

665777

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

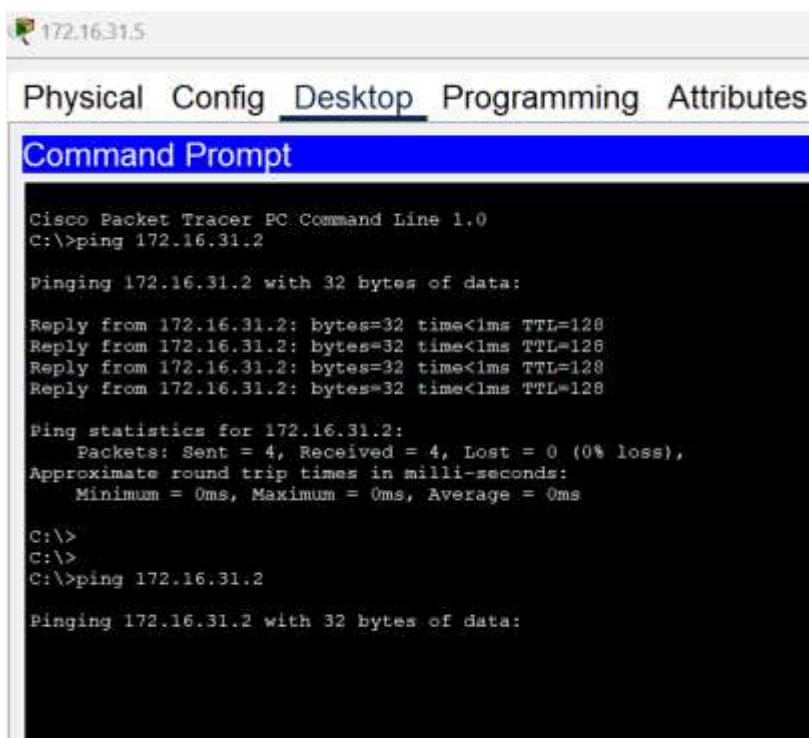
This activity is optimized for viewing PDUs. The devices are already configured. You will gather PDU information in simulation mode and answer a series of questions about the data you collect.

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.

- Click **172.16.31.5** and open the **Command Prompt**.
- Enter the **ping 172.16.31.2** command.



```

Cisco Packet Tracer PC Command Line 1.0
C:\>ping 172.16.31.2

Pinging 172.16.31.2 with 32 bytes of data:

Reply from 172.16.31.2: bytes=32 time<1ms TTL=128
Reply from 172.16.31.2: bytes=32 time<1ms TTL=128
Reply from 172.16.31.2: bytes=32 time<1ms TTL=128
Reply from 172.16.31.2: bytes=32 time<1ms TTL=128

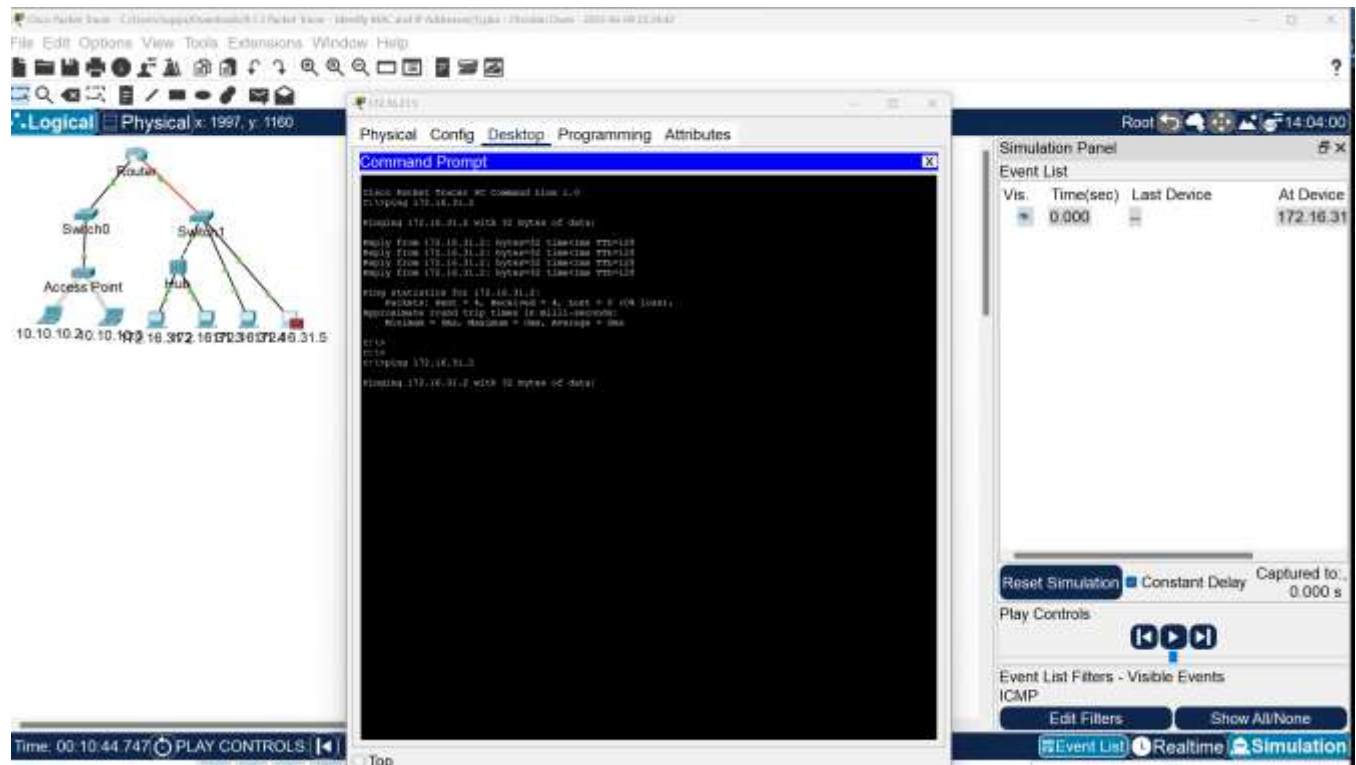
Ping statistics for 172.16.31.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
C:\>
C:\>ping 172.16.31.2

Pinging 172.16.31.2 with 32 bytes of data:
  
