

Objectives

Part 1: Gather PDU Information for Local Network Communication

Part 2: Gather PDU Information for Remote Network Communication

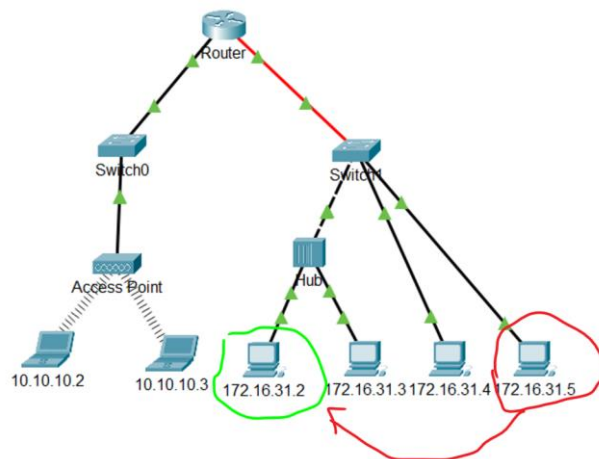
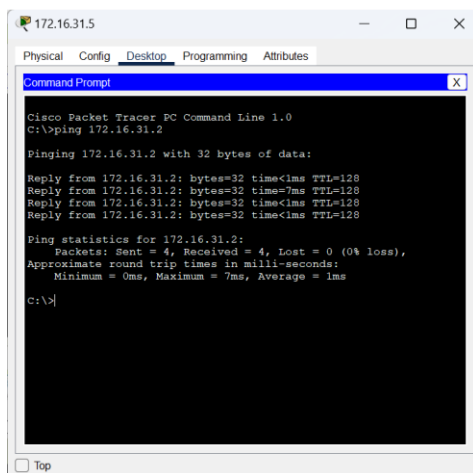
Background

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.

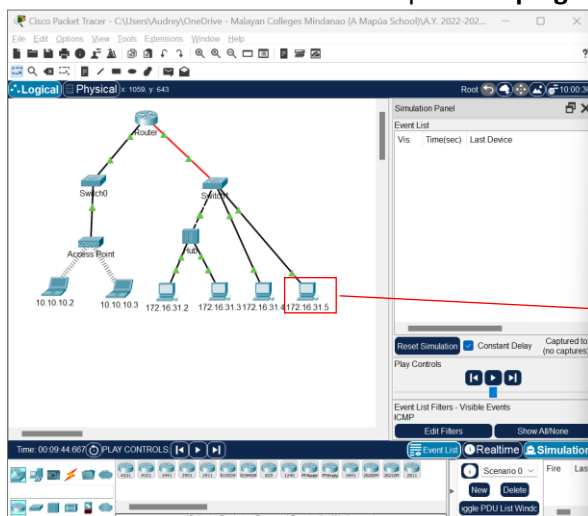
Part 1: Gather PDU Information for Local Network Communication

Step 1

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

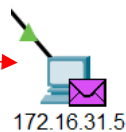


- Switch to simulation mode and repeat the **ping 172.16.31.2** command. A PDU appears next to 172.16.31.5.



```
C:\>ping 172.16.31.2

Pinging 172.16.31.2 with 32 bytes of data:
```

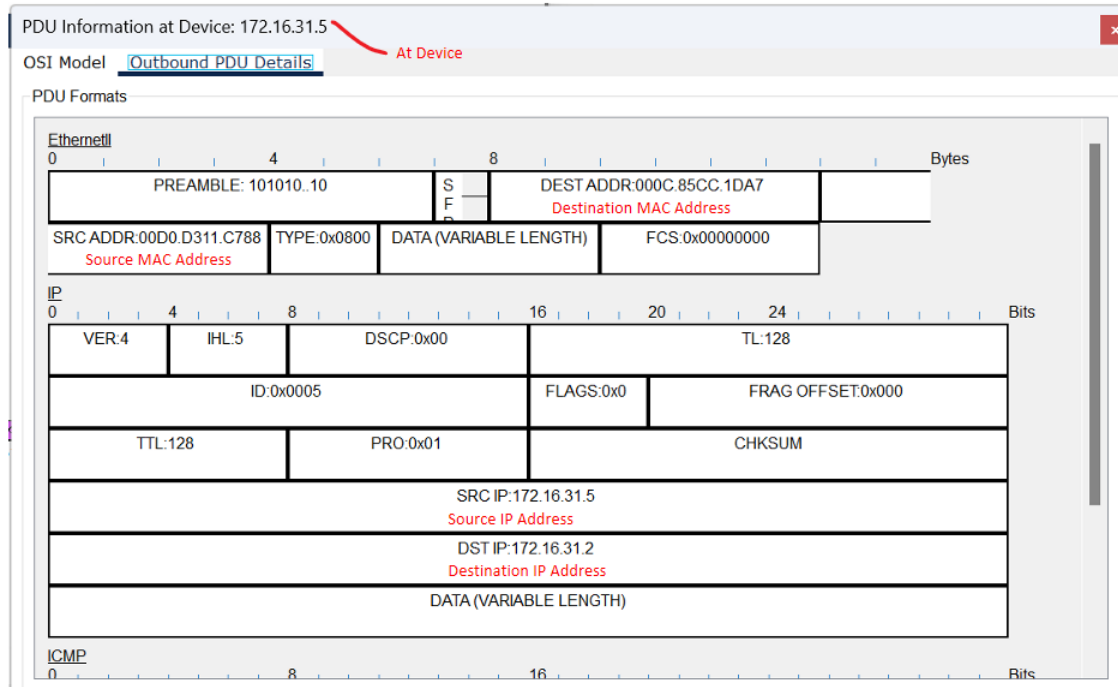


d. Click the PDU and note the following information from the **OSI Model** and **Outbound PDU Layer** tabs:

