Faculty of Engineering and Technology

Department of Electrical and Computer Engineering

Computer Networks

ENCS3320

Project #2

Network Layer

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Sections: 1,4.

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Abstract

This project aims to improve our understanding in network layer by creating a practical network design using packet tracer software. Specifically, to be familiar with packet tracer software, and use it to build a complete topology that contains data center, companies and core network. Additionally, to do IP subnetting and address assignment, and to configure devices and PCs in the topology using appropriate IPs. Moreover, to configure HTTP and DNS servers to use them to access a simple website. In addition, to design and implement a routing protocol like (OSPF) to control the flow of packets between routers. Furthermore, to test our design by using some network utilities like ping and tracert between all PCs in the topology and also accessing the HTTP and DNS server from them. Also, we send some packets with different protocols such as TCP, ICMP and DHCP to study their outputs using wireshark.

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1. Wireshark

TCP:

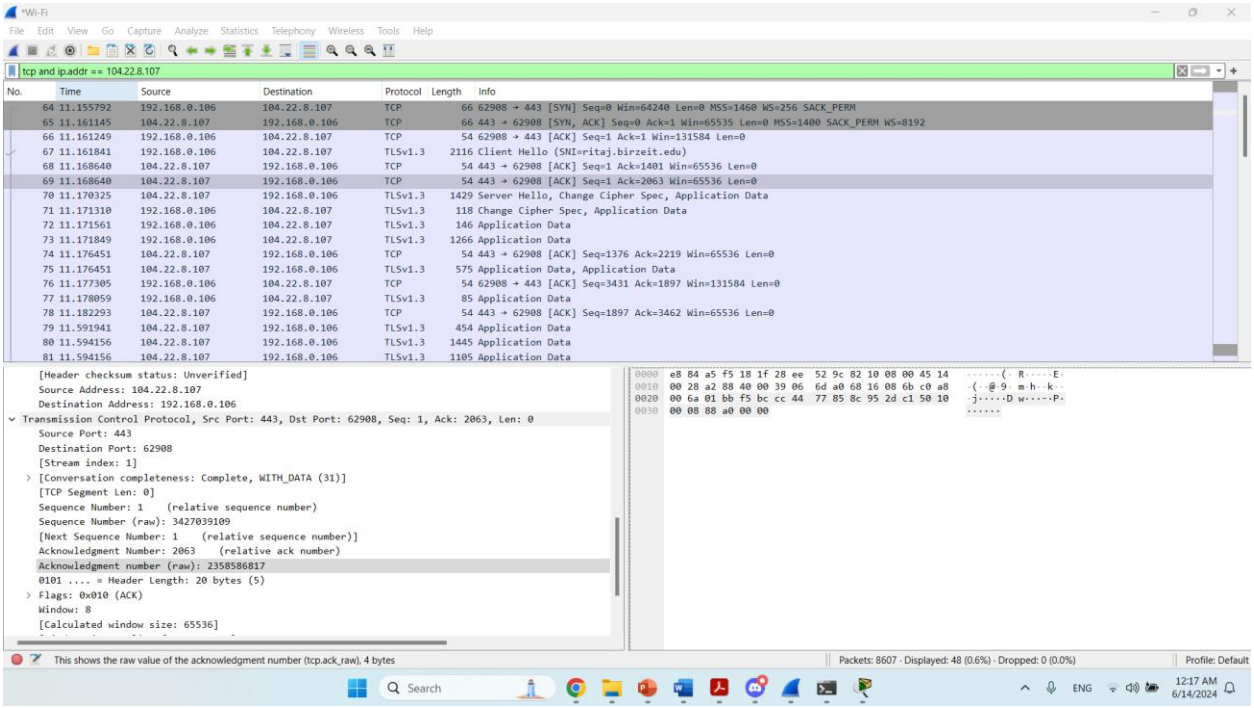


Figure 1: TCP packets

As shown in figure 1 we capture a TCP packet that has the following information source port, destination port, sequence number and acknowledgement number.

Source port is equal to 443 and it used to know from which packet it was sent.

Destination port is equal to 62908 and it used to know from which packet being sent.

Sequence number equals to 1 which is the first byte of this segment.

Acknowledgement number equals to 2063 which is the next sequence number that the sender is expected to receive.

DHCP:

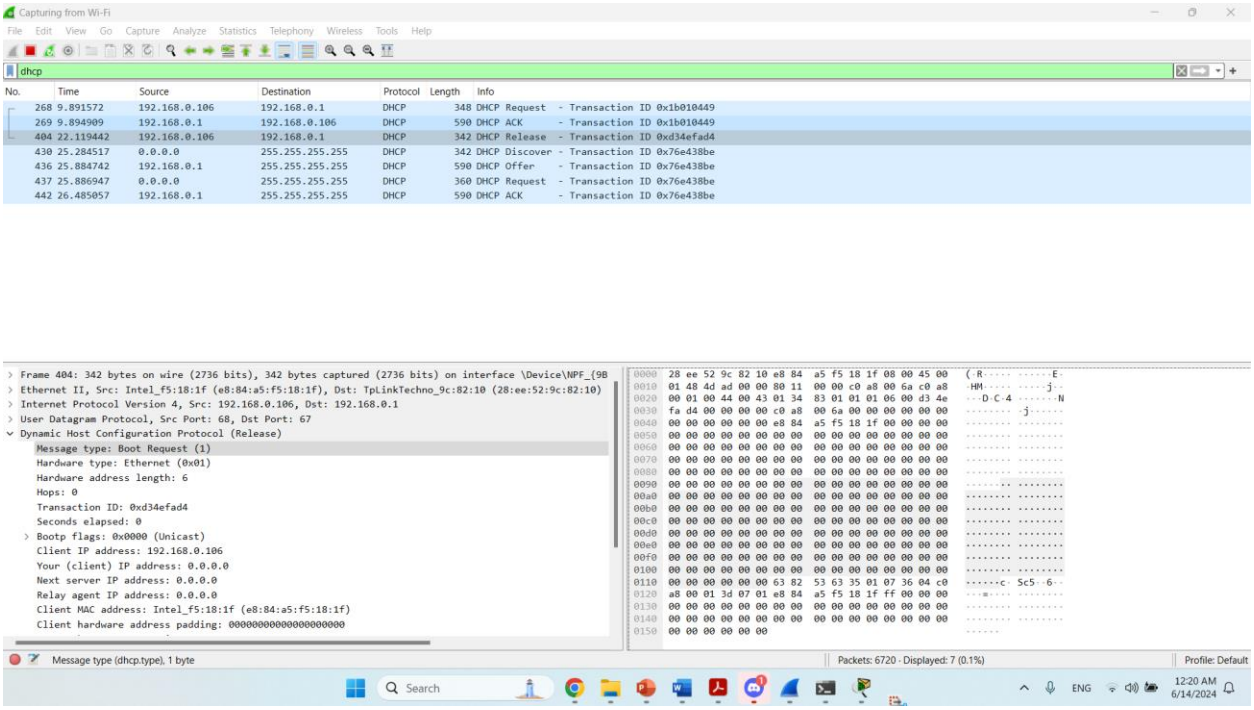


Figure 2: DHCP packet

As shown in figure 2 we capture a DHCP packet that has the following information message type, Transaction ID, Client IP Address and Your (client) IP Address.

message type is equal to Boot **Request,** and it used Indicates the type of DHCP message.

Transaction ID is equal to 0Xd34efad4, and it is used as a unique identifier for the DHCP transaction.

Client IP Address equals 192.168.0.106 which is the IP address of the client.

Your (client) IP Address equals to 0.0.0.0 which is The IP address that the server is offering to the client.

ICMP:

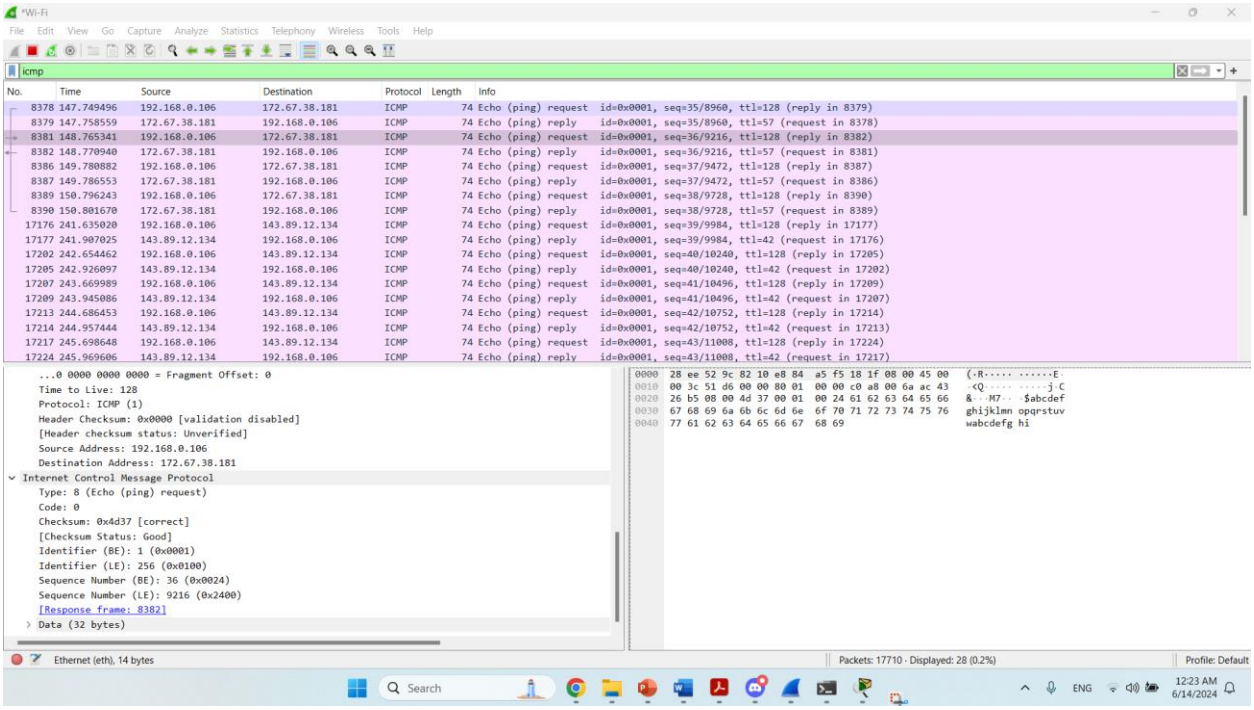


Figure 3: ICMP packet

As shown in figure 3 we capture an ICMP packet that has the following information Type, Code, Checksum and Identifier.

Type is equal to 8(Echo Request)**,** and it is used to indicate the type of ICMP message.

Code is equal to 0, and it is used to provide further information about the ICMP message type.

Checksum equals 0X4d37 used for error-checking the ICMP header and data.

Identifier equals to 0X0001 which is used to match requests and replies in Echo messages.

2. Packet Tracer

2.1. IP subnetting and assignment:

We have chosen Abdelrahmans's ID (12117769) to do the subnetting, thus our IP address will be: 117.69.4.0/23.