```

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

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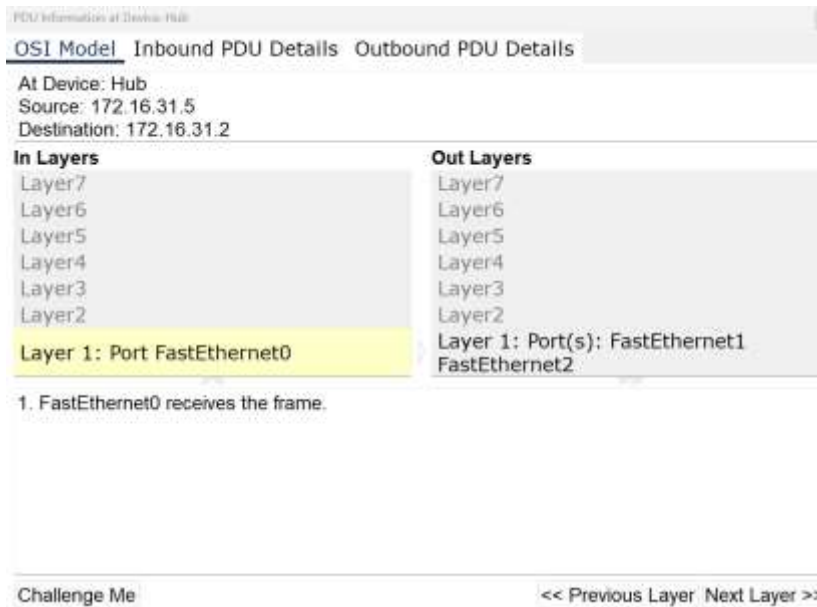


- d. Click the PDU and note the following information from the **OSI Model** and **Outbound PDU Layer** tabs:
 - o Destination MAC Address: **000C:85CC:1DA7**
 - o Source MAC Address: **00D0:D311:C788**
 - o Source IP Address: **172.16.31.5**
 - o Destination IP Address: **172.16.31.2**
 - o At Device: **172.16.31.5**

[illegible]

- 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:



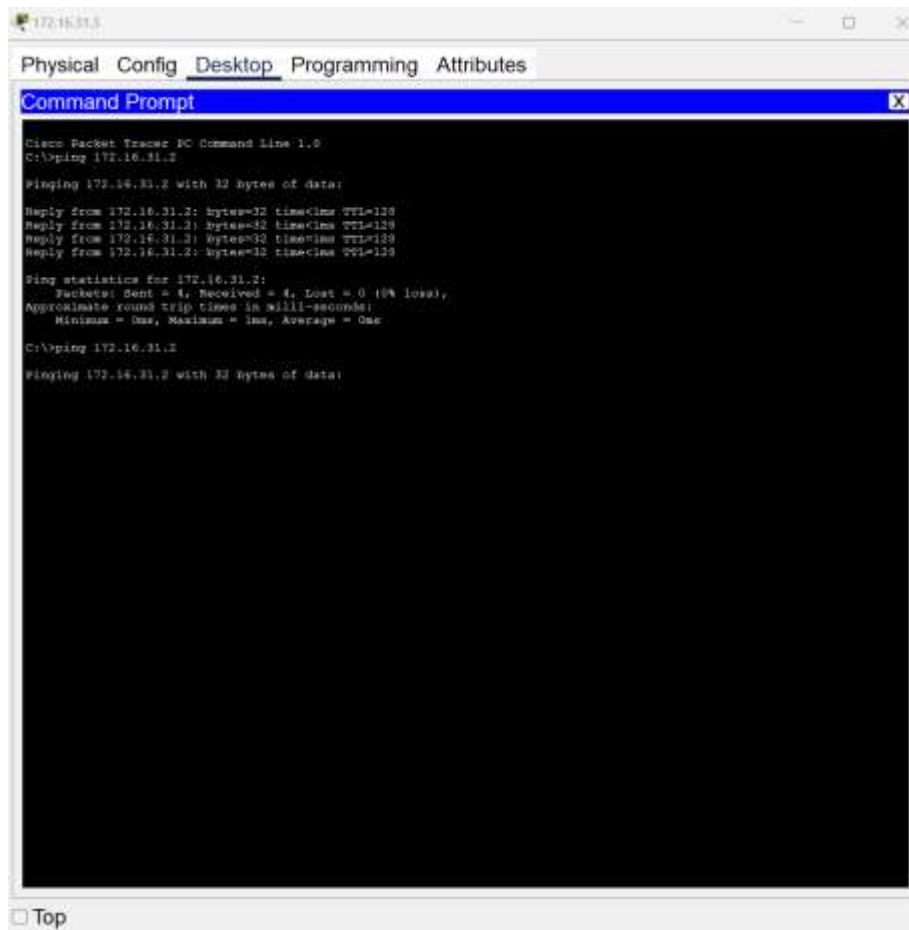
Example Spreadsheet Format

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.



The screenshot shows a Packet Tracer PC Command Line window for a device with IP 172.16.31.2. The window has tabs for Physical, Config, Desktop, Programming, and Attributes, with 'Desktop' selected. The Command Prompt shows the following text:

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 172.16.31.2

Pinging 172.16.31.2 with 32 bytes of data:

Reply from 172.16.31.2: bytes=32 time=1ms TTL=128
Reply from 172.16.31.2: bytes=32 time=1ms TTL=128
Reply from 172.16.31.2: bytes=32 time=1ms TTL=128
Reply from 172.16.31.2: bytes=32 time=1ms TTL=128

Ping statistics for 172.16.31.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ping 172.16.31.2