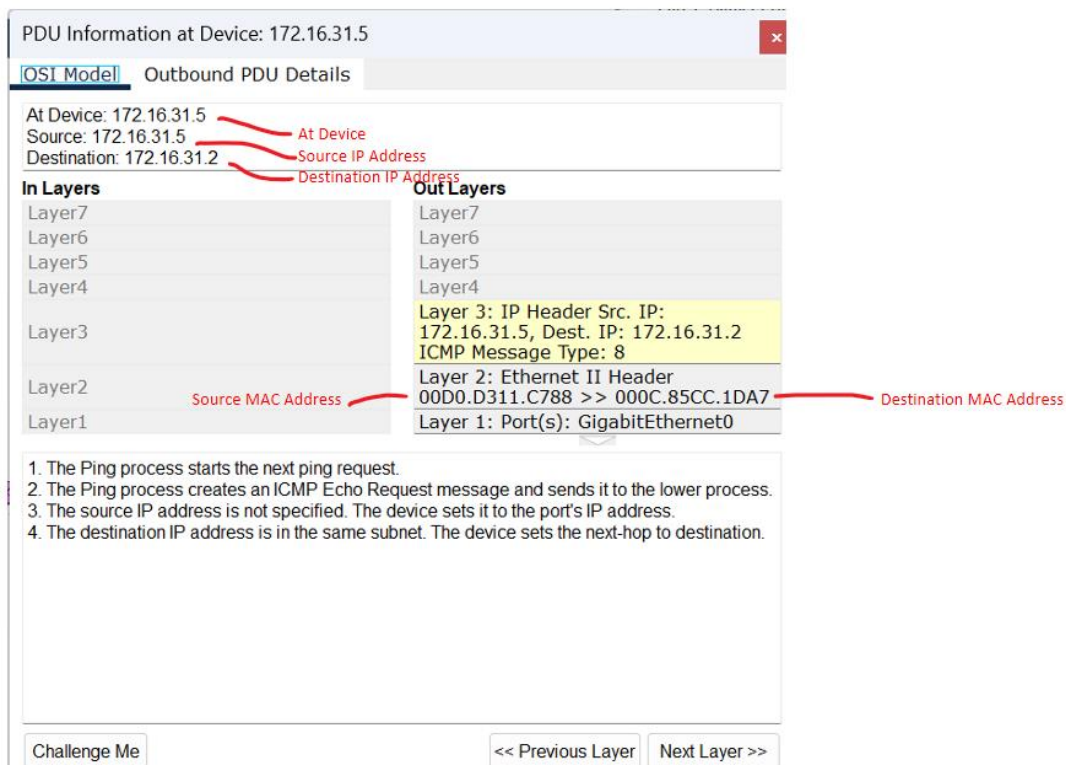
- Destination MAC Address: 000C:85CC:1DA7
- Source MAC Address: 00D0:D311:C788
- Source IP Address: 172.16.31.5
- Destination IP Address: 172.16.31.2
- At Device: 172.16.31.5

172.16.31.5 (Source Device: PC)

OSI Model:



Outbound PDU Details:

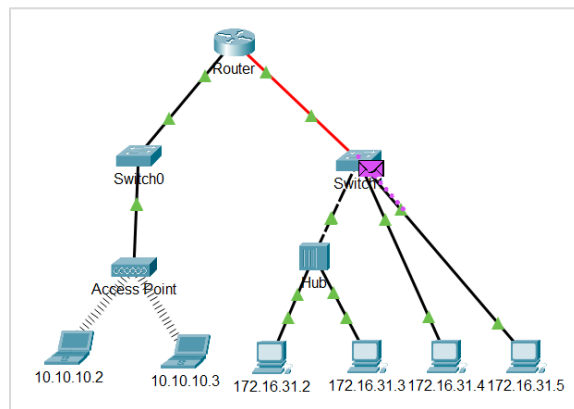


- e. Click **Capture / Forward** (the right arrow followed by a vertical bar) to move the PDU to the next device. Gather the same information from Step 1d. Repeat this process until the PDU reaches its destination. **Record the PDU information you gathered into a spreadsheet** using a format like the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

Switch1



PDU Information at Device: Switch1

OSI Model Inbound PDU Details Outbound PDU Details

At Device: Switch1
Source: 172.16.31.5
Destination: 172.16.31.2

In Layers

- Layer7
- Layer6
- Layer5
- Layer4
- Layer3
- Layer2: Ethernet II Header
00D0:D311:C788 >> 000C:85CC:1DA7
- Layer1: Port GigabitEthernet1/1

Out Layers

- Layer7
- Layer6
- Layer5
- Layer4
- Layer3
- Layer2: Ethernet II Header
00D0:D311:C788 >> 000C:85CC:1DA7
- Layer1: Port(s): GigabitEthernet3/1

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

IP fields are N/A because layer 3 (network/internet layer) is disabled in this device.

PDU Information at Device: Switch1

OSI Model Inbound PDU Details Outbound PDU Details

PDU Formats

Ethernet II

PREAMBLE: 101010...10		S F		DEST ADDR: 000C:85CC:1DA7	
SRC ADDR: 00D0:D311:C788		TYPE: 0x0800		DATA (VARIABLE LENGTH)	
FCS: 0x00000000					

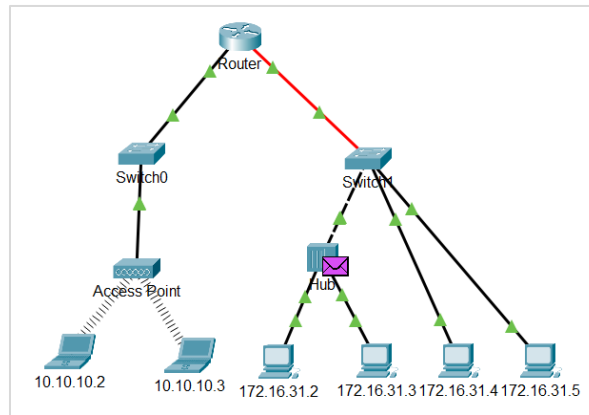
IP

VER: 4		IHL: 5		DSCP: 0x00		TL: 128	
ID: 0x001a				FLAGS: 0x0		FRAG OFFSET: 0x000	
TTL: 128		PRO: 0x01		CHKSUM			
SRC IP: 172.16.31.5							
DST IP: 172.16.31.2							
DATA (VARIABLE LENGTH)							

ICMP

0		8		16		Bits	
---	--	---	--	----	--	------	--

Hub



PDU Information at Device: Hub

OSI Model Inbound PDU Details Outbound PDU Details

At Device: Hub
Source: 172.16.31.5
Destination: 172.16.31.2

In Layers
Layer7
Layer6
Layer5
Layer4
Layer3
Layer2
Layer1: Port FastEthernet0

Out Layers
Layer7
Layer6
Layer5
Layer4
Layer3
Layer2
Layer1: Port(s): FastEthernet1 FastEthernet2

At Device	Dest. MAC	Src MAC	Src IPv4	Dest IPv4
Hub	N/A	N/A	N/A	N/A

MAC and IP fields are N/A because layer 3 (network/internet) and layer 2 (data link) are disabled.

PDU Information at Device: Hub

OSI Model Inbound PDU Details Outbound PDU Details

PDU Formats

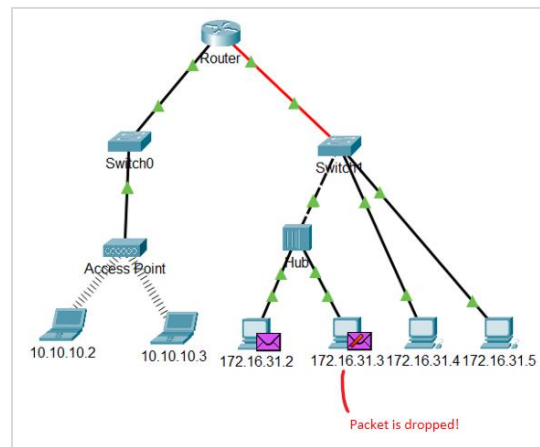
EthernetII

Bytes	
PREAMBLE: 101010.10	SFD
DEST ADDR: 000C.85CC.1DA7	
SRC ADDR: 000D.D311.C788	TYPE: 0x0800
DATA (VARIABLE LENGTH)	
FCS: 0x00000000	

