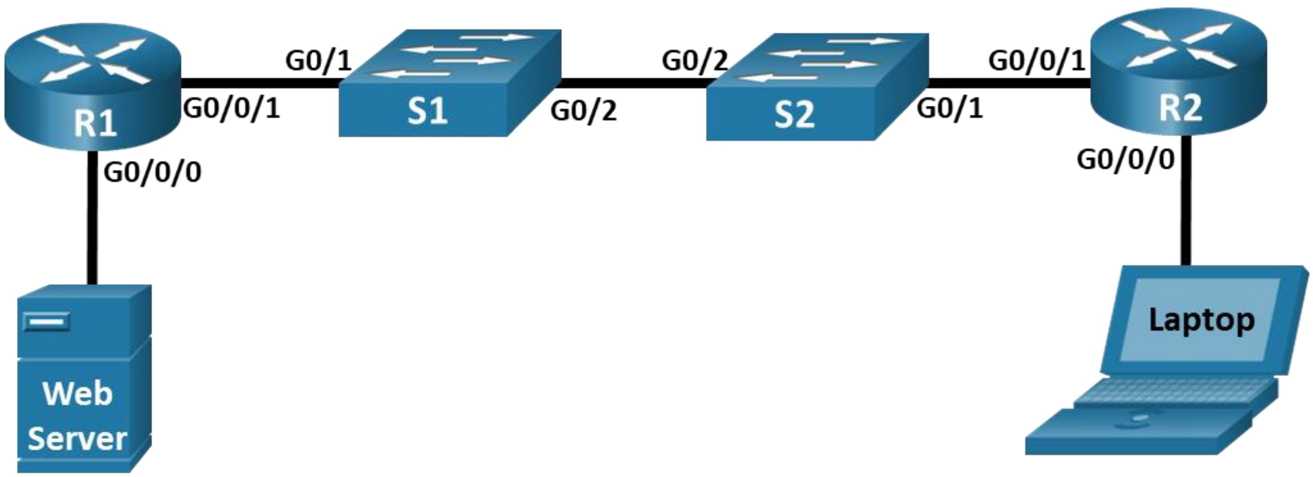
Packet Tracer - Configure Single-Area OSPFv2 - Physical Mode

Topology



Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	G0/0/1	10.53.0.1	255.255.255.0	n/a
	G0/0/0	172.16.1.1	255.255.255.0	n/a
R2	G0/0/1	10.53.0.2	255.255.255.0	n/a
	G0/0/0	192.168.1.1	255.255.255.0	n/a
Web Server	F0	172.16.1.10	255.255.255.0	172.16.1.1
Laptop	F0	192.168.1.10	255.255.255.0	192.168.1.1

Objectives

Part 1: Build the Network and Configure Basic Device Settings

Part 2: Configure and Verify Single-Area OSPFv2 for Basic Operation

Part 3: Optimize and Verify the Single-Area OSPFv2 Configuration

Background / Scenario

You have been tasked with configuring a small company's network using OSPFv2. R1 will share the default route information to R2. After the initial configuration, the organization has asked for the configuration to be optimized to reduce protocol traffic and ensure that R1 remains in control of routing.

Note: The equipment required for this activity is located in the wiring closet on the utility shelf.

Instructions

Part 1: Build the Network and Configure Basic Device Settings

Step 1: Cable the network as shown in the topology.

Place the required devices on the rack and the table. Power on the PCs and cable the devices according to the topology. To select the correct port on a switch, right click and select **Inspect Front**. Use the Zoom tool, if necessary. Float your mouse over the ports to see the port numbers. Packet Tracer will score the correct cable and port connections.

a. There are several switches, routers, and other devices on the **Shelf.** Click and drag the routers **R1** and **R2** and the switches **S1** and **S2** to the **Rack.** Click and drag the **Web Server** to the **Rack**. Click and drag the **Laptop** to the **Table.**

b. Power on the routers and the laptop.

c. On the **Cable Pegboard**, click a **Copper Straight-Through** cable. Click the **GigabitEthernet0/1** port on **S1** and then click the **GigabitEthernet0/0/1** port on **R1** to connect them.

d. On the **Cable Pegboard**, click a **Copper Straight-Through** cable. Click the **GigabitEthernet0/1** port on **S2** and then click the **GigabitEthernet0/0/1** port on **R2** to connect them.

e. On the **Cable Pegboard**, click a **Copper Cross-Over** cable. Click the **GigabitEthernet0/2** port on **S1** and then click the **GigabitEthernet0/2** port on **S2** to connect them. You should see the cable connecting the two ports.

f. On the **Cable Pegboard**, click a **Copper Straight-Through** cable. Click the **GigabitEthernet0/0/0** port on **R1** and then click the **FastEthernet0** port on the **Web Server** to connect them**.**

g. On the **Cable Pegboard**, click a **Copper Straight-Through** cable. Click the **GigabitEthernet0/0/0** port on **R2** and then click the **FastEthernet0** port on the **Laptop** to connect them.