Pinging 172.16.31.2 with 32 bytes of data:
```

At the bottom left of the window, there is a 'Top' button.

Packet Tracer - Identify MAC and IP Addresses

PDU Information at Device: 172.16.31.3

OSI Model Outbound PDU Details

PDU Formats

EthernetII

0 4 8 Bytes			
PREAMBLE: 101010..10		SF D	DEST ADDR: 000C.85CC .1DA7
SRC ADDR: 006 0.7036.2849	TYPE :0x08 00	DATA (VARIABLE LENGTH)	
		FCS: 0x00000000 0	

IP

0 4 8 16 20 24 Bits			
VER: 4	IHL: 5	DSCP: 0x00	TL: 128
ID: 0x0005		FLAGS: 0x0	FRAG OFFSET: 0x000
TTL: 128	PRO: 0x01	CHKSUM	
SRC IP: 172.16.31.3			
DST IP: 172.16.31.2			
DATA (VARIABLE LENGTH)			

PDU Information at Device: Hub

OSI Model Inbound PDU Details Outbound PDU Details

PDU Formats

EthernetII

0				4				8				12				16				20				24				Bytes			
PREAMBLE: 101010..10								SF D		DEST ADDR:000C.85CC.1 DA7																					
SRC ADDR:0060. 7036.2849								TYPE: 0x080 0		DATA (VARIABLE LENGTH)								FCS:0x00000000													

IP

0				4				8				12				16				20				24				Bits			
VER:4				IHL:5				DSCP:0x00				TL:128																			
ID:0x0005												FLAGS:0 x0				FRAG OFFSET:0x000															
TTL:128								PRO:0x01								CHKSUM															
SRC IP:172.16.31.3																															
DST IP:172.16.31.2																															
DATA (VARIABLE LENGTH)																															

Packet Tracer - Identify MAC and IP Addresses

PDU Information at Device: 172.16.31.2

OSI Model Inbound PDU Details Outbound PDU Details

PDU Formats

EthernetII

0 4 8 Bytes

PREAMBLE: 101010..10		SF D	DEST ADDR: 0060.7036.2849
SRC ADDR: 000C.85CC.1DA7	TYP E: 0x0800	DATA (VARIABLE LENGTH)	FCS: 0x00000000

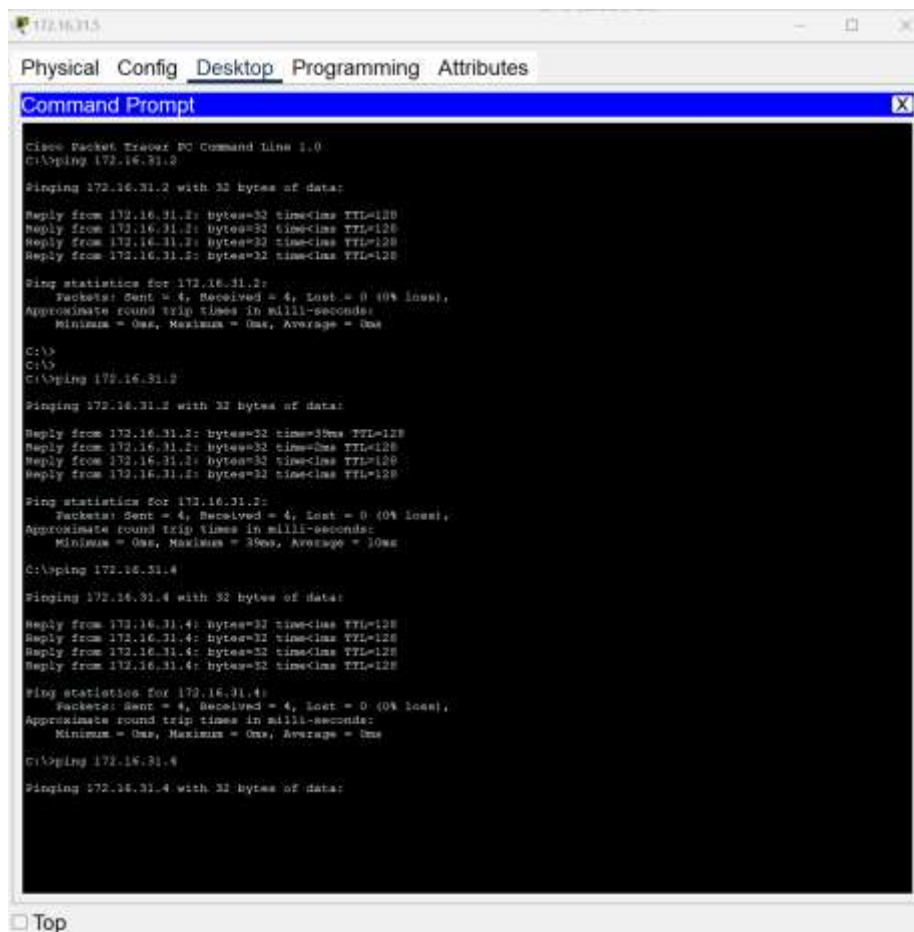
IP

0 4 8 16 20 24 Bits

VER: 4	IHL: 5	DSCP: 0x00	TL: 128
ID: 0x000d		FLAGS: 0x0	FRAG OFFSET: 0x000
TTL: 128	PRO: 0x01	CHKSUM	
SRC IP: 172.16.31.2			
DST IP: 172.16.31.3			
DATA (VARIABLE LENGTH)			

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.



The screenshot shows a Packet Tracer PC Command Line window for a device named 172.16.31.5. The window has tabs for Physical, Config, Desktop, Programming, and Attributes, with Desktop selected. The Command Prompt shows the following output:

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 172.16.31.2

Pinging 172.16.31.2 with 32 bytes of data:

Reply from 172.16.31.2: bytes=32 time=1ms TTL=128
Reply from 172.16.31.2: bytes=32 time=1ms TTL=128
Reply from 172.16.31.2: bytes=32 time=1ms TTL=128
Reply from 172.16.31.2: bytes=32 time=1ms TTL=128

Ping statistics for 172.16.31.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
C:\>
C:\>ping 172.16.31.2

Pinging 172.16.31.2 with 32 bytes of data:

Reply from 172.16.31.2: bytes=32 time=38ms TTL=128
Reply from 172.16.31.2: bytes=32 time=3ms TTL=128
Reply from 172.16.31.2: bytes=32 time=3ms TTL=128
Reply from 172.16.31.2: bytes=32 time=3ms TTL=128

Ping statistics for 172.16.31.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 38ms, Average = 10ms

C:\>ping 172.16.31.4

Pinging 172.16.31.4 with 32 bytes of data:

Reply from 172.16.31.4: bytes=32 time=1ms TTL=128
Reply from 172.16.31.4: bytes=32 time=1ms TTL=128
Reply from 172.16.31.4: bytes=32 time=1ms TTL=128
Reply from 172.16.31.4: bytes=32 time=1ms TTL=128

Ping statistics for 172.16.31.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 172.16.31.4

Pinging 172.16.31.4 with 32 bytes of data:
```

At the bottom of the window, there is a "Top" button.