IP

Bits	
VER: 4	IHL: 5
DSCP: 0x00	TL: 128
ID: 0x001a	FLAGS: 0x0
FRAG OFFSET: 0x000	
TTL: 128	PRO: 0x01
CHKSUM	
SRC IP: 172.16.31.5	
DST IP: 172.16.31.2	
DATA (VARIABLE LENGTH)	

172.16.31.2 (Destination Device: PC)



PDU Information at Device: 172.16.31.2

OSI Model Inbound PDU Details Outbound PDU Details

PDU Formats

EthernetII

Bytes	
PREAMBLE: 101010.10	SFD
DEST ADDR: 000D.D311.C788	
SRC ADDR: 000C.85CC.1DA7	TYPE: 0x0800
DATA (VARIABLE LENGTH)	
FCS: 0x00000000	

IP

Bits	
VER: 4	IHL: 5
DSCP: 0x00	TL: 128
ID: 0x001c	FLAGS: 0x0
FRAG OFFSET: 0x000	
TTL: 128	PRO: 0x01
CHKSUM	
SRC IP: 172.16.31.2	
DST IP: 172.16.31.5	
DATA (VARIABLE LENGTH)	

ICMP

Bits	
DATA (VARIABLE LENGTH)	

At Device	Dest. MAC	Src MAC	Src IPv4	Dest IPv4
172.16.31.2	00D0.D311.C788	000C.85CC.1DA7	172.16.31.2	172.16.31.5

PDU Information at Device: 172.16.31.2

OSI Model Inbound PDU Details Outbound PDU Details

PDU Formats

EthernetII

Bytes	
PREAMBLE: 101010.10	SFD
DEST ADDR: 000D.D311.C788	
SRC ADDR: 000C.85CC.1DA7	TYPE: 0x0800
DATA (VARIABLE LENGTH)	
FCS: 0x00000000	

IP

Bits	
VER: 4	IHL: 5
DSCP: 0x00	TL: 128
ID: 0x0020	FLAGS: 0x0
FRAG OFFSET: 0x000	
TTL: 128	PRO: 0x01
CHKSUM	
SRC IP: 172.16.31.2	
DST IP: 172.16.31.5	
DATA (VARIABLE LENGTH)	

ICMP

Bits	
DATA (VARIABLE LENGTH)	

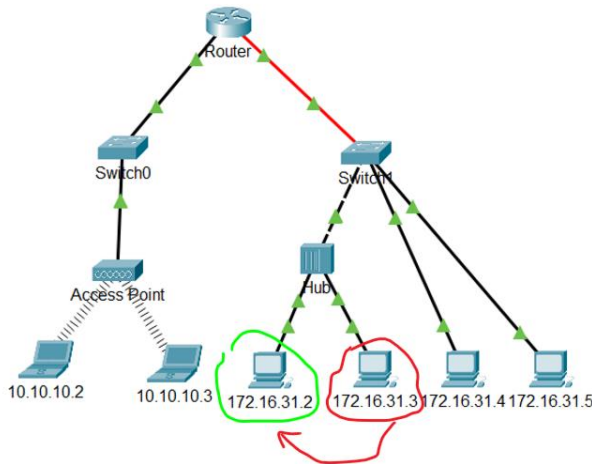
Step 2: Gather additional PDU information from other pings.

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

- Ping 172.16.31.2 from 172.16.31.3.
- Ping 172.16.31.4 from 172.16.31.5.

Return to Realtime mode.

a. Ping 172.16.31.2 from 172.16.31.3.



172.16.31.3 (Source Device: PC)

Go to simulation mode and ping device 172.16.31.2 from device 172.16.31.3's command prompt

Physical Config Desktop Programming Attributes

Command Prompt

```
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=7ms 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 = 7ms, Average = 1ms

C:\>ping 172.16.31.2

Pinging 172.16.31.2 with 32 bytes of data:
```

Time: 00:13:23.257 PLAY CONTROLS: [Stop] [Play] [Fast Forward] [Fast Reverse]

Event List Realtime Simulation

Click PDU to gather information.

PDU Information at Device: 172.16.31.3

OSI Model | Outbound PDU Details

At Device: 172.16.31.3
Source: 172.16.31.3
Destination: 172.16.31.2

In Layers

- Layer7
- Layer6
- Layer5
- Layer4
- Layer3
- Layer2
- Layer1

Out Layers

- Layer7
- Layer6
- Layer5
- Layer4
- Layer3: IP Header Src. IP: 172.16.31.3, Dest. IP: 172.16.31.2
ICMP Message Type: 8
- Layer2: Ethernet II Header
0060.7036.2849 >> 000C.85CC.1DA7
- Layer1: Port(s): FastEthernet0

- The Ping process starts the next ping request.
- The Ping process creates an ICMP Echo Request message and sends it to the lower process.
- The source IP address is not specified. The device sets it to be port's IP address.
- The destination IP address is in the same subnet. The device sets the next-hop to destination.

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

PDU Information at Device: 172.16.31.3

OSI Model | Outbound PDU Details

PDU Formats

Ethernet II

Bytes	0	4	8	12	16	20	24	28	32	
PREAMBLE	101010.10				SFD		DEST ADDR: 000C.85CC.1DA7			
SRC ADDR	0060.7036.2849				TYPE: 0x0800		DATA (VARIABLE LENGTH)		FCS: 0x00000000	

IP

Bits	0	4	8	12	16	20	24	28	32
VER: 4	IHL: 5		DSCP: 0x00		TL: 128				
ID: 0x0014				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)									

ICMP

Bits	0	8	16	24	32
ICMP Message Type: 8					

Hub

Logical | Physical | x: 576, y: 279

PDU Information at Device: Hub

OSI Model | Inbound PDU Details | Outbound PDU Details

At Device: Hub
Source: 172.16.31.3
Destination: 172.16.31.2

In Layers

- Layer7
- Layer6
- Layer5
- Layer4
- Layer3
- Layer2
- Layer1

Out Layers

- Layer7
- Layer6
- Layer5
- Layer4
- Layer3
- Layer2
- Layer1: Port FastEthernet2

- FastEthernet2 receives the frame.

At Device	Dest. MAC	Src MAC	Src IPv4	Dest IPv4
Hub	N/A	N/A	N/A	N/A

All N/A because layer 3 (network/internet) and layer 2 (data link) are disabled.

