Networking Academy

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# Packet Tracer - Identify MAC and IP Addresses

## Objectives

**Part 1: Gather PDU Information for Local Network Communication**

**Part 2: Gather PDU Information for Remote Network Communication**

## Background

This activity is optimized for viewing PDUs. The devices are already configured. You will gather PDU information in simulation mode and answer a series of questions about the data you collect.

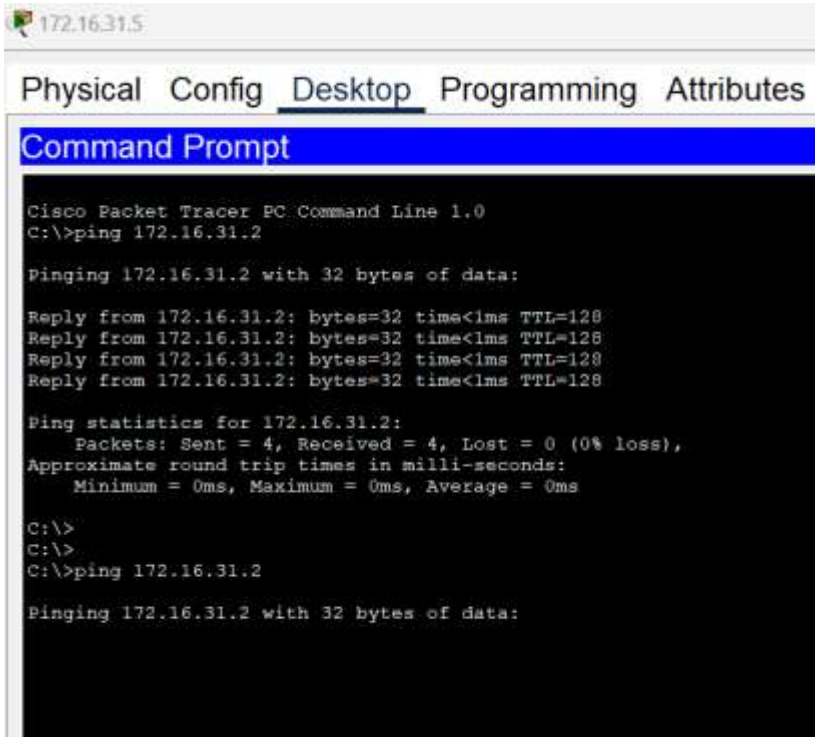
## Instructions

### Part 1: Gather PDU Information for Local Network Communication

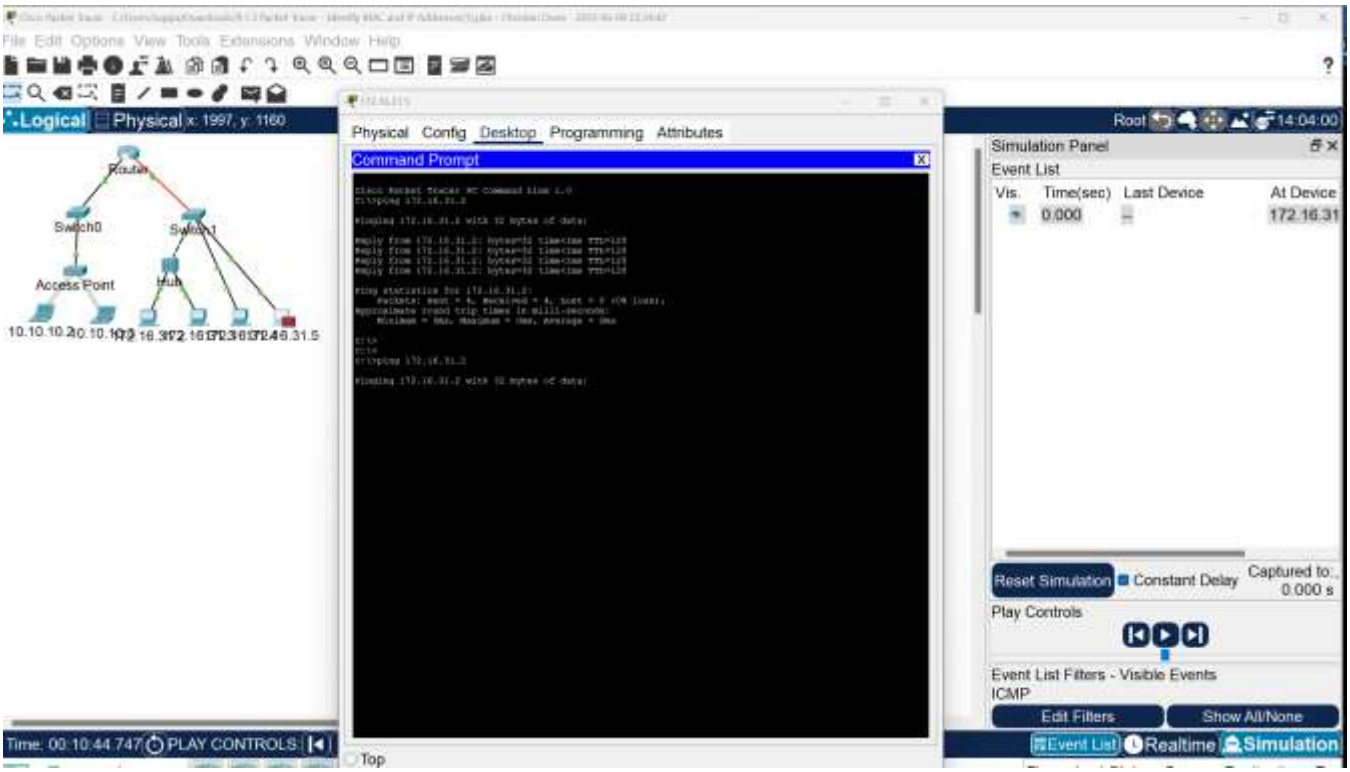
**Note**: Review the Reflection Questions in Part 3 before proceeding with Part 1. It will give you an idea of the type of information you will need to gather.Gather PDU information as a packet travels from 172.16.31.5 to 172.16.31.2.

a. Click **172.16.31.5** and open the **Command Prompt**.

b. Enter the **ping 172.16.31.2** command.

