

Polytechnic University of Puerto Rico Department of Electrical Engineering Hato Rey

Module 6 Project COE 4331

Computer Networks Laboratory

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Schmidt Montilla, Coral S., Student ID: 148830

Professor: Juan Tovar

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Introduction

The primary aim of this lab was to explore key networking concepts, including the features of IPv4 addressing, the role of DHCP servers, and the process of identifying MAC addresses. By delving into the structure and functionality of IPv4 addresses, the lab emphasized the distinctions between public, private, and reserved address types, alongside the growing need for IPv6 in modern networking. A practical component demonstrated the configuration of a DHCP server to automate IP address assignments, enhancing our understanding of dynamic addressing. Additionally, this module provided step-by-step guidance on determining a device's MAC address, linking its significance to device communication at the Data Link Layer. These tasks offered a comprehensive perspective on how IP and MAC addresses collaboratively support seamless network operations.

Method

Packet Tracer - Configure DHCP on a Wireless

Topology



Objective

- Connect 3 PCs to a wireless router
- Change the DHCP setting to a specific network range
- · Configure the clients to obtain their address via DHCP

Background / Scenario

A home user wants to use a wireless router to connect 3 PCs. All 3 PCs should obtain their address automatically from the wireless router.

Step 1: Set up the network topology

- a. Add three generic PCs.
- b. Connect each PC to an Ethernet port to the wireless router using straight-through cables.

Step 2: Observe the default DHCP settings

a. After the amber lights have turned green, click **PC0**. Click the **Desktop** tab. Select **IP Configuration**. Select **DHCP** to receive an IP address from **DHCP Enabled Router**.

Record the IP address of the default gateway: 192.168.0.1

- b. Close the IP Configuration window.
- c. Open a Web Browser.
- d. Enter the IP address of the default gateway recorded earlier into the URL field. When prompted, enter the username **admin** and password **admin**.
- e. Scroll through the Basic Setup page to view default settings, including the default IP address of the wireless router.

Notice that DHCP is enabled, the starting address of the DHCP range and the range of addresses available to clients.

Step 3: Change the default IP address of the wireless router.

- a. Within the Router IP Settings section, change the IP address to: 192.168.5.1.
- b. Scroll to the bottom of the page and click Save Settings.
- c. If it is done correctly, the web page will display an error message. Close the web browser.
- d. Click IP Configuration to renew the assigned IP address. Click Static. Click DHCP to receive new IP address information from the wireless router.
- e. Open the web browser, enter the IP address **192.168.5.1** in the URL field. When prompted, enter the username **admin** and password **admin**.

Step 4: Change the default DHCP range of addresses.

- a. Notice the DHCP Server Start IP Address is updated to the same network as the Router IP.
- b. Change the Starting IP Address from 192.168.5.100 to **192.168.5.26**.
- c. Change the Maximum Number of Users to **75**.
- d. Scroll to the bottom of the page and click Save Settings. Click Continue.
- e. Scroll back up to the DHCP Settings to ensure the change is made.
- f. Close the web browser.
- g. Select Command Prompt. Enter ipconfig. Record the IP address for PC0: 192.168.5.100

Step 5: Enable DHCP on the other PCs.

- a. Click PC1.
- b. Select **Desktop** tab.
- c. Select IP Configuration.
- d. Click **DHCP**. Record the IP address for PC1: 192.168.5.26
- e. Close the configuration window.
- f. Enable DHCP on **PC2** following the steps for PC1.

Step 6: Verify connectivity

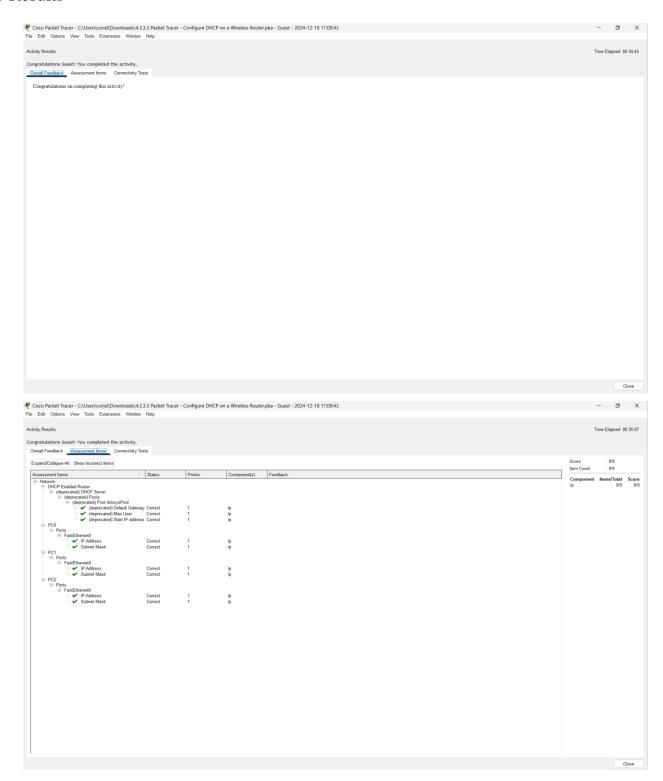
- a. Click PC2 and select the Desktop tab.
- b. Select Command Prompt.
- c. Type **ipconfig** at the prompt to view the IP configuration.
- d. Type **ping 192.168.5.1** to ping the wireless router.

Type **ping 192.168.5.26** to ping PC0.

Type **ping 192.168.5.27** to ping PC1.

The pings to all devices should be successful.

Lab Results



Conclusion

This lab provided a well-rounded understanding of fundamental networking concepts, bridging theory with hands-on practice. By exploring IPv4 features and addressing types, we gained insights into the necessity of dynamic and static IP assignments in network configurations. The practical exercise of setting up and configuring a DHCP server demonstrated how automated addressing streamlines device connectivity. The lab also highlighted the critical role of MAC addresses in identifying devices within a network and their unchanging nature as hardware-defined identifiers. Lastly, the introduction to IPv6 reinforced the importance of preparing for the growing demands on network infrastructures. This lab not only enhanced our technical skills but also deepened our appreciation for the foundational elements of modern networking.

References

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