Challenge Me | << Previous Layer | Next Layer >> | Edit Filters | Show All/None | Event List | Realtime | Simulation

PDU Information at Device: Hub

OSI Model | Inbound PDU Details | Outbound PDU Details

PDU Formats

Ethernet II

Bytes	0	4	8	12	16	20	24	28	32	
PREAMBLE	101010.10				SFD		DEST ADDR: 000C.85CC.1DA7			
SRC ADDR	0060.7036.2849				TYPE: 0x0800		DATA (VARIABLE LENGTH)		FCS: 0x00000000	

IP

Bits	0	4	8	12	16	20	24	28	32
VER: 4	IHL: 5		DSCP: 0x00		TL: 128				
ID: 0x0014				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)									

172.16.31.2 (Destination Device: PC)

Logical | Physical | x: 579, y: 292

Simulation Panel

PDU Information at Device: 172.16.31.2

OSI Model | Inbound PDU Details | Outbound PDU Details

At Device: 172.16.31.2
Source: 172.16.31.3
Destination: 172.16.31.2

In Layers

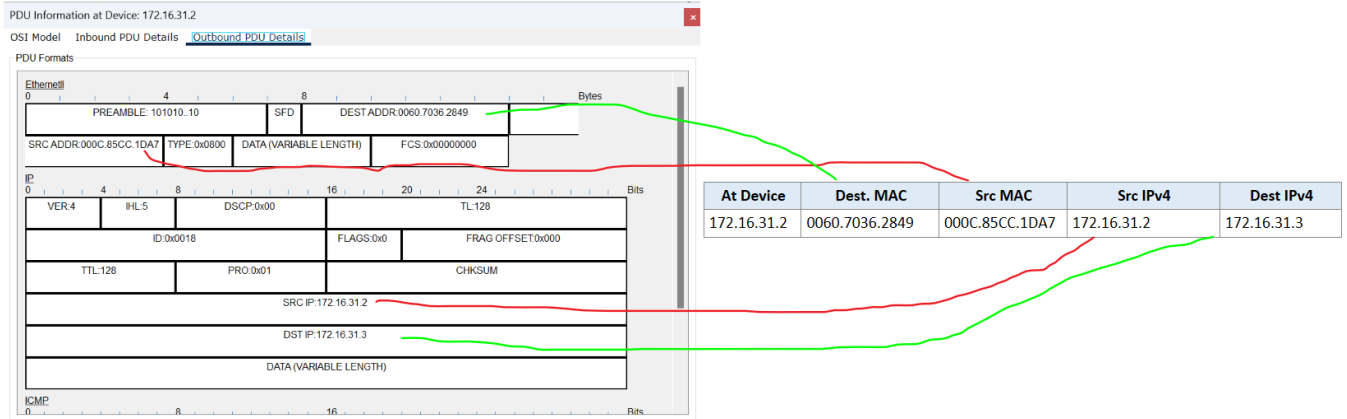
- Layer7
- Layer6
- Layer5
- Layer4
- Layer3: IP Header Src. IP: 172.16.31.3, Dest. IP: 172.16.31.2
ICMP Message Type: 8
- Layer2: Ethernet II Header
0060.7036.2849 >> 000C.85CC.1DA7
- Layer1: Port FastEthernet0

Out Layers

- Layer7
- Layer6
- Layer5
- Layer4
- Layer3: IP Header Src. IP: 172.16.31.2, Dest. IP: 172.16.31.3
ICMP Message Type: 0
- Layer2: Ethernet II Header
000C.85CC.1DA7 >> 0060.7036.2849
- Layer1: Port(s): FastEthernet0

- FastEthernet0 receives the frame.

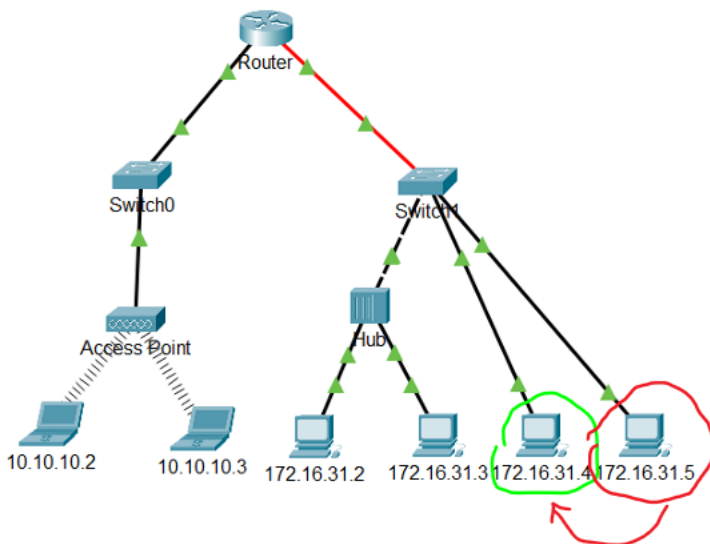
Challenge Me | << Previous Layer | Next Layer >> | Event List | Realtime | Simulation



Final Table:

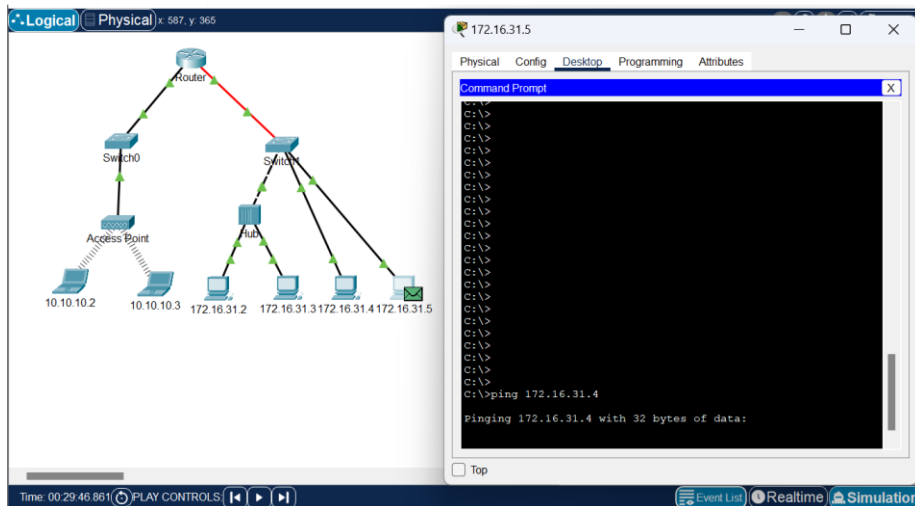
At Device	Dest. MAC	Src MAC	Src IPv4	Dest IPv4
172.16.31.3	000C.85CC.1DA7	0060.7036.2849	172.16.31.3	172.16.31.2
Hub	N/A	N/A	N/A	N/A
172.16.31.2	0060.7036.2849	000C.85CC.1DA7	172.16.31.2	172.16.31.3

b. Ping 172.16.31.4 from 172.16.31.5.