We are given five subnets in the topology, and we have added additional five subnets to cover the links between each router (each subnet needs two hosts) as shown below:

Network	Number of End Devices (PCs and Servers)
Data center	50
Company A	26
Company B	29
Company C Office 1	10
Company C Office 2	15
R1-R2 link	2
R2-R3 link	2
R1-R4 link	2
R3-R4 link	2
R4-R5 link	2

Table 1: subnetting details

We start by the subnet with highest number of hosts (Data Center):

- 50 hosts (+2 for network and broadcast IPs) → needs 6-bits for host part.
- Network IP: 117.69.00000100.00000000 /26 → total of 62 users

Company B:

- 29 hosts (+2 for network and broadcast IPs) → needs 5-bits for host part.
- Network IP: 117.69.00000100.01000000 /27 → total of 30 users

Company A:

- 26 hosts (+2 for network and broadcast IPs) → needs 5-bits for host part.
- Network IP: 117.69.00000100.10000000 /27 → total of 30 users

Company C office 2:

- 15 hosts (+2 for network and broadcast IPs) → needs 5-bits for host part.
- Network IP: 117.69.00000100.11000000 /27 → total of 30 users

Company C office 1:

- 10 hosts (+2 for network and broadcast IPs) → needs 4-bits for host part.
- Network IP: 117.69.00000100.01100000 /28 → total of 14 users

R1-R2 link:

- 2 hosts (+2 for network and broadcast IPs) → needs 2-bits for host part.
- Network IP: 117.69.00000100.11100000 /30 → total of 2 users

R2-R3 link:

- 2 hosts (+2 for network and broadcast IPs) → needs 2-bits for host part.
- Network IP: 117.69.00000100.11100100 /30 → total of 2 users

R3-R4 link:

- 2 hosts (+2 for network and broadcast IPs) → needs 2-bits for host part.
- Network IP: 117.69.00000100.11101000 /30 → total of 2 users

R1-R4 link:

- 2 hosts (+2 for network and broadcast IPs) → needs 2-bits for host part.
- Network IP: 117.69.00000100.11101100 /30 → total of 2 users

R4-R5 link:

- 2 hosts (+2 for network and broadcast IPs) → needs 2-bits for host part.
- Network IP: 117.69.00000100.11110000 /30 → total of 2 users

Final results and details:

Subnet	Subnet Mask "using the slash notation"	Network IP	Broadcast IP	First IP	Last IP	Maximum number of IPs in this subnet
Data Center	**255.255.255.192/26**	**117.69.4.0/26**	**117.69.4.63/26**	**117.69.4.1/26**	**117.69.4.62/26**	**Hosts = 62**
Company B	**255.255.255.224/27**	**117.69.4.64/27**	**117.69.4.95/27**	**117.69.4.65/27**	**117.69.4.94/27**	**Hosts =30**
Company A	**255.255.255.224/27**	**117.69.4.128/27**	**117.69.4.159/27**	**117.69.4.129/27**	**117.69.4.158/27**	**Hosts =30**
Company C Office 2	**255.255.255.224/27**	**117.69.4.192/27**	**117.69.4.223/27**	**117.69.4.193/27**	**117.69.4.222/27**	**Hosts =30**
Company C Office 1	**255.255.255.240/28**	**117.69.4.96/28**	**117.69.4.111/28**	**117.69.4.97/28**	**117.69.4.110/28**	**Hosts =14**
R1-R2 Link	**255.255.255.252/30**	**117.69.4.224/30**	**117.69.4.227/30**	**117.69.4.225/30**	**117.69.4.226/30**	**Hosts =2**
R2-R3 Link	**255.255.255.252/30**	**117.69.4.228/30**	**117.69.4.231/30**	**117.69.4.229/30**	**117.69.4.230/30**	**Hosts =2**
R3-R4 Link	**255.255.255.252/30**	**117.69.4.232/30**	**117.69.4.235/30**	**117.69.4.233/30**	**117.69.4.234/30**	**Hosts =2**
R4-R1 Link	**255.255.255.252/30**	**117.69.4.236/30**	**117.69.4.239/30**	**117.69.4.237/30**	**117.69.4.238/30**	**Hosts =2**
R4-R5 Link	**255.255.255.252/30**	**117.69.4.240/30**	**117.69.4.243/30**	**117.69.4.241/30**	**117.69.4.242/30**	**Hosts =2**

Table 2: subnetting final details

2.2. Building The Topology

In this part, we built a topology using **PacketTracer**, based on the IP's found in Part0. As shown in the figure above, we build the topology into one area:

The topology:

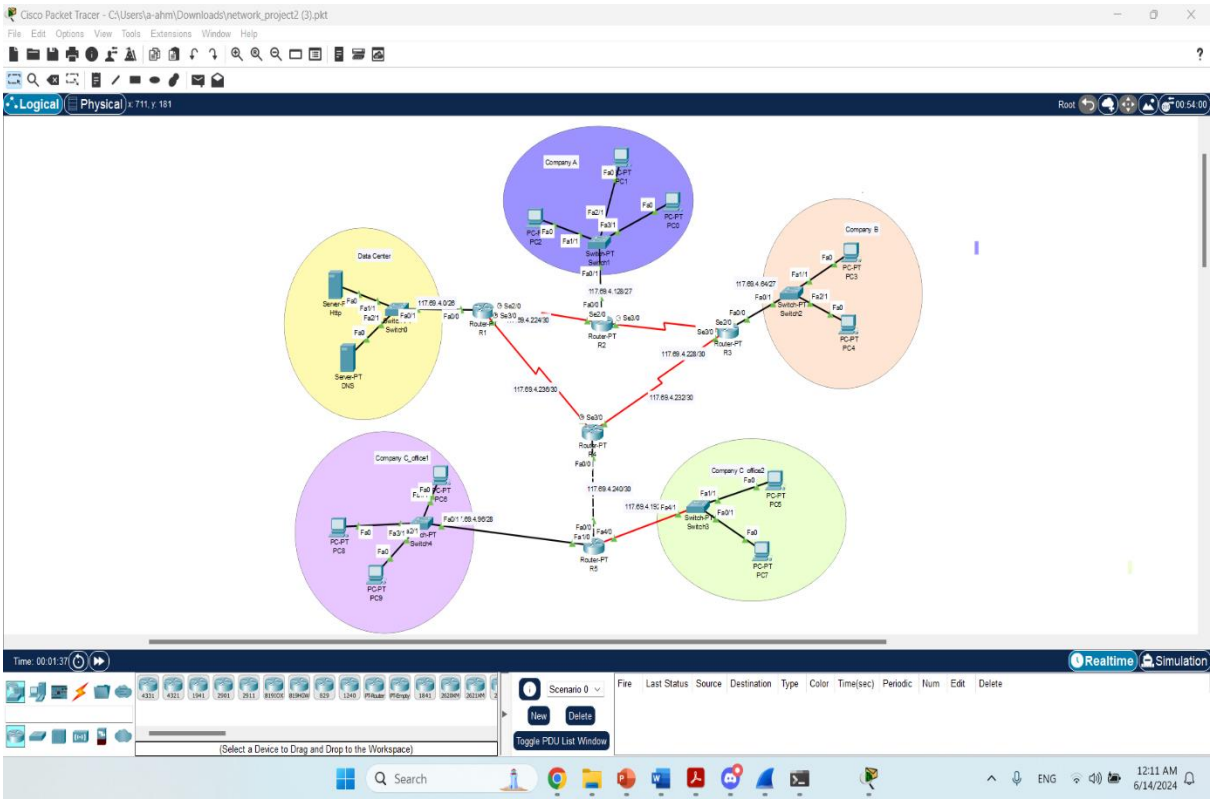


Figure 4: Topology with IPs

- Data center: Yellow area
- Company A: blue area
- Company B: olive area
- Company C office 1: Pink area
- Company C office 2: green area

Then, we gave each area an IP address:

- Data center: 117.69.4.0/28
- Company A: 117.69.4.128/27
- Company B: 117.69.4.64/27
- Company C office 1: 117.69.4.96/28
- Company C office 2: 117.69.4.192/27

2.2.1. Configurations

1. Routers:

- **Router (R1)**

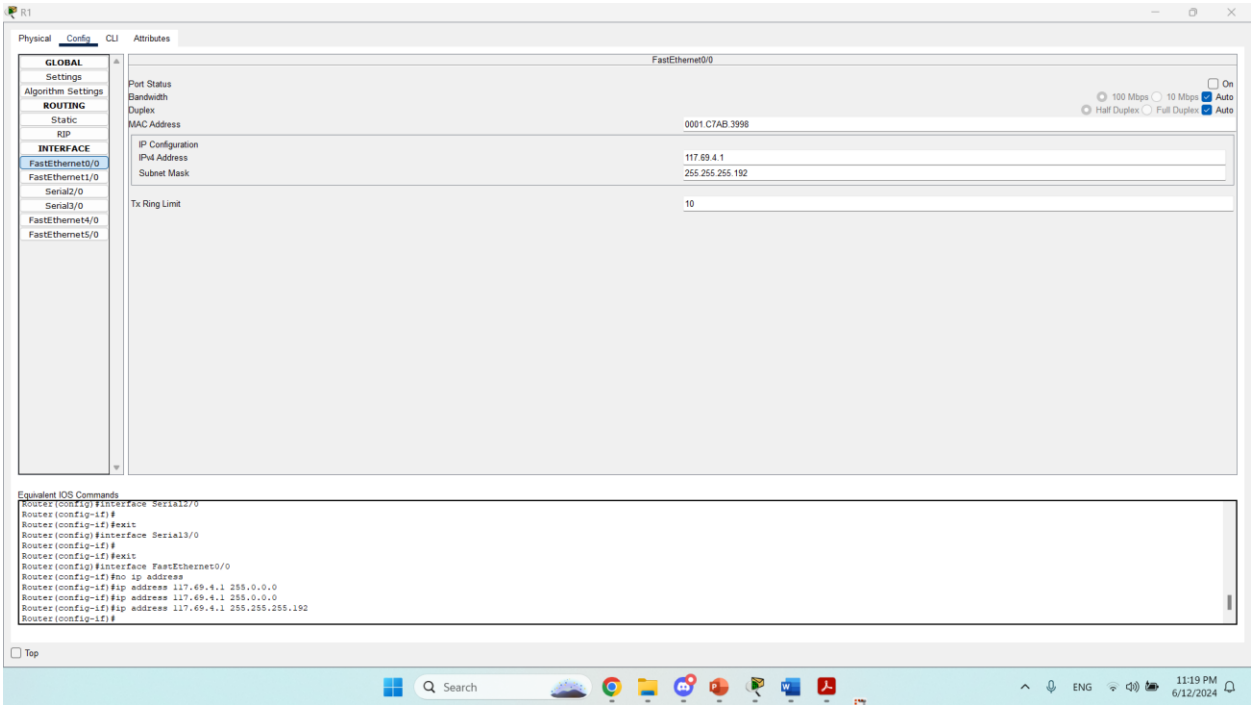


Figure 5: Router R1 configuration.

