
- O **172.16.3.0/24** [110/2] via 192.168.2.2, 00:10:42, GigabitEthernet0/0/0

192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks

- C 192.168.1.0/30 is directly connected, GigabitEthernet0/0/1
- L 192.168.1.1/32 is directly connected, GigabitEthernet0/0/1

192.168.2.0/24 is variably subnetted, 2 subnets, 2 masks

- C 192.168.2.0/30 is directly connected, GigabitEthernet0/0/0
- L 192.168.2.1/32 is directly connected, GigabitEthernet0/0/0

192.168.3.0/30 is subnetted, 1 subnets

- O 192.168.3.0/30 [110/2] via 192.168.2.2, 00:10:42, GigabitEthernet0/0/0

[110/2] via 192.168.1.2, 00:10:42, GigabitEthernet0/0/1

192.168.255.0/32 is subnetted, 3 subnets

- C 192.168.255.1/32 is directly connected, Loopback0
- O **192.168.255.2/32** [110/2] via 192.168.1.2, 00:10:52, GigabitEthernet0/0/1
- O **192.168.255.3/32** [110/2] via 192.168.2.2, 00:10:42, GigabitEthernet0/0/0

## R1#show ip route 172.16.3.0

Routing entry for 172.16.3.0/24

Known via "ospf 1", distance 110, metric 2, type intra area

Last update from 192.168.2.2 on GigabitEthernet0/0/0, 00:13:06 ago

Routing Descriptor Blocks:

\* **192.168.2.2**, from 192.168.255.3, 00:13:06 ago, via GigabitEthernet0/0/0

Route metric is 2, traffic share count is 1

## Lab Notes

OSPF is a classless routing protocol where wildcard masks define subnets for advertising. The routes are advertised only to the area specified. OSPF can be configured with either the interface method or global method. The interface method is based on enabling OSPF directly on an interface. That will advertise the network address assigned to that interface to OSPF neighbors. Connected routes include physical interfaces and loopback interfaces. There are also LAN interfaces such as 172.16.1.0/26, 172.16.2.0/28, and 172.16.3.0/24.

Assigning an interface to OSPF process 1 and advertise routes to area 0 would require command **ip ospf 1 area 0**. The result is that OSPF will advertise the subnet of that physical or logical interface to OSPF neighbors. It takes precedence over **network area** global method command when it is within the range of an interface network address. You can mix both configuration methods on the same router and within the same network.

Ethernet is a broadcast network type that has DR/BDR election per subnet. It is largely meaningless however with a point-to-point physical topology where two OSPF neighbors are directly connected. The router that starts first is assigned as designated router (DR) for the connected neighbor. You could configure OSPF priority 0 (zero) on a router interface to exclude it from DR/BDR election. The alternate solution is configure OSPF point-to-point network type on an interface.

OSPF only load balances equal cost paths. This explains why some alternate paths do not exist. R1 only has a single path to 172.16.3.0/24 that is advertised from R3. There is no load balancing of packets to 172.16.3.0/24 from R1 via R2 since that path has cost 3. The path from R1 to 172.16.3.0/24 has only cost 2 since there are only two network hops. Each egress interface is a hop and has the default cost 1. The exception is a loopback interface host route that adds cost 1.