Module 4: Evidence of Learning

In Active Class 6, we explored the journey of an IP packet from my home to your home, aiming to understand how data is transported in IP networks. The class was structured to achieve several learning objectives:

- Understanding the Internet Protocol (IP).
- Explaining the data plane operation of the network layer.
- Building a simple network in Cisco Packet Tracer and simulating its operation.

Activity 1
It was focused on analyzing IP using Wireshark. I captured packets from various network applications, analyzed IP datagrams' headers, identified IP addresses, determined IP version, identified transport layer protocols, examined IP header fields, and compared findings between different packet types.

Activity 2
It involved group discussions on IP and routing. As a group, we explored analogies between postal systems and computer networks, discussed building a network with LANs and configuring devices, and detailed packet routing steps between PCs.

Activity 3
It is centred on implementing learned concepts in Cisco Packet Tracer. I configured devices, verified connectivity using "ping" commands, and simulated packet routing to validate discussed steps.

Throughout the activities, we took notes, collaborated, and engaged actively to enhance learning and task completion.

Evidence: Module Exercises
Quiz 4

Exercise 1:

Quiz 04 - Module 4: Network Layer-Data Plane

Total points 100/100

The respondent's email (**rnirosh134@cicracampus.net**) was recorded on submission of this form.

✓ The name of the transport layer packet is "segment". What is the name of the network layer packet? 10/10

- ○ IP frame
- ○ IP Segment
- ◉ Datagram ✓
- ○ IP packet

Exercise 2:

✓ Which of the following statement is incorrect? 10/10

- ◉ The main function of the network layer's data plane is packet forwarding, it forwards datagrams from the sender to the receiver. ✓
- ○ In traditional networks, both data plane and control plane operations are implemented in the router.
- ○ The main function of the network layer's data plane is packet forwarding, it forwards datagrams from the input link to the relevant output link.
- ○ The main function of the network layer's control plane is routing, it decides the route that a packet takes from its sender to its receiver.

Exercise 3:

✓ A typical router consists of four main components. They are input ports, output ports, a switching fabric, and a routing processor. Which of these functions are implemented in hardware? 10/10

- ○ Only input ports and output ports
- ○ input ports, output ports, a switching fabric, and a routing processor
- ○ Switching fabric and a routing processor
- ◉ Input ports, output ports, and a switching fabric ✓

Exercise 4:

✓ The packet loss that occurs at the output port of a router can be prevented by increasing the speed of the switching fabric. Is this statement true or false? 10/10

- ○ True
- ◉ False ✓

Exercise 5:

✓ How does host's network layer identify the correct transport layer protocol of the segment it receives (in the payload)? 10/10

- ○ Using the type of service field in the datagram header
- ◉ Using the 8-bit protocol field in the datagram header ✓
- ○ Using the combination of type of service field and destination address field in the datagram header
- ○ Using 16-bit identifier field in the datagram header

Exercise 6:

✓ What is the 32-bit binary equivalent of the IP address 192.168.1.25? 10/10

- (●) 11000000 10101000 00000001 00011001 ✓
- ( ) 11000000 10101000 00000001 00011101
- ( ) 11000000 10101000 00000001 00111101
- ( ) 11001000 10111000 00000001 00011001

Exercise 7:

✓ Assume a sender sent an IP datagram to a receiver and there are two routers between the sender and the receiver. 10/10

1) How many interfaces that the datagram traveled through to reach the receiver?
2) How many forwarding tables were indexed to move the datagram from the sender to receiver?

- ( ) 6 interfaces and 4 forwarding tables
- (●) 6 interfaces and 2 forwarding tables ✓
- ( ) 2 interfaces and 1 forwarding tables
- ( ) 4 interfaces and 4 forwarding tables
- ( ) 4 interfaces and 2 forwarding tables

Exercise 8:

✓ Suppose that a router with four output ports will be forwarded packets to the output interfaces as follows. 10/10

The router receives a datagram with the destination IP address of 11001000 00010111 00011000 11111110 . Which output interface this datagram will be switched to?

Destination Address Range	Link interface
11001000 00010111 00010*** ********	0
11001000 00010111 00011000 ********	1
11001000 00010111 00011*** ********	2
otherwise	3

- ○ 0
- ○ 3
- ○ 2
- ◉ 1 ✓

Exercise 9:

✓ What does "192.168.24.0/24" mean? 10/10

- ○ In this subnet (network), we have 128 host IP addresses and all host IP addresses will have 192.168.24 in common.
- ◉ In this subnet (network), we have 256 host IP addresses and all host IP addresses will have 192.168.24 in common. ✓
- ○ In this subnet (network), we have 256 host IP addresses and all host IP addresses will have 192.168.24.0 in common.
- ○ In this subnet (network), we have 0 host IP addresses and all host IP addresses will have 192.168.24 in common.

Exercise 10:

Which of the following statements is correct? 10/10

- (selected) IPv6 datagrams do not have the checksum field
- IPv4 datagrams do not have the checksum field
- Both IPv4 and IPv6 datagrams do not have the checksum field
- Both IPv4 and IPv6 datagrams have the checksum field

Notes

Forwarding and Routing:

• **Forwarding** refers to the local process of moving packets from a router's input link to the appropriate output link, akin to navigating through a single interchange on a trip.

• **Routing** is the network-wide process that determines the path packets take from source to destination4. It involves routing algorithms and is comparable to planning the entire trip.

Data Plane and Control Plane:

• **The Data Plane** is a local function that determines how a datagram arriving at a router input port is forwarded to an output port.
• **The Control Plane** is a network-wide logic that decides how datagrams are routed among routers from the source host to the destination host.

Network Service Models: Different network architectures offer various service models, such as the Internet's "best effort" model, which provides no guarantees on successful datagram delivery, timing, order, or available bandwidth.

Router Architecture: A generic router architecture includes input ports, a high-speed switching fabric, and output ports. The forwarding function operates in nanoseconds, while routing and management functions operate in milliseconds.

IP Addressing: IP addresses are 32-bit identifiers associated with each host or router interface. This module explains subnetting, CIDR (Classless InterDomain Routing), and the use of subnet masks.

Subnetting is the process of dividing a larger network into smaller, more manageable subnetworks or subnets.

• **Subnet Mask:** A subnet mask is used to identify the subnet portion of an IP address by masking certain bits.

• **IP Address Structure:** IP addresses have two parts: the network part and the host part. Subnetting involves borrowing bits from the host part to create the subnet part.

• **Defining Subnets:** Subnets are defined by detaching each interface from its host or router, creating isolated networks, each known as a subnet.

• **CIDR Notation:** Classless Inter-Domain Routing (CIDR) allows for a flexible assignment of IP addresses by specifying a subnet prefix length (e.g. /24).
This process helps in efficient IP address management and improves network security and performance.

DHCP and NAT:

• **DHCP (Dynamic Host Configuration Protocol)** allows hosts to dynamically obtain an IP address from a network server when joining a network9.

• **NAT (Network Address Translation**) enables multiple devices on a local network to share a single IP address when accessing the Internet10.

• **IPv6:** IPv6 addresses the limitations of IPv4, including the exhaustion of the address space. It introduces a 128-bit address space and simplifies packet processing.

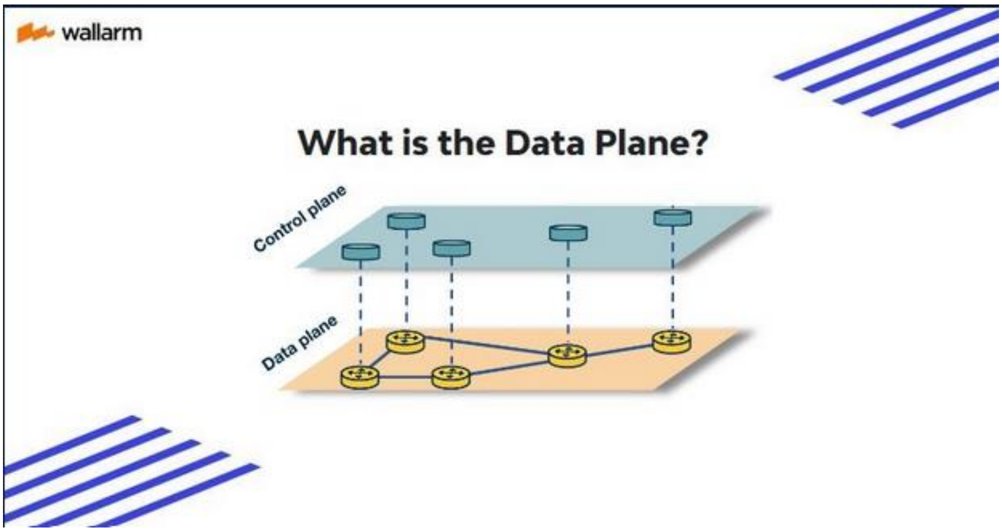
Some external resources I referred to

1. Lee, I. (2024, May 2). *What is the Data Plane?* Wallarm.

   https://www.wallarm.com/what/what-is-the-data-plane

2. *Network - data plane*. (n.d.). NetworkLessons Notes.

   https://notes.networklessons.com/network-data-plane



Evidence: Active Classes

Active Class 6:

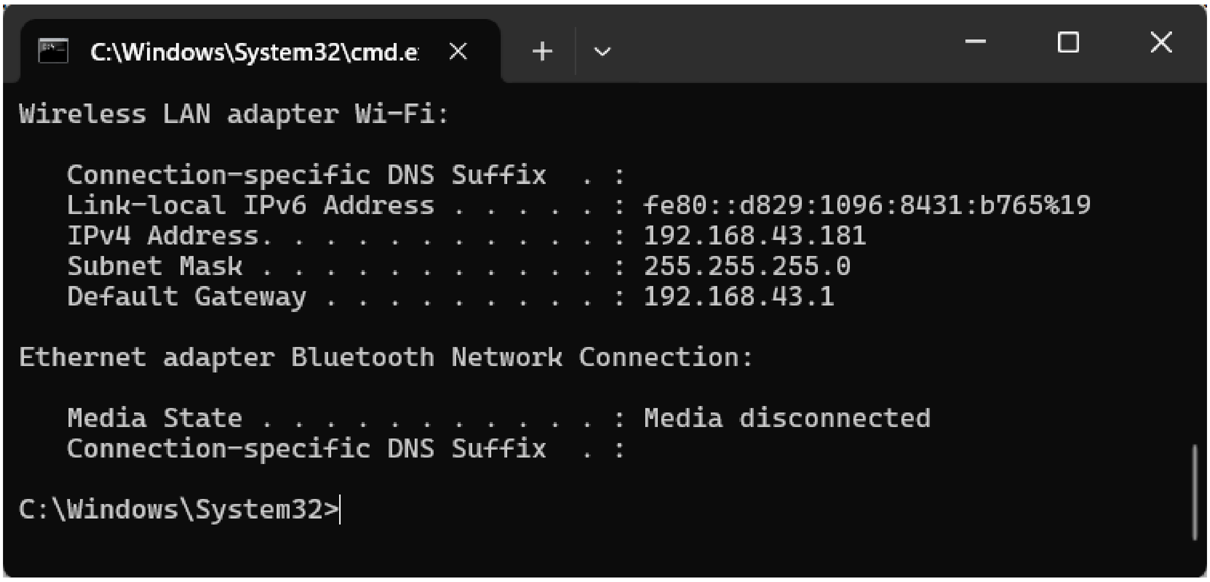
Activity 1:

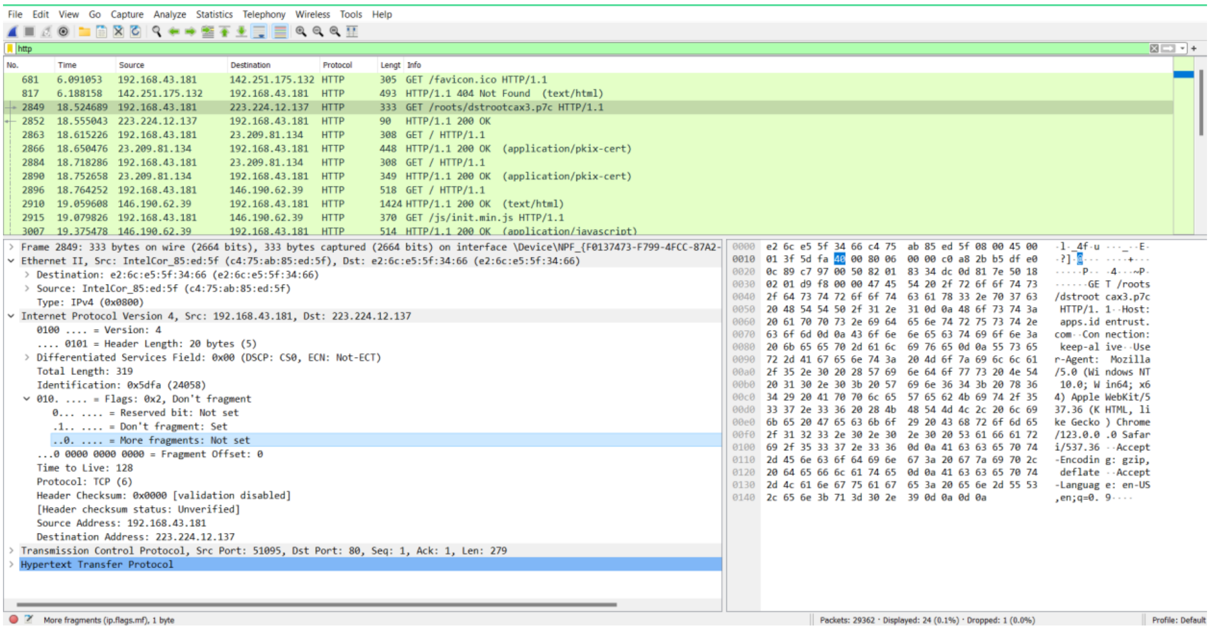
In this activity, I utilized Wireshark to delve into the inner workings of IP protocols. After capturing packets from various network applications like web browsing and MSTeams, I selected specific packets to dissect.