Packet Tracer - Identify MAC and IP Addresses

PDU Information at Device: 172.16.31.5

OSI Model Outbound PDU Details

PDU Formats

EthernetII

0	4	8	Bytes
PREAMBLE: 101010..10		SF D	DEST ADDR:000C.CF0B .BC80
SRC ADDR:00D 0.D311.C788	TYPE :0x08 .00	DATA (VARIABLE LENGTH)	FCS:0x0000000 0

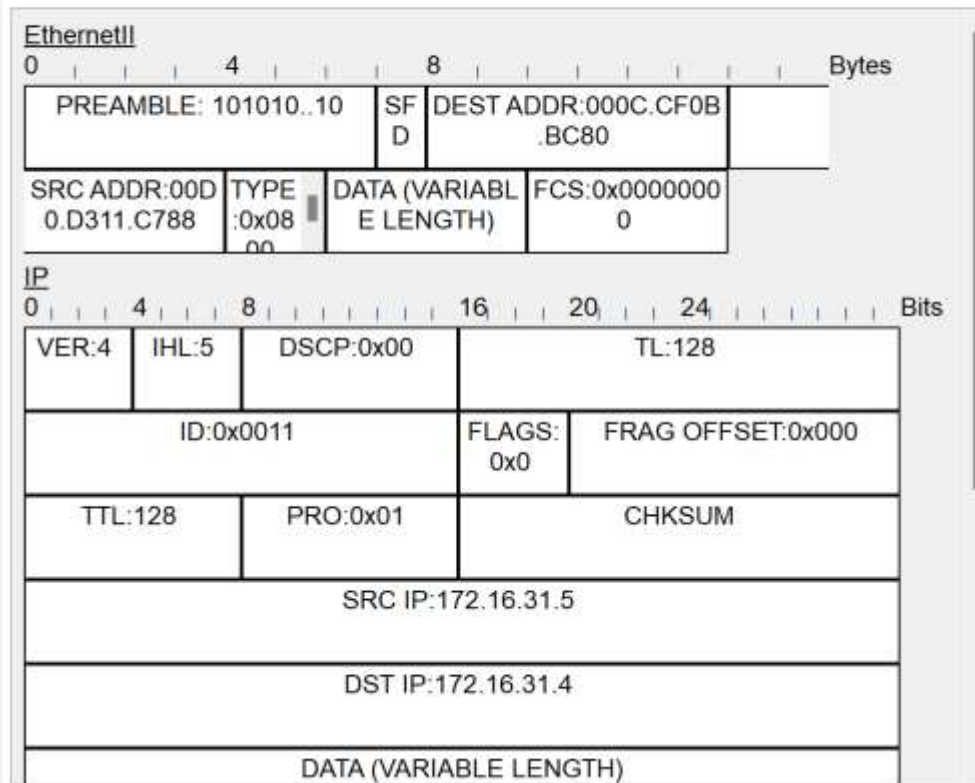
IP

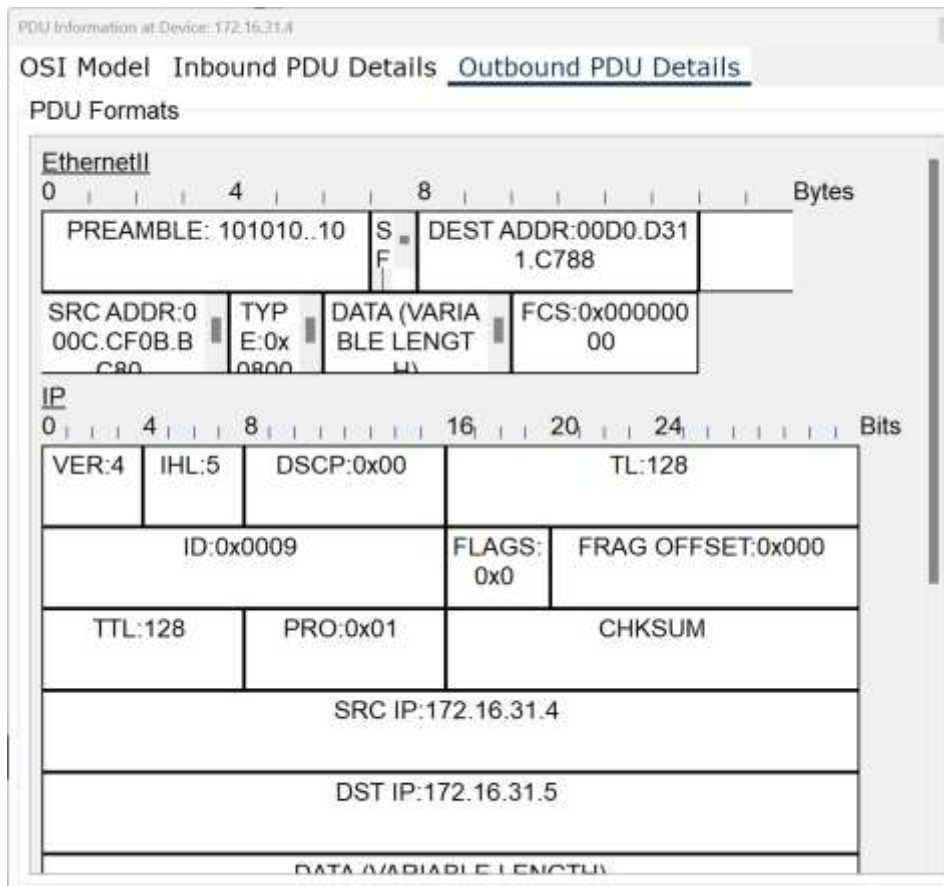
0		4		8		16		20		24		Bits
VER:4		IHL:5		DSCP:0x00		TL:128						
ID:0x0011						FLAGS: 0x0		FRAG OFFSET:0x000				
TTL:128				PRO:0x01		CHKSUM						
