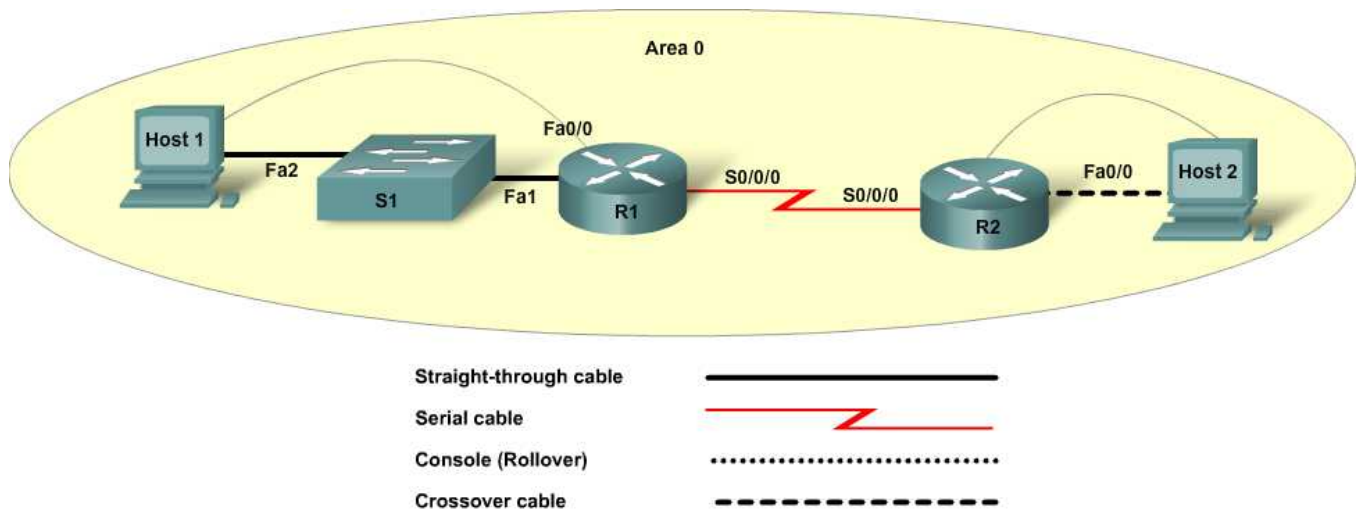


## Lab 6.2.1 Configuring and Verifying Single Area OSPF



Device	Host Name	Fast Ethernet 0/0 IP Address	Serial 0/0/0 IP Address	Serial 0/0/0 Interface Type	Network Statements	Enable Secret Password	Enable, vty, and Console Password
Router 1	R1	192.168.1.129/26	192.168.15.1/30	DCE	192.168.1.128 192.168.15.0	class	cisco
Router 2	R2	192.168.0.1/24	192.168.15.2/30	DTE	192.168.15.0 192.168.0.0	class	cisco
Switch 1	S1					class	cisco

### Objectives

- Set up an IP addressing scheme for OSPF Area 0.
- Configure and verify OSPF routing.
- View the routing table.
- Verify connectivity.

## Background / Preparation

In this lab, you will cable a network similar to the one shown in the diagram. Any router that meets the interface requirements displayed in the addressing table may be used. For example, router series 800, 1600, 1700, 1800, 2500, 2600, 2800, or any combination can be used.

The information in this lab applies to 1841 routers. Other routers may be used; however, the command syntax may vary. Depending on the router model, the interfaces may differ. For example, on some routers Serial 0 may be Serial 0/0 or Serial 0/0/0 and Ethernet 0 may be FastEthernet 0/0. The Cisco Catalyst 2960 switch comes preconfigured and only needs to be assigned basic security information before being connected to a network.

The following resources are required:

- One Cisco 2960 switch or other comparable switch
- Two routers, each with a serial connection and an Ethernet interface
- Two Windows-based PCs, each with a terminal emulation program, and each set up as a host
- At least one RJ-45-to-DB-9 connector console cable to configure the routers and switch
- Two straight-through Ethernet cables
- One crossover Ethernet cable
- One 2-part (DTE/DCE) serial cable

**NOTE:** Make sure that the routers and the switches have been erased and have no startup configurations. Instructions for erasing both switch and router are provided in the Lab Manual, located on Academy Connection in the Tools section.

**NOTE: SDM Enabled Routers** – If the startup-config is erased in an SDM enabled router, SDM will no longer come up by default when the router is restarted. It will be necessary to build a basic router configuration using IOS commands. The steps provided in this lab use IOS commands and do not require the use of SDM. If you wish to use SDM, refer to the instructions in the Lab Manual, located on the Academy Connection in the Tools section or contact your instructor if necessary.

### Step 1: Connect the equipment

- a. Connect Router 1 Serial 0/0/0 interface to Router 2 Serial 0/0/0 interface using a serial cable.
- b. Connect Router 1 Fa0/0 interface to Switch 1 Fa0/1 port using a straight-through cable.
- c. Connect each PC with a console cable to perform configurations on the router and switches.
- d. Connect Host 1 to the Switch 1 Fa0/2 port using a straight-through cable.
- e. Connect a crossover cable between Host 2 and the Fa0/0 interface of Router 2.