For Router R1, we gave it the first IP after the network IP 117.69.4.1, and subnet mask 255.255.255.192

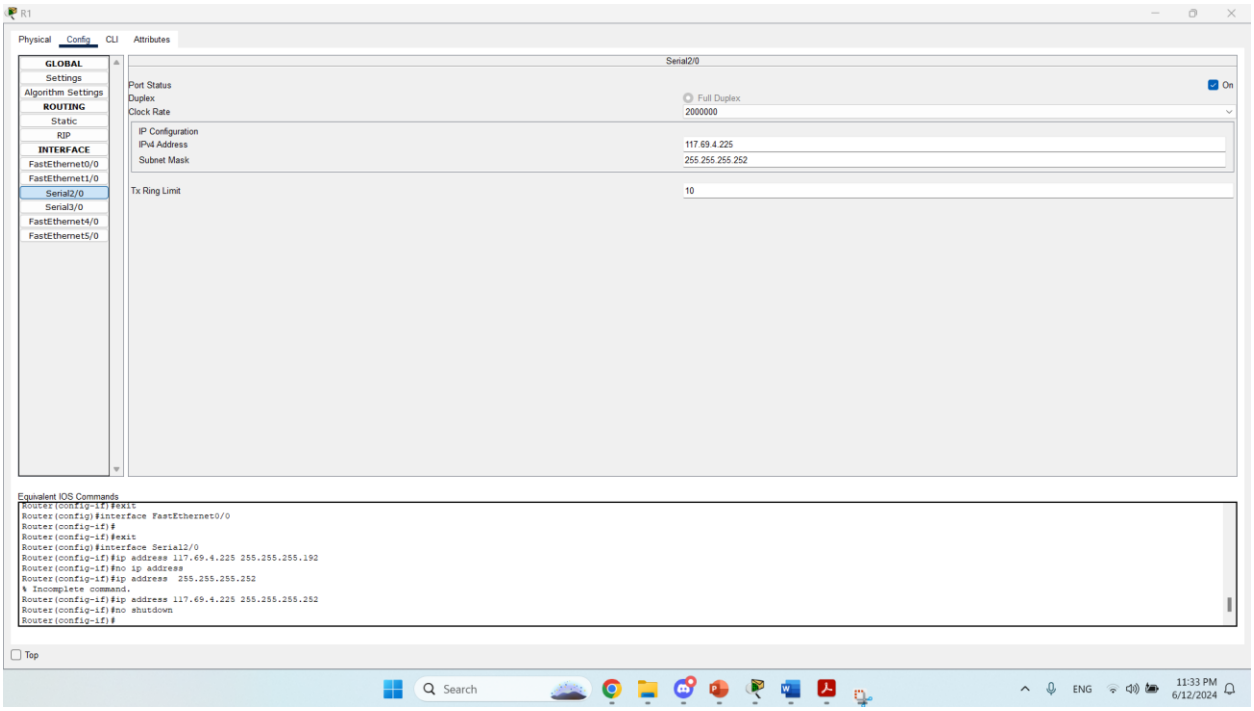


Figure 6: Router R1 interface se2/0 configuration.

For the interface that is used to connect with the fourth Router (R2) se2/0, we gave it the first IP after link IP 117.69.4.225 and a subnet mask 255.255.255.252.

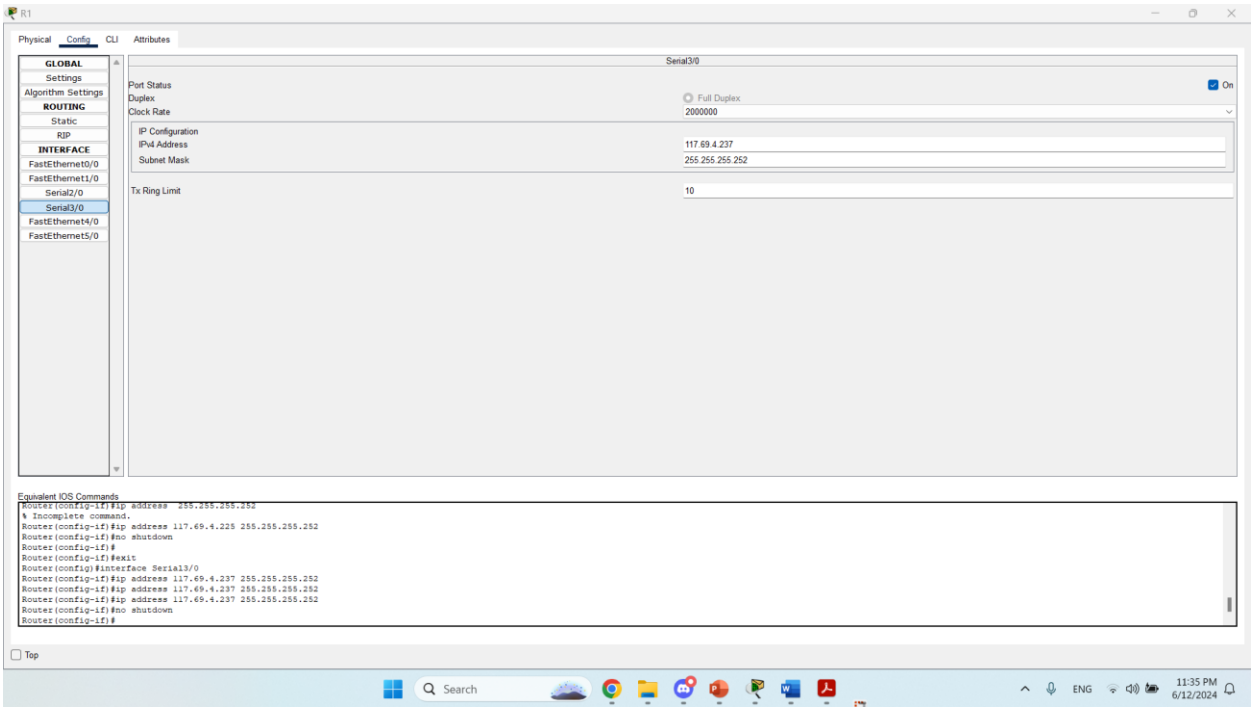


Figure 7 : Router R1 interface se3/0 configuration.

For the interface that is used to connect with the second Router (R4) se3/0, we gave it the first IP after link IP 117.69.4.237 and a subnet mask 255.255.255.252.

- **Router (R2)**

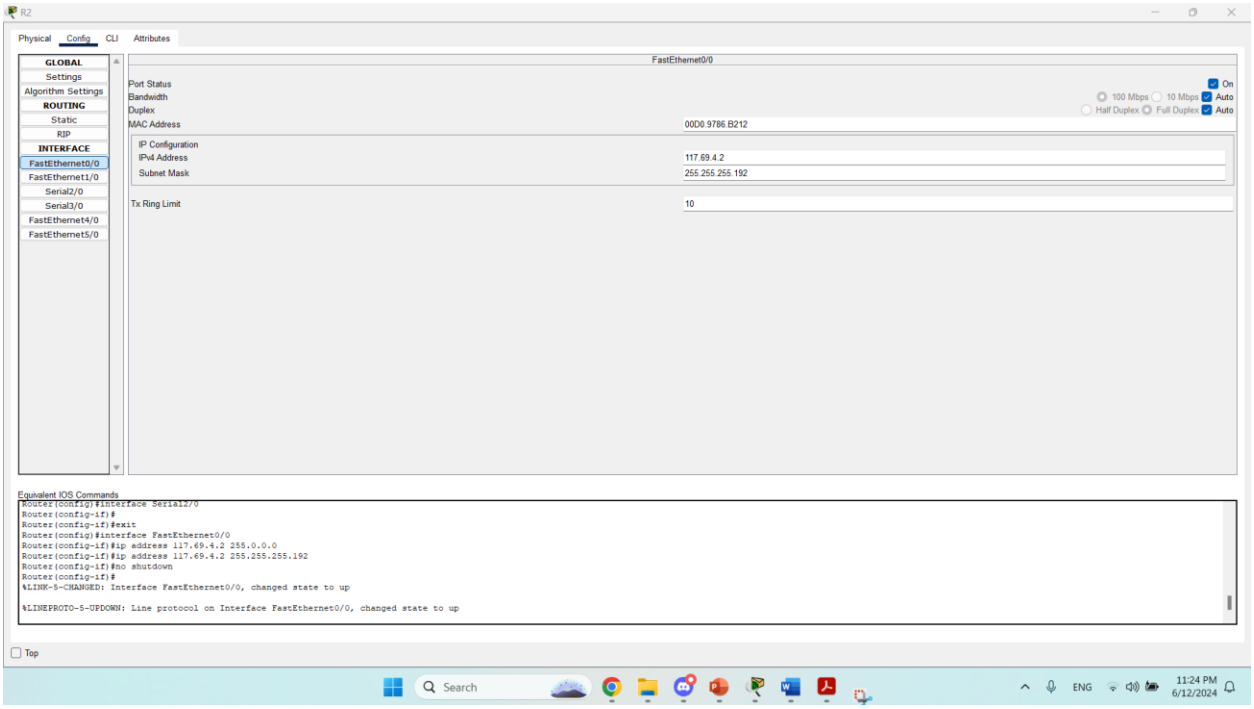


Figure 8: Router R2 configuration.

For Router R2, we gave it the first IP after the network IP 117.69.4.2 and subnet mask 255.255.255.192.

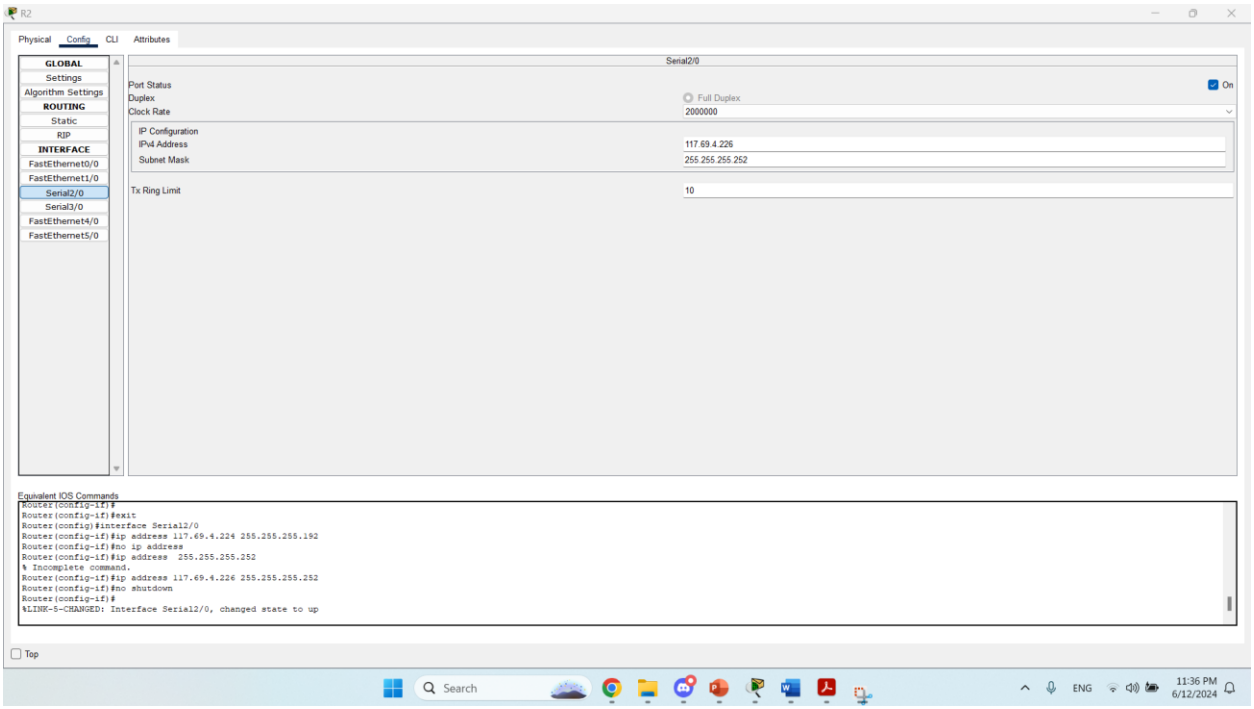


Figure 9: Router R2 interface se2/0 configuration.

