Lab 5 - Packet Tracer - Verify Single-Area OSPFv2

# Addressing Table

| Device | Interface | IP Address | Subnet Mask | Default Gateway |
| --- | --- | --- | --- | --- |
| R1 | G0/0 | 172.16.1.1 | 255.255.255.0 | N/A |
| R1 | G0/1 | 64.100.54.6 | 255.255.255.252 | N/A |
| R1 | S0/0/0 | 172.16.3.1 | 255.255.255.252 | N/A |
| R1 | S0/0/1 | 192.168.10.5 | 255.255.255.252 | N/A |
| R2 | G0/0 | 172.16.2.1 | 255.255.255.0 | N/A |
| R2 | S0/0/0 | 172.16.3.2 | 255.255.255.252 | N/A |
| R2 | S0/0/1 | 192.168.10.9 | 255.255.255.252 | N/A |
| R3 | G0/0 | 192.168.1.1 | 255.255.255.0 | N/A |
| R3 | G0/1 | 192.168.11.1 | 255.255.255.0 | N/A |
| R3 | S0/0/0 | 192.168.10.6 | 255.255.255.252 | N/A |
| R3 | S0/0/1 | 192.168.10.10 | 255.255.255.252 | N/A |
| R4 | G0/0/0 | 192.168.1.2 | 255.255.255.0 | N/A |
| R4 | G0/0/1 | 192.168.11.1 | 255.255.255.0 | N/A |
| ISP Router | NIC | 64.100.54.5 | 255.255.255.252 | N/A |
| PC1 | NIC | 172.16.1.2 | 255.255.255.0 | 172.16.1.1 |
| PC2 | NIC | 172.16.2.2 | 255.255.255.0 | 172.16.2.1 |
| PC3 | NIC | 192.168.1.2 | 255.255.255.0 | 192.168.1.1 |
| Laptop | NIC | DHCP | DHCP | DHCP |

# Objectives

In this lab, you will use the CLI commands to verify the operation of an existing OSPFv2 network. In Part 2, you will add a new LAN to the configuration and verify connectivity.

* Identify and verify the status of OSPF neighbors.
* Determine how the routes are being learned in the network.
* Explain how the neighbor state is determined.
* Examine the settings for the OSPF process ID.
* Add a new LAN into an existing OSPF network and verify connectivity.

# Background / Scenario

You are the network administrator for a branch office of a larger organization. Your branch is adding a new wireless network into an existing branch office LAN. The existing network is configured to exchange routes using OSPFv2 in a single-area configuration. Your task is to verify the operation of the existing OSPFv2 network, before adding in the new LAN. When you are sure that the current OSPFv2 LAN is operating correctly, you will connect the new LAN and verify that OSPF routes are being propagated for the new LAN. As branch office network administrator, you have full access to the IOS on routers R3 and R4. You only have read access to the enterprise LAN routers R1 and R2, using the username **BranchAdmin**, and the password **Branch1234**.

# Instructions

## Verify the existing OSPFv2 network operation.

The following commands will help you find the information needed to answer the questions:

**show ip interface brief**

**show ip route**

**show ip route ospf**

**show ip ospf neighbor**

**show ip protocols**

**show ip ospf**

**show ip ospf interface**

### Verify OSPFv2 operation.

Wait until STP has converged on the network. You can click the Packet Tracer Fast Forward Time button to speed up the process. Continue only when all link lights are green.

* + - 1. Log into router **R1** using the username **BranchAdmin** and the password **Branch1234**. Execute the **show ip route** command.

