ASSIGNMENT

COURSE	Networking Fundamental	**ASSIGNMENT NO**	4
MODULE	Devices	**ASSIGNMENT DATE**	22/08/2024
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Q1. What is the difference between Switch and Router?

Ans:

SWITCH	ROUTER
Connects devices within the same network (LAN).	Connects different networks, such as a LAN to the internet (WAN).
Operates at Layer 2 (Data Link Layer) of the OSI model.	Operates at Layer 3 (Network Layer) of the OSI model.
Uses MAC addresses to forward data.	Uses IP addresses to route data.
All ports belong to the same broadcast domain (unless VLAN is used).	Each port is a separate broadcast domain.
Forward data within the same network.	Route data between different networks.
Used in Local Area Networks (LAN).	Used in Wide Area Networks (WAN) or between networks
Faster in switching packets within the same network.	Slightly slower due to routing complexity between networks.
Handles data packets based on MAC addresses.	Handles data packets based on IP addresses.
Less advanced in handling	More advanced security features,

security compared to routers.	such as firewalls and VPN support.

Q2. Draw a network topology with the following devices:

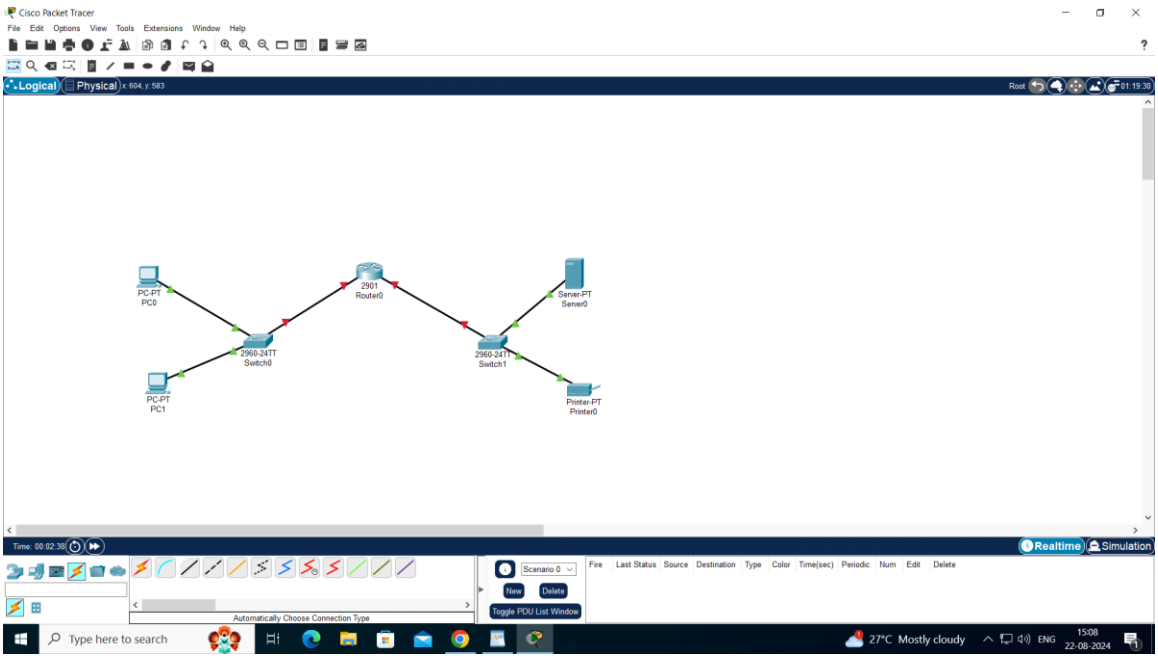
- Two PC's PC1 & PC2
- Two switches
- One Server & One Printer
- One Router
- Connect them with cables

Task:

- Assign IP Address to each network
- Delete ARP table at PC1, ping PC1 to PC2 in Simulation Mode
- Show ARP and IP entries both inbound and outbound
- Connect ARP and IP entries at each stage using simulation mode
- Connect a router and server and show packet flow

Ans:

- **Draw the Network and show the topology**



- **<u>Show IP Address allocation and highlight MAC address of all devices</u>**

Device	**IP Address**	**MAC Address**
PC1	192.168.1.10	[Auto]
PC2	192.168.1.20	[Auto]
Server	192.168.2.10	[Auto]
Printer	192.168.2.20	[Auto]
Router 1 (to PC1)	192.168.1.1	[Auto]
Router 2 (to Server, Printer)	192.168.2.1	[Auto]

- **<u>Delete ARP entry of PC1 and switch to Simulation Mode</u>**

On PC1:

Open the command prompt.

Use the command:

arp -d

This command deletes all ARP entries from the ARP table of PC1.

Switch to Simulation Mode:

In your simulation tool (e.g., Cisco Packet Tracer), switch to Simulation Mode. This will allow you to capture and analyze packet flow.

- **Send Ping packet from PC1 to PC2**

On PC1:

Open the command prompt.

Ping PC2's IP address (192.168.1.20):

Simulation Mode:

In simulation mode, the ping packet will generate an ARP request if the MAC address for PC2 is not known.

ARP Request: PC1 will broadcast an ARP request asking for the MAC address of PC2.

ARP Reply: PC2 will reply with its MAC address.