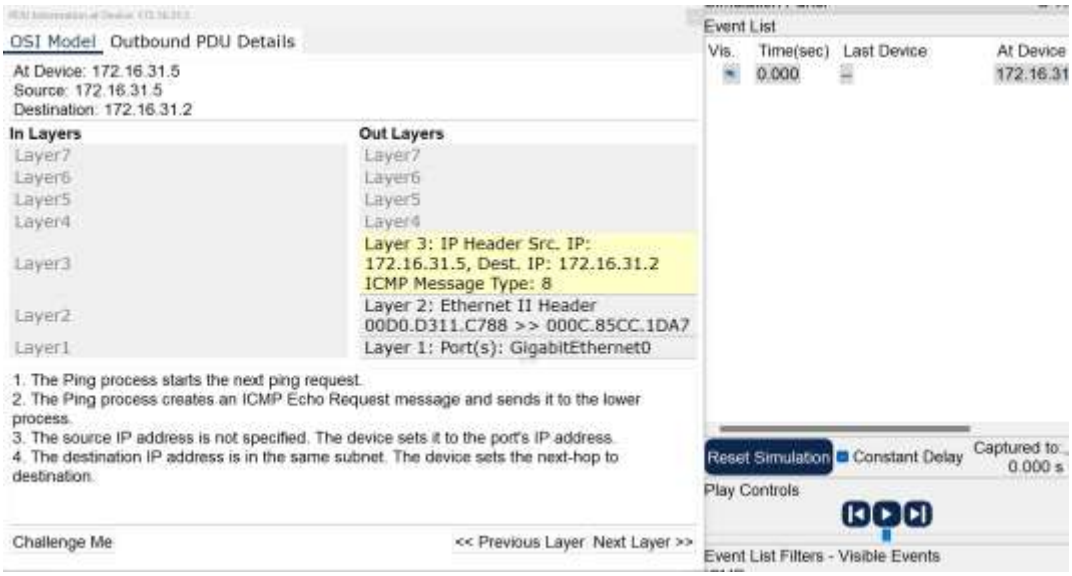



c. Switch to simulation mode and repeat the **ping 172.16.31.2** command. A PDU appears next to **172.16.31.5**.



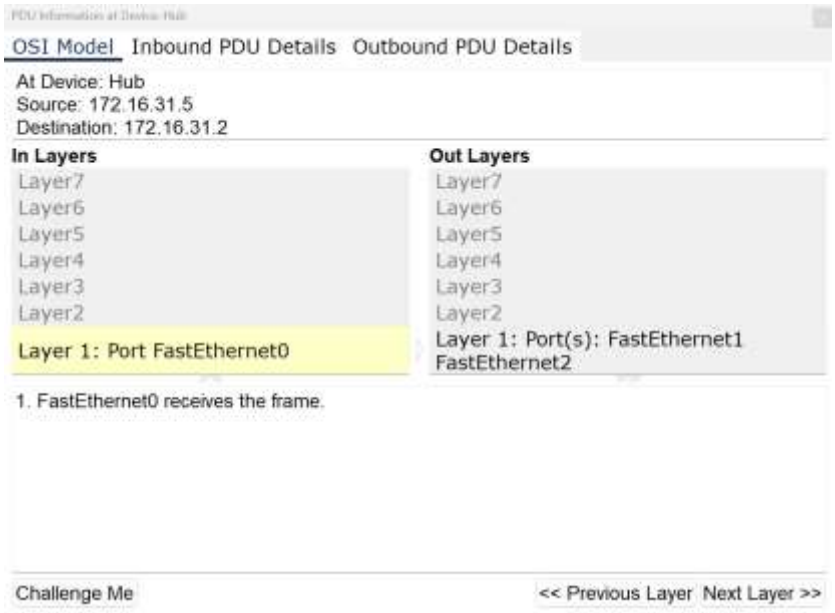

d. Click the PDU and note the following information from the **OSI Model** and **Outbound PDU Layer** tabs:

- Destination MAC Address: **000C:85CC:1DA7**
- Source MAC Address: **00D0:D311:C788**
- Source IP Address: **172.16.31.5**
- Destination IP Address: **172.16.31.2**
- At Device: **172.16.31.5**




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 into a spreadsheet using a format like the table shown below:



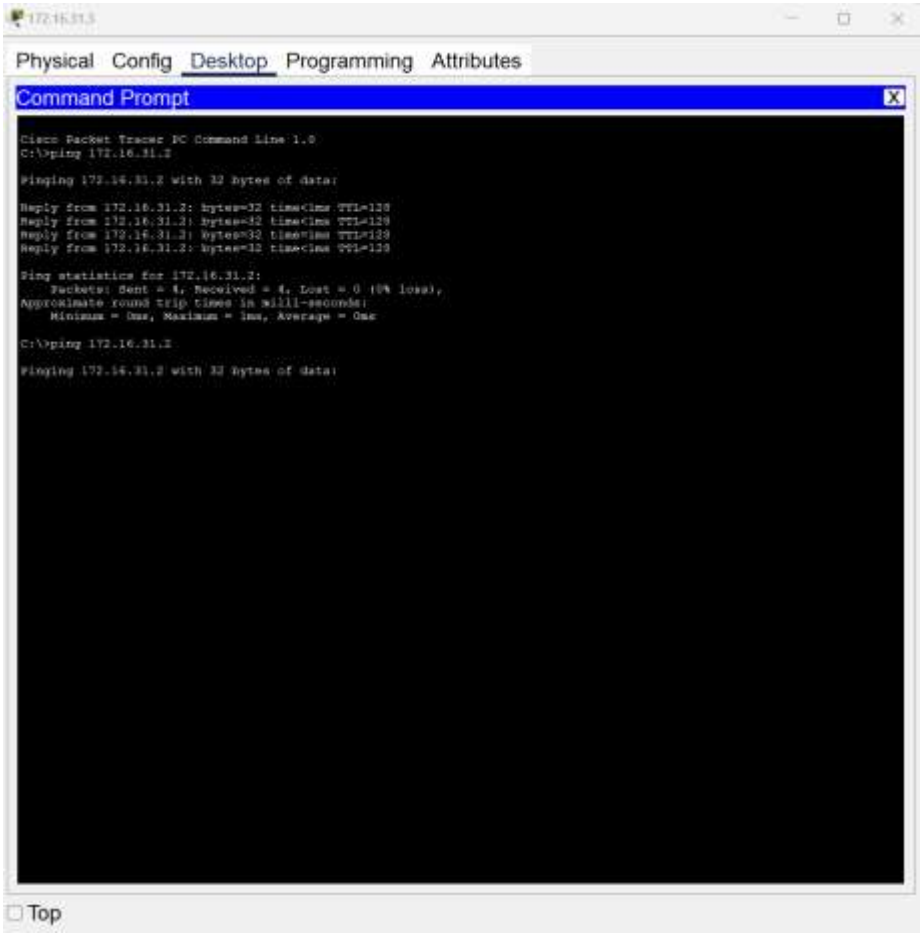

**Example Spreadsheet Format**

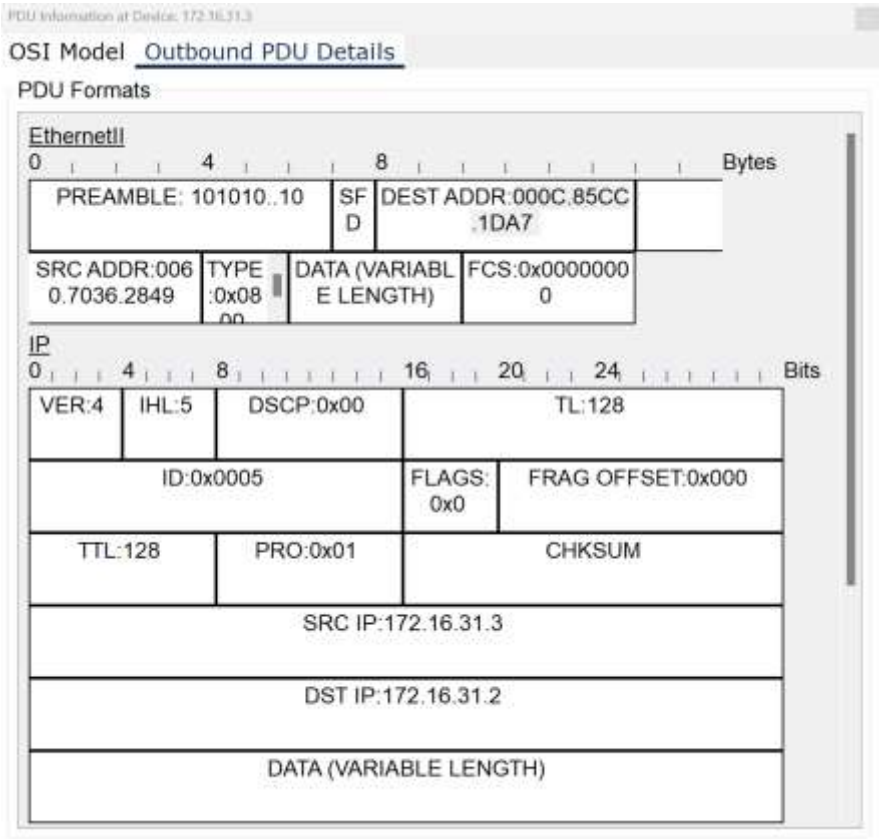
| At Device | Dest. MAC | Src MAC | Src IPv4 | Dest IPv4 |
|---|---|---|---|---|
| 172.16.31.5 | 000C:85CC:1DA7 | 00D0:D311:C788 | 172.16.31.5 | 172.16.31.2 |
| Switch1 | 000C:85CC:1DA7 | 00D0:D311:C788 | N/A | N/A |
| Hub | N/A | N/A | N/A | N/A |
| 172.16.31.2 | 00D0:D311:C788 | 000C:85CC:1DA7 | 172.16.31.2 | 172.16.31.5 |

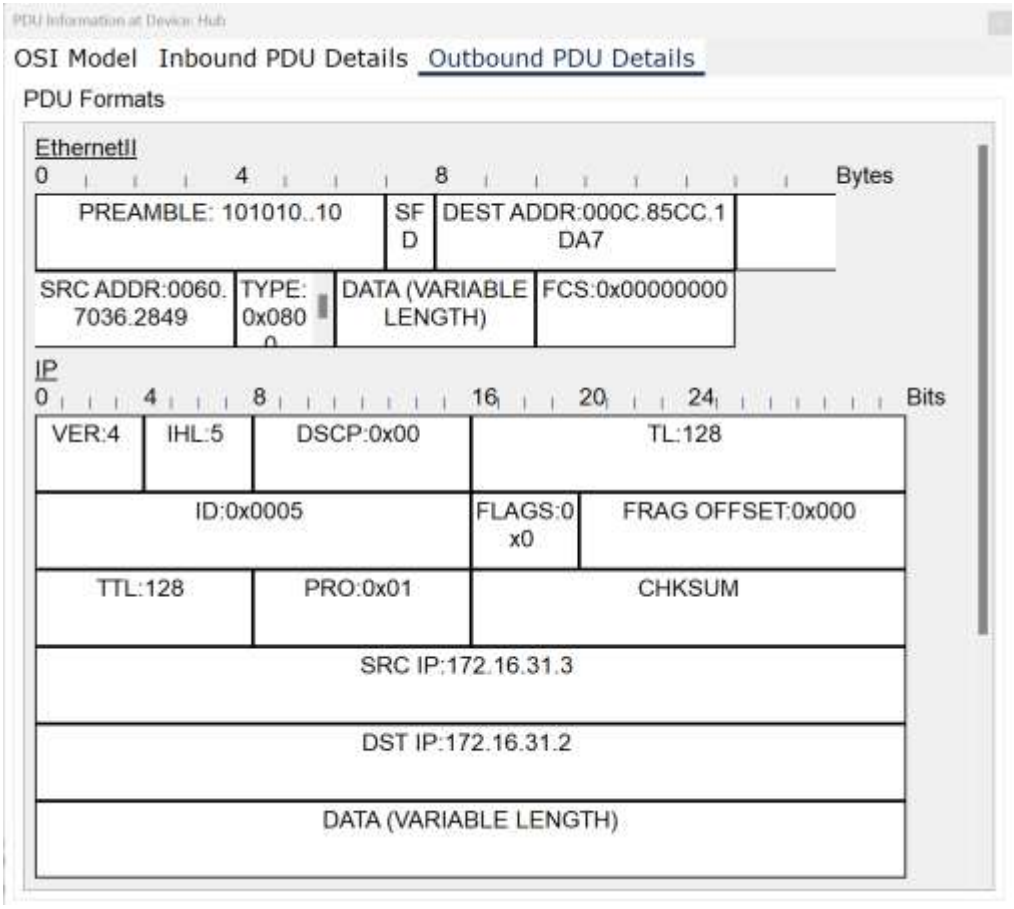
## Step 2: Gather additional PDU information from other pings.

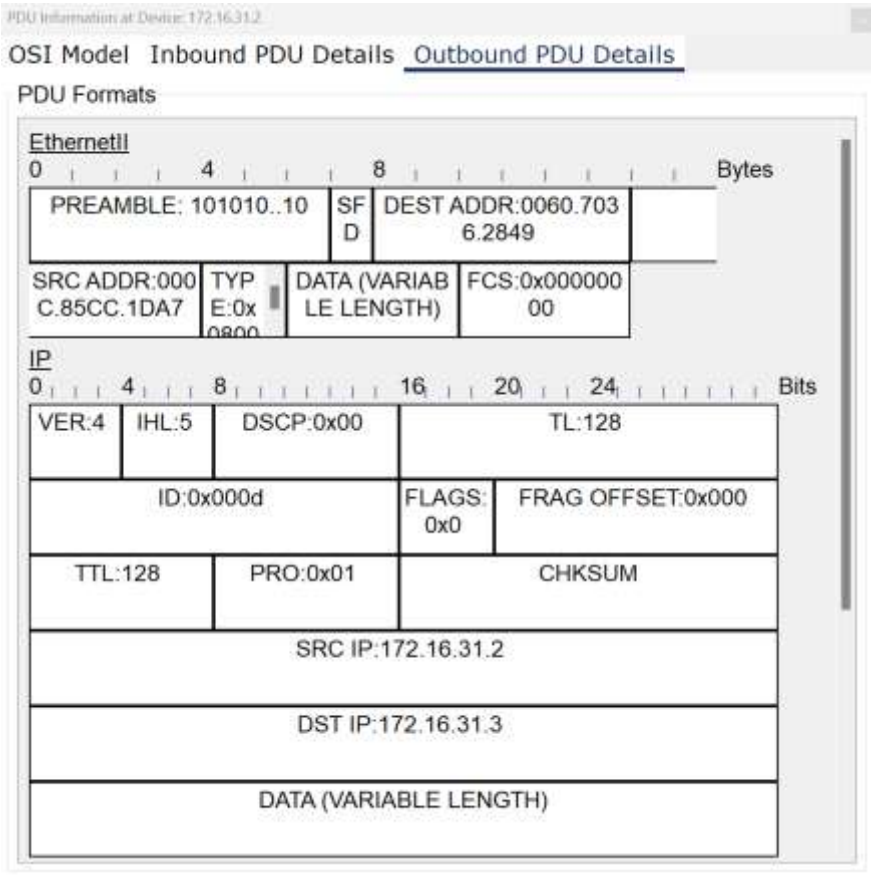
Repeat the process in Step 1 and gather the information for the following tests:

- Ping 172.16.31.2 from 172.16.31.3.