For the interface that is used to connect with the First Router (R1) se2/0, we gave it the second IP after link IP 117.69.4.226 and a subnet mask 255.255.255.252.

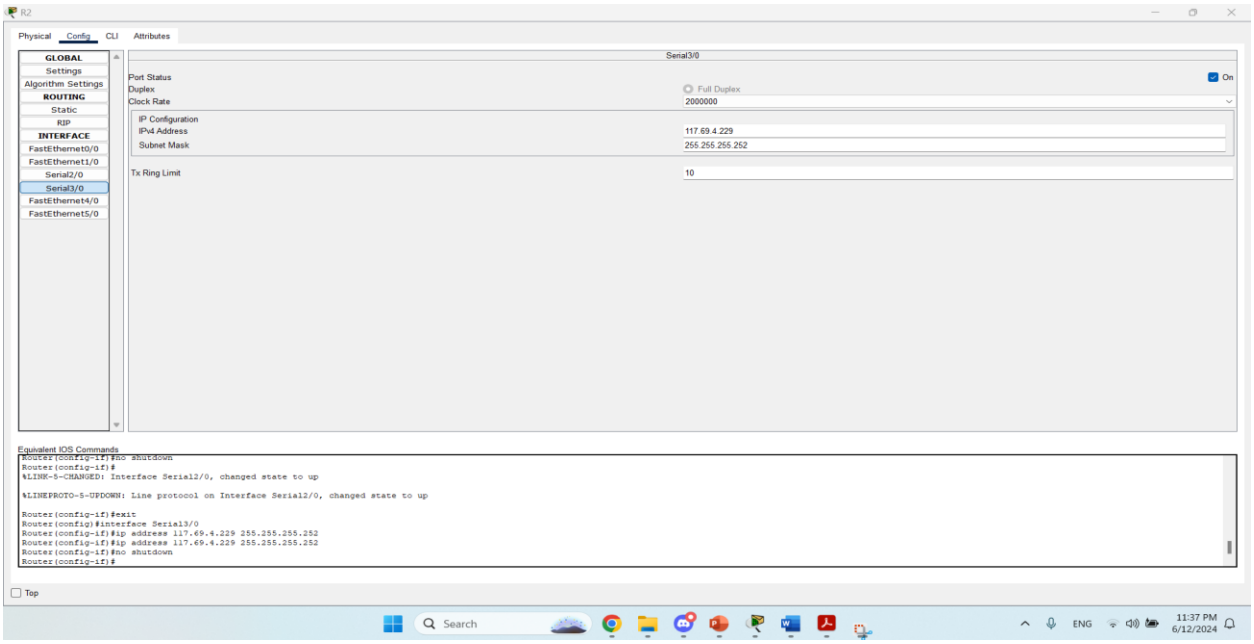


Figure 10: Router R2 interface se3/0 configuration.

For the interface that is used to connect with the Third Router (R3) se3/0, we gave it the second IP after link IP 117.69.4.229 and a subnet mask 255.255.255.252.

- **Router (R3)**

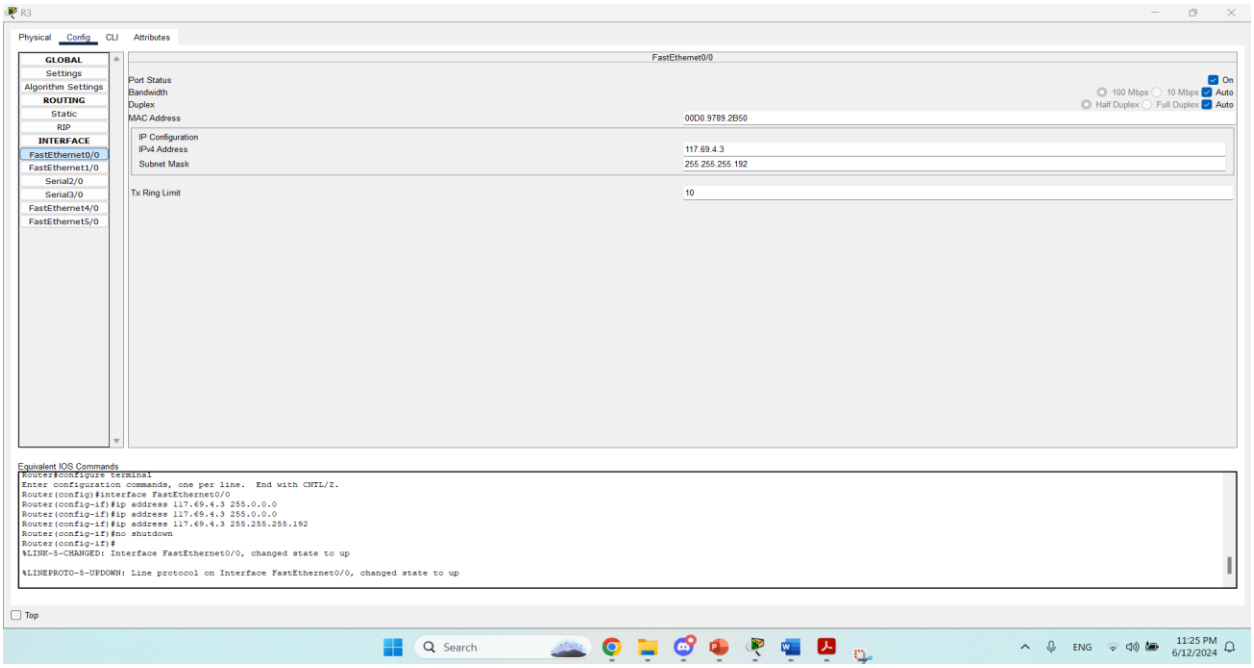


Figure 11: Router R3 configuration.

For Router R3, we gave it the first IP after the network IP 117.69.4.3 and subnet mask 255.255.255.192.

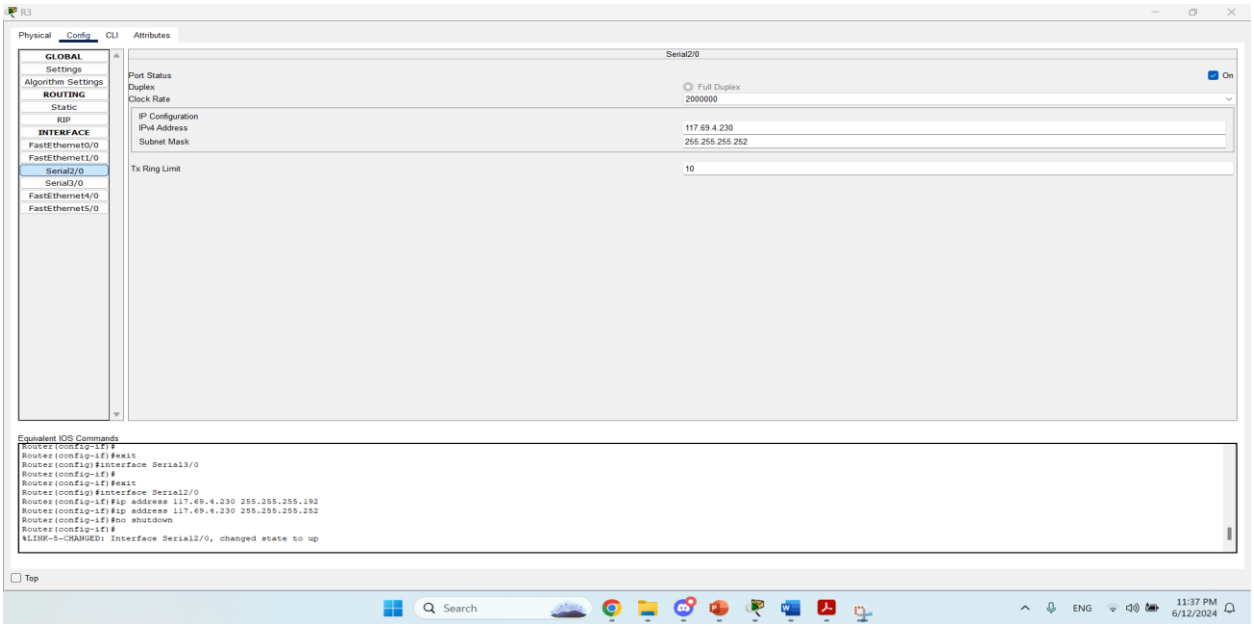


Figure 12: Router R3 interface se2/0 configuration

For the interface that is used to connect with the Second Router (R2) se2/0, we gave it the second IP after link IP 117.69.4.230 and a subnet mask 255.255.255.252.

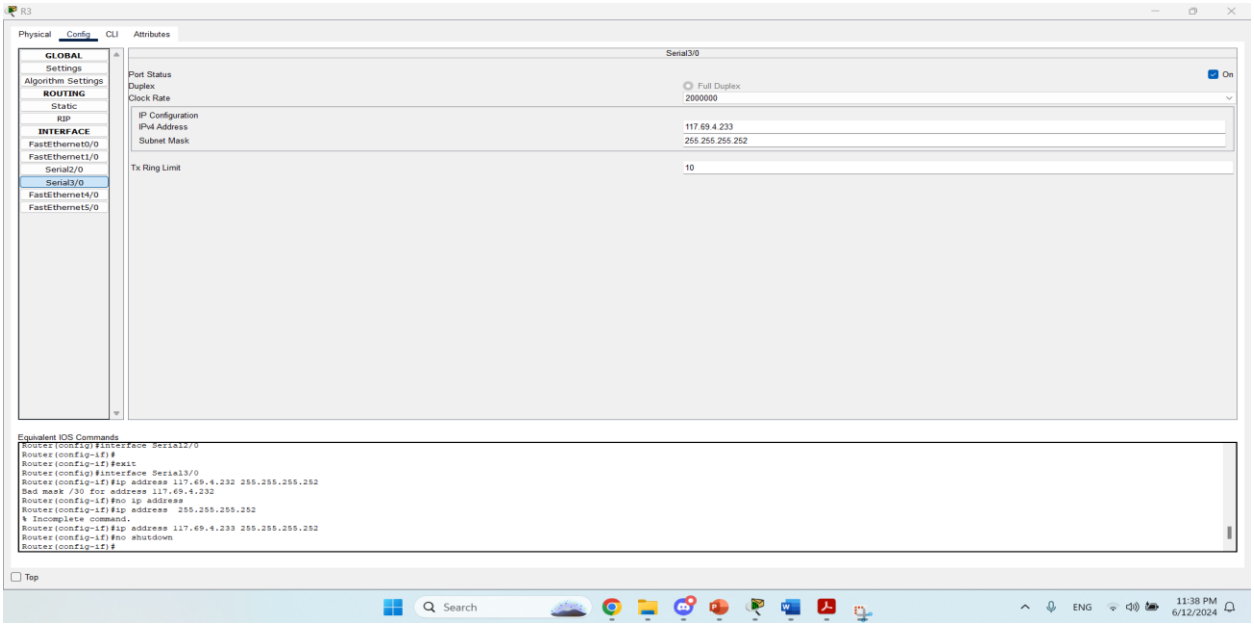


Figure 13 : Router R3 interface se3/0 configuration.

For the interface that is used to connect with the Fourth Router (R4) se3/0, we gave it the First IP after link IP 117.69.4.233 and a subnet mask 255.255.255.252.