I examined the IP datagram's header, identifying both my device's IP address and the destination host's IP address. By scrutinizing the IP header, I discerned the transport layer protocol used and compared it with the information in the packet details window.

Furthermore, I calculated the size of the IP header and payload in bytes, investigated whether the IP datagram was fragmented, and explored other essential fields in the IP header. Finally, I conducted a similar analysis using a different packet type, comparing and contrasting the findings.

The screenshot for the wireshark:





1. **Examine the IP datagram's header. Can you identify the IP address of your device and the IP address of the destination host?**

   My Device's IP Address: 192.168.43.181
   Destination Host IP Address: 223.224.12.137

2. **Can you identify the version of IP addresses?**

   The version of IP addresses is IPv4. This can be identified by looking for the Version field in the IP header

3. **By examine the IP header, can you identify the transport layer protocol used? Does this match with the transport layer protocol listed in in the packet details window?**

   By examining the Protocol field in the IP header we can identify the transport layer protocol as TCP.

4. **What is the size of IP header in Bytes? What is the size of the payload (in Bytes) of this IP datagram? How did you calculate the size of the payload?**

   First, I looked for the "IHL" (Internet Header Length) field in the IP header. It's a 4-bit value representing the number of 32-bit words in the header. Multiply IHL by 4 to get the size in bytes. IHL of 5 translates to 5 * 4 = 20 bytes.

   Subtracting the header length from the total packet size will give the payload size

   payload size = total packet size - header length
   = 319-20
   = 299

5. **Can you check whether this IP datagram is fragmented or not? Explain your answer**.

   We can check for a flag named "MF" (More Fragments) in the IP header. If it's not set, the packet isn't fragmented. If it's set, the packet is part of a larger message broken into smaller fragments for transmission. since it is not set in my capture, the packet is not a part of large message or it is not broken into smaller fragments.

6. **Examine other important fields in the IP header.**

   TOS (Type of Service): This field defines how a packet should be handled by the network. It's visible in the captured packet under "Internet Protocol" as "0x00" (which represents routine handling).

   Total Length: This shows the entire packet's size in bytes. It's usually mentioned in the packet details window.

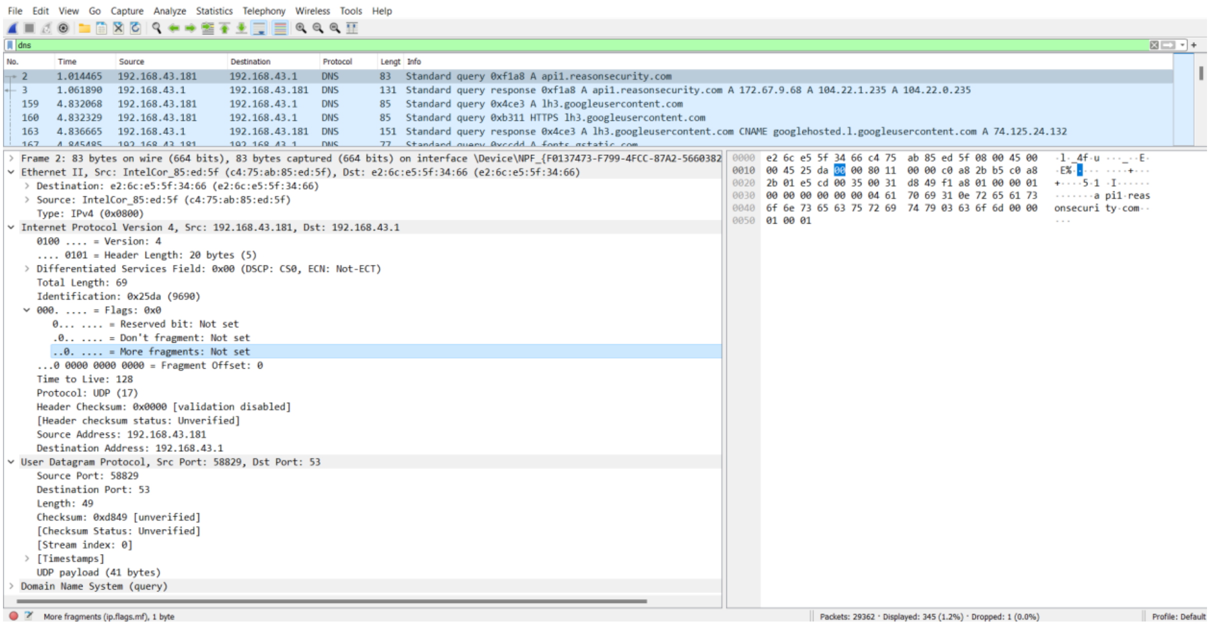
   Identification: Used for fragmentation and reassembly, holds a unique identifier for the original packet (if fragmented). It's part of the IP header.

   Flags: Besides "MF", there are other flags like "DF" (Don't Fragment) which, if set, indicates the packet shouldn't be fragmented.

   Time to Live (TTL): This value decrements with each hop the packet takes on the network. If it reaches zero, the packet is discarded. It's a part of the IP header information.

7. **Now, conduct a similar analysis using a different type of packet (if you have used HTTP before, now you can use DNS) and compare the findings.**

   Screenshot:



My Device's IP Address: 192.168.43.181
Destination Host IP Address: 192.168.43.1

IP Version:
The version of IP addresses is IPv4. This can be identified by looking for the "Version" field in the IP header

By examining the "Protocol" field in the IP header we can identify the transport layer protocol as UDP.

First, I looked for the "IHL" (Internet Header Length) field in the IP header. It's a 4-bit value representing the number of 32-bit words in the header. Multiply IHL by 4 to get the size in bytes. IHL of 5 translates to 5 * 4 = 20 bytes.

Subtracting the header length from the total packet size will give the payload size

payload size = total packet size - header length
= 69-20
= 49

We can check for a flag named "MF" (More Fragments) in the IP header. If it's not set, the packet isn't fragmented. If it's set, the packet is part of a larger message broken into smaller fragments for transmission. since it is not set in my capture, the packet is not a part of large message or it is not broken into smaller fragments.

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Identification: Used for fragmentation and reassembly, holds a unique identifier for the original packet (if fragmented). It's part of the IP header.

Flags: Besides "MF", there are other flags like "DF" (Don't Fragment) which, if set, indicates the packet shouldn't be fragmented.

Time to Live (TTL): This value decrements with each hop the packet takes on the network. If it reaches zero, the packet is discarded. It's a part of the IP header information.

Activity 2:

This collaborative group activity fostered discussions surrounding IP and routing concepts. Within my group, we contemplated the analogy between sending a present through the postal system and transmitting a message over computer networks.

We then tackled the task of building a network with two LANs and assigning roles to group members. As we configured devices, set IP addresses, and determined gateways, we strategized on enabling communication between LANs. Lastly, we meticulously outlined the steps a packet would traverse from PC1 to PC3.

1. **Assume you are sending a present to a friend in another country. Can you list the various places and steps that your parcel would go in the postal system before it reaches your friend?**

Baxy Today at 2:42 PM
Activity 2: IP and routing

This is a group activity. Therefore, you need to form a group of four (4)- five (5) people. At your table (or in MS team chat) discuss the following questions with your group members. Remember to take notes as they will help you prepare your task submissions and complete other activities.

1. Assume you are sending a present to a friend in another country. Can you list the various places and steps that your parcel would go in the postal system before it reaches your friend?

Alright, team, let's tackle this task. So, imagine we're sending a present to a friend in another country. First off, we'd take the package to our local post office. From there, it would likely head to a sorting facility, right? (edited)

ipiot Today at 2:42 PM
Exactly, Nirosh. Then, it might get loaded onto a truck or plane to go to a central hub, where it could go through customs if it's crossing borders. After that, it's back on another truck or plane to head to its final destination. It's like a globe-trotting adventure for our package!

Amjad Today at 2:42 PM
And don't forget about the smaller stops along the way. It could change hands multiple times before it finally reaches our friend's doorstep. Each stop is a checkpoint in its journey.

mabrook Today at 2:43 PM
True, Amjad. It's fascinating how our package navigates through this network of postal services, isn't it? From the local post office to sorting centers, transportation hubs, and finally, its delivery destination.

H44mid Today at 2:43 PM
Absolutely, Mabrook. It's quite a journey our package goes on. And it makes us appreciate the efficiency of the postal system in getting our parcels to where they need to be, even across borders and oceans.

2. **How this analogous to a situation where you want to send a message to a friend in another country over the computer networks?**

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Baxy Today at 2:44 PM
Agreed, Haamid. Well, that wraps up our discussion on the journey of a parcel through the postal system. Let's move on to the next part of our activity.
.
2. How this analogous to a situation where you want to send a message to a friend in another country over the computer networks?

Alright, team, let's dive into the next part of our activity. So, imagine instead of sending a physical package, we're sending a message to a friend in another country over computer networks. How do you think this is similar to sending a parcel through the postal system? (edited)

ipiot Today at 2:44 PM
Well, just like with the parcel, our message would go through multiple steps and locations in the digital realm. Instead of post offices and sorting facilities, we have routers and servers that help route our message to its destination.

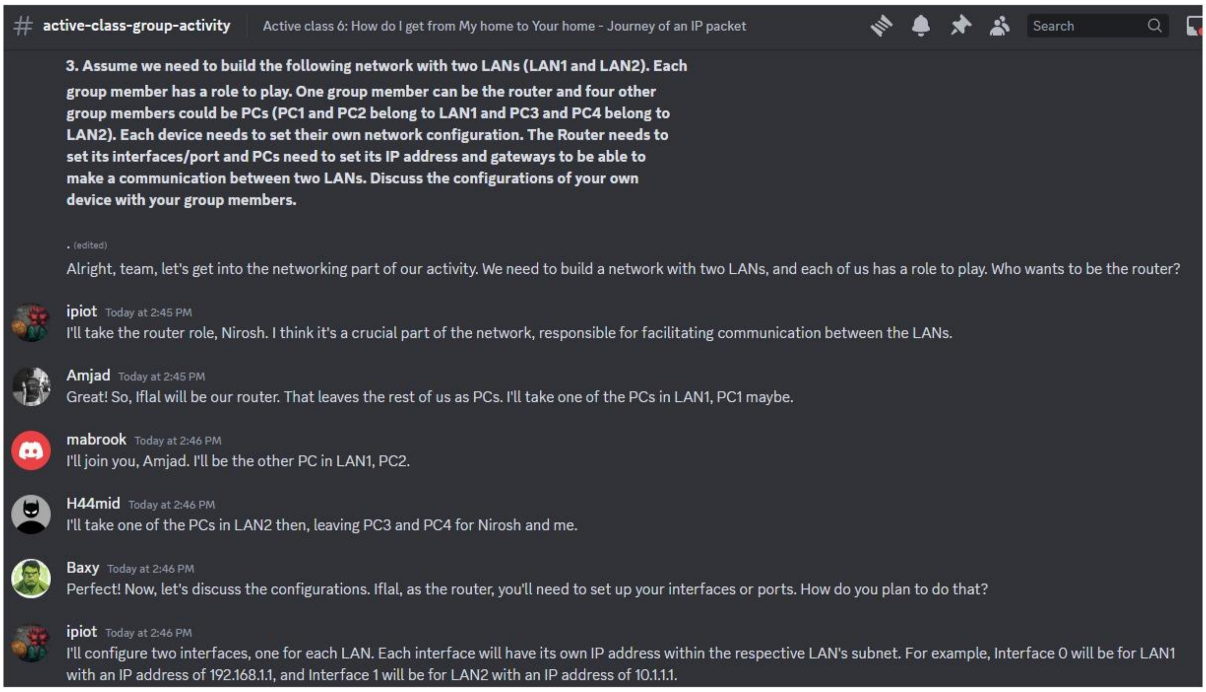
Amjad Today at 2:44 PM
Exactly, Iflal. And just like our parcel, the message might go through various checkpoints or nodes along the way. Each router it passes through makes a decision on where to send it next, based on its destination address.

mabrook Today at 2:44 PM
And let's not forget about the concept of protocols. Just like how the postal system has rules and regulations, computer networks operate on protocols like TCP/IP. These protocols ensure that our message is properly formatted and transmitted across the network.