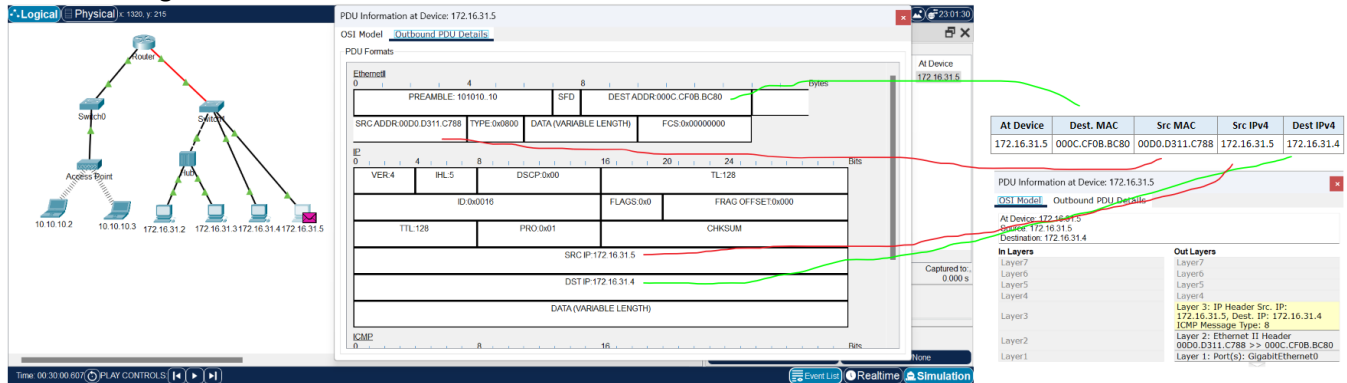


172.16.31.5 (Source Device: PC)

Go to simulation mode and ping device 172.16.31.4 from device 172.16.31.5's command prompt



Click PDU to gather information.



The network diagram shows a topology with a Router, two Switches, and an Access Point. The PDU details for Device 172.16.31.5 show an Ethernet II frame with the following fields:

Field	Value
PREAMBLE	101010.10
DEST ADDR	000C.F0B.BC80
SRC ADDR	00D0.D311.C788
TYPE	0x0800
DATA	(VARIABLE LENGTH)
FCS	0x00000000

The IP header fields are:

Field	Value
VER	4
IHL	5
DS	0
TL	128
ID	0x0016
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)

The ICMP header fields are:

Field	Value
TYPE	8
CODE	0
Checksum	
Sequence Number	

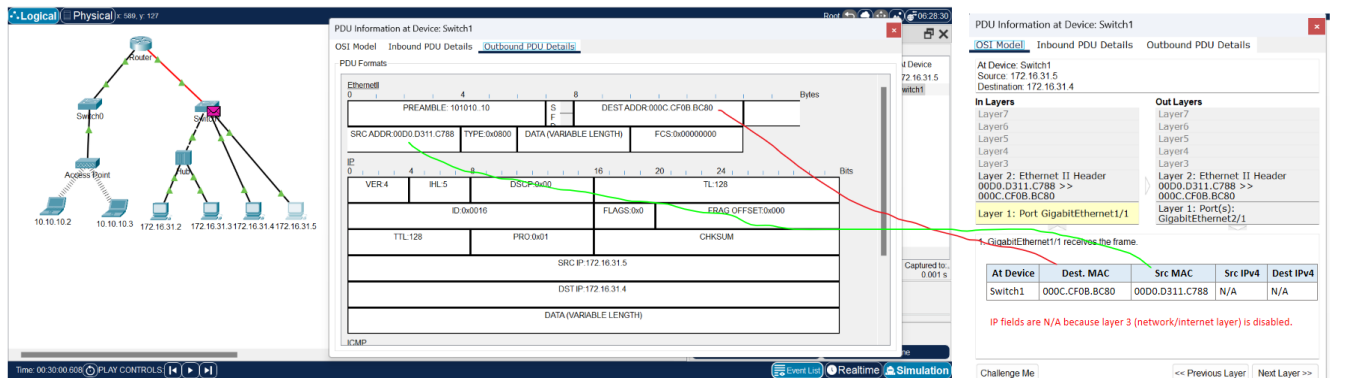
The table below summarizes the PDU information at Device 172.16.31.5:

At Device	Dest. MAC	Src MAC	Src IPv4	Dest IPv4
172.16.31.5	000C.F0B.BC80	00D0.D311.C788	172.16.31.5	172.16.31.4

The PDU information at Device 172.16.31.5 shows the following layers:

- Layer 7: IP Header Src. IP: 172.16.31.5, Dest. IP: 172.16.31.4
- Layer 6: ICMP Message Type: 8
- Layer 5: Ethernet II Header
- Layer 4: 00D0.D311.C788 >> 000C.F0B.BC80
- Layer 3: Port(s): GigabitEthernet0

Switch1



The network diagram shows the same topology. The PDU details for Device Switch1 show an Ethernet II frame with the following fields:

Field	Value
PREAMBLE	101010.10
DEST ADDR	000C.F0B.BC80
SRC ADDR	00D0.D311.C788
TYPE	0x0800
DATA	(VARIABLE LENGTH)
FCS	0x00000000

The IP header fields are:

Field	Value
VER	4
IHL	5
DS	0
TL	128
ID	0x0016
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)

The ICMP header fields are:

Field	Value
TYPE	8
CODE	0
Checksum	
Sequence Number	

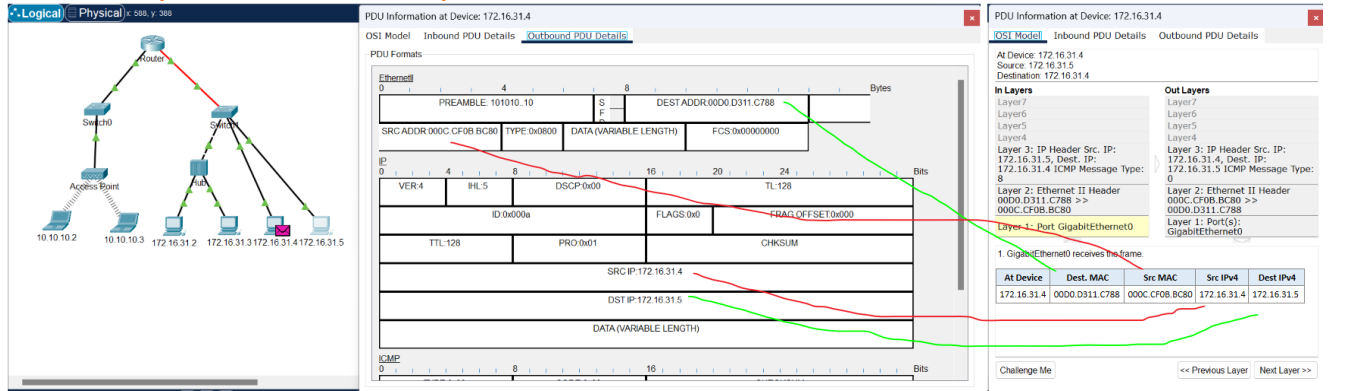
The table below summarizes the PDU information at Device Switch1:

At Device	Dest. MAC	Src MAC	Src IPv4	Dest IPv4
Switch1	000C.F0B.BC80	00D0.D311.C788	N/A	N/A

The PDU information at Device Switch1 shows the following layers:

- Layer 7: IP Header Src. IP: 172.16.31.5, Dest. IP: 172.16.31.4
- Layer 6: ICMP Message Type: 8
- Layer 5: Ethernet II Header
- Layer 4: 00D0.D311.C788 >> 000C.F0B.BC80
- Layer 3: Port(s): GigabitEthernet0