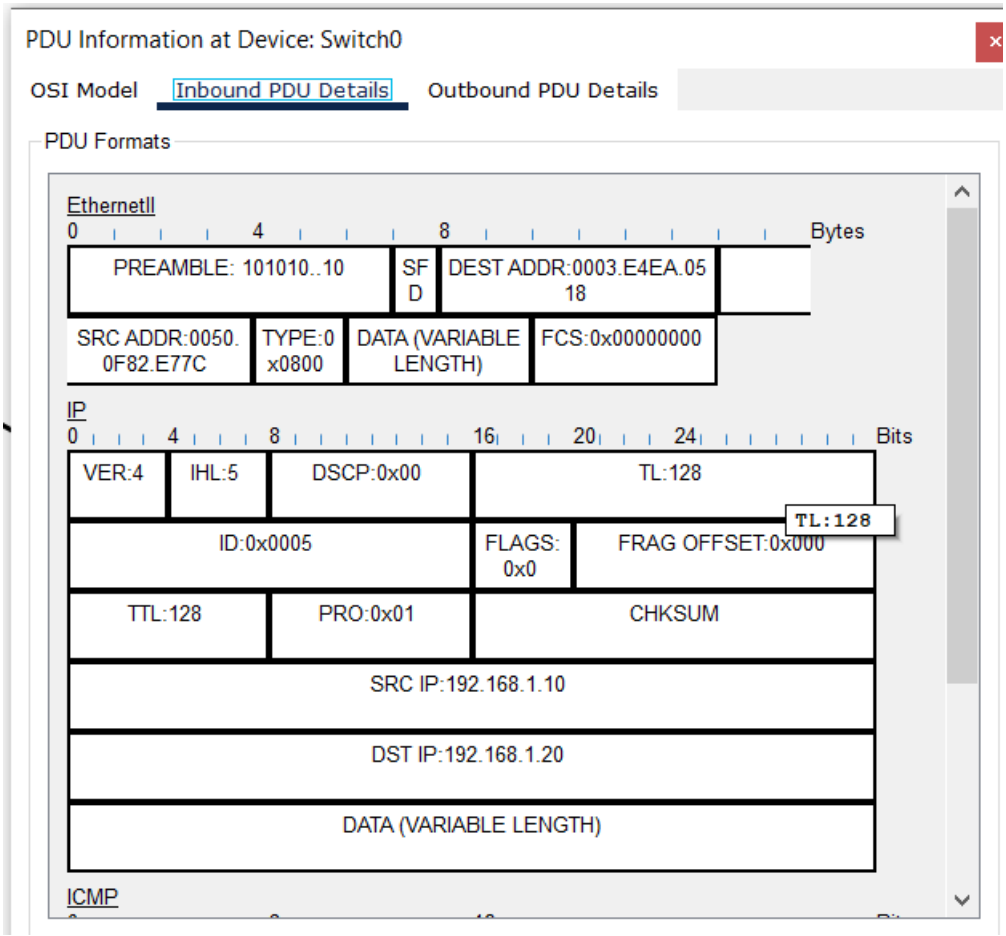
Ping: The ICMP packet is sent from PC1 to PC2 after the ARP process is complete.

Observations:

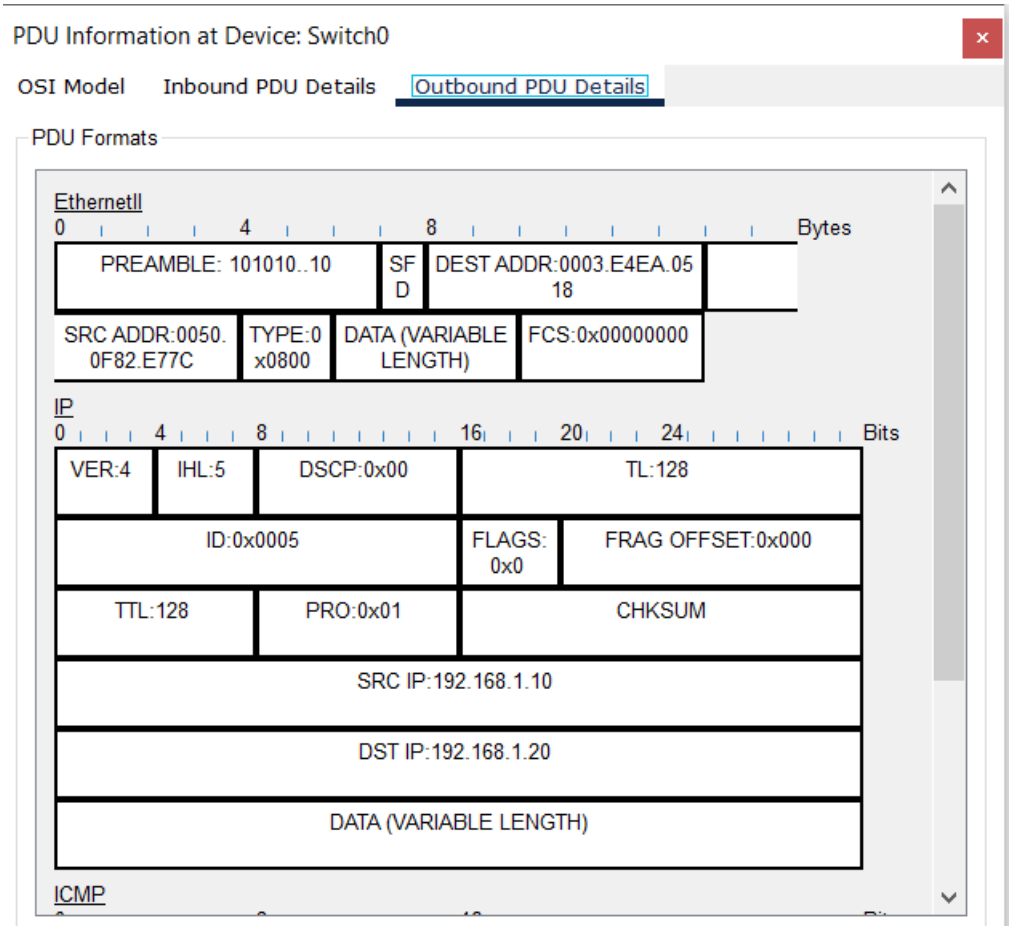
Initially, PC1 will send an ARP request to resolve the IP address of PC2 to a MAC address.

Once the ARP table is updated, subsequent packets will be sent directly to PC2 using its MAC address.