- **Router (R4)**

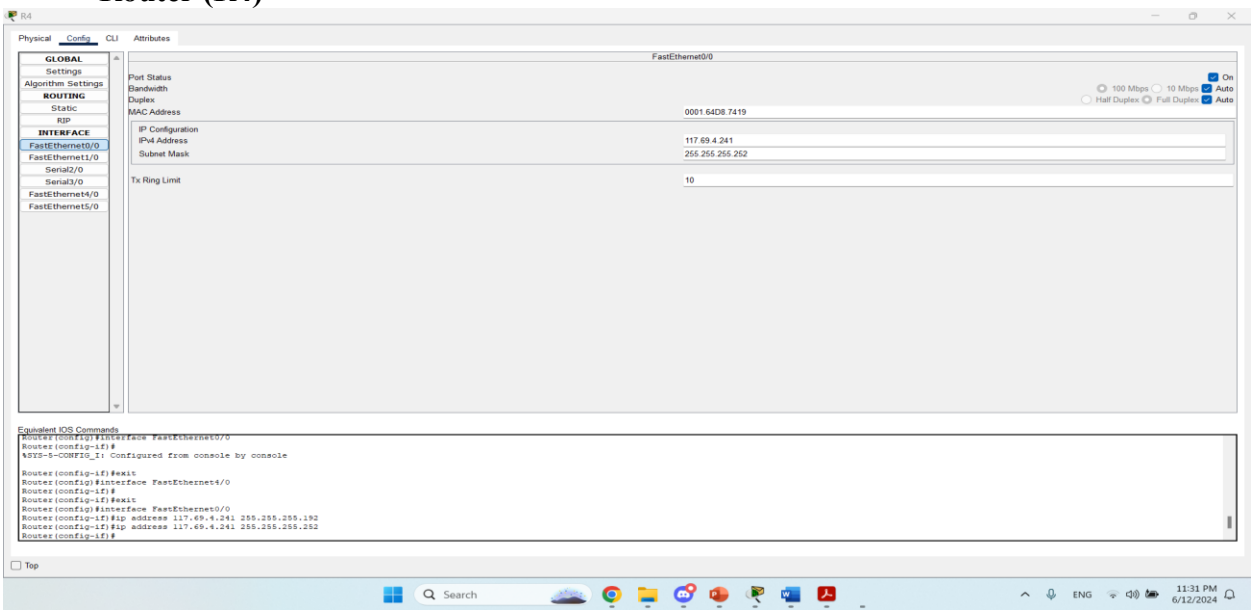


Figure 14 : Router R4 configuration.

For Router R4, we gave it the first IP after the network IP 117.69.4.241 and subnet mask 255.255.255.252.

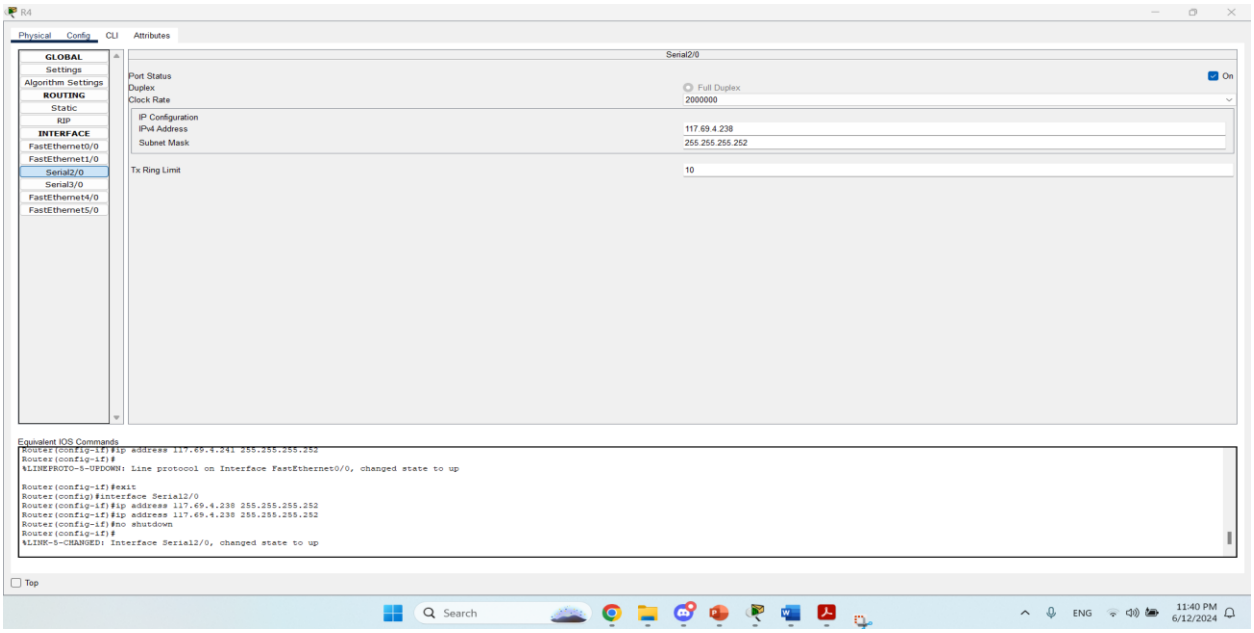


Figure 15: Router R4 interface se2/0 configuration.

For the interface that is used to connect with the Third Router (R3) se2/0, we gave it the second IP after link IP 117.69.4.238 and a subnet mask 255.255.255.252.

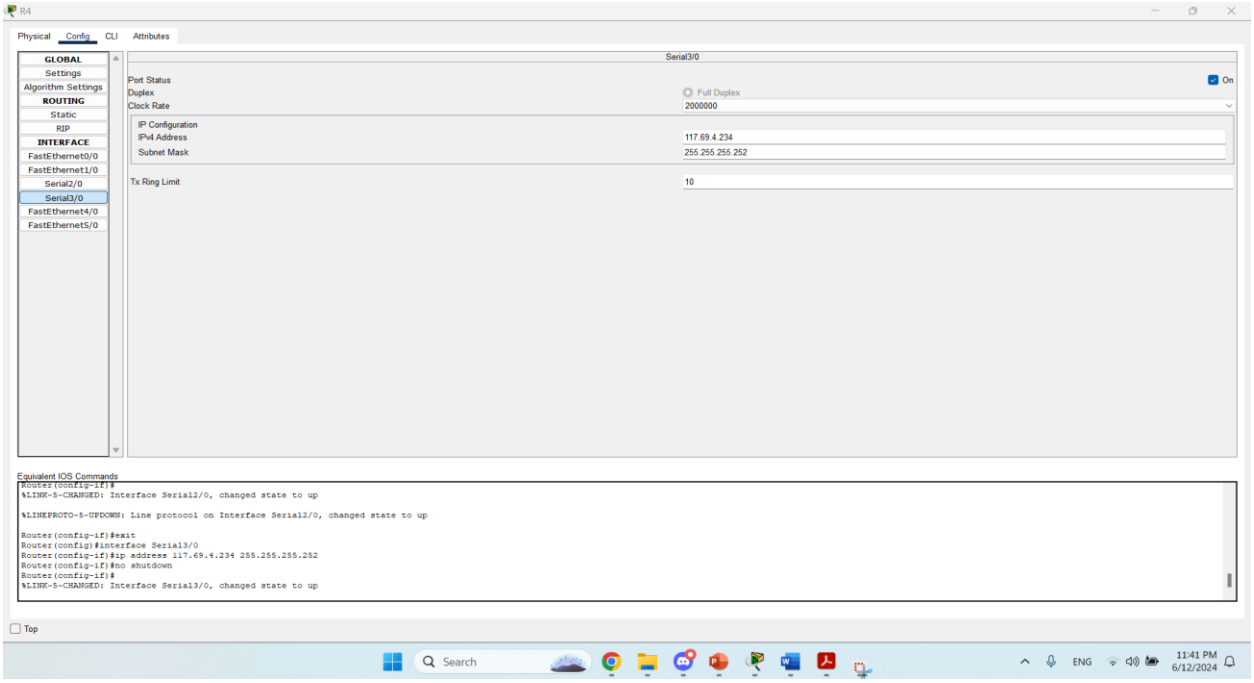


Figure 16: Router R4 interface se3/0 configuration.

For the interface that is used to connect with the First Router (R1) se3/0, we gave it the First IP after link IP 200.0.10.26, and a subnet mask 255.255.255.252.

- **Router (R5)**

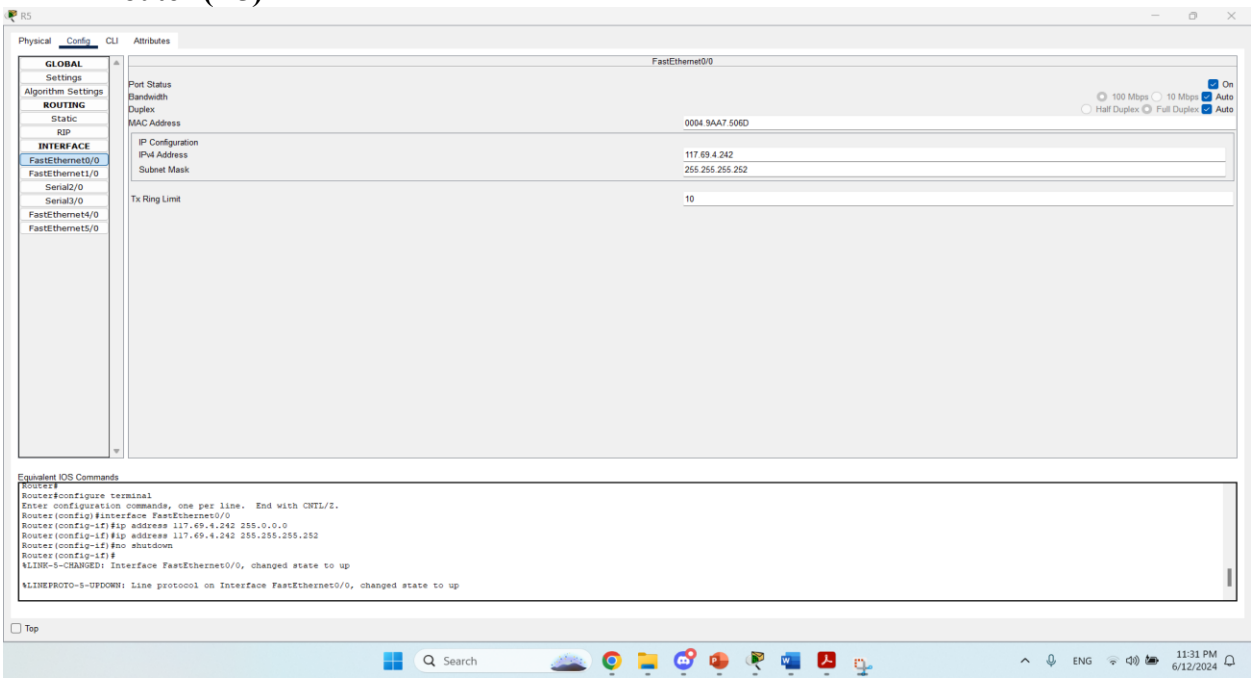


Figure 17: Router R5 configuration.

For Router R4, we gave it the first IP after the network IP we gave it the First IP after link IP 117.69.4.242, and a subnet mask 255.255.255.252.