172.16.31.4 (Destination Device: PC)



The network diagram shows the same topology. The PDU details for Device 172.16.31.4 show an Ethernet II frame with the following fields:

Field	Value
PREAMBLE	101010.10
DEST ADDR	00D0.D311.C788
SRC ADDR	000C.F0B.BC80
TYPE	0x0800
DATA	(VARIABLE LENGTH)
FCS	0x00000000

The IP header fields are:

Field	Value
VER	4
IHL	5
DS	0
TL	128
ID	0x000a
FLAGS	0x0
FRAG OFFSET	0x000
TTL	128
PRO	0x01
CHKSUM	
SRC IP	172.16.31.4
DST IP	172.16.31.5
DATA	(VARIABLE LENGTH)

The ICMP header fields are:

Field	Value
TYPE	8
CODE	0
Checksum	
Sequence Number	

The table below summarizes the PDU information at Device 172.16.31.4:

At Device	Dest. MAC	Src MAC	Src IPv4	Dest IPv4
172.16.31.4	00D0.D311.C788	000C.F0B.BC80	172.16.31.4	172.16.31.5

The PDU information at Device 172.16.31.4 shows the following layers:

- Layer 7: IP Header Src. IP: 172.16.31.4, Dest. IP: 172.16.31.5
- Layer 6: ICMP Message Type: 8
- Layer 5: Ethernet II Header
- Layer 4: 00D0.D311.C788 >> 000C.F0B.BC80
- Layer 3: Port(s): GigabitEthernet0

Final Table:

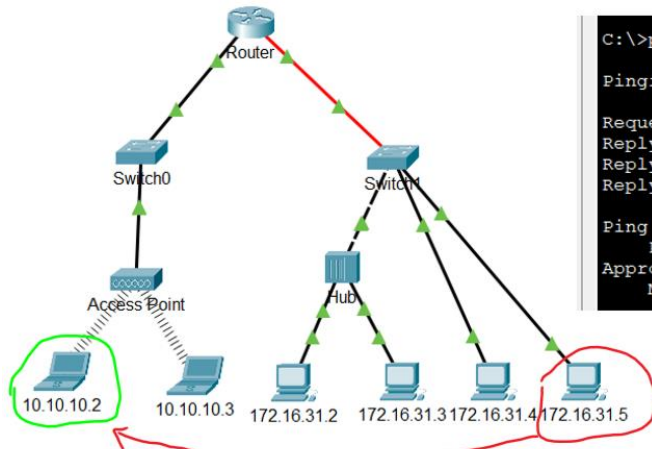
At Device	Dest. MAC	Src MAC	Src IPv4	Dest IPv4
172.16.31.5	000C.F0B.BC80	00D0.D311.C788	172.16.31.5	172.16.31.4
Switch1	000C.F0B.BC80	00D0.D311.C788	N/A	N/A
172.16.31.4	00D0.D311.C788	000C.F0B.BC80	172.16.31.4	172.16.31.5

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.



```
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=26ms TTL=127
Reply from 10.10.10.2: bytes=32 time=12ms TTL=127
Reply from 10.10.10.2: bytes=32 time=17ms 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 = 12ms, Maximum = 26ms, Average = 18ms
```

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

Time: 00:40:29 185 PLAY CONTROLS Event List Realtime Simulation

- 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

172.16.31.5 (Source Device: PC)

PDU Information at Device: 172.16.31.5

OSI Model: [Outbound PDU Details](#)

PDU Formats

At Device: 172.16.31.5
Source: 172.16.31.5
Destination: 10.10.10.2

In Layers: Layer7, Layer6, Layer5, Layer4, Layer3, Layer2, Layer1

Out Layers: Layer7, Layer6, Layer5, Layer4, Layer3, Layer2, Layer1

Layer 3: IP Header Src. IP: 172.16.31.5, Dest. IP: 10.10.10.2
ICMP Message Type: 8
Layer 2: Ethernet II Header 00D0.D311.C788 >> 00D0.BA8E.741A
Layer 1: Port(s): GigabitEthernet0

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

What device has the destination MAC that is shown?

00D0:BA8E:741A --- This is the MAC address of the router. It is the default gateway MAC address.

Simulation Panel

Event List

Device Name: Router
Device Model: 2621XM
Hostname: Router

Port	Link	IP Address	IPv6 Address	MAC Address
FastEthernet0/0	Up	10.10.10.1/24	<not set>	00D0.588C.2401
FastEthernet0/1	Down	<not set>	<not set>	00D0.588C.2402
Serial0/0	Down	<not set>	<not set>	<not set>
Serial0/1	Down	<not set>	<not set>	<not set>
FastEthernet1/0	Up	172.16.31.1/24	<not set>	00D0.BA8E.741A

Physical Location: Intercity > Home City > Office Building > Primary Network > Rack > Router

- 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

Switch1

Logical Physical x: 426, y: 173

PDU Information at Device: Switch1

OSI Model: [Inbound PDU Details](#) [Outbound PDU Details](#)

At Device: Switch1
Source: 172.16.31.5
Destination: 10.10.10.2

In Layers: Layer7, Layer6, Layer5, Layer4, Layer3, Layer2, Layer1

Out Layers: Layer7, Layer6, Layer5, Layer4, Layer3, Layer2, Layer1

Layer 3: Ethernet II Header 00D0.D311.C788 >> 00D0.BA8E.741A
Layer 1: Port GigabitEthernet1/1

1. GigabitEthernet1/1 receives the frame.

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

Challenge Me

<< Previous Layer Next Layer >>

PDU Information at Device: Switch1

OSI Model: [Inbound PDU Details](#) [Outbound PDU Details](#)

At Device: Switch1
Source: 172.16.31.5
Destination: 10.10.10.2

In Layers: Layer7, Layer6, Layer5, Layer4, Layer3, Layer2, Layer1

Out Layers: Layer7, Layer6, Layer5, Layer4, Layer3, Layer2, Layer1

Layer 3: Ethernet II Header 00D0.D311.C788 >> 00D0.BA8E.741A
Layer 1: Port(s): FastEthernet0/1

1. GigabitEthernet0/1 receives the frame.

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

Challenge Me

<< Previous Layer Next Layer >>

Router

Logical Physical x 291, y 49

PDU Information at Device: Router

OSI Model Inbound PDU Details Outbound PDU Details

At Device: Router
Source: 172.16.31.5
Destination: 10.10.10.2

In Layers
Layer7
Layer6
Layer5
Layer4
Layer3
Layer2
Layer1

Out Layers
Layer7
Layer6
Layer5
Layer4
Layer3
Layer2
Layer1

Layer 3: IP Header Src. IP: 172.16.31.5, Dest. IP: 10.10.10.2
ICMP Message Type: 8
Layer 2: Ethernet II Header
0000.D311.C788 >> 0000.BA8E.741A
Layer 1: Port FastEthernet1/0

