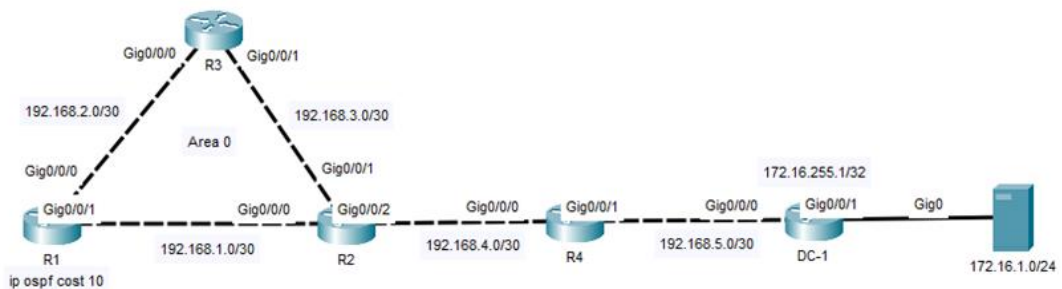


OSPF Cost Metric

Lab Summary

Modify OSPF cost metric on a network interface to influence route selection.

Figure 1 Lab Topology



Lab Configuration

Start Packet Tracer File: **ospf cost metric.pkt**

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

Step 1: Enter enable mode.

```
R1>enable
```

Step 2: Verify the preferred route in the routing table to 172.16.1.0/24 (server) is currently via 192.168.1.2 next hop address (R2).

```
R1#show ip route
```

```
<output omitted>
```

```
O 172.16.1.0/24 [110/4] via 192.168.1.2, 00:01:55, GigabitEthernet0/0/1
```

```
R1#show ip route 172.16.1.0
```

```
Routing entry for 172.16.1.0/24
```

```
Known via "ospf 1", distance 110, metric 4, type intra area
```

```
Last update from 192.168.1.2 on GigabitEthernet0/0/1, 00:02:27 ago
```

```
Routing Descriptor Blocks:
```

```
* 192.168.1.2, from 172.16.255.1, 00:02:27 ago, via GigabitEthernet0/0/1
```

```
Route metric is 4, traffic share count is 1
```

Step 3: Verify the forwarding path from R1 to 172.16.1.1 (server) is via R2. Run traceroute twice with Packet Tracer for proper results.

```
R1#traceroute 172.16.1.1
```

Type escape sequence to abort.

Tracing the route to 172.16.1.1

1	192.168.1.2	0 msec 0 msec 0 msec
2	192.168.4.2	0 msec 0 msec 0 msec
3	192.168.5.2	0 msec 0 msec 0 msec
4	172.16.1.1	0 msec 0 msec 1 msec

Step 4: Configure OSPF cost metric 10 on R1 interface Gi0/0/1.

```
R1(config)#interface Gi0/0/1
```

```
R1(config-if)#ip ospf cost 10
```

Step 5: Verify the preferred route in the routing table to 172.16.1.0/24 (server) is now via R3 (192.168.2.2). The path cost is 5 now since there is an additional hop.

```
R1#show ip route
```

<output omitted>

```
O 172.16.1.0/24 [110/5] via 192.168.2.2, 00:01:51, GigabitEthernet0/0/0
```

Step 6: Verify forwarding path from R1 to 172.16.1.1 is now via R3 (192.168.2.2).

```
R1#traceroute 172.16.1.1
```

Type escape sequence to abort.

Tracing the route to 172.16.1.1

1	192.168.2.2	0 msec 0 msec 0 msec
2	192.168.3.2	0 msec 0 msec 0 msec
3	192.168.4.2	0 msec 0 msec 0 msec
4	192.168.5.2	0 msec 0 msec 0 msec
5	172.16.1.1	0 msec 0 msec 0 msec

Step 7: Shutdown R1 interface Gi0/0/0 to install higher cost route in routing table.

```
R1(config)#interface Gi0/0/0
```

```
R1(config-if)#shut
```

Step 8: Verify the OSPF path cost to 172.16.1.1 is 13 (via R2) when the lower cost path is not available.

R1#show ip route

<output omitted>

O 172.16.1.0/24 [110/13] via **192.168.1.2**, 00:02:57, GigabitEthernet0/0/1

Step 9: Verify the OSPF cost configured on R1 interface Gi0/0/1 is 10.

R1#show ip ospf interface Gi0/0/1

GigabitEthernet0/0/1 is up, line protocol is up

Internet address is 192.168.1.1/30, Area 0

Process ID 1, Router ID 192.168.2.1, Network Type BROADCAST, **Cost: 10**

Transmit Delay is 1 sec, State BDR, Priority 1

Designated Router (ID) 192.168.4.1, Interface address 192.168.1.2

Backup Designated Router (ID) 192.168.2.1, Interface address 192.168.1.1

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

Hello due in 00:00:02

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 192.168.4.1 (Designated Router)

Suppress hello for 0 neighbor(s)

Lab Notes

The default OSPF cost of an Ethernet network interface is 1 based on the default reference bandwidth of 100 Mbps. OSPF will select the route with lowest cost when multiple routes exist to a destination. There is also equal cost load balancing when multiple paths exist to the same destination with the same cost metric. Assigning a higher cost metric to a network interface will influence path selection so that an alternate route is selected. OSPF calculates the sum of all egress interfaces from source to destination.

Path Cost: 172.16.1.0/24 via R2

= R1 Gi0/0/1 (10) + R2 G0/0/2 (1) + R4 Gi0/0/1 (1) + DC-1 0/0/1 (1) = 13

Path Cost: 172.16.1.0/24 via R3

= R1 Gi0/0/0 (1) + R3 G0/0/1 (1) + R2 Gi0/0/2 (1) + R4 Gi0/0/1 (1) + DC-1 0/0/1 (1) = 5