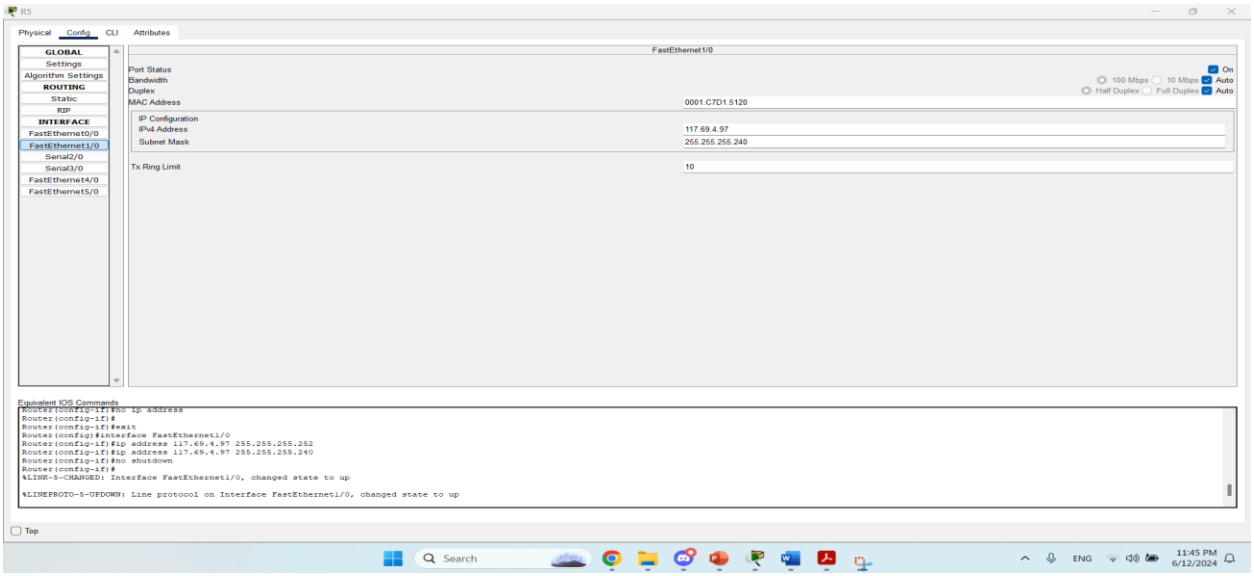


Figure 18: Router R5 FA1 configuration.

For the interface that is used to connect with the Switch (S0), we gave it the First IP after link IP 117.69.4.97, and a subnet mask 255.255.255.240.

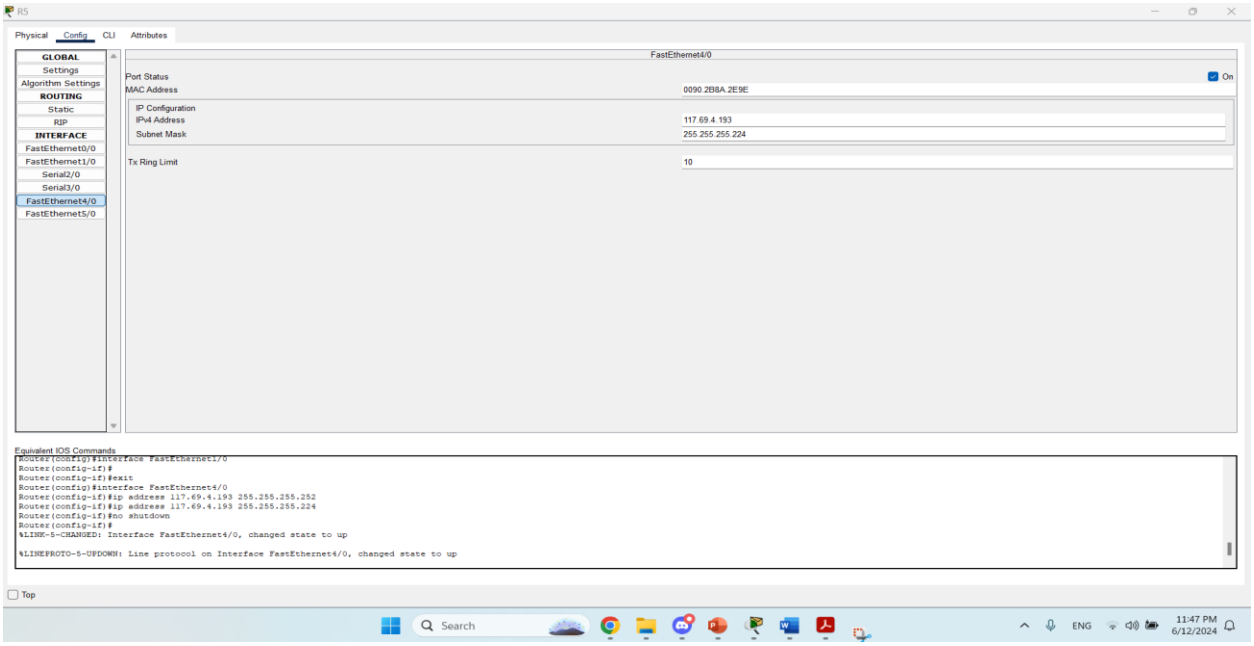


Figure 19: Router R5 FA4 configuration.

For the interface that is used to connect with the Switch (S3), we gave it the First IP after link IP 117.69.4.193, and a subnet mask 255.255.255.224.

2. Servers:

- **HTTP server**

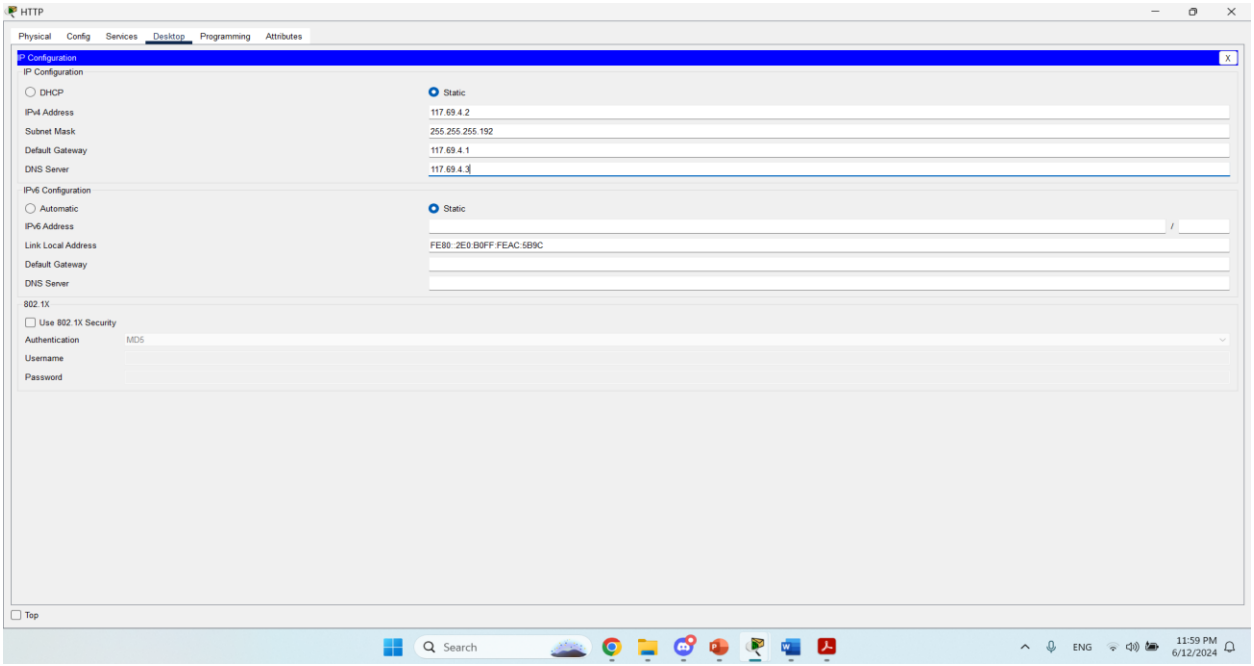


Figure 20: HTTP server configuration.

For the web server (http) we give it the first IP after the router IP 117.69.4.2 and subnet mask 255.255.255.192 and put the gateway router 117.69.4.1 and the DNS it 117.69.4.3.

- **DNS server**

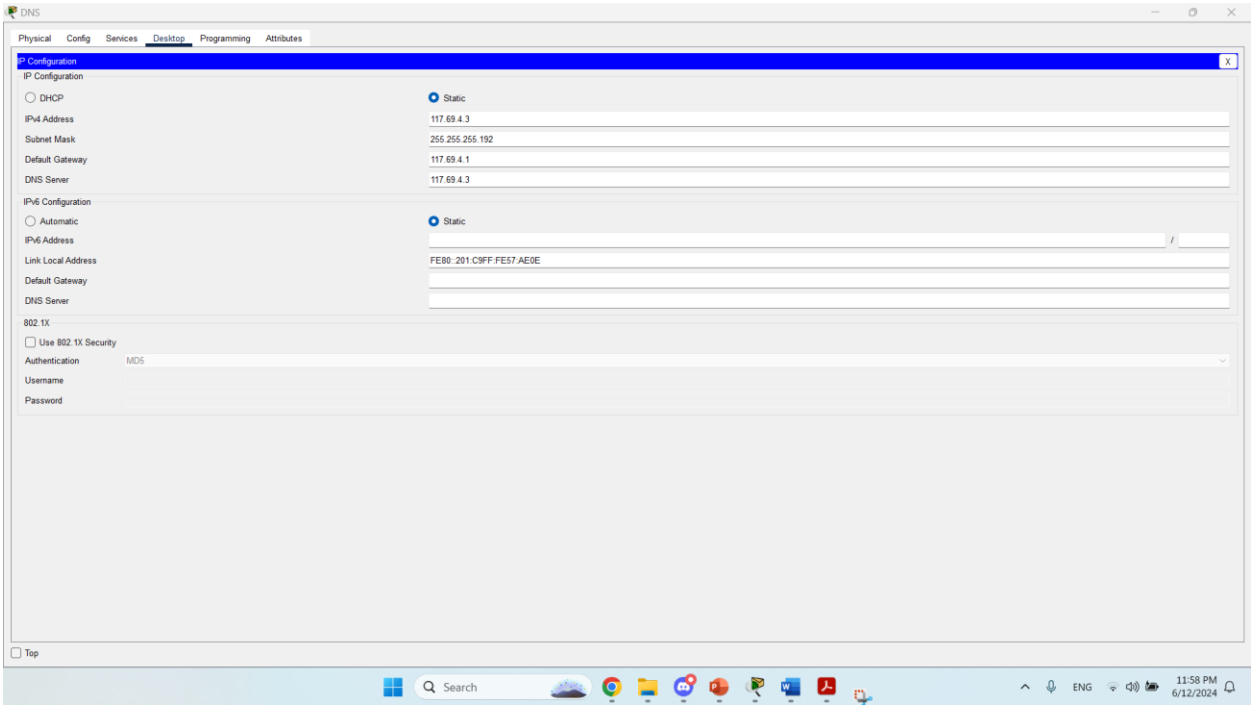


Figure 21: DNS server configuration.

For the DNS server we give it the second IP after the router IP 117.69.4.3 and subnet mask 255.255.255.192 and put the gateway router 117.69.4.1 and the DNS it 117.69.4.3.