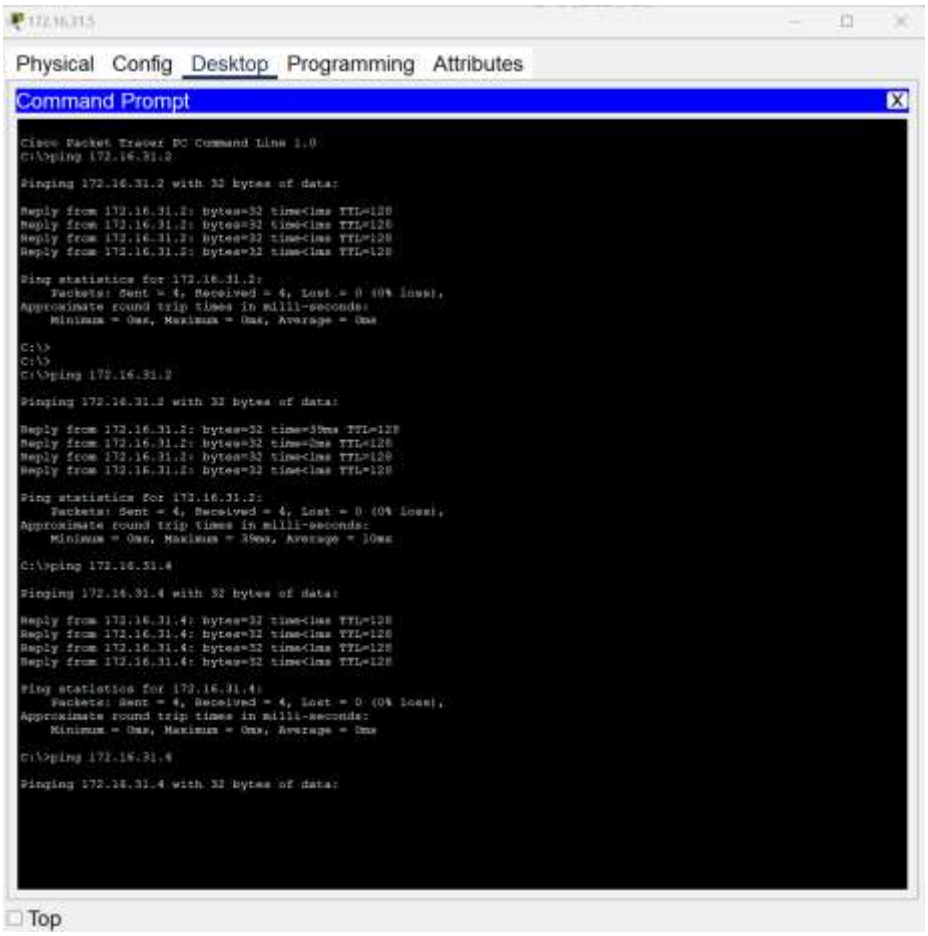


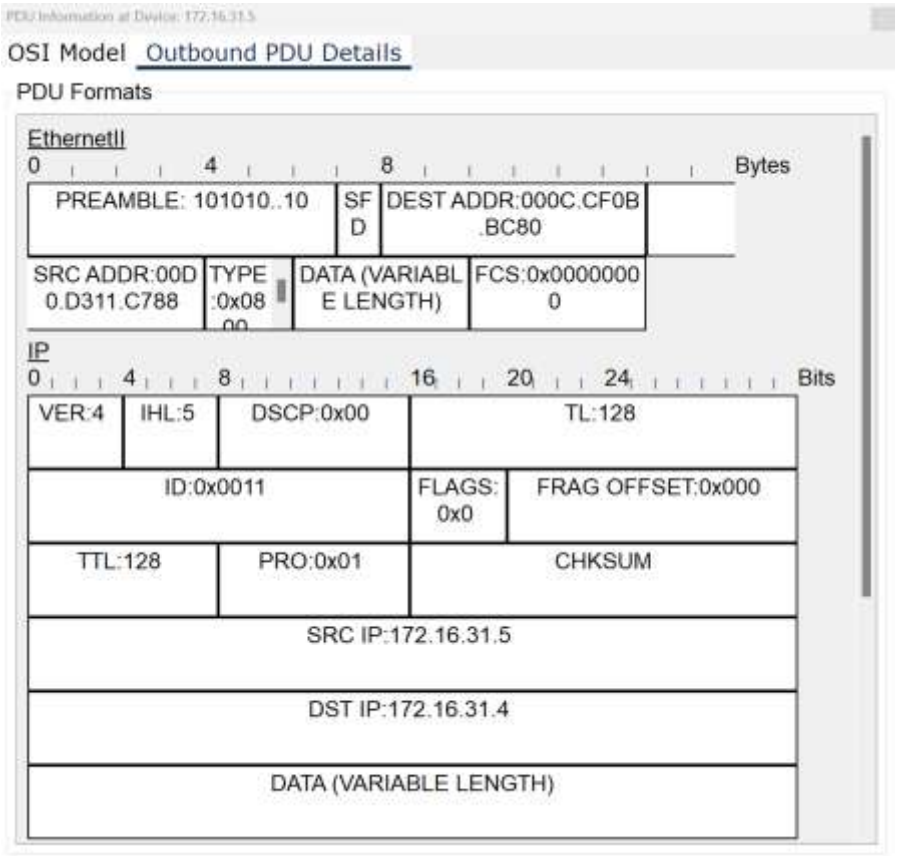


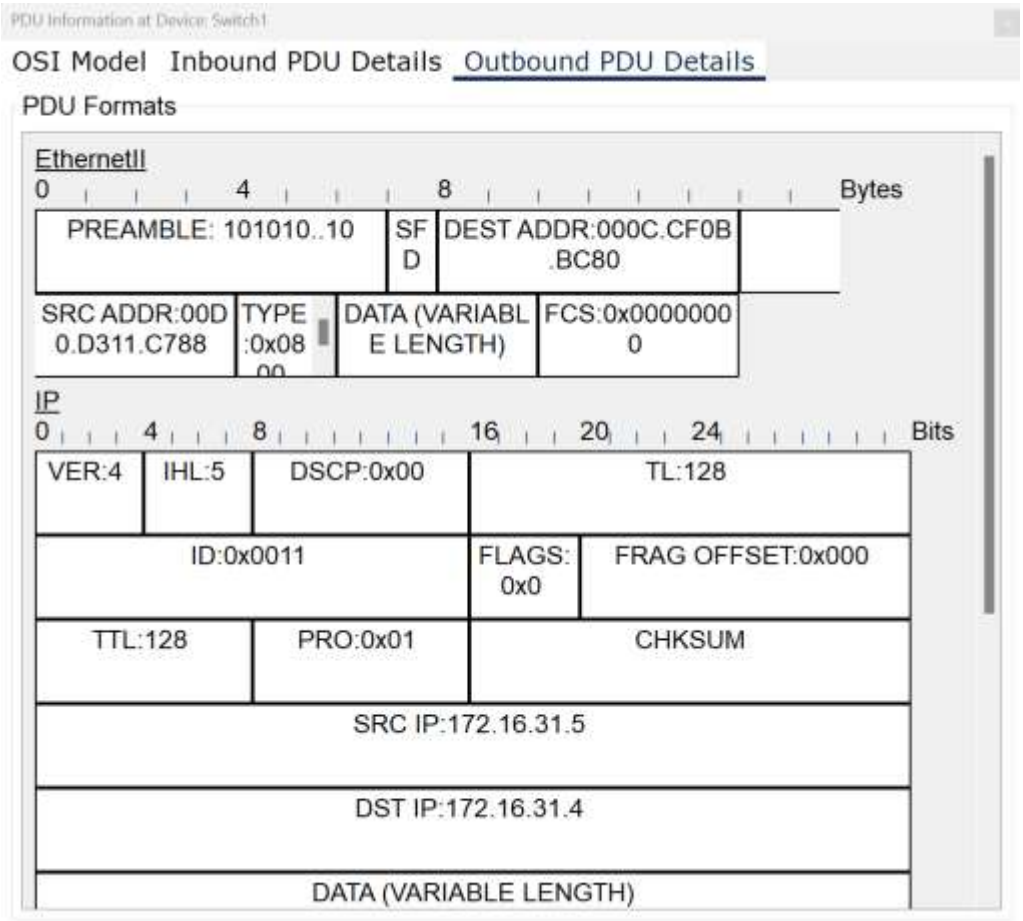


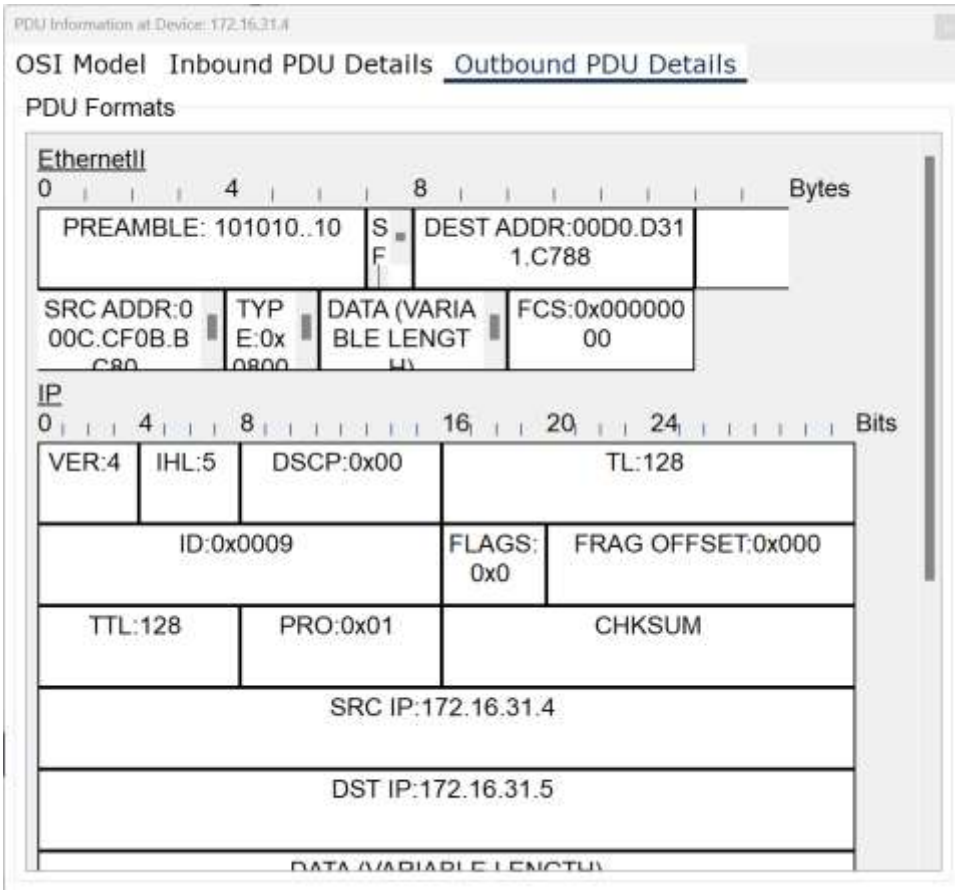

| At Device | Dest. MAC | Src MAC | Src IPv4 | Dest IPv4 |
|---|---|---|---|---|
| 172.16.31.3 | 000C.85CC.1DA7 | 0060.7036.2849 | 172.16.31.3 | 172.16.31.2 |
| Hub | N/A | N/A | N/A | N/A |
| 172.16.31.2 | 0060.7036.2849 | 000C.85CC.1DA7 | 172.16.31.2 | 172.16.31.3 |
| | | | | |

- Ping 172.16.31.4 from 172.16.31.5.










| At Device | Dest. MAC | Src MAC | Src IPv4 | Dest IPv4 |
|---|---|---|---|---|
| 172.16.31.5 | 000C.CF0B.BC80 | 00D0.D311.C788 | 172.16.31.5 | 172.16.31.4 |
| Switch 1 | 000C.CF0B.BC80 | 00D0.D311.C788 | N/A | N/A |
| 172.16.31.4 | 00D0.D311.C788 | 000C.CF0B.BC80 | 172.16.31.4 | 172.16.31.5 |
| | | | | |

Return to Realtime mode.

## Part 2: Gather PDU Information for Remote Network Communication

In order to communicate with remote networks, a gateway device is necessary. Study the process that takes place to communicate with devices on the remote network. Pay close attention to the MAC addresses used.

### Step 1: Gather PDU information as a packet travels from 172.16.31.5 to 10.10.10.2.

a. Click **172.16.31.5** and open the **Command Prompt**.

