

Packet Tracer - Identify MAC and IP Addresses

Objectives

Part 1: Gather PDU Information for a Local Network Communication

Part 2: Gather PDU Information for a Remote Network Communication

Background

If you are interested in a career in network administration or network security, it is important to understand normal network communication processes. In this Packet Tracer activity, you will inspect Ethernet frames and IP packets at different points in the network as they travel from source to destination. You will focus on the way that the MAC and IP addresses change depending on the destination (local or remote) and the place where the PDUs are captured.

Packet Tracer has a simulation mode which will enable you to investigate details about how PDUs travel on networks. It enables you to check the Layer 2 MAC addressing and Layer 3 IPv4 addressing of the PDUs at different locations in the network as the PDUs flow from source to destination.

This activity is optimized for viewing PDUs as they travel on local and remote networks. You will gather PDU information in PT simulation mode and answer a series of questions about the data you collect. No device configuration is required.

Instructions

Part 1: Gather PDU Information for a Local Network Communication

In this part, you will study how a device on a local network does not need a default gateway to communicate with another device on the same local network.

Note: Review the Reflection Questions in Part 3 before proceeding with this part. It will give you an idea of the type of information you will need to gather. Click host **172.16.31.3** and open the **Command Prompt**.

- a. Enter the **ping 172.16.31.2** command. This command will issue a series of ICMP echo request packets to the destination. If the packets reach the destination, it will send echo-reply messages back to the source of the ping requests.
- b. Click the **Simulation** mode button to switch to simulation mode. Repeat the **ping 172.16.31.2** command. An envelope icon that represents a PDU appears next to **172.16.31.3**.

c. Click the PDU and locate the following information in both the **OSI Model** and **Outbound PDU Details** tabs. The **Outbound PDU Details** tab shows simplified packet and frame headers for the PDU. You should observe the following details regarding addressing for the PDU.

- ? At Device: **172.16.31.3**
- ? Source MAC Address: **0060.7036.2849**
- ? Destination MAC Address: **000C:85CC:1DA7**
- ? Source IP Address: **172.16.31.3**
- ? Destination IP Address: **172.16.31.2**

d. Click **Capture / Forward (the right arrow followed by a vertical bar)** and the PDU moves to the next step in its journey. Use the OSI model tab to gather the same information from Step 1d. Repeat this process until the PDU reaches its destination. For each step on the path to delivery, record the information for each PDU into a spreadsheet that uses a format like the table shown below. The information for the first step is shown in the table.

Example Spreadsheet Format

At Device	Src MAC	Dest. MAC	Src IPv4	Dest IPv4
172.16.31.3		000C:85CC:1DA7	172.16.31.3	172.16.31.2

Blank Line, No additional information

e. You will notice that the information for the inbound PDU is unchanged.

Question:

In the PDU information window, click the tab for the outbound PDU. How does the addressing differ, and why? Record the addressing in your table.

f. Return to **Realtime** mode.

Part 2: Gather PDU Information for a Remote Network Communication

To communicate with remote networks, a gateway device is necessary. The gateway device connects two or more networks together. In this part, you will study the process that takes place when one device communicates with another device that is on a remote network. Pay close attention to the MAC addresses used.

Note: Move your mouse over the **Router**. You will see information about the addressing of the router interfaces. Refer to these addresses as you observe the PDU flow through the router.

- a. Return to the **Command Prompt** for **172.16.31.3**.
- b. Enter the **ping 10.10.10.2** command. The first couple of pings may time out.
- c. Switch to **Simulation** mode and repeat the **ping 10.10.10.2** command. A PDU appears next to **172.16.31.3**.
- d. Click the PDU and note the following information tab:
 - ? At Device: 172.16.31.3
 - ? Source MAC Address: 0060.7036.2849
 - ? Destination MAC Address: 00D0:BA8E:741A
 - ? Source IP Address: 172.16.31.3
 - ? Destination IP Address: 10.10.10.2

Question:

What device and interface has the destination MAC address that is shown?

- e. Click **Capture / Forward (the right arrow followed by a vertical bar)** to move the PDU to the next device. Gather the same information from Step 1d. Repeat this process until the PDU reaches its destination. Record the PDU information you gathered from pinging 172.16.31.5 to 10.10.10.2 into a spreadsheet using a format like the sample table shown below. Enter details for both the inbound and outbound PDUs at the Router.

At Device	Src MAC	Dest. MAC	Src IPv4	Dest IPv4
172.16.31.3	00D0:D311:C788	00D0:BA8E:741A	172.16.31.3	10.10.10.2

At Device	Src MAC	Dest. MAC	Src IPv4	Dest IPv4

Blank Line, No additional information

- f. Repeat the process for the echo-reply message that originates from host 10.10.10.2.
Complete the table for each step.

At Device	Src MAC	Dest. MAC	Src IPv4	Dest IPv4

Blank Line, No additional information

Reflection Questions

Answer the following questions regarding the captured data:

1. What different types of cables/media were used to connect devices?
2. Did the cables change the handling of the PDU in any way?
3. Did the wireless **Access Point** do anything to the PDUs that it received?
4. Was PDU addressing changed by the access point?
5. What was the highest OSI layer that the **Access Point** used?

6. At what Layer of the OSI model do cables and access points operate?
7. When examining the **PDU Details** tab, which MAC address appeared first, the source or the destination?
8. Sometimes PDUs were marked with red Xs while others had green check marks. What is the significance of these markings?
9. Every time that the PDU was sent between the 10 network and the 172 network, there was a point where the MAC addresses suddenly changed. Where did that occur?
10. Which device uses MAC addresses that start with 00D0:BA?
11. What devices did the other MAC addresses belong to?
12. Did the sending and receiving IPv4 addresses change in any of the PDUs?
13. When you follow the reply to a ping, sometimes called a *pong*, what happens to the source and destination addresses?
14. Why do you think the interfaces of the router are part of two different IP networks?
15. Which IP networks are connected by the router?