1. FastEthernet1/0 receives the frame.

At Device	Dest. MAC	Src MAC	Src IPv4	Dest IPv4
172.16.31.5	0000.BA8E.741A	0000.D311.C788	172.16.31.5	10.10.10.2
Switch1	0000.BA8E.741A	0000.D311.C788	N/A	N/A
Router	0060.2F84.4AB6	0000.58BC.2401	172.16.31.5	10.10.10.2
Switch0	0060.2F84.4AB6	0000.58BC.2401	N/A	N/A
Access Point	N/A	N/A	N/A	N/A
10.10.10.2	0000.58BC.2401	0060.2F84.4AB6	10.10.10.2	127.16.31.5

Challenge Me << Previous Layer Next Layer >>

Time: 00:40:29.187 PLAY CONTROLS

PDU Information at Device: Router

OSI Model Inbound PDU Details Outbound PDU Details

PDU Formats

Ethernet II

0 4 8 16 20 24 Bytes

PREAMBLE: 101010.10 S F DEST ADDR: 0060.2F84.4AB6

SRC ADDR: 0000.58BC.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: 0x002e FLAGS: 0x0 FRAG OFFSET: 0x000

TTL: 127 PRO: 0x01 CHKSUM

SRC IP: 172.16.31.5

DST IP: 10.10.10.2

DATA (VARIABLE LENGTH)

ICMP

0 8 16 Bits

Switch0

Logical Physical x 1321, y 33

PDU Information at Device: Switch0

OSI Model Inbound PDU Details Outbound PDU Details

At Device: Switch0
Source: 172.16.31.5
Destination: 10.10.10.2

In Layers
Layer7
Layer6
Layer5
Layer4
Layer3
Layer2
Layer1

Out Layers
Layer7
Layer6
Layer5
Layer4
Layer3
Layer2
Layer1

Layer 2: Ethernet II Header
0000.58BC.2401 >> 0060.2F84.4AB6
Layer 1: Port FastEthernet0/1

1. FastEthernet0/1 receives the frame.

At Device	Dest. MAC	Src MAC	Src IPv4	Dest IPv4
172.16.31.5	0000.BA8E.741A	0000.D311.C788	172.16.31.5	10.10.10.2
Switch1	0000.BA8E.741A	0000.D311.C788	N/A	N/A
Router	0060.2F84.4AB6	0000.58BC.2401	172.16.31.5	10.10.10.2
Switch0	0060.2F84.4AB6	0000.58BC.2401	N/A	N/A
Access Point	N/A	N/A	N/A	N/A
10.10.10.2	0000.58BC.2401	0060.2F84.4AB6	10.10.10.2	127.16.31.5

Challenge Me << Previous Layer Next Layer >>

Time: 00:40:49.027 PLAY CONTROLS

PDU Information at Device: Switch0

OSI Model Inbound PDU Details Outbound PDU Details

PDU Formats

Ethernet II

0 4 8 16 20 24 Bytes

PREAMBLE: 101010.10 S F DEST ADDR: 0060.2F84.4AB6

SRC ADDR: 0000.58BC.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: 0x002e FLAGS: 0x0 FRAG OFFSET: 0x000

TTL: 127 PRO: 0x01 CHKSUM

SRC IP: 172.16.31.5

DST IP: 10.10.10.2

DATA (VARIABLE LENGTH)

Access Point

Logical Physical x 171, y 288

PDU Information at Device: Access Point

OSI Model Inbound PDU Details Outbound PDU Details

At Device: Access Point
Source: 172.16.31.5
Destination: 10.10.10.2

In Layers
Layer7
Layer6
Layer5
Layer4
Layer3
Layer2
Layer1

Out Layers
Layer7
Layer6
Layer5
Layer4
Layer3
Layer2
Layer1

Layer 1: Port 0

1. Port 0 receives the frame.

At Device	Dest. MAC	Src MAC	Src IPv4	Dest IPv4
172.16.31.5	0000.BA8E.741A	0000.D311.C788	172.16.31.5	10.10.10.2
Switch1	0000.BA8E.741A	0000.D311.C788	N/A	N/A
Router	0060.2F84.4AB6	0000.58BC.2401	172.16.31.5	10.10.10.2
Switch0	0060.2F84.4AB6	0000.58BC.2401	N/A	N/A
Access Point	N/A	N/A	N/A	N/A
10.10.10.2	0000.58BC.2401	0060.2F84.4AB6	10.10.10.2	127.16.31.5

Challenge Me << Previous Layer Next Layer >>

Time: 00:40:49.828 PLAY CONTROLS

PDU Information at Device: Access Point

OSI Model Inbound PDU Details Outbound PDU Details

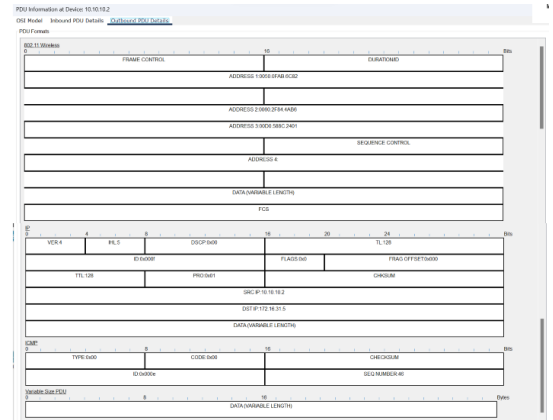
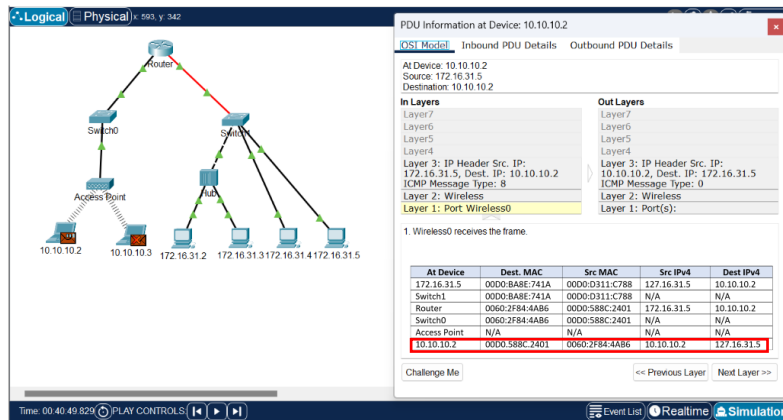
PDU Formats

802.11 (802.11)