SRC IP:172.16.31.5												
DST IP:172.16.31.4												
DATA (VARIABLE LENGTH)												

PDU Information at Device: Switch1

OSI Model Inbound PDU Details Outbound PDU Details

PDU Formats





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

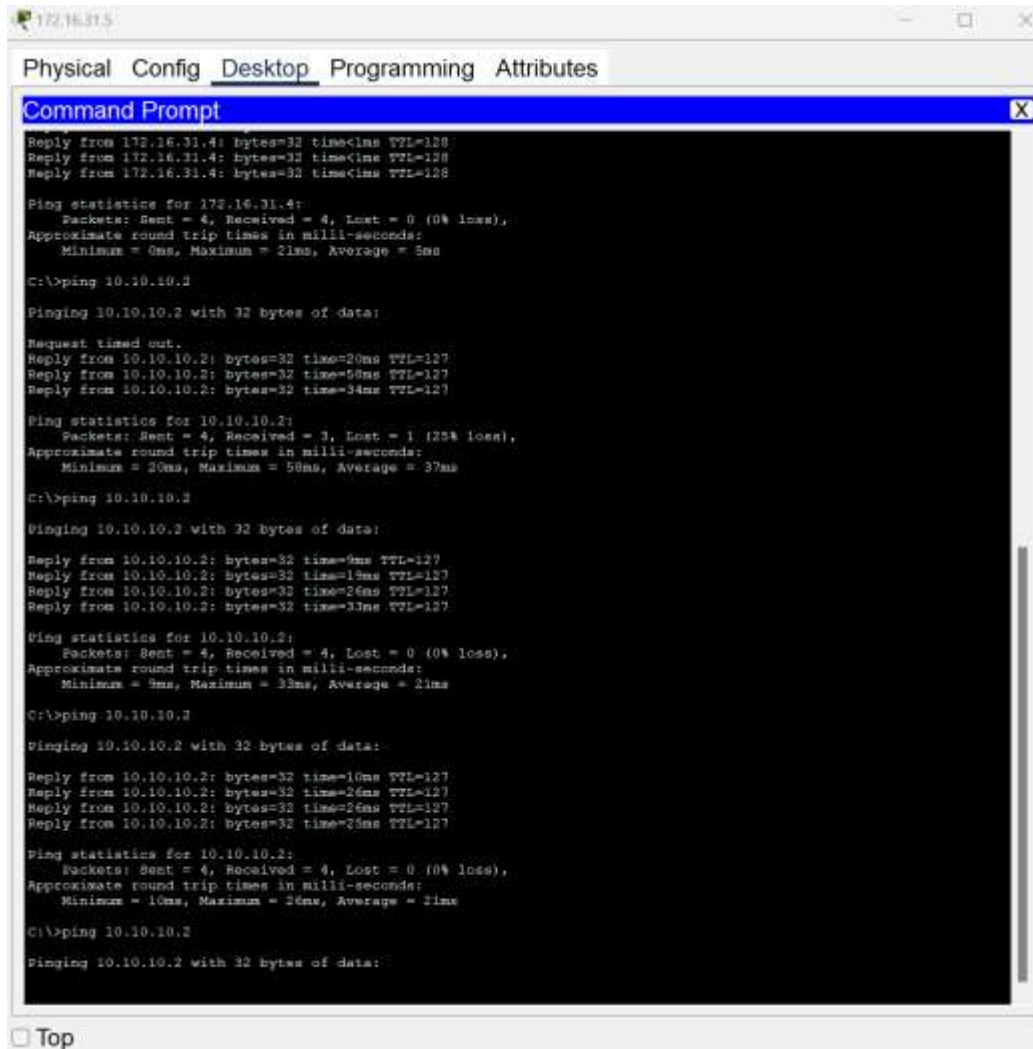
In order to communicate with remote networks, a gateway device is necessary. Study the process that takes place to communicate with devices on the remote network. Pay close attention to the MAC addresses used.