H44mid Today at 2:44 PM
And much like our parcel, our message might traverse across borders and oceans, going through different networks and possibly even encountering delays or congestion along the way. It's a journey through the digital landscape.

Baxy Today at 2:45 PM
Spot on, Haamid. So, in essence, sending a message over computer networks shares many similarities with sending a parcel through the postal system. It's all about navigating through a network of nodes and checkpoints to reach its intended destination. Great insights, team! Let's move on to the next part of our activity.

3. **Assume we need to build the following network with two LANs (LAN1 and LAN2). Each group member has a role to play. One group member can be the router and four other group members could be PCs (PC1 and PC2 belong to LAN1 and PC3 and PC4 belong to LAN2). Each device needs to set their own network configuration. The Router needs to set its interfaces/port and PCs need to set its IP address and gateways to be able to make a communication between two LANs. Discuss the configurations of your own device with your group members.**



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3. Assume we need to build the following network with two LANs (LAN1 and LAN2). Each group member has a role to play. One group member can be the router and four other group members could be PCs (PC1 and PC2 belong to LAN1 and PC3 and PC4 belong to LAN2). Each device needs to set their own network configuration. The Router needs to set its interfaces/port and PCs need to set its IP address and gateways to be able to make a communication between two LANs. Discuss the configurations of your own device with your group members.

. (edited)

Alright, team, let's get into the networking part of our activity. We need to build a network with two LANs, and each of us has a role to play. Who wants to be the router?

ipiot Today at 2:45 PM
I'll take the router role, Nirosh. I think it's a crucial part of the network, responsible for facilitating communication between the LANs.

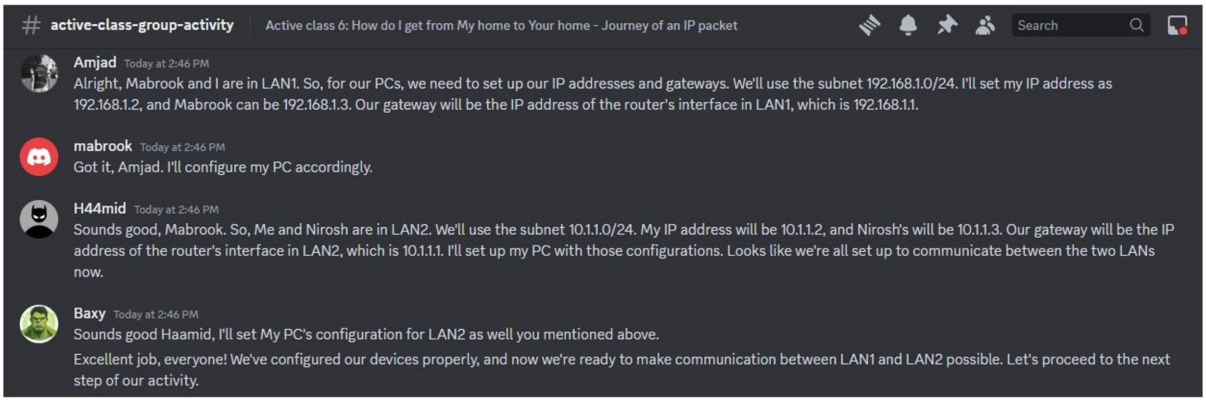
Amjad Today at 2:45 PM
Great! So, Iflal will be our router. That leaves the rest of us as PCs. I'll take one of the PCs in LAN1, PC1 maybe.

mabrook Today at 2:46 PM
I'll join you, Amjad. I'll be the other PC in LAN1, PC2.

H44mid Today at 2:46 PM
I'll take one of the PCs in LAN2 then, leaving PC3 and PC4 for Nirosh and me.

Baxy Today at 2:46 PM
Perfect! Now, let's discuss the configurations. Iflal, as the router, you'll need to set up your interfaces or ports. How do you plan to do that?

ipiot Today at 2:46 PM
I'll configure two interfaces, one for each LAN. Each interface will have its own IP address within the respective LAN's subnet. For example, Interface 0 will be for LAN1 with an IP address of 192.168.1.1, and Interface 1 will be for LAN2 with an IP address of 10.1.1.1.



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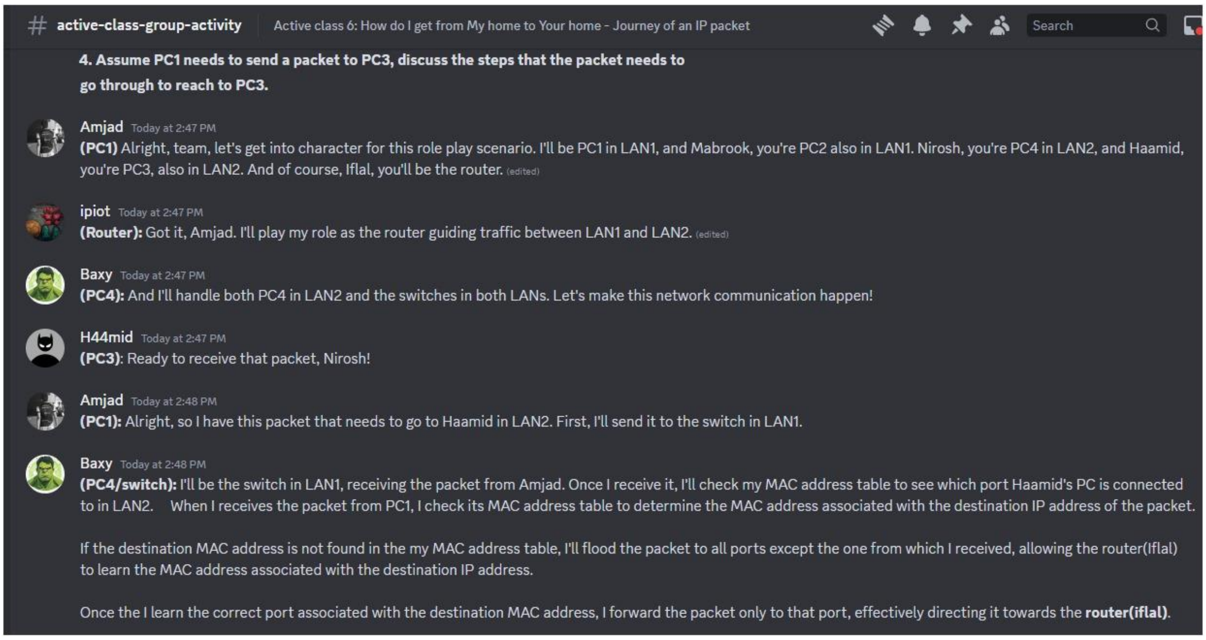
Amjad Today at 2:46 PM
Alright, Mabrook and I are in LAN1. So, for our PCs, we need to set up our IP addresses and gateways. We'll use the subnet 192.168.1.0/24. I'll set my IP address as 192.168.1.2, and Mabrook can be 192.168.1.3. Our gateway will be the IP address of the router's interface in LAN1, which is 192.168.1.1.

mabrook Today at 2:46 PM
Got it, Amjad. I'll configure my PC accordingly.

H44mid Today at 2:46 PM
Sounds good, Mabrook. So, Me and Nirosh are in LAN2. We'll use the subnet 10.1.1.0/24. My IP address will be 10.1.1.2, and Nirosh's will be 10.1.1.3. Our gateway will be the IP address of the router's interface in LAN2, which is 10.1.1.1. I'll set up my PC with those configurations. Looks like we're all set up to communicate between the two LANs now.

Baxy Today at 2:46 PM
Sounds good Haamid, I'll set My PC's configuration for LAN2 as well you mentioned above.
Excellent job, everyone! We've configured our devices properly, and now we're ready to make communication between LAN1 and LAN2 possible. Let's proceed to the next step of our activity.

4. **Assume PC1 needs to send a packet to PC3, discuss the steps that the packet needs to go through to reach to PC3.**



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4. Assume PC1 needs to send a packet to PC3, discuss the steps that the packet needs to go through to reach to PC3.

Amjad Today at 2:47 PM
(PC1) Alright, team, let's get into character for this role play scenario. I'll be PC1 in LAN1, and Mabrook, you're PC2 also in LAN1. Nirosh, you're PC4 in LAN2, and Haamid, you're PC3, also in LAN2. And of course, Iflal, you'll be the router. (edited)

ipiot Today at 2:47 PM
(Router): Got it, Amjad. I'll play my role as the router guiding traffic between LAN1 and LAN2. (edited)

Baxy Today at 2:47 PM
(PC4): And I'll handle both PC4 in LAN2 and the switches in both LANs. Let's make this network communication happen!

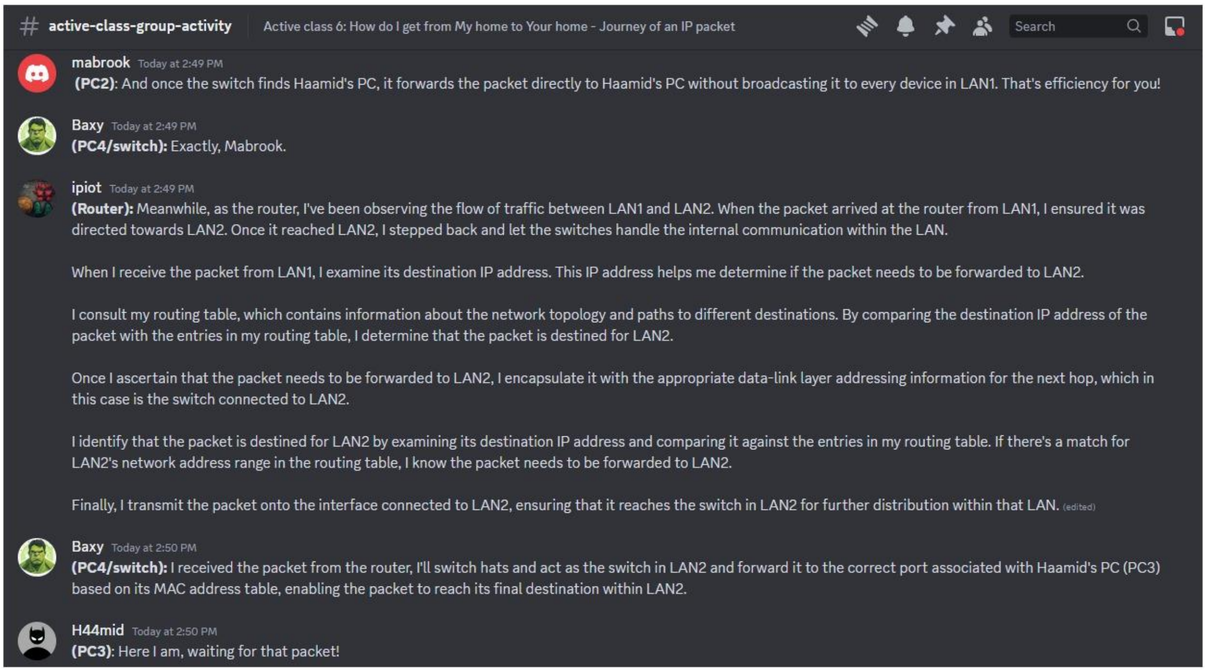
H44mid Today at 2:47 PM
(PC3): Ready to receive that packet, Nirosh!