0 16 32 48 64 80 96 112 128 144 160 176 192 208 224 240 256 272 288 304 320 336 352 368 384 400 416 432 448 464 480 496 512 528 544 560 576 592 608 624 640 656 672 688 704 720 736 752 768 784 800 816 832 848 864 880 896 912 928 944 960 976 992 1008 1024 1040 1056 1072 1088 1104 1120 1136 1152 1168 1184 1200 1216 1232 1248 1264 1280 1296 1312 1328 1344 1360 1376 1392 1408 1424 1440 1456 1472 1488 1504 1520 1536 1552 1568 1584 1600 1616 1632 1648 1664 1680 1696 1712 1728 1744 1760 1776 1792 1808 1824 1840 1856 1872 1888 1904 1920 1936 1952 1968 1984 2000 2016 2032 2048 2064 2080 2096 2112 2128 2144 2160 2176 2192 2208 2224 2240 2256 2272 2288 2304 2320 2336 2352 2368 2384 2400 2416 2432 2448 2464 2480 2496 2512 2528 2544 2560 2576 2592 2608 2624 2640 2656 2672 2688 2704 2720 2736 2752 2768 2784 2800 2816 2832 2848 2864 2880 2896 2912 2928 2944 2960 2976 2992 3008 3024 3040 3056 3072 3088 3104 3120 3136 3152 3168 3184 3200 3216 3232 3248 3264 3280 3296 3312 3328 3344 3360 3376 3392 3408 3424 3440 3456 3472 3488 3504 3520 3536 3552 3568 3584 3600 3616 3632 3648 3664 3680 3696 3712 3728 3744 3760 3776 3792 3808 3824 3840 3856 3872 3888 3904 3920 3936 3952 3968 3984 4000 4016 4032 4048 4064 4080 4096 4112 4128 4144 4160 4176 4192 4208 4224 4240 4256 4272 4288 4304 4320 4336 4352 4368 4384 4400 4416 4432 4448 4464 4480 4496 4512 4528 4544 4560 4576 4592 4608 4624 4640 4656 4672 4688 4704 4720 4736 4752 4768 4784 4800 4816 4832 4848 4864 4880 4896 4912 4928 4944 4960 4976 4992 5008 5024 5040 5056 5072 5088 5104 5120 5136 5152 5168 5184 5200 5216 5232 5248 5264 5280 5296 5312 5328 5344 5360 5376 5392 5408 5424 5440 5456 5472 5488 5504 5520 5536 5552 5568 5584 5600 5616 5632 5648 5664 5680 5696 5712 5728 5744 5760 5776 5792 5808 5824 5840 5856 5872 5888 5904 5920 5936 5952 5968 5984 6000 6016 6032 6048 6064 6080 6096 6112 6128 6144 6160 6176 6192 6208 6224 6240 6256 6272 6288 6304 6320 6336 6352 6368 6384 6400 6416 6432 6448 6464 6480 6496 6512 6528 6544 6560 6576 6592 6608 6624 6640 6656 6672 6688 6704 6720 6736 6752 6768 6784 6800 6816 6832 6848 6864 6880 6896 6912 6928 6944 6960 6976 6992 7008 7024 7040 7056 7072 7088 7104 7120 7136 7152 7168 7184 7200 7216 7232 7248 7264 7280 7296 7312 7328 7344 7360 7376 7392 7408 7424 7440 7456 7472 7488 7504 7520 7536 7552 7568 7584 7600 7616 7632 7648 7664 7680 7696 7712 7728 7744 7760 7776 7792 7808 7824 7840 7856 7872 7888 7904 7920 7936 7952 7968 7984 8000 8016 8032 8048 8064 8080 8096 8112 8128 8144 8160 8176 8192 8208 8224 8240 8256 8272 8288 8304 8320 8336 8352 8368 8384 8400 8416 8432 8448 8464 8480 8496 8512 8528 8544 8560 8576 8592 8608 8624 8640 8656 8672 8688 8704 8720 8736 8752 8768 8784 8800 8816 8832 8848 8864 8880 8896 8912 8928 8944 8960 8976 8992 9008 9024 9040 9056 9072 9088 9104 9120 9136 9152 9168 9184 9200 9216 9232 9248 9264 9280 9296 9312 9328 9344 9360 9376 9392 9408 9424 9440 9456 9472 9488 9504 9520 9536 9552 9568 9584 9600 9616 9632 9648 9664 9680 9696 9712 9728 9744 9760 9776 9792 9808 9824 9840 9856 9872 9888 9904 9920 9936 9952 9968 9984 10000

FRAME CONTROL ADDRESS 1: 0000.2F84.4AB6 ADDRESS 2: 0000.2F84.4AB6 ADDRESS 3: 0000.2F84.4AB6 ADDRESS 4: 0000.2F84.4AB6 ADDRESS 5: 0000.2F84.4AB6 ADDRESS 6: 0000.2F84.4AB6 ADDRESS 7: 0000.2F84.4AB6 ADDRESS 8: 0000.2F84.4AB6 ADDRESS 9: 0000.2F84.4AB6 ADDRESS 10: 0000.2F84.4AB6 ADDRESS 11: 0000.2F84.4AB6 ADDRESS 12: 0000.2F84.4AB6 ADDRESS 13: 0000.2F84.4AB6 ADDRESS 14: 0000.2F84.4AB6 ADDRESS 15: 0000.2F84.4AB6 ADDRESS 16: 0000.2F84.4AB6 ADDRESS 17: 0000.2F84.4AB6 ADDRESS 18: 0000.2F84.4AB6 ADDRESS 19: 0000.2F84.4AB6 ADDRESS 20: 0000.2F84.4AB6 ADDRESS 21: 0000.2F84.4AB6 ADDRESS 22: 0000.2F84.4AB6 ADDRESS 23: 0000.2F84.4AB6 ADDRESS 24: 0000.2F84.4AB6 ADDRESS 25: 0000.2F84.4AB6 ADDRESS 26: 0000.2F84.4AB6 ADDRESS 27: 0000.2F84.4AB6 ADDRESS 28: 0000.2F84.4AB6 ADDRESS 29: 0000.2F84.4AB6 ADDRESS 30: 0000.2F84.4AB6 ADDRESS 31: 0000.2F84.4AB6 ADDRESS 32: 0000.2F84.4AB6 ADDRESS 33: 0000.2F84.4AB6 ADDRESS 34: 0000.2F84.4AB6 ADDRESS 35: 0000.2F84.4AB6 ADDRESS 36: 0000.2F84.4AB6 ADDRESS 37: 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10.10.10.2 (Destination Device: Laptop)



Final Table:

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

Reflection Questions

Answer the following questions regarding the captured data:

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

We can think about this by looking at the packet tracer topology. Most are copper connections (black lines), some wireless, and one fiber.

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

No

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

No, the hub still did what it meant to do.

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

Hub devices don't operate at layer 2 and layer 3 levels, so they do nothing with MAC and IP addresses.

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

The wireless access point repackaged the information it received as wireless 802.11 frames.

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

No

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

Layer 1

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

Yes

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

Destination

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

A switch can begin forwarding a frame to a known MAC address more quickly if the destination is listed first.

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

No

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

No

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?

It occurred at the router

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

The router

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

To the sending (172.16.31.5) and receiving (10.10.10.2) devices

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

No

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

Yes

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

The source and destination IP addresses when at the starting and ending device are swapped.

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

The function of a router is to interconnect different IP networks, so you need to have different ports to different networks.

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

Essentially nothing, except for the IPv4 addresses being replaced with IPv6 addresses.