3. **PCs**

- **PC A_0**

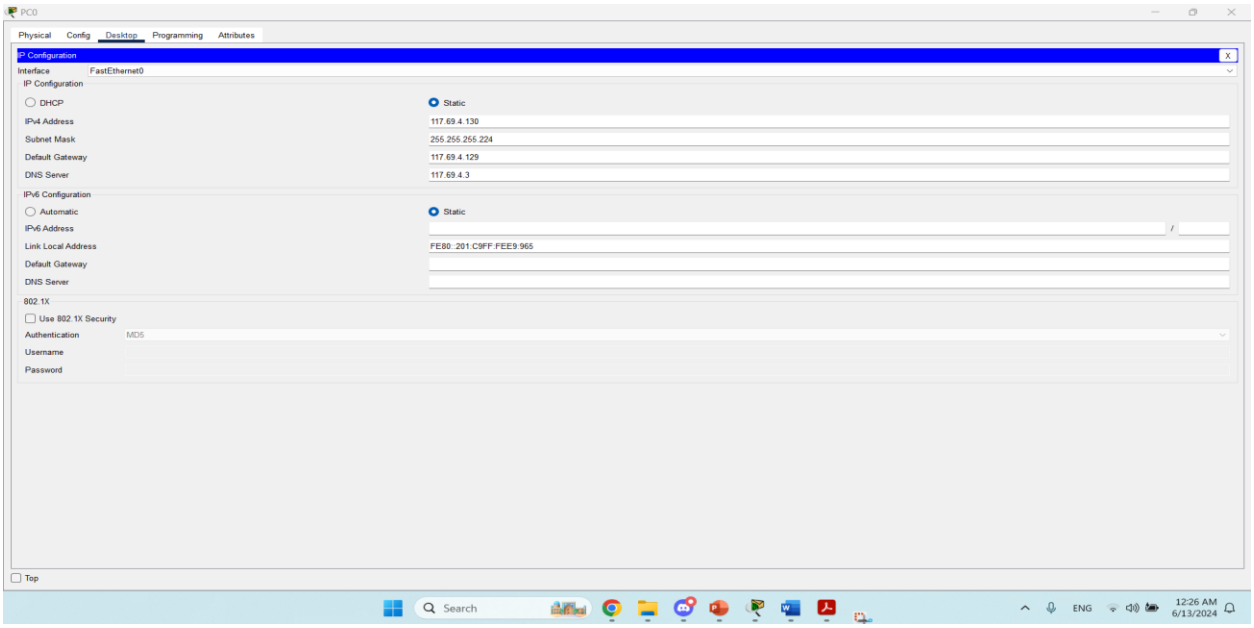


Figure 22: PC A_0 configuration

For PC A_0 configuration we give it the first IP after the router IP 117.69.4.130 and subnet mask 255.255.255.224 and put the gateway Router(R2) 117.69.4.129 and the DNS 117.69.4.3.

- **PC A_1**

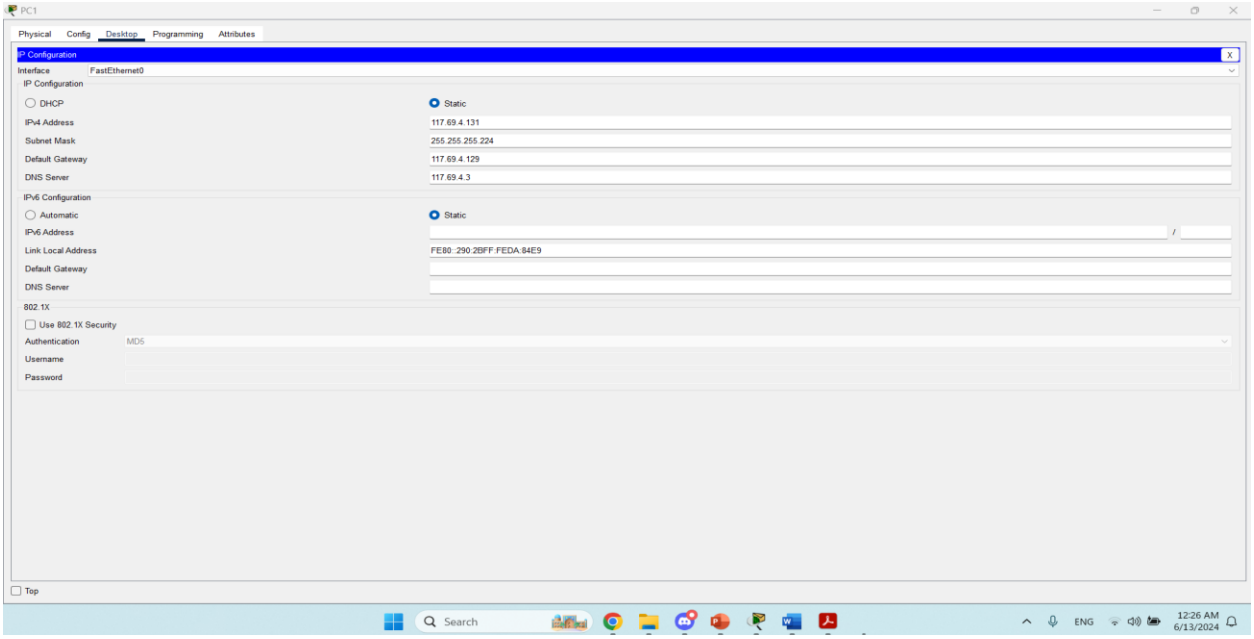


Figure 23: PC A_1 configuration

For PC A_1 configuration we give it the first IP after the router IP 117.69.4.131 and subnet mask 255.255.255.224 and put the gateway Router(R2) 117.69.4.129 and the DNS 117.69.4.3.

- **PC A_2**

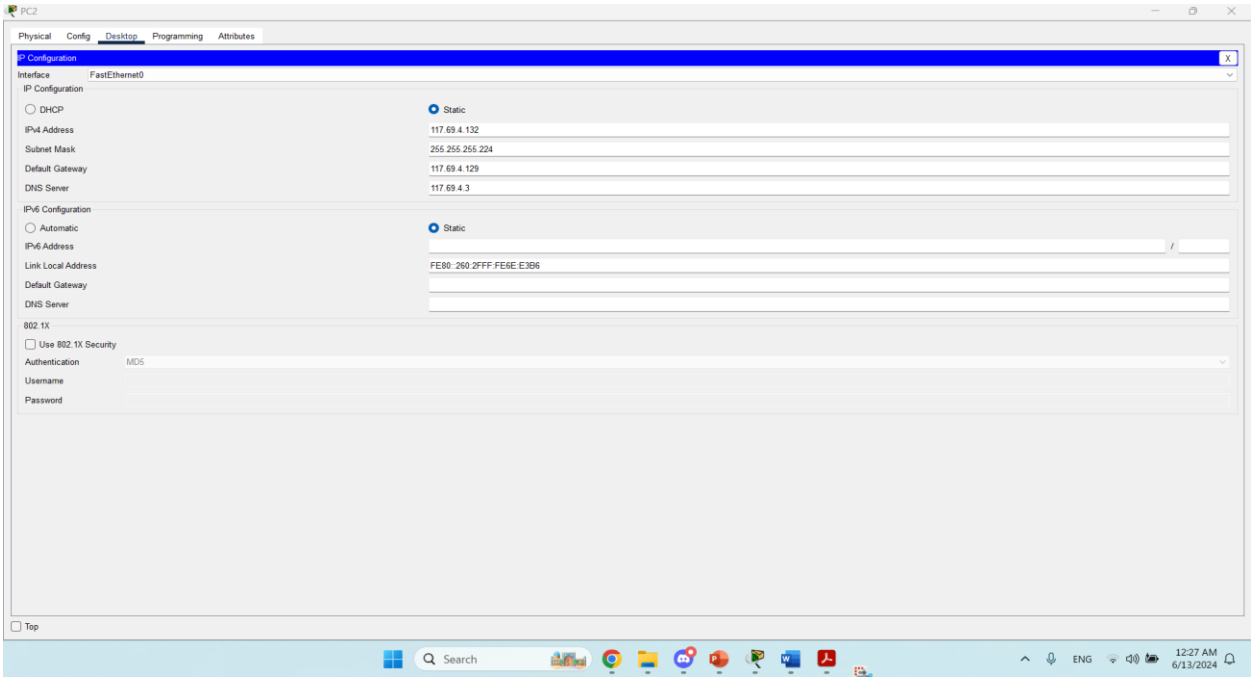


Figure 24: PC A_2 configuration

For PC A_2 configuration we give it the first IP after the router IP 117.69.4.132 and subnet mask 255.255.255.224 and put the gateway Router(R2) 117.69.4.129 and the DNS 117.69.4.3.

- **PC B_3**

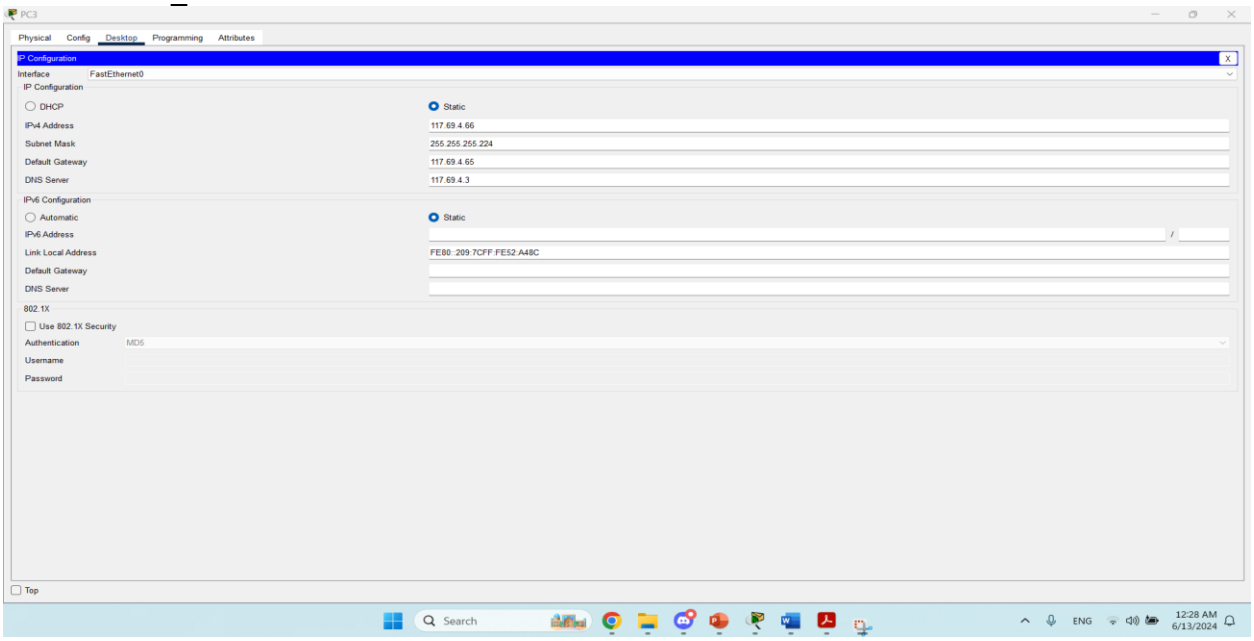


Figure 25: PC B_3 configuration

For PC B_3 configuration we give it the first IP after the router IP 117.69.4.66 and subnet mask 255.255.255.224 and put the gateway Router(R3)117.69.4.66 and the DNS 117.69.4.3.