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

- Click **172.16.31.5** and open the **Command Prompt**.
- Enter the **ping 10.10.10.2** command.
- Switch to simulation mode and repeat the **ping 10.10.10.2** command. A PDU appears next to **172.16.31.5**.
- Click the PDU and note the following information from the **Outbound PDU Layer** tab:
 - Destination MAC Address: 00D0:BA8E:741A

Packet Tracer - Identify MAC and IP Addresses

- 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



The screenshot shows a Packet Tracer interface with a 'Command Prompt' window open on a device with IP 172.16.31.5. The window displays the results of several ping commands to the destination IP 10.10.10.2. The first three lines show successful replies from 172.16.31.4. The subsequent four blocks of text show the results of ping commands from the current device (172.16.31.5) to 10.10.10.2, including statistics for packets sent, received, lost, and round trip times.

```
172.16.31.5
Physical Config Desktop Programming Attributes
Command Prompt
Reply from 172.16.31.4: bytes=32 time<1ms TTL=128
Reply from 172.16.31.4: bytes=32 time<1ms TTL=128
Reply from 172.16.31.4: bytes=32 time<1ms TTL=128

Ping statistics for 172.16.31.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 21ms, Average = 5ms

C:\>ping 10.10.10.2

Pinging 10.10.10.2 with 32 bytes of data:

Request timed out.
Reply from 10.10.10.2: bytes=32 time=20ms TTL=127
Reply from 10.10.10.2: bytes=32 time=58ms TTL=127
Reply from 10.10.10.2: bytes=32 time=34ms TTL=127

Ping statistics for 10.10.10.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 20ms, Maximum = 58ms, Average = 37ms

C:\>ping 10.10.10.2

Pinging 10.10.10.2 with 32 bytes of data:

Reply from 10.10.10.2: bytes=32 time=9ms TTL=127
Reply from 10.10.10.2: bytes=32 time=15ms TTL=127
Reply from 10.10.10.2: bytes=32 time=26ms TTL=127
Reply from 10.10.10.2: bytes=32 time=33ms TTL=127

Ping statistics for 10.10.10.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 9ms, Maximum = 33ms, Average = 21ms

C:\>ping 10.10.10.2

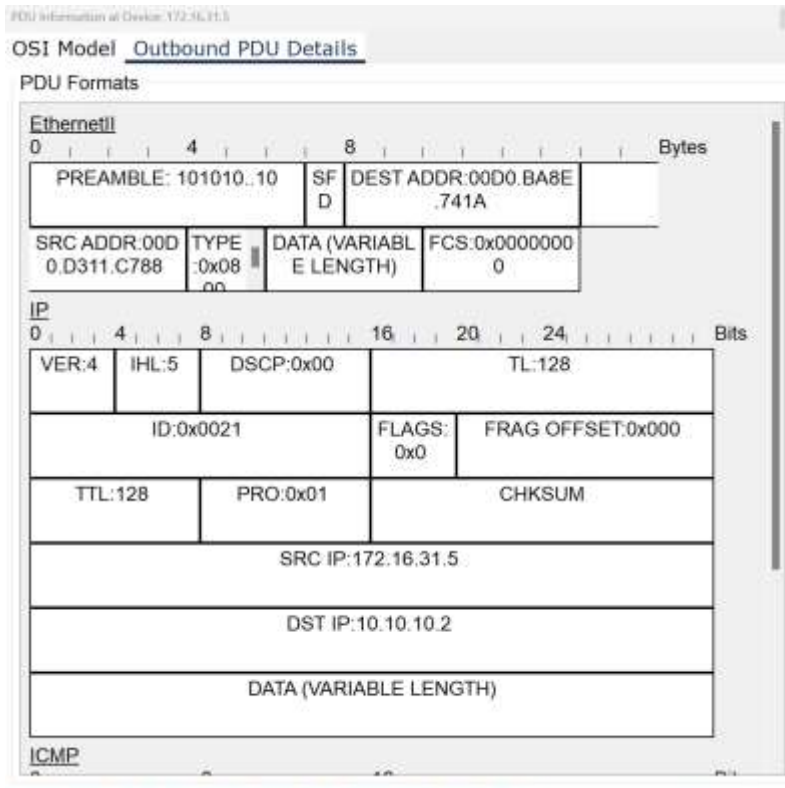
Pinging 10.10.10.2 with 32 bytes of data:

Reply from 10.10.10.2: bytes=32 time=10ms TTL=127
Reply from 10.10.10.2: bytes=32 time=26ms TTL=127
Reply from 10.10.10.2: bytes=32 time=26ms TTL=127
Reply from 10.10.10.2: bytes=32 time=25ms TTL=127

Ping statistics for 10.10.10.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 10ms, Maximum = 26ms, Average = 21ms

C:\>ping 10.10.10.2

Pinging 10.10.10.2 with 32 bytes of data:
```