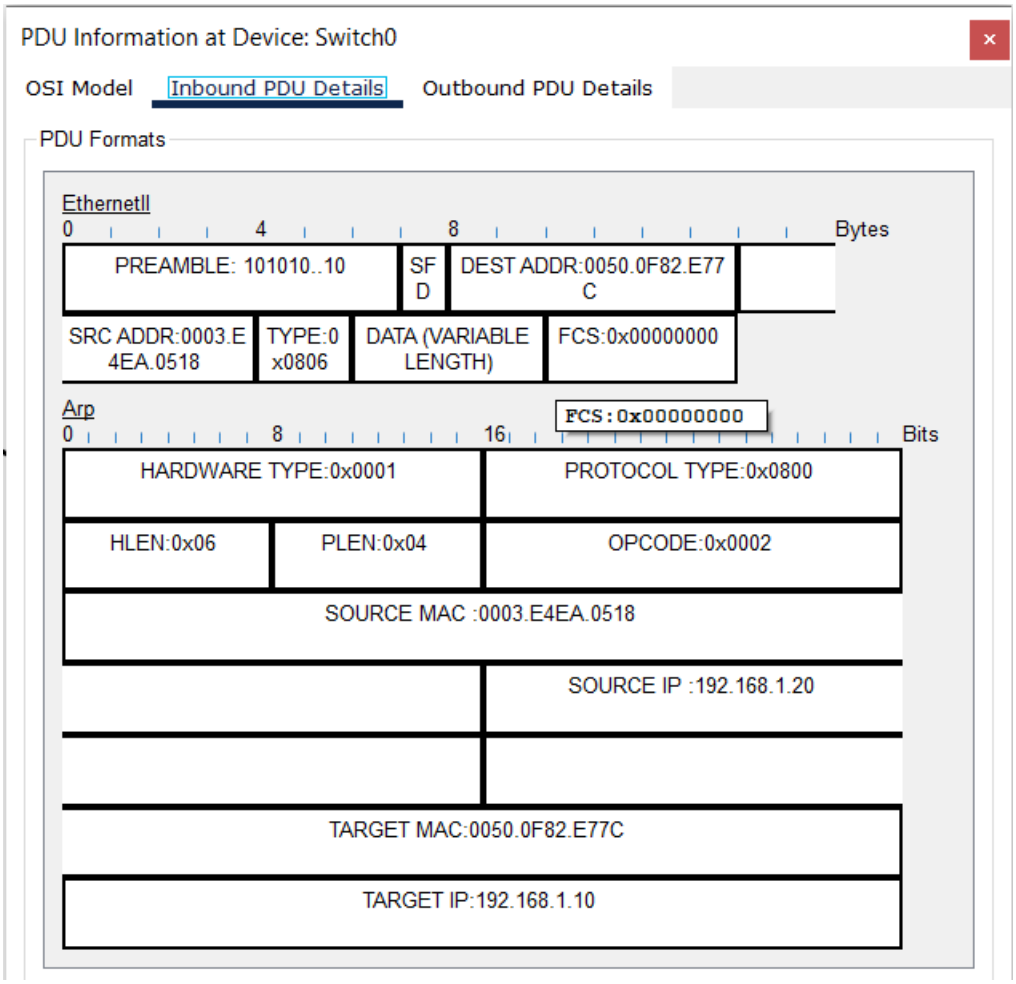
INBOUND P0 TO P1:



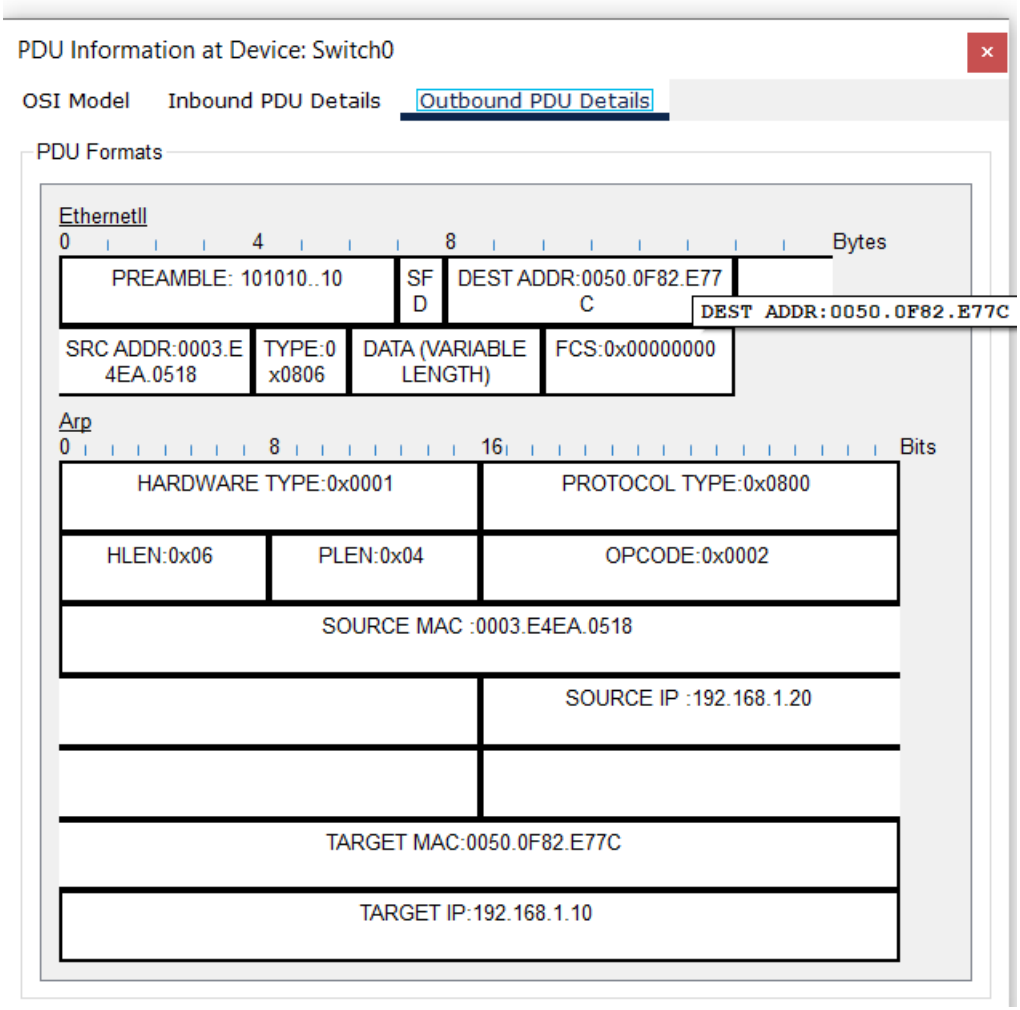
OUTBOUND P0 TO P1



INBOUND P1 TO P2



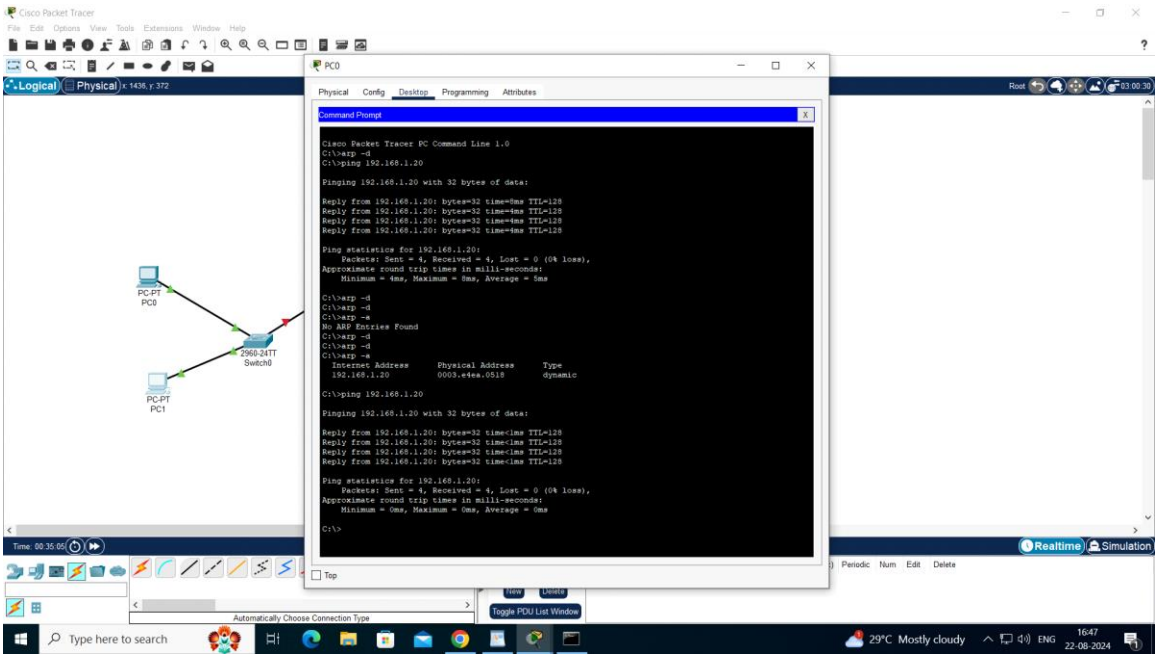
OUTBOUND P1 TO P0



- **<u>Check ARP table and list your observations</u>**

"Compare the new ARP entries with table made at point 2"

"Support your entries with screenshots"



- **<u>Send traffic from PC1 to Server using Simulation Mode</u>**

  PC1:

  Open the command prompt.

  Ping the server's IP address (192.168.2.10):

  ping 192.168.2.10

  Simulation Mode:

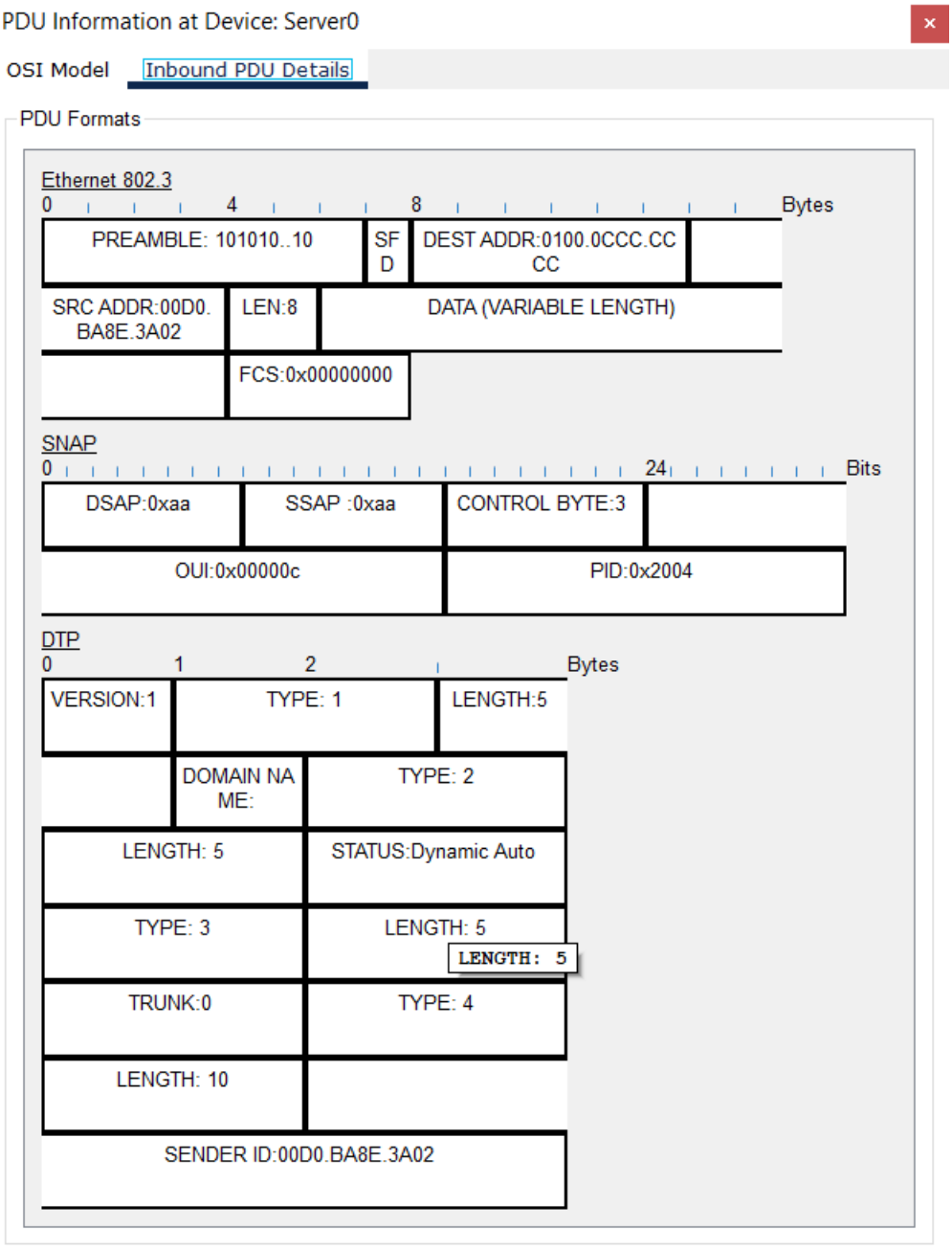
  The server and pc1 given gateway ip address given:

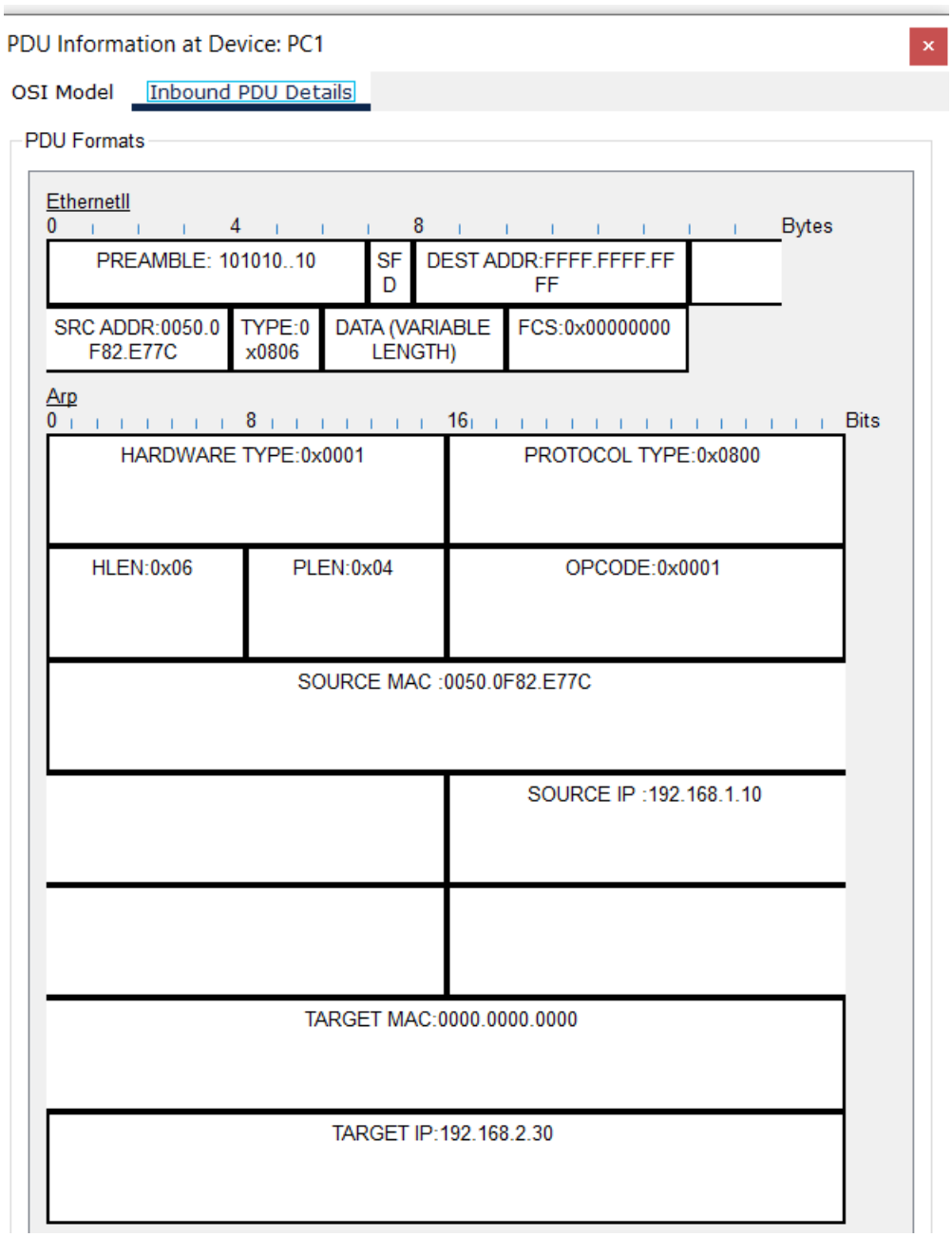
  The packet will first reach the Router, where it will be forwarded to the correct network (192.168.2.0/24).

ARP Process: PC1 sends an ARP request to the Router to resolve the Router's MAC address. Then, the Router forwards the packet to the server after completing the ARP resolution on the 192.168.2.0/24 network.

Observations:

You will see both ARP and IP packets flow between PC1 and the Router, then between the Router and the Server.





- **Send traffic from PC2 to Printer using Simulation Mode**

On PC2:

Ping the printer’s IP address (192.168.2.20):

ping 192.168.2.20

Simulation Mode:

The packet will be routed through the Router and forwarded to the Printer.