Amjad Today at 2:48 PM
(PC1): Alright, so I have this packet that needs to go to Haamid in LAN2. First, I'll send it to the switch in LAN1.

Baxy Today at 2:48 PM
(PC4/switch): I'll be the switch in LAN1, receiving the packet from Amjad. Once I receive it, I'll check my MAC address table to see which port Haamid's PC is connected to in LAN2. When I receives the packet from PC1, I check its MAC address table to determine the MAC address associated with the destination IP address of the packet.

If the destination MAC address is not found in the my MAC address table, I'll flood the packet to all ports except the one from which I received, allowing the router(Iflal) to learn the MAC address associated with the destination IP address.

Once the I learn the correct port associated with the destination MAC address, I forward the packet only to that port, effectively directing it towards the **router(iflal)**.



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mabrook Today at 2:49 PM
(PC2): And once the switch finds Haamid's PC, it forwards the packet directly to Haamid's PC without broadcasting it to every device in LAN1. That's efficiency for you!

Baxy Today at 2:49 PM
(PC4/switch): Exactly, Mabrook.

ipiot Today at 2:49 PM
(Router): Meanwhile, as the router, I've been observing the flow of traffic between LAN1 and LAN2. When the packet arrived at the router from LAN1, I ensured it was directed towards LAN2. Once it reached LAN2, I stepped back and let the switches handle the internal communication within the LAN.

When I receive the packet from LAN1, I examine its destination IP address. This IP address helps me determine if the packet needs to be forwarded to LAN2.

I consult my routing table, which contains information about the network topology and paths to different destinations. By comparing the destination IP address of the packet with the entries in my routing table, I determine that the packet is destined for LAN2.

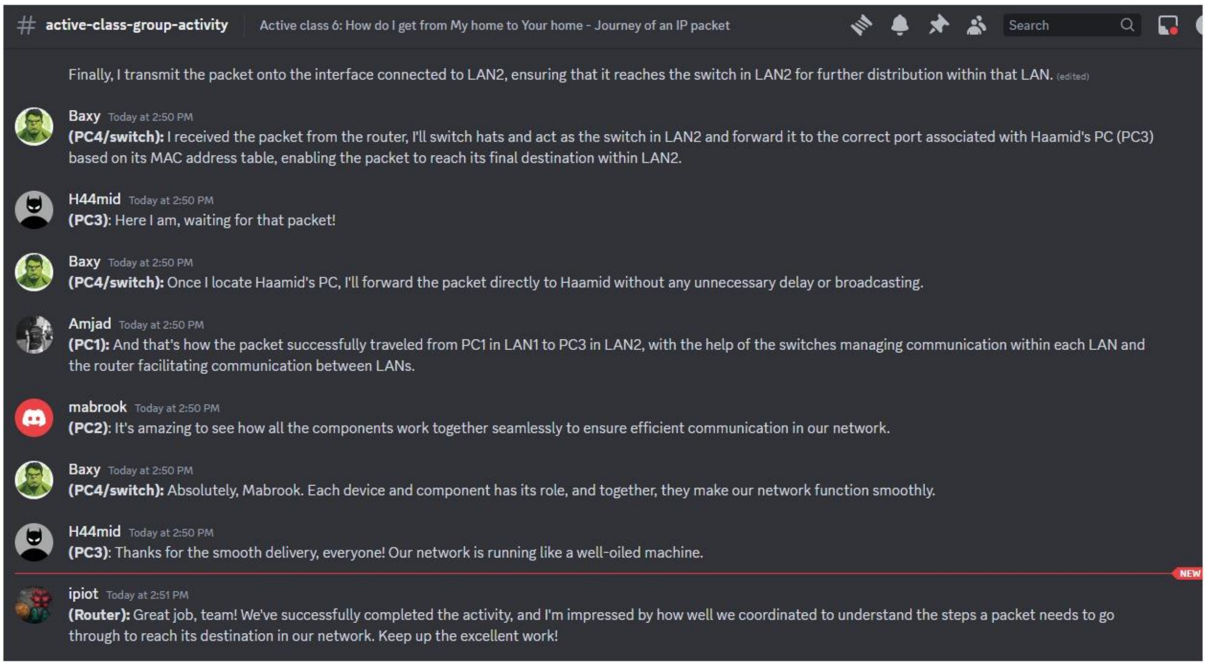
Once I ascertain that the packet needs to be forwarded to LAN2, I encapsulate it with the appropriate data-link layer addressing information for the next hop, which in this case is the switch connected to LAN2.

I identify that the packet is destined for LAN2 by examining its destination IP address and comparing it against the entries in my routing table. If there's a match for LAN2's network address range in the routing table, I know the packet needs to be forwarded to LAN2.

Finally, I transmit the packet onto the interface connected to LAN2, ensuring that it reaches the switch in LAN2 for further distribution within that LAN. (edited)

Baxy Today at 2:50 PM
(PC4/switch): I received the packet from the router, I'll switch hats and act as the switch in LAN2 and forward it to the correct port associated with Haamid's PC (PC3) based on its MAC address table, enabling the packet to reach its final destination within LAN2.

H44mid Today at 2:50 PM
(PC3): Here I am, waiting for that packet!



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H44mid Today at 2:50 PM
(PC3): Here I am, waiting for that packet!

Baxy Today at 2:50 PM
(PC4/switch): Once I locate Haamid's PC, I'll forward the packet directly to Haamid without any unnecessary delay or broadcasting.

Amjad Today at 2:50 PM
(PC1): And that's how the packet successfully traveled from PC1 in LAN1 to PC3 in LAN2, with the help of the switches managing communication within each LAN and the router facilitating communication between LANs.

mabrook Today at 2:50 PM
(PC2): It's amazing to see how all the components work together seamlessly to ensure efficient communication in our network.

Baxy Today at 2:50 PM
(PC4/switch): Absolutely, Mabrook. Each device and component has its role, and together, they make our network function smoothly.

H44mid Today at 2:50 PM
(PC3): Thanks for the smooth delivery, everyone! Our network is running like a well-oiled machine.

NEW

ipiot Today at 2:51 PM
(Router): Great job, team! We've successfully completed the activity, and I'm impressed by how well we coordinated to understand the steps a packet needs to go through to reach its destination in our network. Keep up the excellent work!

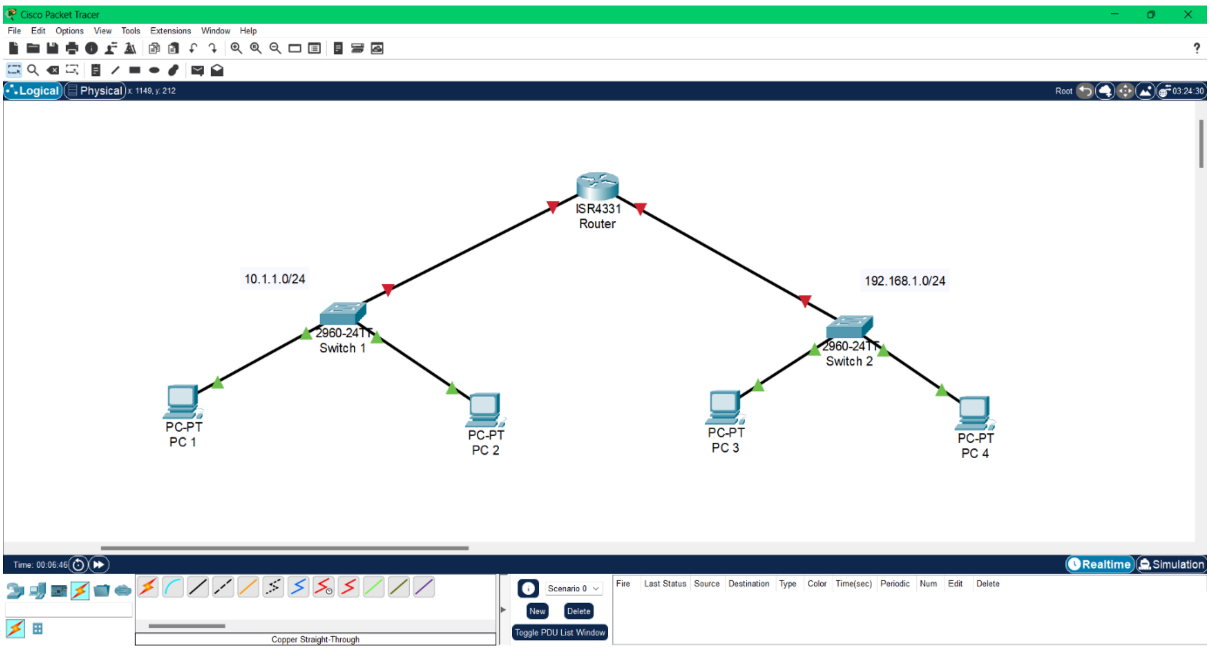
Activity 3:

The end of our learning journey involved implementing the network we conceptualized in Cisco Packet Tracer. I carefully determined the IP addresses of all PCs based on their LAN affiliations.

Once all devices were configured and interconnected, I verified connectivity using the ping command. Leveraging simulation mode, I validated the steps discussed in Activity 2. To show as evidence.

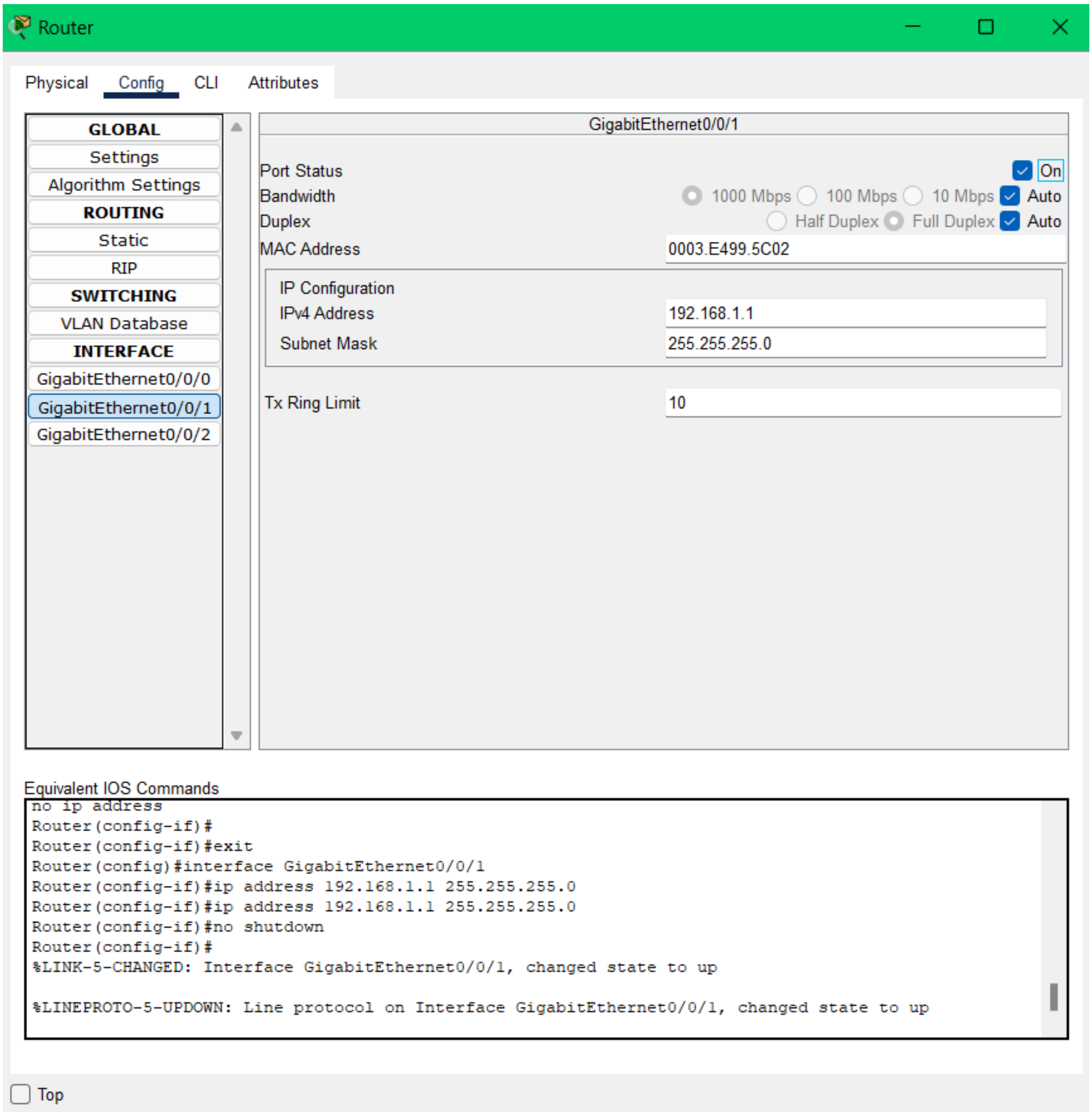
This involves practically setting up the network we discussed in Activity 2. We need to create the network with two LANs (LAN1 and LAN2) and configure the devices (PCs and router) with the appropriate IP addresses and settings as we discussed earlier.

