



Polytechnic University of Puerto Rico

Department of Electrical Engineering

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Computer Networks Laboratory

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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

Cisco Packet Tracer - C:\Users\coral\Downloads\4.3.3.3 Packet Tracer - Configure DHCP on a Wireless Router.pka - Guest - 2024-12-18 17:00:43

File Edit Options View Tools Extensions Window Help

Activity Results

Time Elapsed: 00:34:45

Congratulations Guest! You completed the activity.

Overall Feedback Assessment Items Connectivity Tests

Congratulations on completing this activity!

Close

Cisco Packet Tracer - C:\Users\coral\Downloads\4.3.3.3 Packet Tracer - Configure DHCP on a Wireless Router.pka - Guest - 2024-12-18 17:00:43

File Edit Options View Tools Extensions Window Help

Activity Results

Time Elapsed: 00:35:07

Congratulations Guest! You completed the activity.

Overall Feedback Assessment Items Connectivity Tests

Expand/Collapse All Show Incorrect Items

Assessment Items	Status	Points	Component(s)	Feedback
Network				
DHCP Enabled Router				
(deprecated) DHCP Server				
(deprecated) Pools				
(deprecated) Pool linksysPool				
(deprecated) Default Gateway	Correct	1	Ip	
(deprecated) Max User	Correct	1	Ip	
(deprecated) Start IP address	Correct	1	Ip	
PC0				
Ports				
FastEthernet0				
IP Address	Correct	1	Ip	
Subnet Mask	Correct	1	Ip	
PC1				
Ports				
FastEthernet0				
IP Address	Correct	1	Ip	
Subnet Mask	Correct	1	Ip	
PC2				
Ports				
FastEthernet0				
IP Address	Correct	1	Ip	
Subnet Mask	Correct	1	Ip	

Score : 9/9

Item Count : 9/9

Component	Items/Total	Score
Ip	9/9	9/9

Close

## 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

- [1] P. Tracer, "Packet Tracer 4.3.3.3 - Configure DHCP on a Wireless Router," *YouTube*, Feb. 27, 2018. Available: <https://www.youtube.com/watch?v=SbpU0Hr7Hcc>. [Accessed: Dec. 18, 2024]
- [2] IP, "IP Address - IPv4 vs IPv6 Tutorial," *YouTube*, Jul. 04, 2016. Available: <https://www.youtube.com/watch?v=ThdO9beHhpA>. [Accessed: Dec. 18, 2024]
- [3] IP, "IP Addresses Explained | Cisco CCNA 200-301," *YouTube*, Jun. 02, 2020. Available: <https://www.youtube.com/watch?v=LizTo6e4FgY>. [Accessed: Dec. 18, 2024]