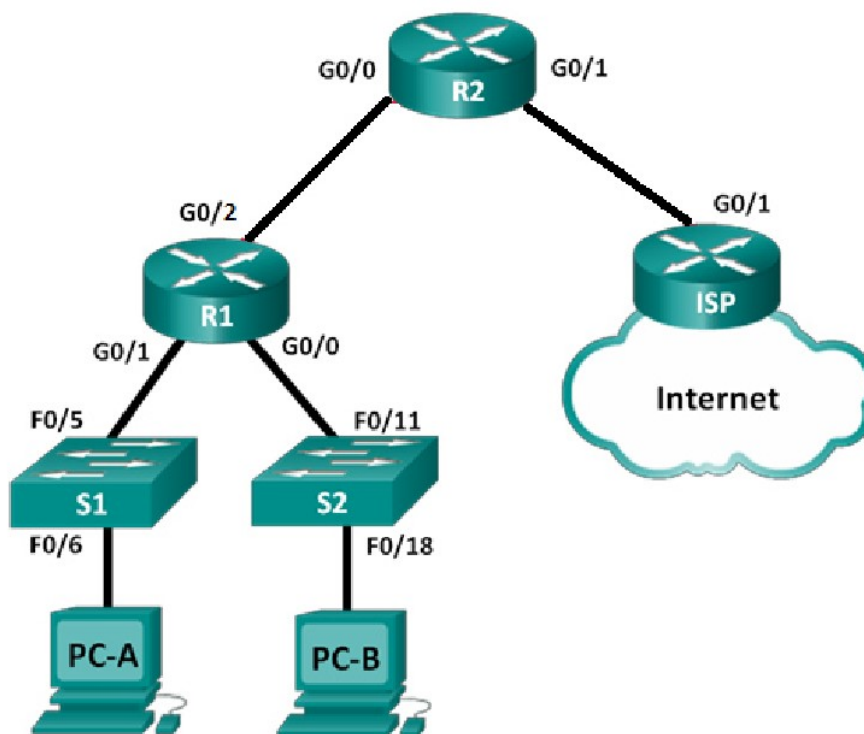


Lab - Configuring Basic DHCPv4 on a Router

Topology



Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	G0/0	192.168.0.1	255.255.255.0	N/A
	G0/1	192.168.1.1	255.255.255.0	N/A
	G0/2	192.168.2.253	255.255.255.252	N/A
R2	G0/0	192.168.2.254	255.255.255.252	N/A
	G0/1	209.165.200.226	255.255.255.224	N/A
ISP	G0/1	209.165.200.225	255.255.255.224	N/A
PC-A	NIC	DHCP	DHCP	DHCP
PC-B	NIC	DHCP	DHCP	DHCP

Objectives

Part 1: Build the Network and Configure Basic Device Settings

Part 2: Configure a DHCPv4 Server and a DHCP Relay Agent

Background / Scenario

The Dynamic Host Configuration Protocol (DHCP) is a network protocol that lets network administrators manage and automate the assignment of IP addresses. Without DHCP, the administrator must manually assign and configure IP addresses, preferred DNS servers, and default gateways. As the network grows in size, this becomes an administrative problem when devices are moved from one internal network to another.

In this scenario, the company has grown in size, and the network administrators can no longer assign IP addresses to devices manually. Your job is to configure the R2 router to assign IPv4 addresses on two different subnets connected to router R1.

Note: Make sure that the routers and switches have been erased and have no startup configurations. If you are unsure, contact your instructor.

Required Resources

- 3 Routers (Cisco 2900 with Cisco IOS Release 15.2(4)M3 universal image or comparable)
- 2 Switches (Cisco 2960 with Cisco IOS Release 15.0(2) lanbasek9 image or comparable)
- 2 PCs (Windows 7, Vista, or XP with 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

Part 1: Build the Network and Configure Basic Device Settings

In Part 1, you will set up the network topology and configure the routers and switches with basic settings, such as passwords and IP addresses. You will also configure the IP settings for the PCs in the topology.

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

Step 2: Initialize and reload the routers and switches.

Step 3: Configure basic settings for each router.

- a. Configure the device name as shown in the topology.
- b. Configure the IP addresses for all the router interfaces according to the Addressing Table.

Step 4: Configure static and default routes or OSPFv2 between routers.

If you need help, refer:

- a. Lab 5a: Configuring IPv4 Static and Default Routes
- b. Lab 5b: Configuring Basic Single-Area OSPFv2

Step 5: Verify network connectivity between the routers.

If any pings between routers fail, correct the errors before proceeding to the next step. Use **show ip route** and **show ip interface brief** to locate possible issues.

Step 6: Verify the host PCs are configured for DHCP.

Part 2: Configure a DHCPv4 Server and a DHCP Relay Agent

To automatically assign address information on the network, you will configure R2 as a DHCPv4 server and R1 as a DHCP relay agent.

Step 1: Configure DHCPv4 server settings on router R2.

On R2, you will configure a DHCP address pool for each of the R1 LANs. Use the pool name **R1G0** for the G0/0 LAN and **R1G1** for the G0/1 LAN. You will also configure the addresses to be excluded from the address pools. Best practice dictates that excluded addresses be configured first, to guarantee that they are not accidentally leased to other devices.

Exclude the first 9 addresses in each R1 LAN starting with .1. All other addresses should be available in the DHCP address pool. Make sure that each DHCP address pool includes a default gateway, the domain **ccna-lab.com**, a DNS server (209.165.200.225), and a lease time of 2 days.

On the lines below, write the commands necessary for configuring DHCP services on router R2, including the DHCP-excluded addresses and the DHCP address pools.

Note: The required commands for in Lecture 0: Application Layer - Dynamic Host Configuration Protocol (DHCP).

On PC-A or PC-B, open a command prompt and enter the **ipconfig /all** command. Did either of the host PCs receive an IP address from the DHCP server? Why?

Step 2: Configure R1 as a DHCP relay agent.

Configure IP helper addresses on R1 to forward all DHCP requests to the R2 DHCP server.

On the lines below, write the commands necessary to configure R1 as a DHCP relay agent for the R1 LANs.

Step 3: Record IP settings for PC-A and PC-B.

On PC-A and PC-B, issue the **ipconfig /all** command to verify that the PCs have received IP address information from the DHCP server on R2. Record the IP and MAC address for each PC.

Based on the DHCP pool that was configured on R2, what are the first available IP addresses that PC-A and PC-B can lease?

Step 4: Verify DHCP services and address leases on R2.

- a. On R2, enter the **show ip dhcp binding** command to view DHCP address leases.
Along with the IP addresses that were leased, what other piece of useful client identification information is in the output?
- b. On R2, enter the **show ip dhcp server statistics** command to view the DHCP pool statistics and message activity.
How many types of DHCP messages are listed in the output?
- c. On R2, enter the **show ip dhcp pool** command to view the DHCP pool settings.
In the output of the **show ip dhcp pool** command, what does the Current index refer to?
- d. On R2, enter the **show run | section dhcp** command to view the DHCP configuration in the running configuration.
- e. On R2, enter the **show run interface** command for interfaces G0/0 and G0/1 to view the DHCP relay configuration in the running configuration.

Reflection

What do you think is the benefit of using DHCP relay agents instead of multiple routers acting as DHCP servers?