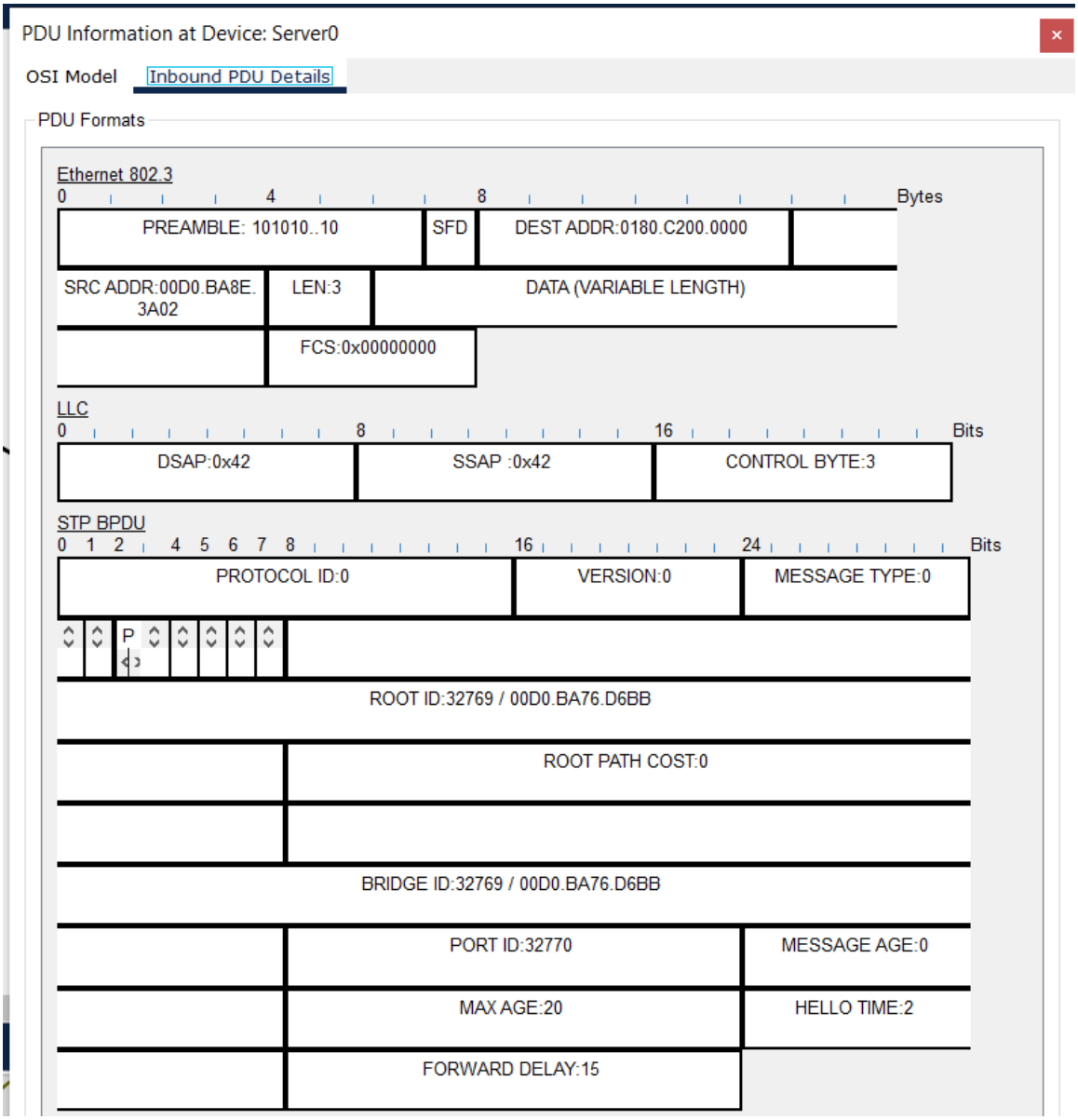
This one also same gateway given pc1 , print:

ARP Process: PC2 will send an ARP request to the Router first to get its MAC address, and the Router will then route the packet to the Printer after completing the ARP process on the 192.168.2.0/24 network.

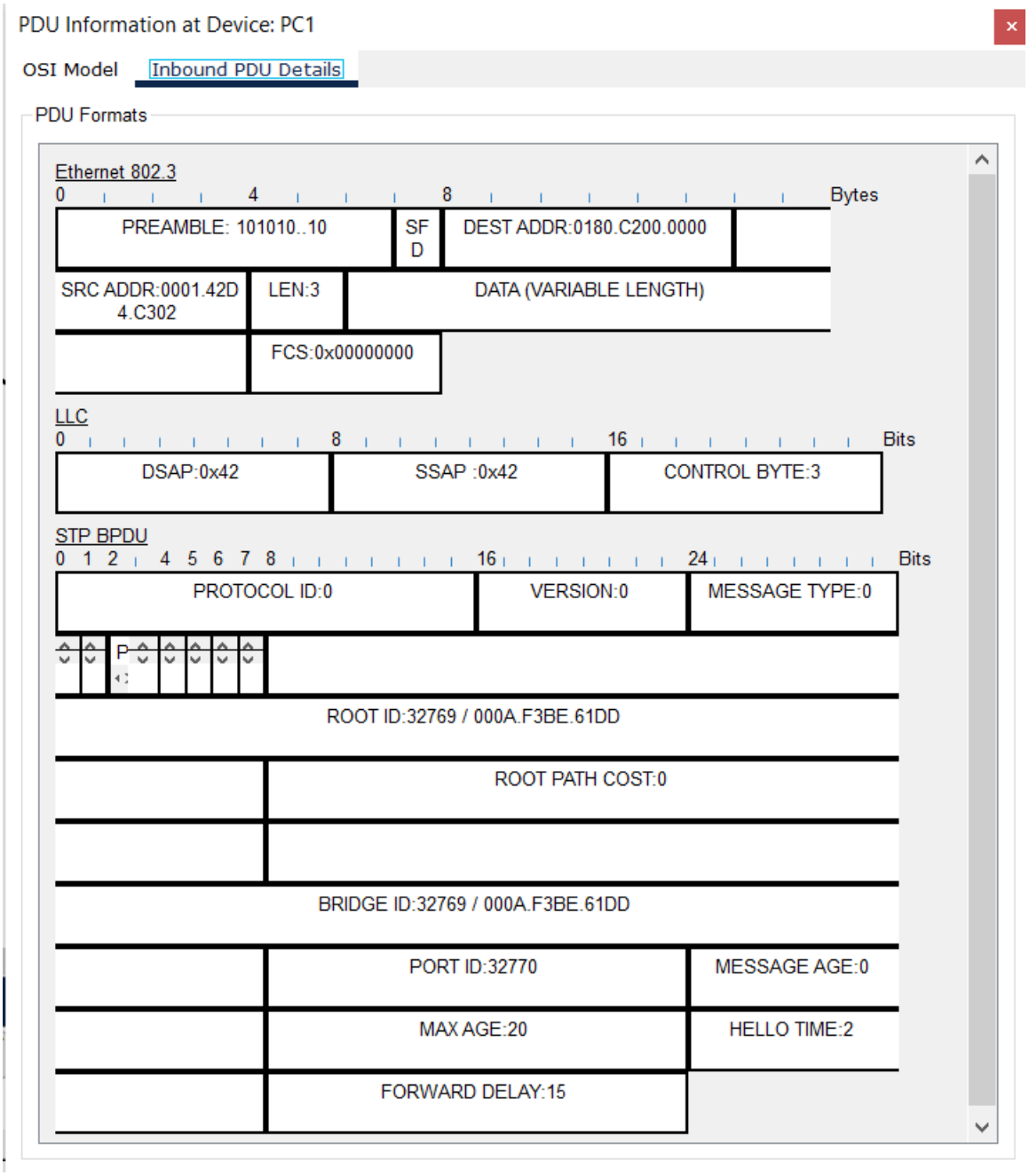
Observations:

The process will involve ARP resolution and packet flow routing similar to the PC1-to-Server scenario.

server0


PDU Information at Device: Server0
OSI Model
Inbound PDU Details
PDU Formats
Ethernet 802.3
0
4
8
Bytes
PREAMBLE: 101010..10
SFD
DEST ADDR:0180.C200.0000
SRC ADDR:00D0.BA8E.3A02
LEN:3
DATA (VARIABLE LENGTH)
FCS:0x00000000
LLC
0
8
16
Bits
DSAP:0x42
SSAP :0x42
CONTROL BYTE:3
STP BPDU
0 1 2 4 5 6 7 8
16
24
Bits
PROTOCOL ID:0
VERSION:0
MESSAGE TYPE:0
P
ROOT ID:32769 / 00D0.BA76.D6BB
ROOT PATH COST:0
BRIDGE ID:32769 / 00D0.BA76.D6BB
PORT ID:32770
MESSAGE AGE:0
MAX AGE:20
HELLO TIME:2
FORWARD DELAY:15

PC1



- **Now connect a router and server , assign relevant addresses and access server using either PC in Simulation Mode**

Ensure Configuration:

The Router interface connected to the Server should be in the same network as the Server (e.g., 192.168.2.1 for Router and 192.168.2.10 for Server).

Ping the Server from PC1 or PC2:

Use the same method of pinging the Server IP (192.168.2.10) from either PC1 or PC2.

Simulation Mode:

Observe the routing of packets through the Router and the ARP process for resolving MAC addresses between different network segments.

Observations:

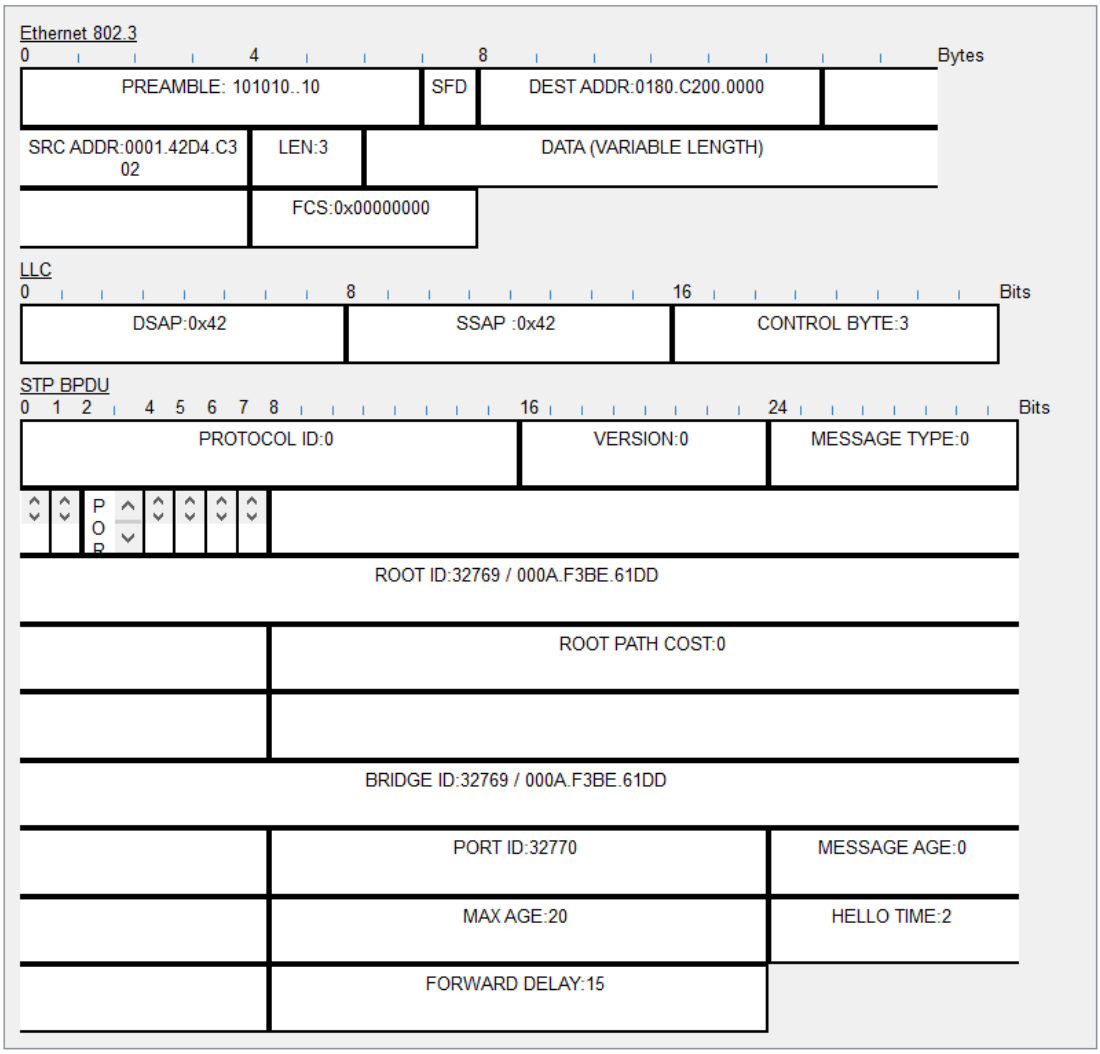
The ping will show the ARP process and the packet flow across different subnets.

After ARP resolution, traffic will flow between the PCs and the Server.