First, I created the network, before configuration

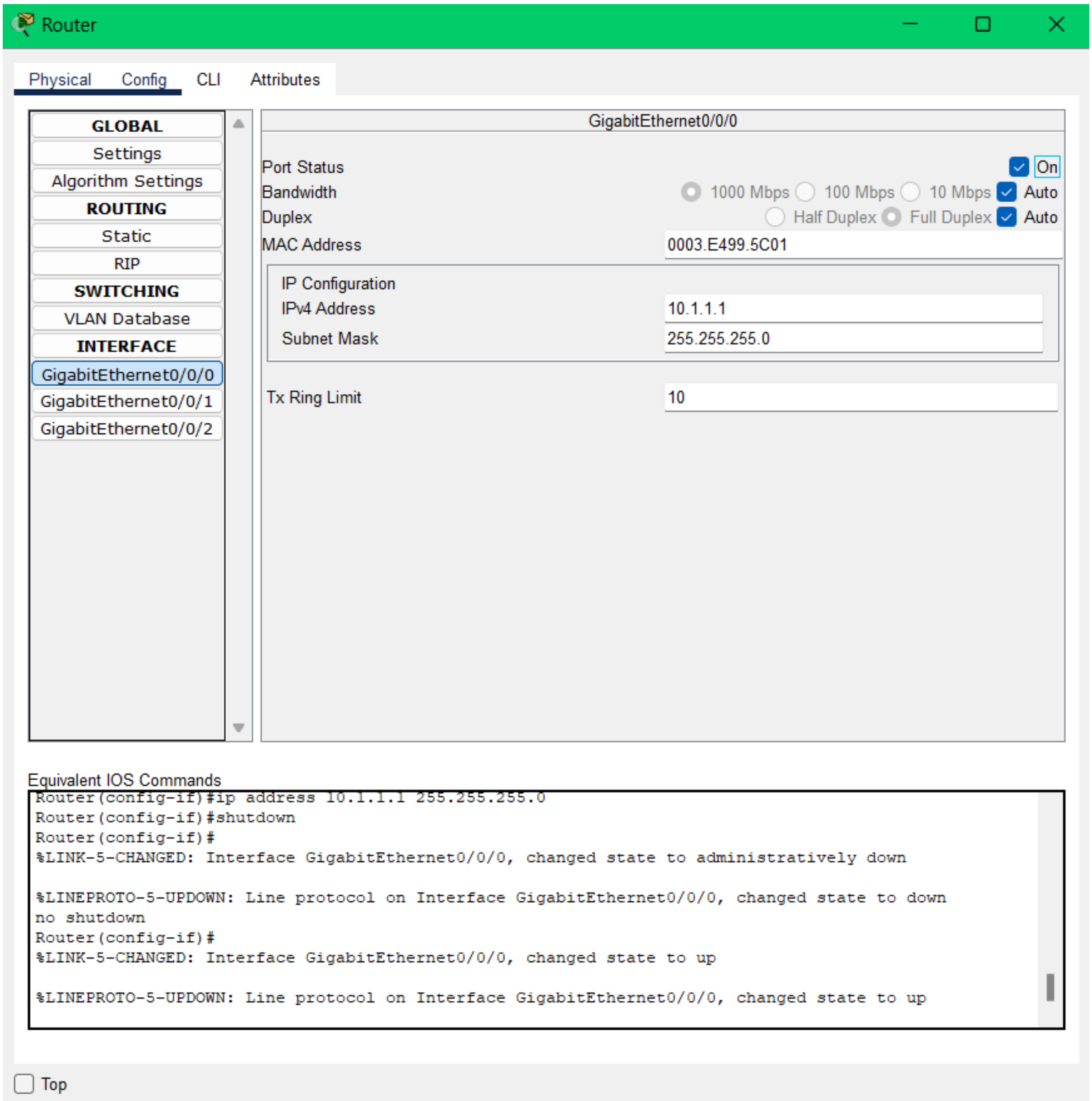


Then I configured the router for both the gigabit ethernet

g/0/1



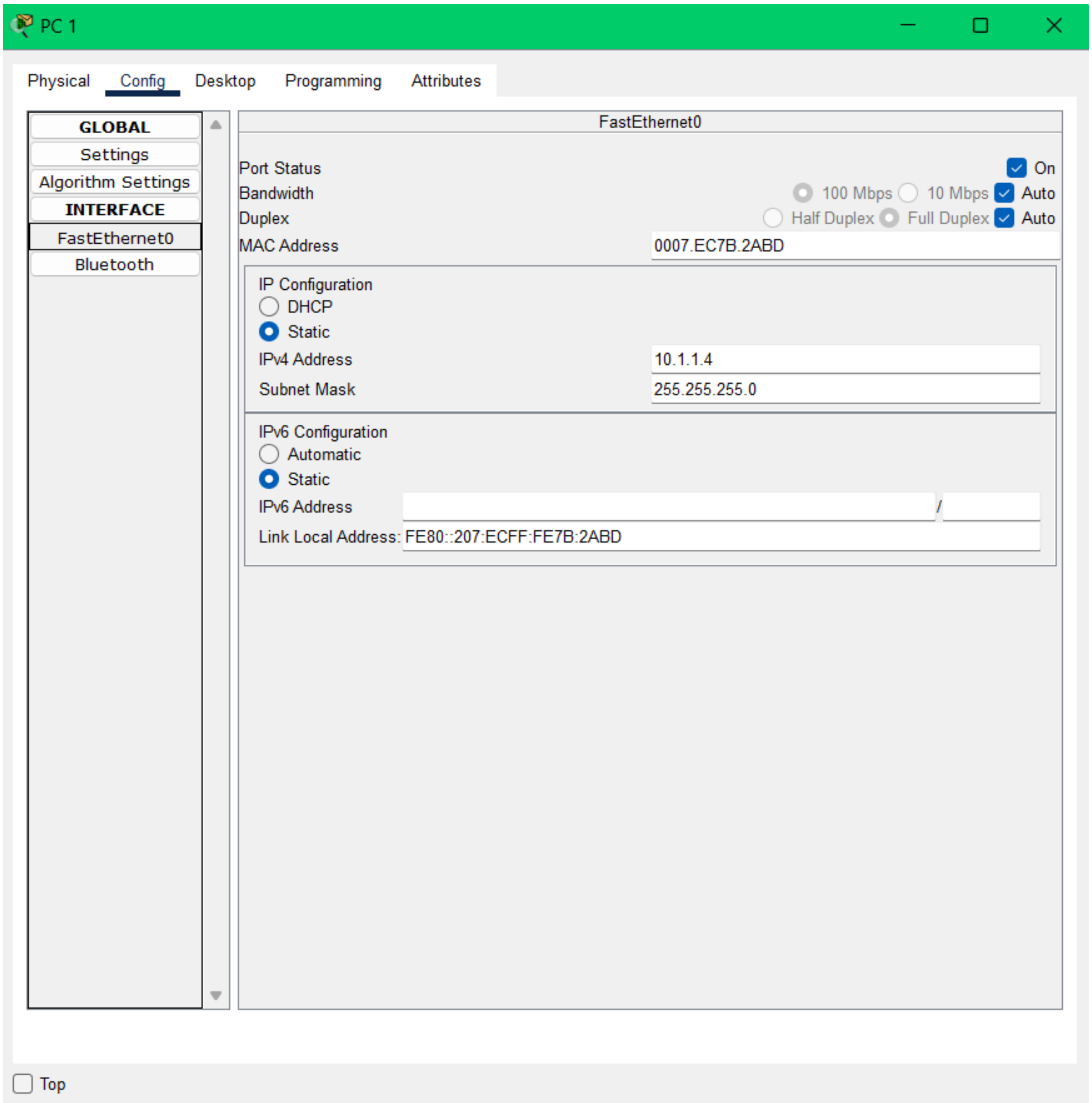
g/0/0



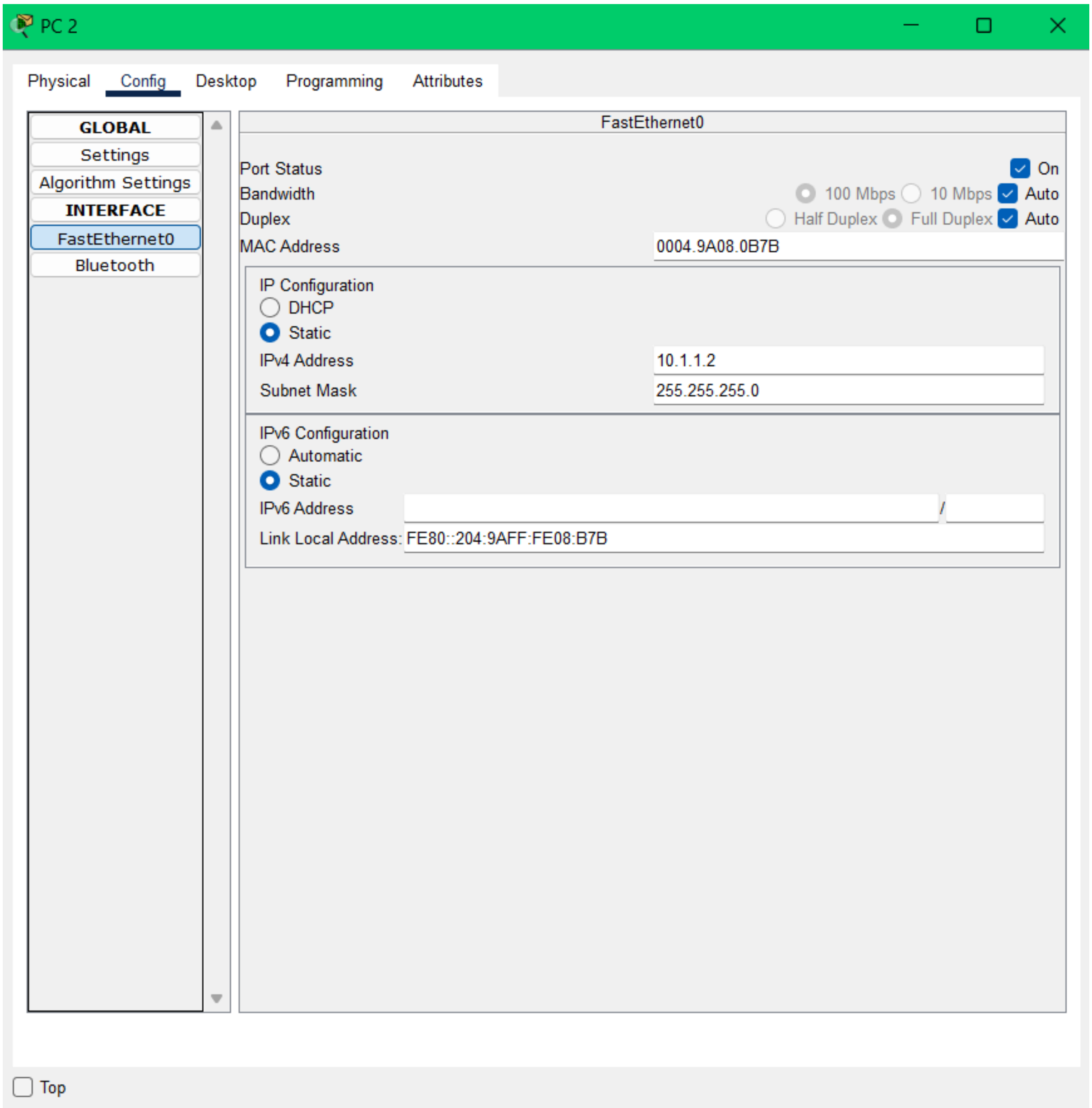
Router
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0/0
GigabitEthernet0/0/1
GigabitEthernet0/0/2
GigabitEthernet0/0/0
Port Status
On
Bandwidth
1000 Mbps
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
0003.E499.5C01
IP Configuration
IPv4 Address
10.1.1.1
Subnet Mask
255.255.255.0
Tx Ring Limit
10
Equivalent IOS Commands
Router(config-if)#ip address 10.1.1.1 255.255.255.0
Router(config-if)#shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to administratively down
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0, changed state to down
no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0, changed state to up
Top