### Step 2: Perform basic configuration on Router 1

- a. Connect a PC to the console port of the router to perform configurations using a terminal emulation program.
- b. Configure Router 1 with a hostname, interfaces, console, Telnet, IP addresses, and privileged passwords according to the table and topology diagram. Save the configuration.

### Step 3: Perform basic configuration on Router 2

Perform basic configuration on Router 1 as the gateway router with a hostname, interfaces, console, Telnet, and privileged passwords according to the table and topology diagram. Save the configuration.

#### Step 4: Perform basic configuration on Switch 1

Configure Switch 1 with a hostname, console, Telnet, and privileged passwords according to the table and topology diagram.

#### Step 5: Configure the hosts with the proper IP address, subnet mask, and default gateway

- a. Configure each host with the proper IP address, subnet mask, and default gateway.
  - 1) Host 1 should be assigned 192.168.1.130/26 and the default gateway of 192.168.1.129.
  - 2) Host 2 should be assigned 192.168.0.2/24 and the default gateway of 192.168.0.1.
- b. Each workstation should be able to ping the attached router. If the ping was not successful, troubleshoot as necessary. Check and verify that the workstation has been assigned a specific IP address and default gateway.

#### Step 6: Verify that the network is functioning

- a. From the attached hosts, ping the FastEthernet interface of the default gateway router.  
Was the ping from the first host successful? \_\_\_\_\_  
Was the ping from the second host successful? \_\_\_\_\_  
If the answer is no for either question, troubleshoot the router and host configurations to find the error. Ping again until they are both successful.
- b. Use the command **show ip interface brief** and check the status of each interface.

What is the state of the interfaces on each router?

##### R1:

FastEthernet 0/0: \_\_\_\_\_

Serial 0/0/0: \_\_\_\_\_

Serial 0/0/1: \_\_\_\_\_

##### R2:

FastEthernet 0/0: \_\_\_\_\_

Serial 0/0/0: \_\_\_\_\_

Serial 0/0/1: \_\_\_\_\_

- c. Ping from one of the router connected serial interfaces to the other connected serial interface.  
Was the ping successful? \_\_\_\_\_  
If the answer is no, troubleshoot the router configurations to find the error. Ping again until successful.

#### Step 7: Configure OSPF routing on R1

- a. Configure an OSPF routing process on router R1. Use OSPF process number 1 and ensure that all networks are in Area 0.

```
R1(config)#router ospf 1
R1(config-router)#network 192.168.1.128 0.0.0.63 area 0
R1(config-router)#network 192.168.15.0 0.0.0.3 area 0
R1(config-router)#end
```

- b. Examine the router running configuration.

Did the IOS automatically add any lines under the **router ospf 1** command? \_\_\_\_\_

If so, what did it add? \_\_\_\_\_

- c. If there were no changes to the running configuration, enter the following commands:

```
R1(config)#router ospf 1  
R1(config-router)#log-adjacency-changes  
R1(config-router)#end
```

- d. Show the routing table for R1.

```
R1#show ip route
```

Are there any OSPF entries in the routing table now? \_\_\_\_\_

Why? \_\_\_\_\_

### Step 8: Configure OSPF routing on R2

- a. Configure an OSPF routing process on router R2. Use OSPF process number 1 and ensure that all networks are in Area 0.

```
R2(config)#router ospf 1  
R2(config-router)#network 192.168.0.0 0.0.0.255 area 0  
R2(config-router)#network 192.168.15.0 0.0.0.3 area 0  
R2(config-router)#end
```

- b. Examine the R2 running configuration.

Did the IOS automatically add any lines under the **router ospf 1** command? \_\_\_\_\_

If so, what did it add? \_\_\_\_\_

- c. If there were no changes to the running configuration, enter the following commands:

```
R2(config)#router ospf 1  
R2(config-router)#log-adjacency-changes  
R2(config-router)#end
```

- d. Show the routing table for R2.

```
R2#show ip route
```

Are there any OSPF entries in the routing table now? \_\_\_\_\_

What is the metric value of the OSPF route to R1 Ethernet network 192.168.1.128?

\_\_\_\_\_

\_\_\_\_\_

What is the VIA address in the OSPF route? \_\_\_\_\_

Are routes to all networks shown in the routing table? \_\_\_\_\_

What does the **O** mean in the first column of the routing table?

\_\_\_\_\_

**Step 8: Test network connectivity**

Ping Host 2 from Host 1.

Was it successful? \_\_\_\_\_

If the answer is no, troubleshoot to find the error. Ping again until successful.

**Step 9: Reflection**

- a. What is an advantage of using OSPF as the routing protocol in a network?

\_\_\_\_\_

- b. What is a disadvantage of using OSPF as the routing protocol in a network?

\_\_\_\_\_