Visually inspect network connections. Initially, when you connect devices to a switch port, the link lights will be amber. After a minute or so, the link lights will turn green.

Step 2: Configure basic settings for the two routers and two switches.

a. On the **Cable Pegboard**, click a **Console** cable.

b. Connect the console cable between the device and the **Laptop**. For the switches, **Inspect Rear** to locate the **Console** port.

c. Assign a name to the device according to the **Topology**.

d. Disable DNS lookup to prevent the router from attempting to translate incorrectly entered commands as though they were host names.

e. Assign **class** as the privileged EXEC encrypted password.

f. Assign **cisco** as the console password and enable login.

g. Assign **cisco** as the vty password and enable login.

h. Encrypt the plaintext passwords.

i. Create a banner that warns anyone accessing the device that unauthorized access is prohibited.

j. Save the running configuration to the startup configuration file.

k. Click one end of the **Console cable** and drag it back to the **Cable Pegboard**.

l. Repeat Step 2 for each device until **R2**, **S1**, and **S2** are also each configured with basic settings.

Step 3: Configure settings for the server and the laptop.

Configure static IP address information on the **Web Server** and **Laptop** according to the **Addressing Table**.

a. Click **Web Server** > **Desktop** > **IP Configuration**. Enter the IPv4 address, subnet mask, and default gateway information for the **Web Server** according to the **Addressing Table**.

b. Close or minimize the **Web Server** window.

c. Repeat the previous steps to assign the IPv4 address information for the **Laptop**, as listed in the **Addressing Table**.

Part 2: Configure and Verify Single-Area OSPFv2 for Basic Operation

Step 1: Configure interface addresses and basic OSPFv2 on each router.

a. Connect a **Console** cable between **R1** and the **Laptop**.

b. Configure interface addresses on each router as shown in the **Addressing Table**.

c. Enter OSPF router configuration mode using process ID 56.

d. Configure a static router ID for each router (1.1.1.1 for R1, 2.2.2.2 for R2).

e. Configure a network statement for the network between R1 and R2, placing it in area 0.

f. Configure a network statement for the other networks connected to R1 and R2 and place them in area 0. Note that the network command for the LAN connected to R1 will not be graded as this network is removed later in the activity.

g. Switch the console cable to **R2** and repeat substeps b through f for **R2**. After configuring R1 and R2, you can simply use Telnet between them, if you wish, instead of moving the console cable each time.

h. Verify that OSPFv2 is operational between the routers. Issue the command to verify that R1 and R2 have formed an adjacency.

   Which router is identified as the DR? Which is the BDR? What was the selection criteria?

i. On R1, issue the **show ip route ospf** command to verify that the R2 G0/0/0 network is present in the routing table.

j. Click **Laptop** > **Command Prompt**, and then ping the **Web Server** at 172.16.1.10. After one or two timeouts, the ping should be successful. If not, troubleshoot your physical connections and configurations.

Part 3: Optimize the Single-Area OSPFv2 Configuration

Step 1: Implement various optimizations on each router.

a. On R1, configure the interface G0/0/1 OSPF priority to 50 to ensure that **R1** is the **Designated Router**.

b. Configure the OSPF timers on interface G0/0/1 of each router for a hello timer of 30 seconds and a dead timer of 120 seconds.

c. On R1, remove the OSPF network command for 172.16.1.0, and then configure a default static route that uses **interface G0/0/0** as the exit interface. Finally, propagate the default route into OSPF. Note the console message after setting the default route.

d. Change the reference bandwidth on each router to 1Gbs. After this configuration, restart OSPF using the **clear ip ospf process** command. Note the console message after setting the new reference bandwidth.

Step 2: Verify OSPFv2 optimizations are in place.

a. Issue the **show ip ospf interface g0/0/1** command on **R1** and verify that the interface priority has been set to 50 and that the time intervals are Hello 30, Dead 120, and the default Network Type is Broadcast.

b. On **R1**, issue the **show ip route ospf** command to verify that the R2 G0/0/0 network is present in the routing table. Note the difference in the metric between this output and the previous output.

c. On **R2**, issue the **show ip route ospf** command. The only OSPF route information should be the default route that R1 is propagating.

d. From the **Laptop**, ping the **Web Server** again. The ping should be successful.

```
O 192.168.1.0/24 [110/11] via 10.53.0.2, 00:04:28, GigabitEthernet0/0/1
O*E2 0.0.0.0/0 [110/1] via 10.53.0.1, 00:00:08, GigabitEthernet0/0/1
```

Why is the OSPF cost for the default route different than the OSPF cost at R1 for the 192.168.1.0/24 network?