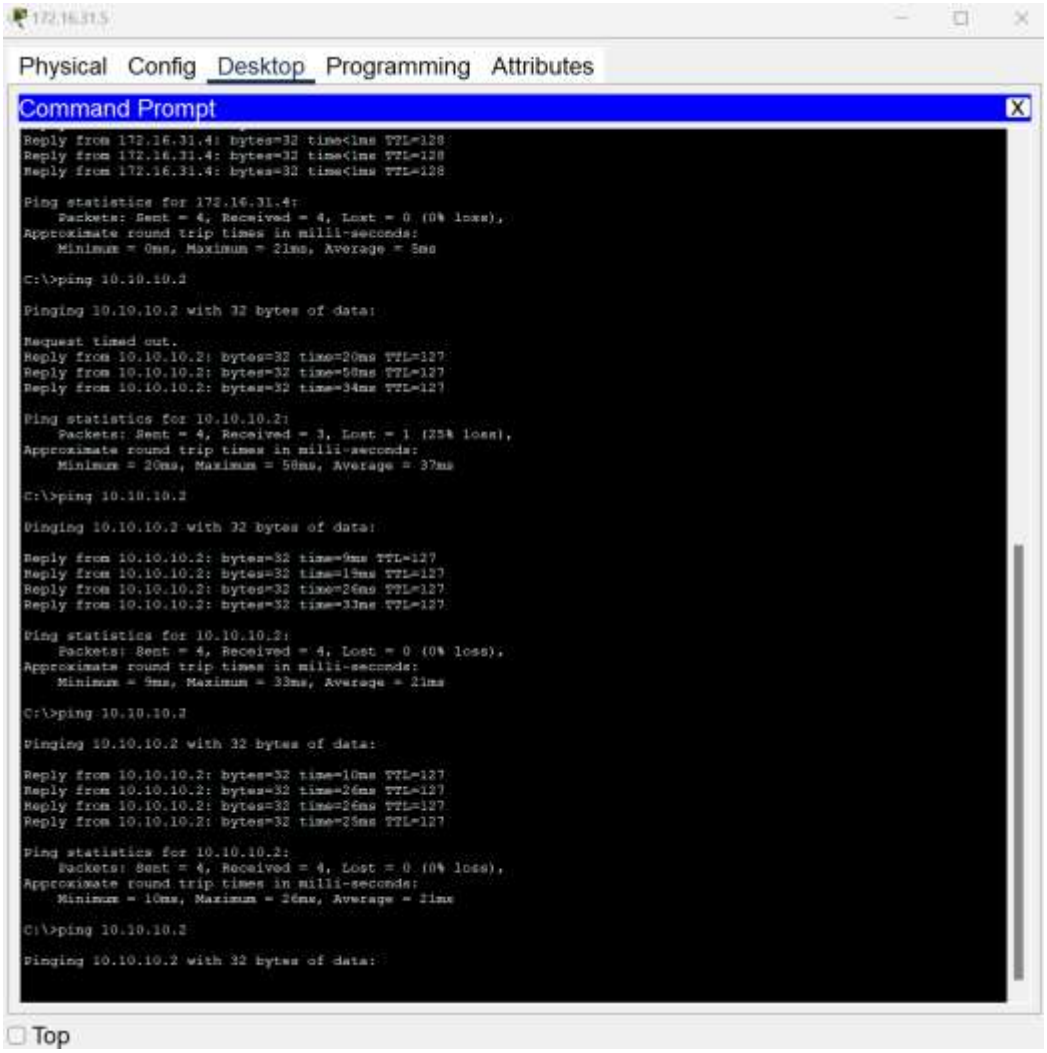
b. Enter the **ping 10.10.10.2** command.

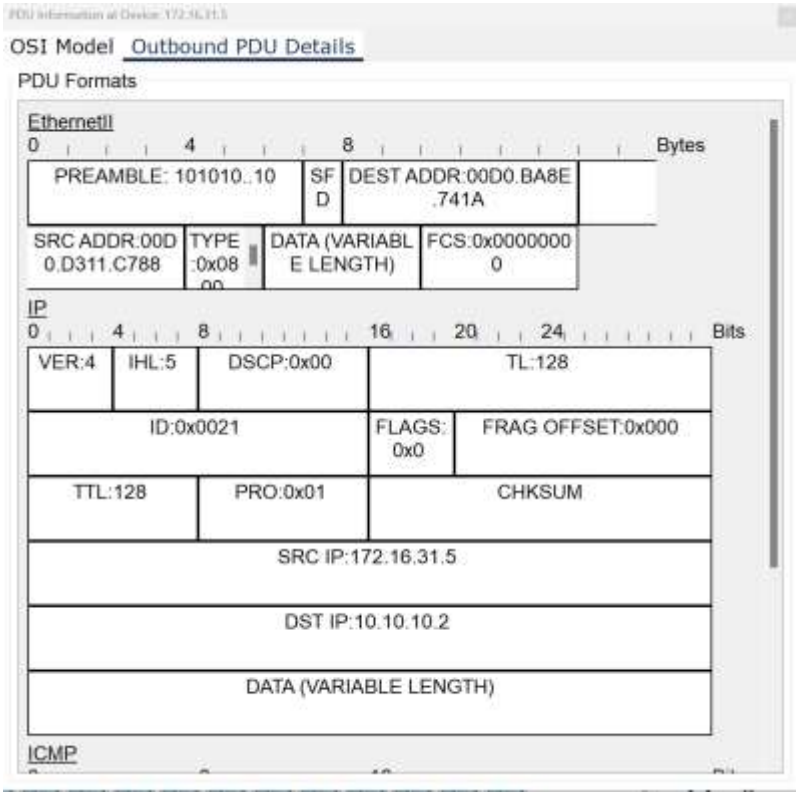
c. Switch to simulation mode and repeat the **ping 10.10.10.2** command. A PDU appears next to **172.16.31.5**.

d. Click the PDU and note the following information from the **Outbound PDU Layer** tab:

- Destination MAC Address: 00D0:BA8E:741A

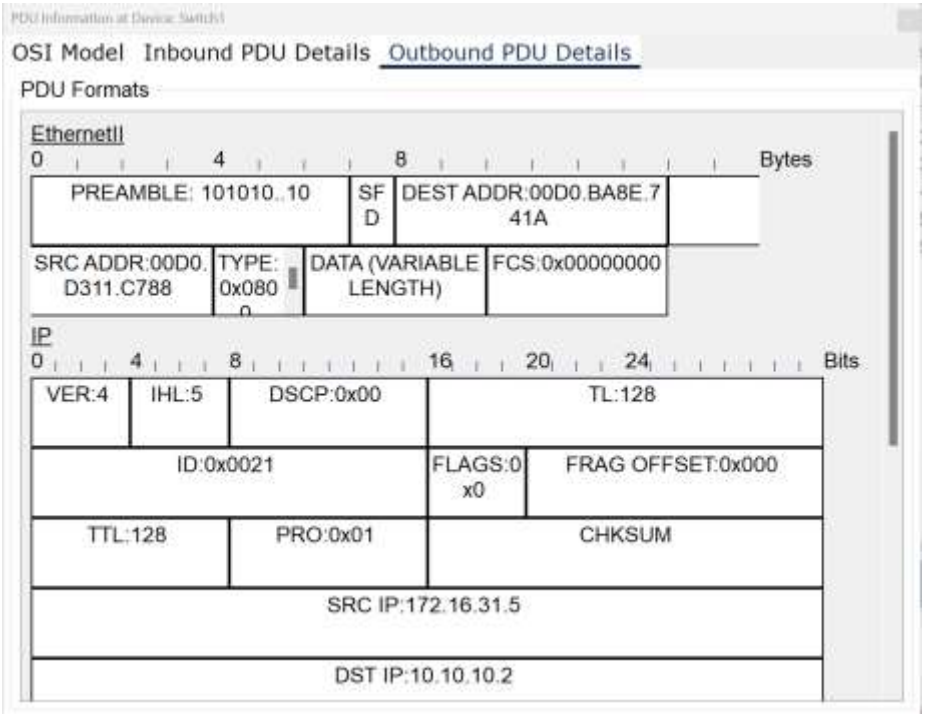
- Source MAC Address: 00D0:D311:C788
- Source IP Address: 172.16.31.5
- Destination IP Address: 10.10.10.2
- At Device: 172.16.31.5