PDU Information at Device: PC1

OSI Model | Inbound PDU Details

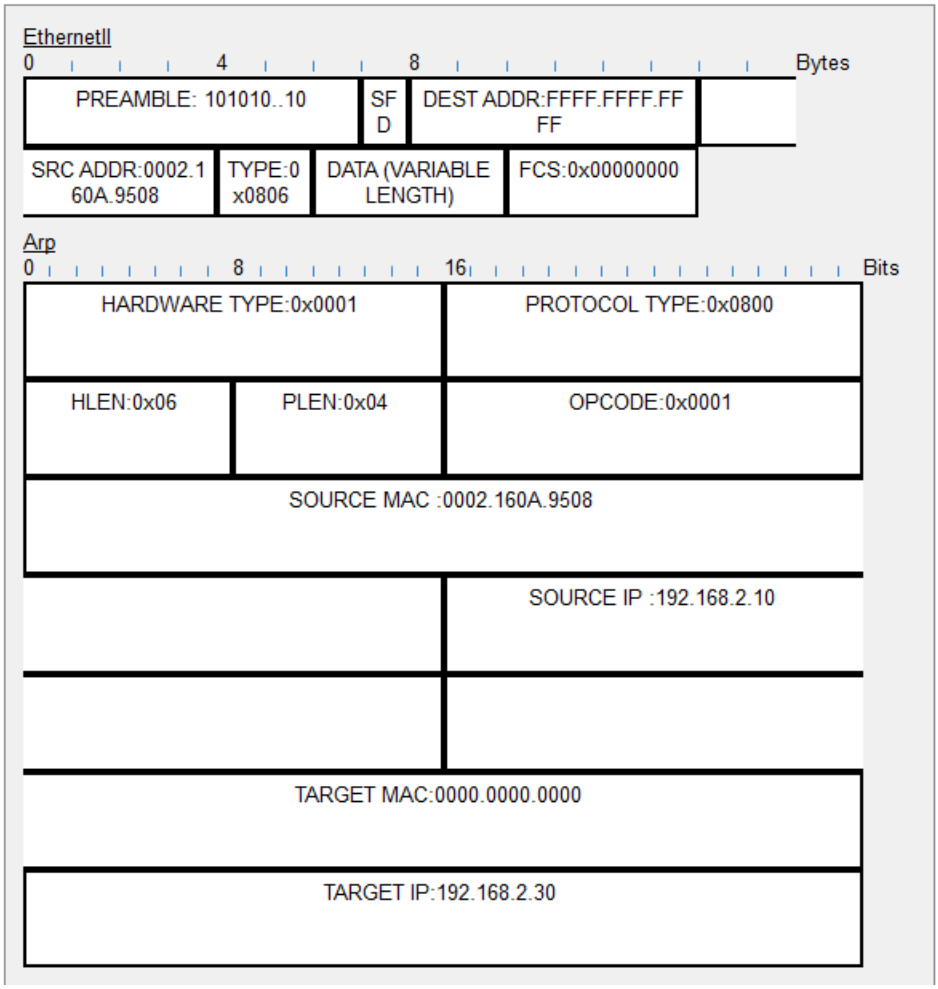
PDU Formats

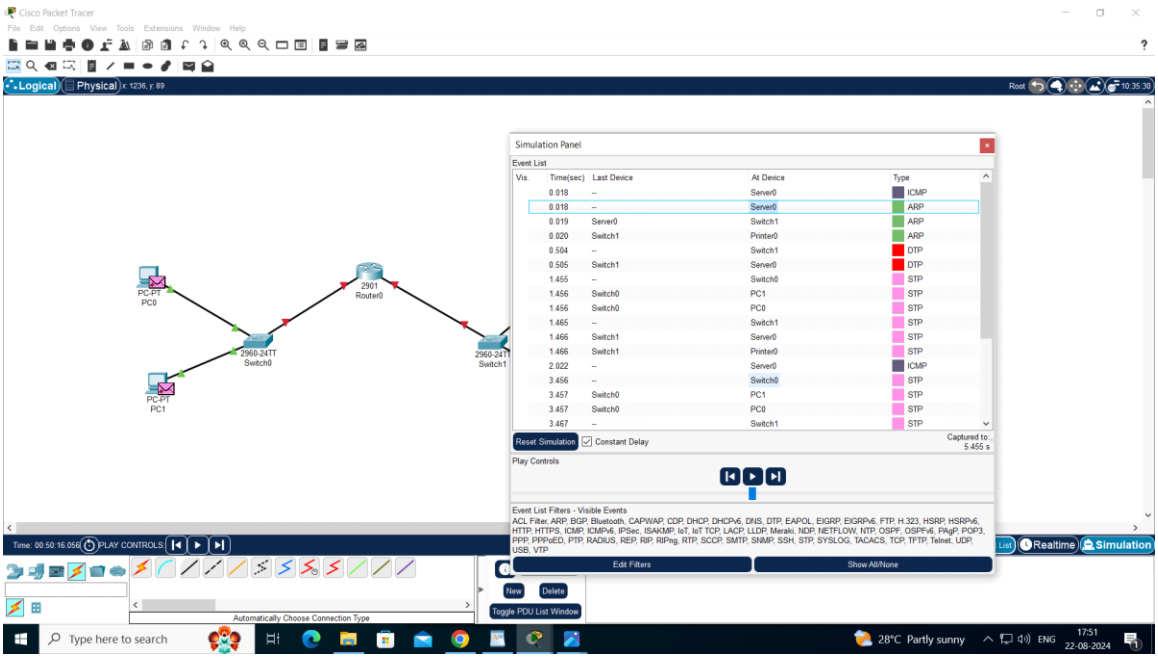


PDU Information at Device: Server0

OSI Model | Outbound PDU Details

PDU Formats




Cisco Packet Tracer
Logical
Physical
Simulation Panel
Event List
Vis.
Time(sec)
Last Device
At Device
Type
PC-PT
PC0
2901
Router0
2960-24TT
Switch0
PC-PT
PC1
2960-24TT
Switch1
Reset Simulation
Constant Delay
Play Controls
Event List Filters - Visible Events
Edit Filters
Show All/None
Realtime
Simulation
New
Delete
Toggle PDU List Window
Automatically Choose Connection Type
Type here to search
28°C Partly sunny
ENG
17:51
22-08-2024