Now I gave the ip addresses for each PCs

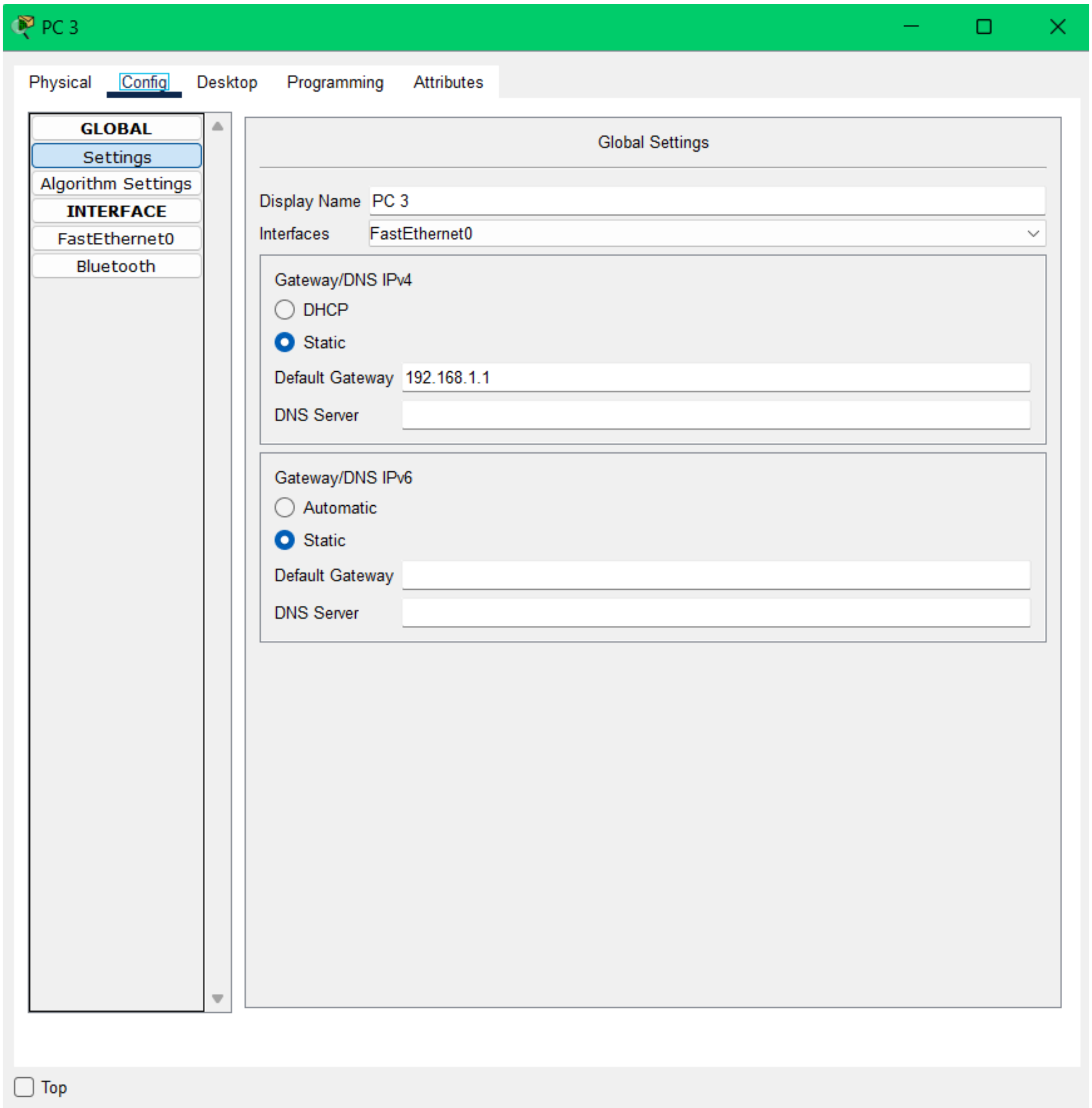
PC1



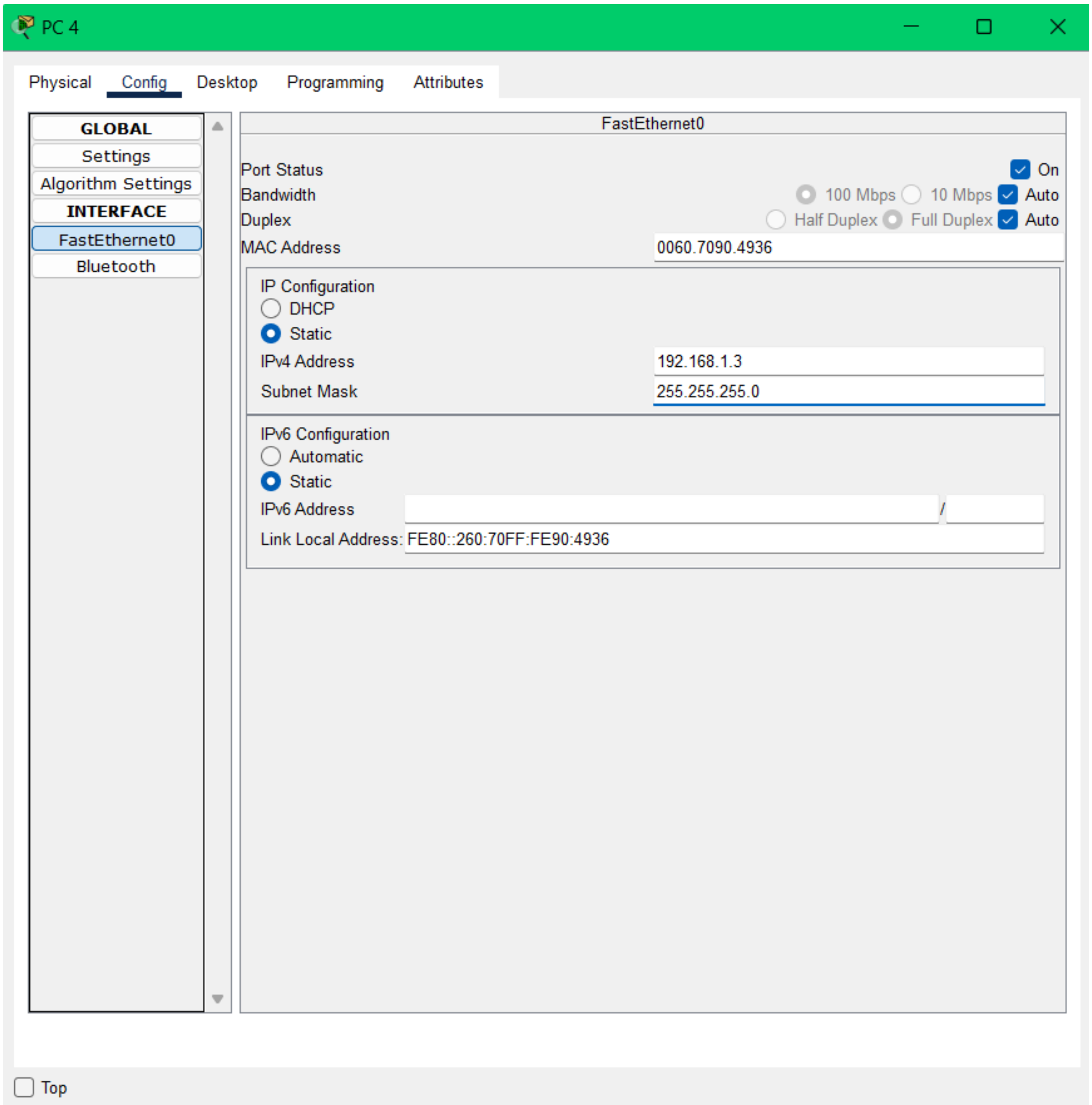
PC2


PC 2
Physical
Config
Desktop
Programming
Attributes
GLOBAL
Settings
Algorithm Settings
INTERFACE
FastEthernet0
Bluetooth
FastEthernet0
Port Status
On
Bandwidth
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
0004.9A08.0B7B
IP Configuration
DHCP
Static
IPv4 Address
10.1.1.2
Subnet Mask
255.255.255.0
IPv6 Configuration
Automatic
Static
IPv6 Address
/
Link Local Address:
FE80::204:9AFF:FE08:B7B
Top

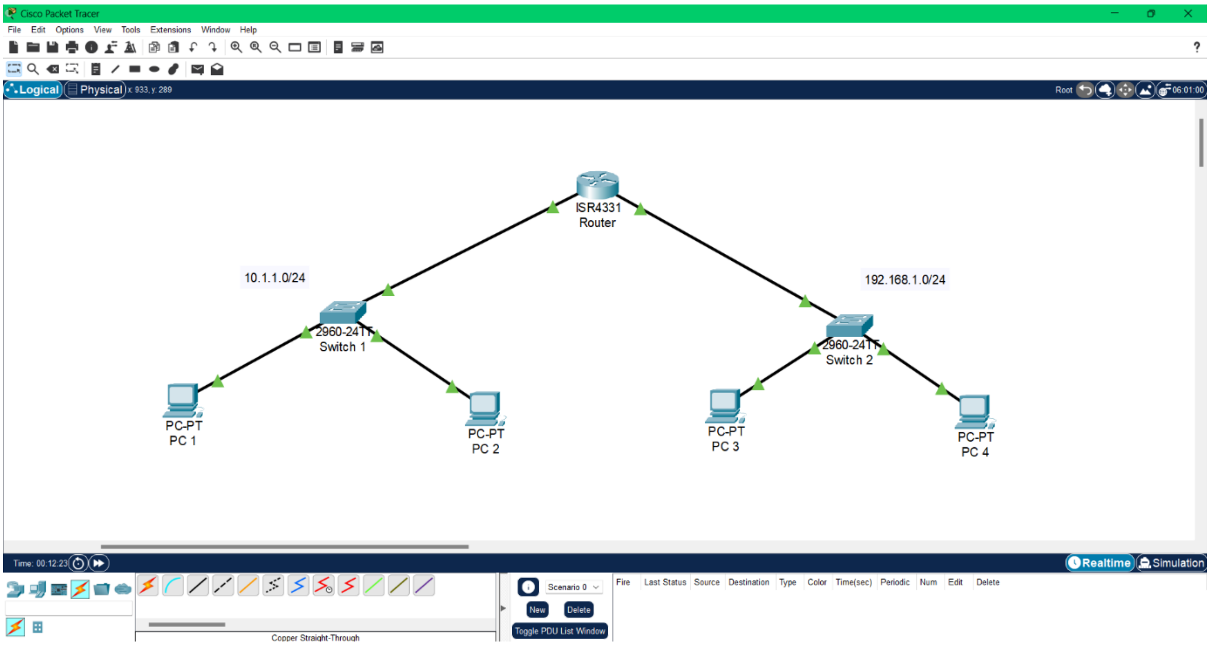
PC3


PC 3
Physical
Config
Desktop
Programming
Attributes
GLOBAL
Settings
Algorithm Settings
INTERFACE
FastEthernet0
Bluetooth
Global Settings
Display Name
PC 3
Interfaces
FastEthernet0
Gateway/DNS IPv4
DHCP
Static
Default Gateway
192.168.1.1
DNS Server
Gateway/DNS IPv6
Automatic
Static
Default Gateway
DNS Server
Top

PC4

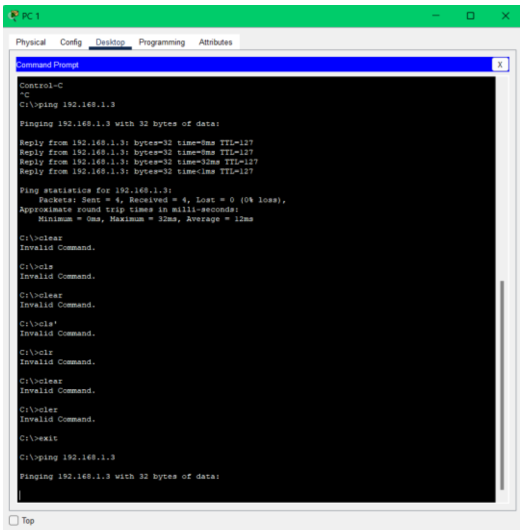

PC 4
Physical
Config
Desktop
Programming
Attributes
GLOBAL
Settings
Algorithm Settings
INTERFACE
FastEthernet0
Bluetooth
FastEthernet0
Port Status
On
Bandwidth
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
0060.7090.4936
IP Configuration
DHCP
Static
IPv4 Address
192.168.1.3
Subnet Mask
255.255.255.0
IPv6 Configuration
Automatic
Static
IPv6 Address
/
Link Local Address:
FE80::260:70FF:FE90:4936
Top