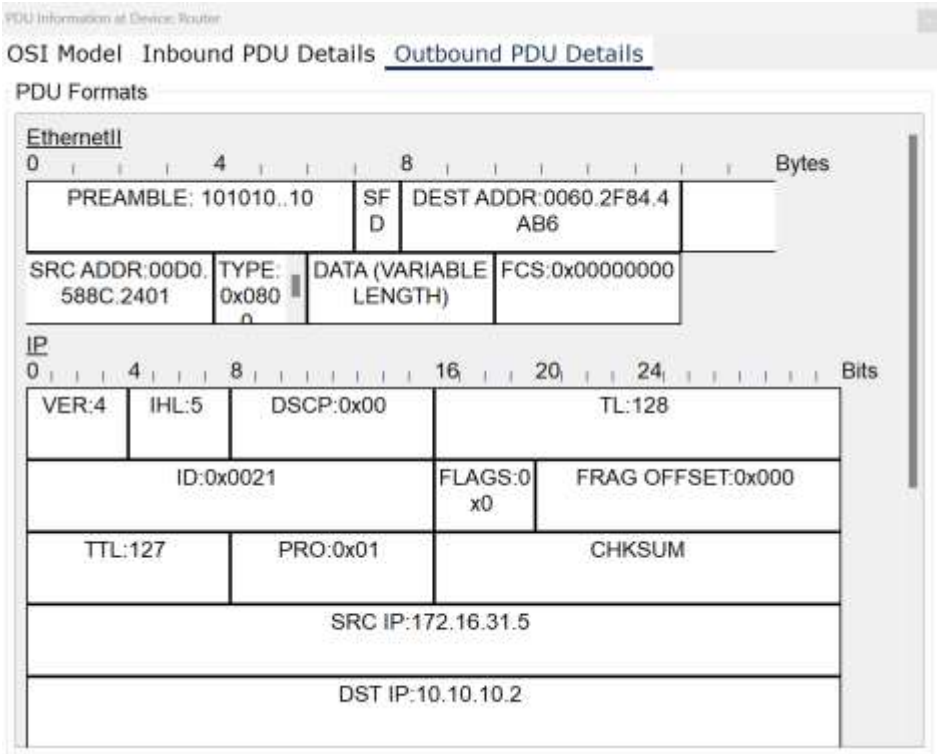


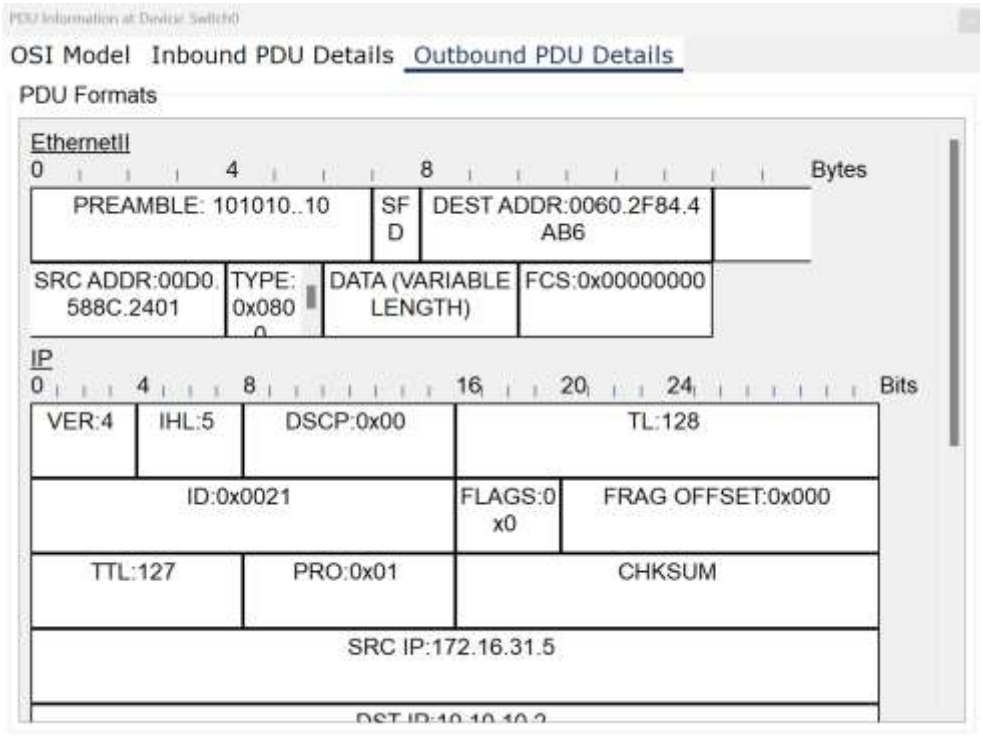


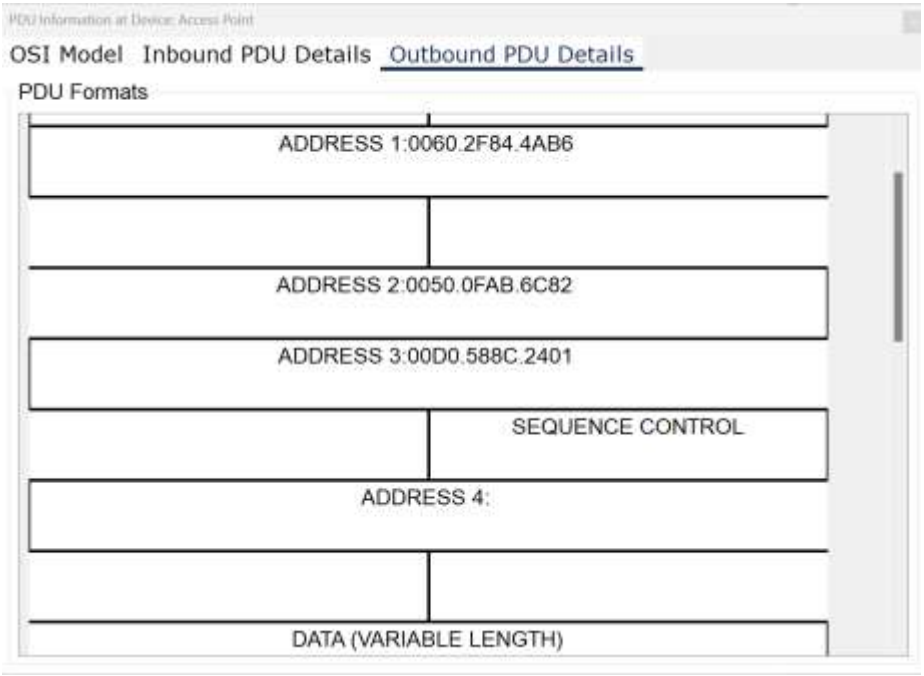

What device has the destination MAC that is shown?
The Router/ Default Gateway has the destination MAC that is shown.