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:

Packet Tracer - Identify MAC and IP Addresses

PDU Information at Device: Switch1

OSI Model Inbound PDU Details Outbound PDU Details

PDU Formats

EthernetII

0 4 8 Bytes			
PREAMBLE: 101010..10		SF D	DEST ADDR: 00D0.BA8E.7 41A
SRC ADDR: 00D0. D311.C788	TYPE: 0x080 0	DATA (VARIABLE LENGTH) FCS: 0x00000000	

IP

0 4 8 16 20 24 Bits			
VER: 4	IHL: 5	DSCP: 0x00	TL: 128
ID: 0x0021		FLAGS: 0 x0	FRAG OFFSET: 0x000
TTL: 128	PRO: 0x01	CHKSUM	
SRC IP: 172.16.31.5			
DST IP: 10.10.10.2			

PDU Information at Device: Router

OSI Model Inbound PDU Details Outbound PDU Details

PDU Formats

EthernetII

0 4 8 Bytes			
PREAMBLE: 101010..10		SF D	DEST ADDR: 0060.2F84.4 A86
SRC ADDR: 00D0. 588C.2401	TYPE: 0x080 0	DATA (VARIABLE LENGTH) FCS: 0x00000000	

IP

0 4 8 16 20 24 Bits			
VER: 4	IHL: 5	DSCP: 0x00	TL: 128
ID: 0x0021		FLAGS: 0 x0	FRAG OFFSET: 0x000
TTL: 127	PRO: 0x01	CHKSUM	
SRC IP: 172.16.31.5			
DST IP: 10.10.10.2			

Packet Tracer - Identify MAC and IP Addresses

PDU Information at Device: Switch0

OSI Model Inbound PDU Details Outbound PDU Details

PDU Formats

EthernetII

0 4 8 Bytes			
PREAMBLE: 101010..10		SF D	DEST ADDR:0060.2F84.4AB6
SRC ADDR:00D0.588C.2401	TYPE:0x0800	DATA (VARIABLE LENGTH)	
FCS:0x00000000			

IP

0 4 8 16 20 24 Bits			
VER:4	IHL:5	DSCP:0x00	TL:128
ID:0x0021		FLAGS:0x0	FRAG OFFSET:0x000
TTL:127	PRO:0x01	CHKSUM	
SRC IP:172.16.31.5			
DST IP:10.10.10.2			

PDU Information at Device: Access Point

OSI Model Inbound PDU Details Outbound PDU Details

PDU Formats

ADDRESS 1:0060.2F84.4AB6	
ADDRESS 2:0050.0FAB.6C82	
ADDRESS 3:00D0.588C.2401	
SEQUENCE CONTROL	
ADDRESS 4:	
DATA (VARIABLE LENGTH)	

The screenshot displays the Cisco Packet Tracer interface. On the left, a network topology is shown with a Router connected to two Switches (Switch0 and Switch1) and an Access Point. The central pane shows the 'Outbound PDU Details' for an 802.11 Wireless PDU. The PDU structure is as follows:

- FRAME CONTROL
- DURATION/ID
- ADDRESS 1: 0050.0FAB.6C82
- ADDRESS 2: 0060.2F84.4AB6
- ADDRESS 3: 00D0.588C.2401
- SEQUENCE CONTROL
- ADDRESS 4: 10.10.10.2

The Simulation Panel on the right shows a list of events with columns for Time(sec), Last Device, At Device, and Type. The events are as follows:

Time(sec)	Last Device	At Device	Type
0.000	--	172.16.31.5	II
0.001	172.16.31.5	Switch1	II
0.002	Switch1	Router	II
0.003	Router	Switch0	II
0.004	Switch0	Access Point	II
0.005	Access Point	10.10.10.3	II
0.006	Access Point	10.10.10.2	II

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.