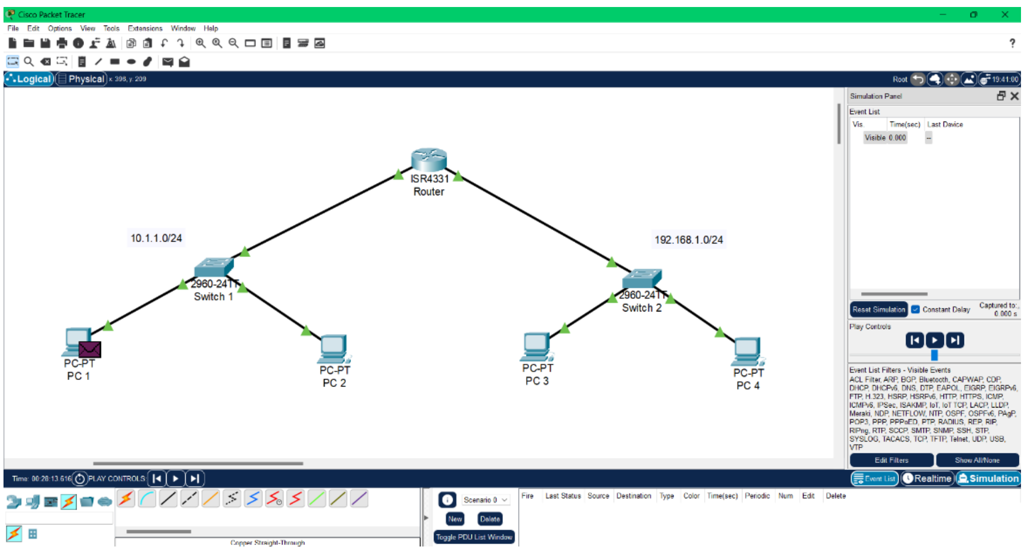
After configurations



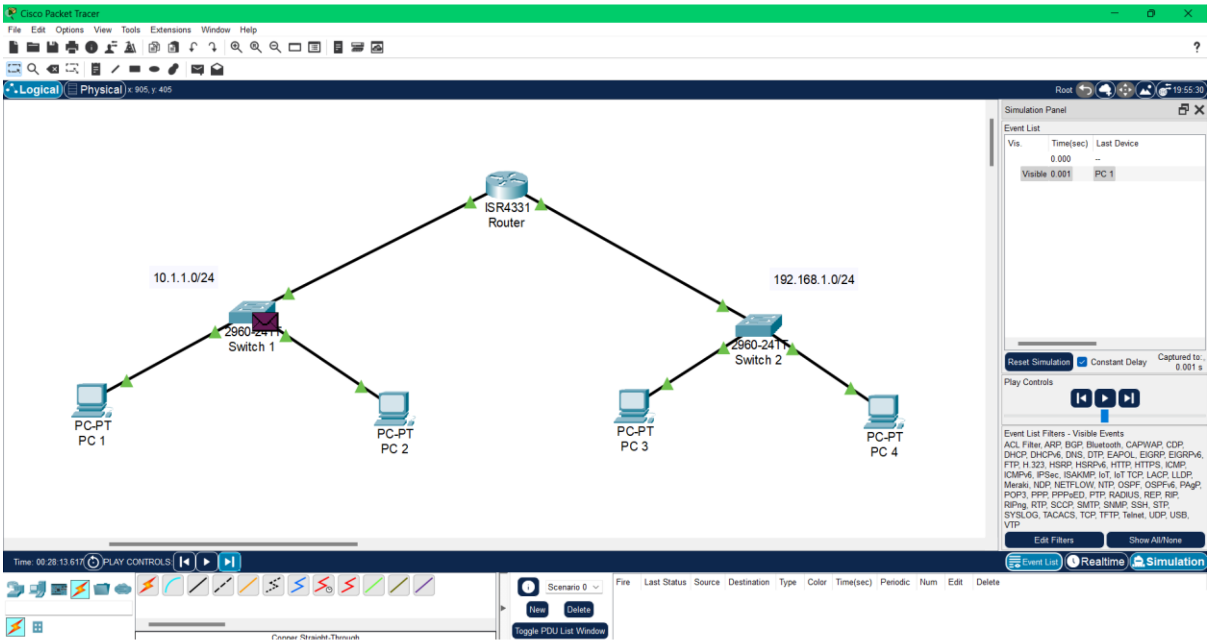
After setting up the network, we'll use the "ping" command from one PC to another to check if the devices can communicate with each other successfully. For instance, if PC3's IP address is 192.168.1.5, we'll type "ping 192.168.1.5" from PC1's command prompt to see if PC1 can reach PC3.