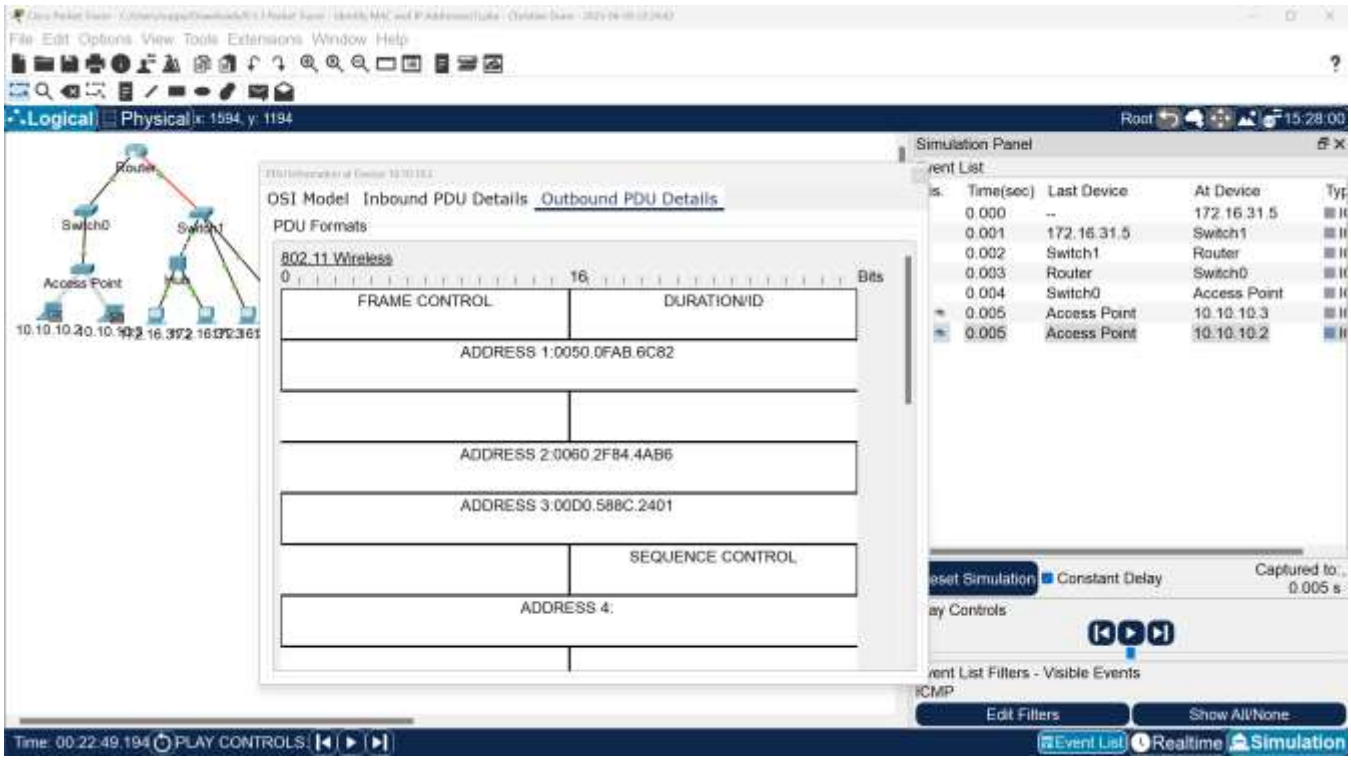
e. Click **Capture / Forward (the right arrow followed by a vertical bar)** to move the PDU to the next device. Gather the same information from Step 1d. Repeat this process until the PDU reaches its destination. Record the PDU information you gathered from pinging 172.16.31.5 to 10.10.10.2 into a spreadsheet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








| At Device | Dest. MAC | Src MAC | Src IPv4 | Dest IPv4 |
|---|---|---|---|---|
| 172.16.31.5 | 00D0:BA8E:741A | 00D0:D311:C788 | 172.16.31.5 | 10.10.10.2 |
| Switch1 | 00D0:BA8E:741A | 00D0:D311:C788 | N/A | N/A |
| Router | 0060:2F84:4AB6 | 00D0:588C:2401 | 172.16.31.5 | 10.10.10.2 |
| Switch0 | 0060:2F84:4AB6 | 00D0:588C:2401 | N/A | N/A |
| Access Point | N/A | N/A | N/A | N/A |
| 10.10.10.2 | 00D0:588C:2401 | 0060:2F84:4AB6 | 10.10.10.2 | 172.16.31.5 |

## Part 3: Reflection Questions

Answer the following questions regarding the captured data:

1. Were there different types of cables/media used to connect devices?

   Yes, Copper cabling, Fiber cabling, and Wireless media were each used to connect devices.

2. Did the cables change the handling of the PDU in any way?

   No, the cables did not change the handling of the PDU because the cabling only deals with Layer 1.

3. Did the **Hub** lose any of the information that it received?

   No, all information was received by the Hub.

4. What does the **Hub** do with MAC addresses and IP addresses?

The Hub doesn't do much besides connect devices and only operates on Layer 1.

5. Did the wireless **Access Point** do anything with the information given to it?

   Yes, it repackaged the information from Wireless 802.11 frames and forwarded them.

6. Was any MAC or IP address lost during the wireless transfer?

   No, I did not notice any losses during the transfer.

7. What was the highest OSI layer that the **Hub** and **Access Point** used?

   Layer 1 is the highest layer that these devices have access to.

8. Did the **Hub** or **Access Point** ever replicate a PDU that was rejected with a red "X"?

   Yes, 10.10.10.3 also received a PDU but rejected it because it wasn't the correct recipient.

9. When examining the **PDU Details** tab, which MAC address appeared first, the source or the destination?

   The Destination MAC always appeared first.

10. Why would the MAC addresses appear in this order?

    I believe it is because information can be forwarded more quickly when the Destination MAC appears first.

11. Was there a pattern to the MAC addressing in the simulation?

    No, there was no noticeable pattern with the MAC addressing.

12. Did the switches ever replicate a PDU that was rejected with a red "X"?

    No, the switches always ended up sending to the destination.

13. 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?

    The change occurred at the router because the router was able to update the destination MAC based on its address table.

14. Which device uses MAC addresses that start with 00D0:BA?

    The router uses MAC addresses that start with 00D0:BA.

15. What devices did the other MAC addresses belong to?

    The other MAC addresses belong to 172.16.31.5 and 10.10.10.2.

16. Did the sending and receiving IPv4 addresses change fields in any of the PDUs?

No, the IPv4 addresses remained in the same fields in this example.

17. When you follow the reply to a ping, sometimes called a *pong*, do you see the sending and receiving IPv4 addresses switch?

    Yes, because devices switch roles after encapsulation/decapsulation.

18. What is the pattern to the IPv4 addressing used in this simulation?

    The ports cannot have overlapping addresses.

19. Why do different IP networks need to be assigned to different ports of a router?

    The router's job is to interconnect different networks, so each port needs different addresses for each network.

20. If this simulation was configured with IPv6 instead of IPv4, what would be different?

    The only difference would be in the kind of addresses given IPv4 is different than IPv6.