Open configuration window

R1# **show ip route**

--- output omitted ----

Gateway of last resort is 172.16.3.2 to network 0.0.0.0

172.16.0.0/16 is variably subnetted, 5 subnets, 3 masks

C 172.16.1.0/24 is directly connected, GigabitEthernet0/0

L 172.16.1.1/32 is directly connected, GigabitEthernet0/0

O 172.16.2.0/24 [110/65] via 172.16.3.2, 00:02:18, Serial0/0/0

C 172.16.3.0/30 is directly connected, Serial0/0/0

L 172.16.3.1/32 is directly connected, Serial0/0/0

O 192.168.1.0/24 [110/65] via 192.168.10.6, 00:02:18, Serial0/0/1

192.168.10.0/24 is variably subnetted, 3 subnets, 2 masks

C 192.168.10.4/30 is directly connected, Serial0/0/1

L 192.168.10.5/32 is directly connected, Serial0/0/1

O 192.168.10.8/30 [110/128] via 172.16.3.2, 00:02:18, Serial0/0/0

[110/128] via 192.168.10.6, 00:02:18, Serial0/0/1

O\*E2 0.0.0.0/0 [110/1] via 172.16.3.2, 00:02:18, Serial0/0/0

#### Questions:

How did router **R1** receive the default route?

Type your answers here.

From which router did **R1** receive the default route?

Type your answers here.

How can you filter the output of **show ip route** to show only the routes learned through OSPF?

Type your answers here.

* + - 1. Execute the **show ip ospf neighbor** command on **R1**.

#### Questions:

Which routers have formed adjacencies with router **R1**?

Type your answers here.

What are the router IDs and state of the routers shown in the command output?

Type your answers here.

Are all of the adjacent routers shown in the output?

Type your answers here.

* + - 1. Using the command prompt on **PC1**, ping the address of the **ISP Router** shown in the Address Table. Is it successful? If not, do a **clear ospf process** command on the routers and repeat the ping command.

### Verify OSPFv2 operation on R2.

* + - 1. Log into router **R2** using the username **BranchAdmin** and the password **Branch1234**. Execute the **show ip route** command. Verify that routes to all the networks in the topology are shown in the routing table.

#### Question:

How did router R2 learn the default route to the ISP?

Type your answers here.

* + - 1. Enter the **show ip ospf interface g0/0** on router **R2**.

#### Questions:

What type of OSPF network is attached to this interface?

Type you answers here.

Are OSPF hello packets being sent out this interface? Explain.

Type your answers here.

* + - 1. Using the command prompt on **PC2**, ping the S0/0/1 address on router **R3**.

#### Question:

Is it successful?

Type your answers here.

### Verify OSPFv2 operation on R3.

* + - 1. Execute the **show ip protocols** command on router R3.

#### Question:

Router R3 is routing for which networks?

Type your answers here.

* + - 1. Execute the **show ip ospf neighbor detail** command on router **R3**.

#### Question:

What is the neighbor priority shown for the OSPF neighbor routers? This value is the default.

Type your answers here.

* + - 1. Using the command prompt on **PC3**, ping the address of the **ISP Router** shown in the Address Table.

#### Question:

Is it successful?

Type your answers here.

Close configuration window

## Add the new Branch Office LAN to the OSPFv2 network.

You will now add the pre-configured Branch Office LAN to the OSPFv2 network.

### Verify the OSPFv2 configuration on router R4.

Open configuration window

Execute a **show run | begin router ospf** command on router **R4**. Verify that the network statements are present for the networks that are configured on the router.

Which interface is configured to not send OSPF update packets?

Type your answers here.

### Connect the Branch Office router R4 to the OSPFv2 network.

* + - 1. Using the correct Ethernet cable, connect the G0/0/0 interface on router **R4** to the G0/1 interface on switch **S3**. Use the **show ip ospf neighbor** command to verify that router **R4** is now adjacent with router **R3.**

#### Question:

What state is displayed for router **R3**?

Type your answers here.

* + - 1. Using the **show ip ospf neighbor** command on **R3**, determine the state of router **R4**. There may be a delay while OSPF converges.

#### Question:

Why is the state of router R4 different than the state of R1 and R2?

Type your answers here.

* + - 1. Using the command prompt on Laptop, ping the address of PC2.

#### Question:

Is it successful?

Type your answers here.

Close configuration window

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