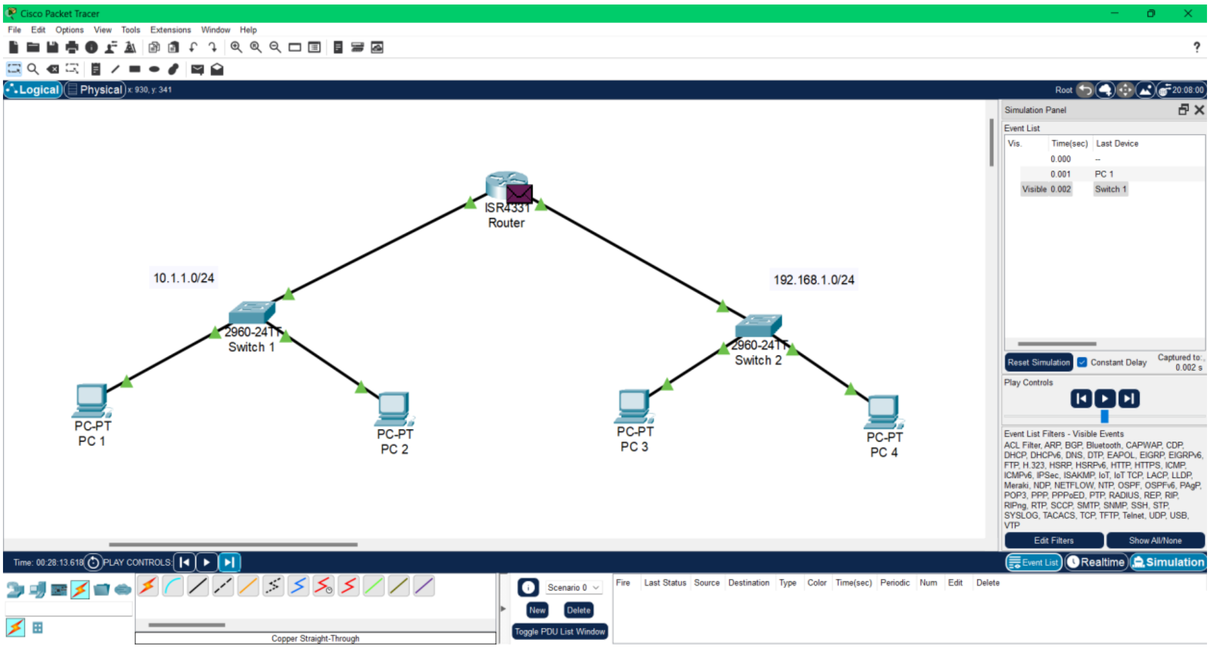
Now I sent a packet from PC1 to PC3

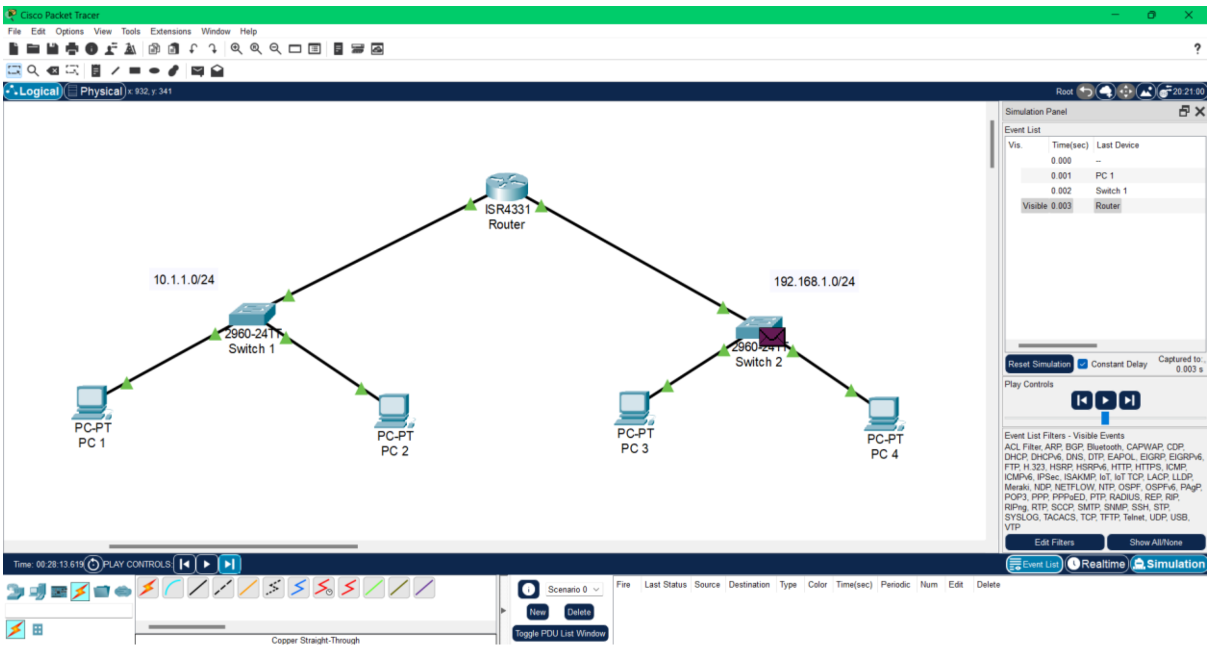


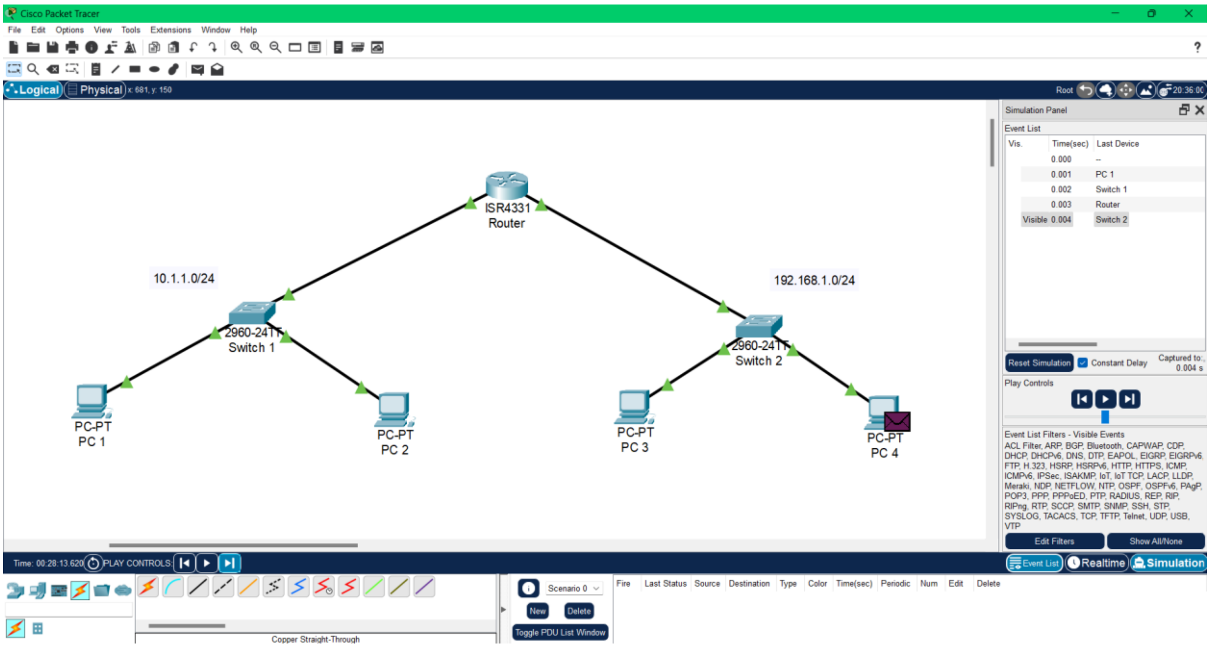


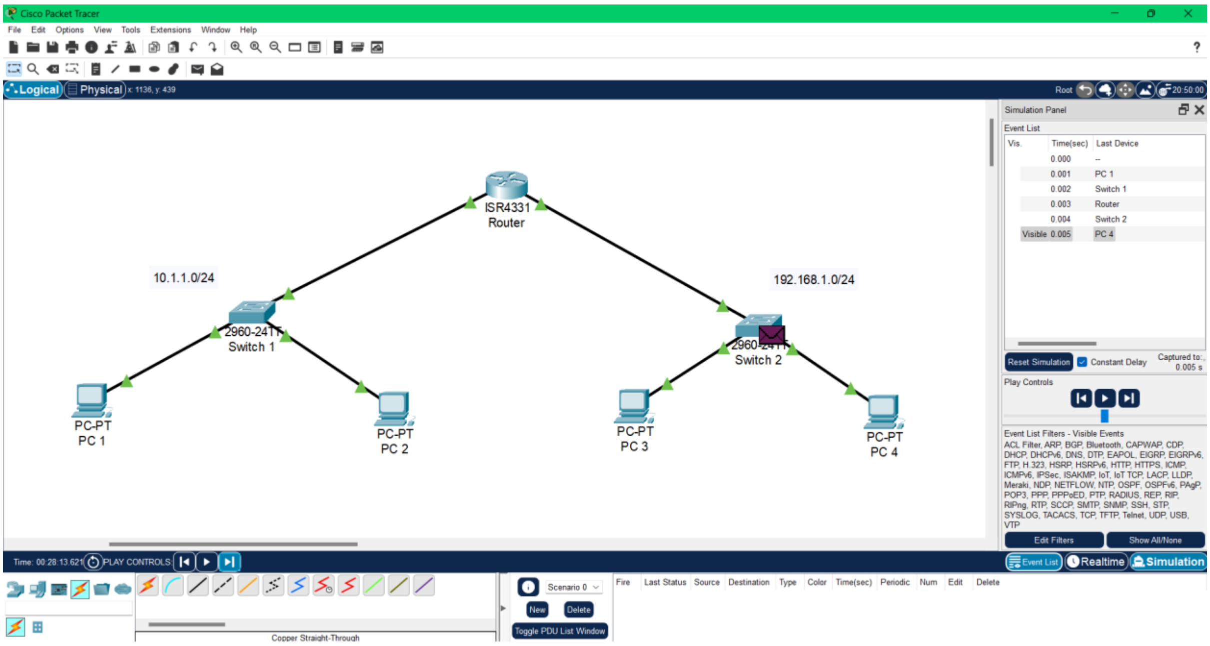
In Activity 2 Step 4, we discussed the steps a packet needs to go through to reach from one PC to another. In this step of Activity 3, we'll use Packet Tracer's simulation mode to visually verify if the packet follows the expected path we discussed earlier. This helps reinforce our understanding of how packets are routed through a network.

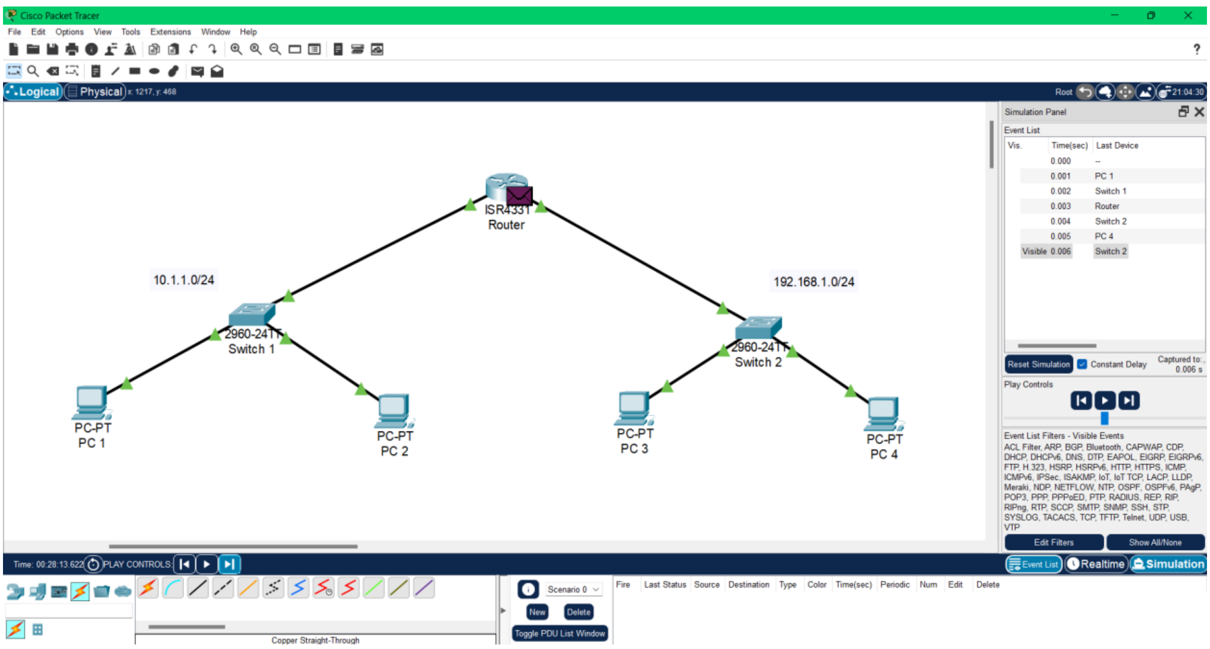

ISR4331
Router
10.1.1.0/24
192.168.1.0/24
2960-24TT
Switch 1
2960-24TT
Switch 2
PC-PT
PC 1
PC-PT
PC 2
PC-PT
PC 3
PC-PT
PC 4

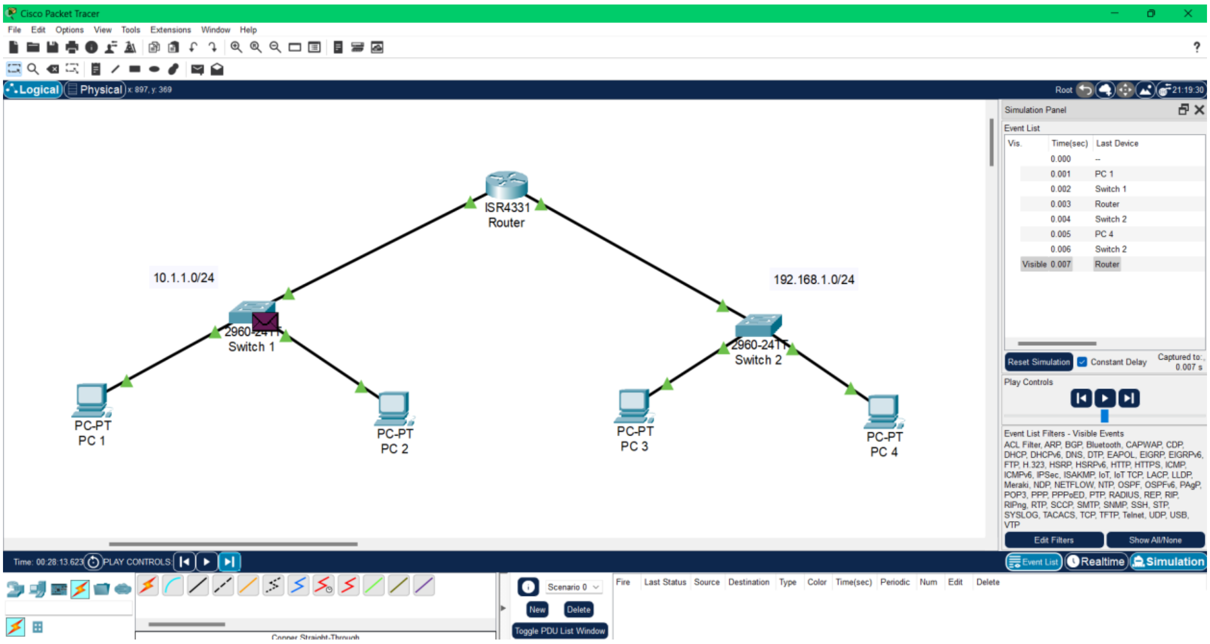

ISR4331
Router
10.1.1.0/24
192.168.1.0/24
2960-24TT
Switch 1
2960-24TT
Switch 2
PC-PT
PC 1
PC-PT
PC 2
PC-PT
PC 3
PC-PT
PC 4

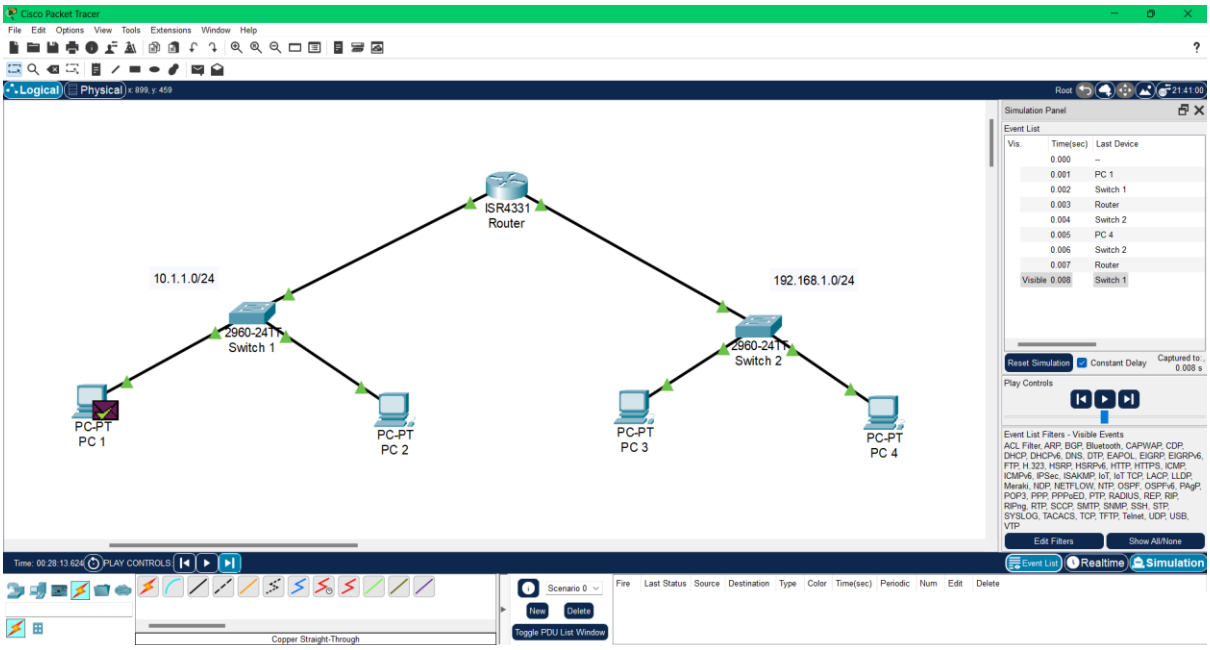

ISR4331
Router
10.1.1.0/24
192.168.1.0/24
2960-24TT
Switch 1
2960-24TT
Switch 2
PC-PT
PC 1
PC-PT
PC 2
PC-PT
PC 3
PC-PT
PC 4


ISR4331
Router
10.1.1.0/24
192.168.1.0/24
2960-24TT
Switch 1
2960-24TT
Switch 2
PC-PT
PC 1
PC-PT
PC 2
PC-PT
PC 3
PC-PT
PC 4
Simulation Panel
Event List


ISR4331
Router
10.1.1.0/24
192.168.1.0/24
2960-24TT
Switch 1
Switch 2
PC-PT
PC 1
PC-PT
PC 2
PC-PT
PC 3
PC-PT
PC 4
Simulation Panel
Event List


Router
10.1.1.0/24
192.168.1.0/24
2960-24TT
Switch 1
2960-24TT
Switch 2
PC-PT
PC 1
PC-PT
PC 2
PC-PT
PC 3
PC-PT
PC 4
Simulation Panel
Event List





The packet first starts from the PC1, reaches the switch, then the switch forwards the packet to the router. Now the router looks for the correct network address