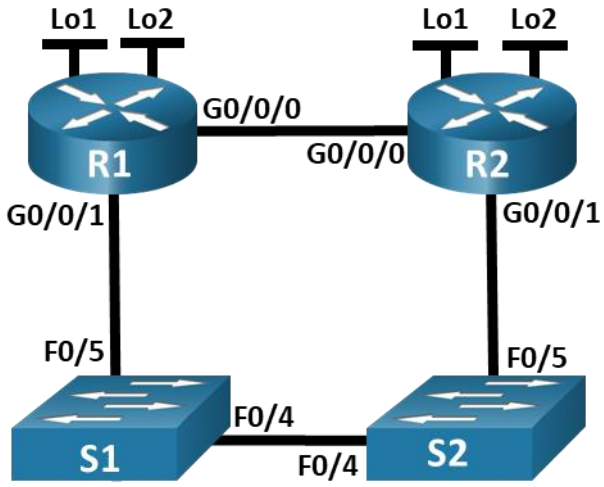
# Lab - Configure IPv4 Static and Default Routes

## Topology




## Addressing Table

| Device | Interface | IP Address / Prefix |
|---|---|---|
| R1 | G0/0/0 | 172.16.1.1 /24 |
| | G0/0/1 | 192.168.1.1 /24 |
| | Loopback1 | 10.1.0.1 /24 |
| | Loopback2 | 209.165.200.225 /27 |
| R2 | G0/0/0 | 172.16.1.2 /24 |
| | G0/0/1 | 192.168.1.2 /24 |
| | Loopback1 | 10.2.0.1 /24 |
| | Loopback2 | 209.165.200.193 /27 |

## Objectives

**Part 1: Build the Network and Configure Basic Device Settings**

**Part 2: Configure and verify IP addressing on R1 and R2**

**Part 3: Configure and verify static and default routing for IPv4 on R1 and R2**

## Background / Scenario

Static and Default routing are the simplest forms of network routing and configured manually. They are fixed, meaning that they do not change dynamically to meet changing network conditions. They are either valid and made available to the routing table or invalid and not made available to the routing table. Static routes have an administrative distance of one by default. However, static and default routes can be configured with an administrator-defined administrative distance. This capability allows the administrator to put the static or default route in reserve, and only make it available to the routing table when routes with lower administrative distances (usually generated by dynamic routing protocols) are no longer valid.

## Required Resources

- 2 Routers (Cisco 4221 with Cisco IOS XE Release 16.9.4 universal image or comparable)
- 2 Switches (Cisco 2960 with Cisco IOS Release 15.2(2) lanbasek9 image or comparable)
- 1 PC (Windows with a terminal emulation program, such as Tera Term)
- Console cables to configure the Cisco IOS devices via the console ports
- Ethernet cables as shown in the topology

## Instructions

## Part 1: Build the Network and Configure Basic Device Settings

In Part 1, you will set up the network topology and configure basic settings on the PC hosts and switches.

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

Attach the devices as shown in the topology diagram, and cable as necessary.

### Step 2: Configure basic settings for each router.

a. Assign a device name to the router.

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

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

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

e. Assign **cisco** as the VTY password and enable login.

f. Encrypt the plaintext passwords.

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

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

### Step 3: Configure basic settings for each switch.

a. Assign a device name to the switch.

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

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

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

e. Assign **cisco** as the VTY password and enable login.

f. Encrypt the plaintext passwords.

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

h. Shutdown all interfaces that will not be used.

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

Issuing the command **show cdp neighbors** at this point on R1 or R2 results in an empty list. Explain.

## Part 2: Configure and verify IPv4 addressing on R1 and R2

In Part 2, you will configure and verify the IPv4 addresses on R1 and R2. Use the table above for the information necessary to complete this part.

### Step 1: Configure IP addresses for both routers.

a. Configure the IP address for all the interfaces according to the Addressing Table.

### Step 2: Verify addressing

a. Issue the command to verify IPv4 assignments to the interfaces.

### Step 3: Save your configuration

Save the running configuration to the startup configuration file on both routers.

## Part 3: Configure and verify static and default routing for IPv4 on R1 and R2

In Part 3, you will configure static and default routing on R1 and R2 to enable full connectivity between the routers using IPv4. Once again, the static routing being used here is not meant to represent best practice, but to assess your ability to complete the required configurations.

### Step 1: On R1, configure a static route to R2's Loopback1 network, using R2's G0/0/1 address as the next hop.

a. Use the **ping** command to ensure that R2's G0/0/1 interface is reachable.

b. Configure a static route for R2's Loopback1 network via R2's G0/0/1 address.

### Step 2: On R1, configure a static default route via R2's G0/0/0 address.

a. Use the **ping** command to ensure that R2's G0/0/0 interface is reachable.

b. Configure a static default route via R2's G0/0/0 address.

### Step 3: On R1, configure a floating static default route via R2's G0/0/1 address.

Configure a floating static default route with an AD of 80 via R2's G0/0/1 address.

### Step 4: On R2, configure a static default route via R1's G0/0/0 address

a. Use the **ping** command to ensure that R1's G0/0/0 interface is reachable.

b. Configure a static default route via R1's G0/0/0 address.

### Step 5: Verify that the routes are operational.

a. Use the **show ip route** command to ensure that R1's routing table shows the static and default routes.

b. On R1, issue the command **traceroute 10.2.0.1**. The output should show that the next hop is 192.168.1.2.

c. On R1, issue the command **traceroute 209.165.200.193**. The output should show that the next hop is 172.16.1.2.

d. Issue the **shutdown** command on R1 G0/0/0.

e. Demonstrate that the floating static route is working. First, issue the **show ip route static** command. You should see two static routes. A default static route with an AD of 80 and a static route to the 10.2.0.0/24 network with an AD of 1.

f. Demonstrate the floating static route is working by issuing the **traceroute 209.165.200.193** command. The traceroute will show the next hop as 192.168.1.2.

g. Issue the **no shutdown** command on R1 G0/0/0.