- **PC B_4**

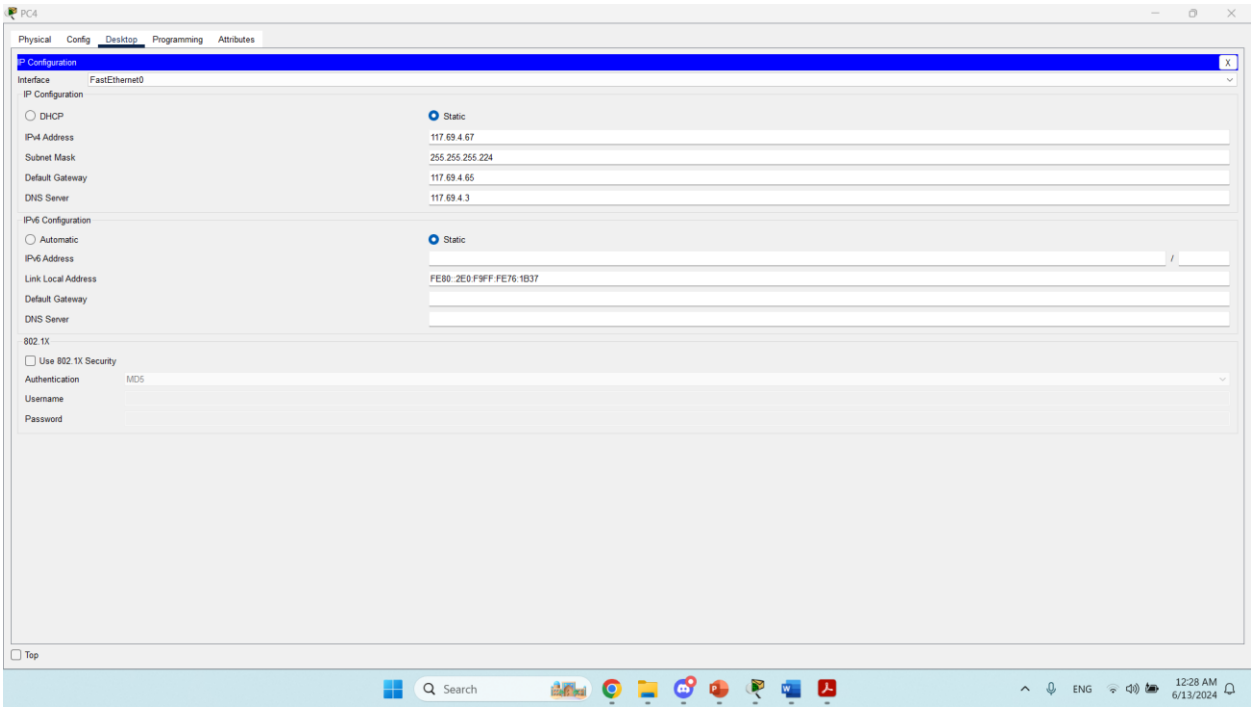


Figure 26: PC B_4 configuration

For PC B_4 configuration we give it the first IP after the router IP 117.69.4.67 and subnet mask 255.255.255.224 and put the gateway Router(R3) 117.69.4.65 and the DNS 117.69.4.3.

- **PC C1_6**

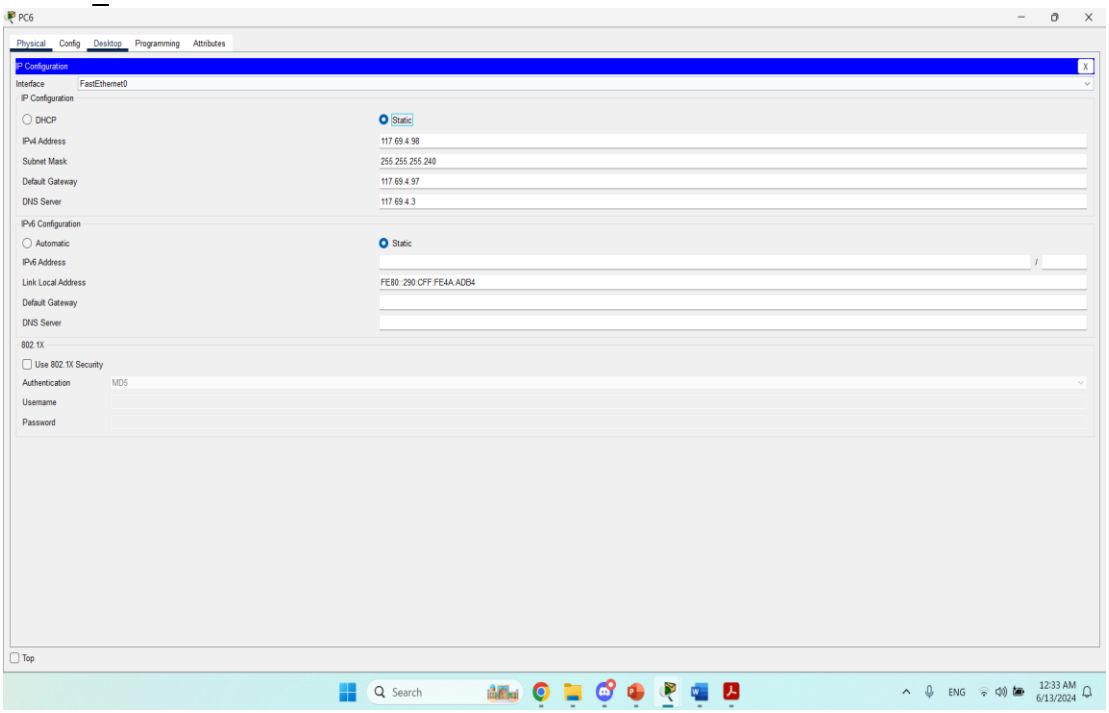


Figure 27: PC C1_6 configuration

For PC C1_6 configuration we give it the first IP after the router IP 117.69.4.98 and subnet mask 255.255.255.240 and put the gateway Router(R5) 117.69.4.97 and the DNS 117.69.4.3.

- **PC C1_8**

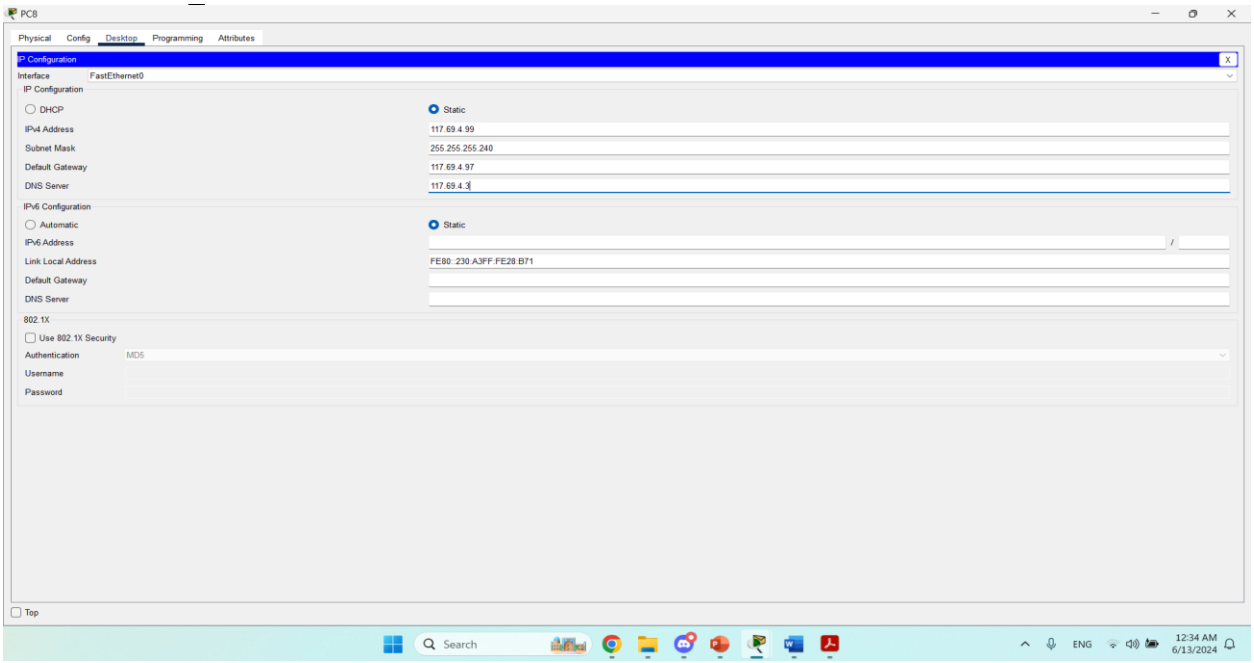


Figure 28: PC C1_8 configuration

For PC C1_8 configuration we give it the first IP after the router IP 117.69.4.99 and subnet mask 255.255.255.240 and put the gateway Router(R5) 117.69.4.97 and the DNS 117.69.4.3.

- **PC C1_9**

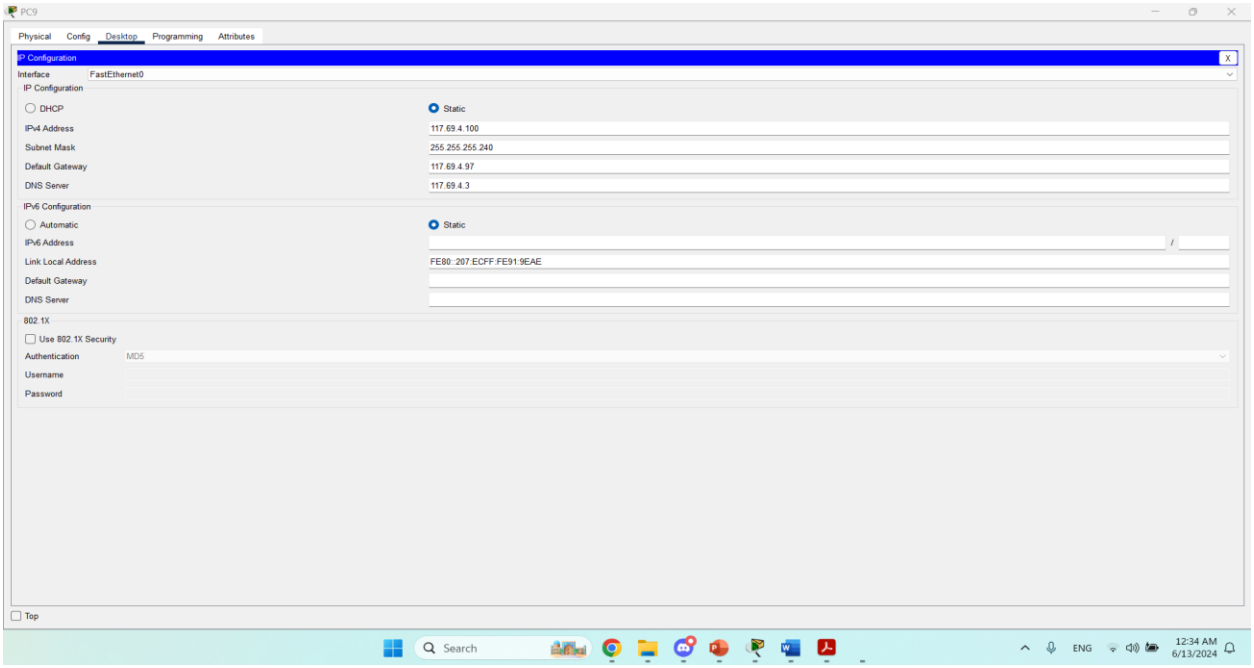


Figure 29: PC C1_9 configuration

For PC C1_9 configuration we give it the first IP after the router IP 117.69.4.100 and subnet mask 255.255.255.240 and put the gateway router1 117.69.4.97 and the DNS 117.69.4.3.

- **PC C2_5**

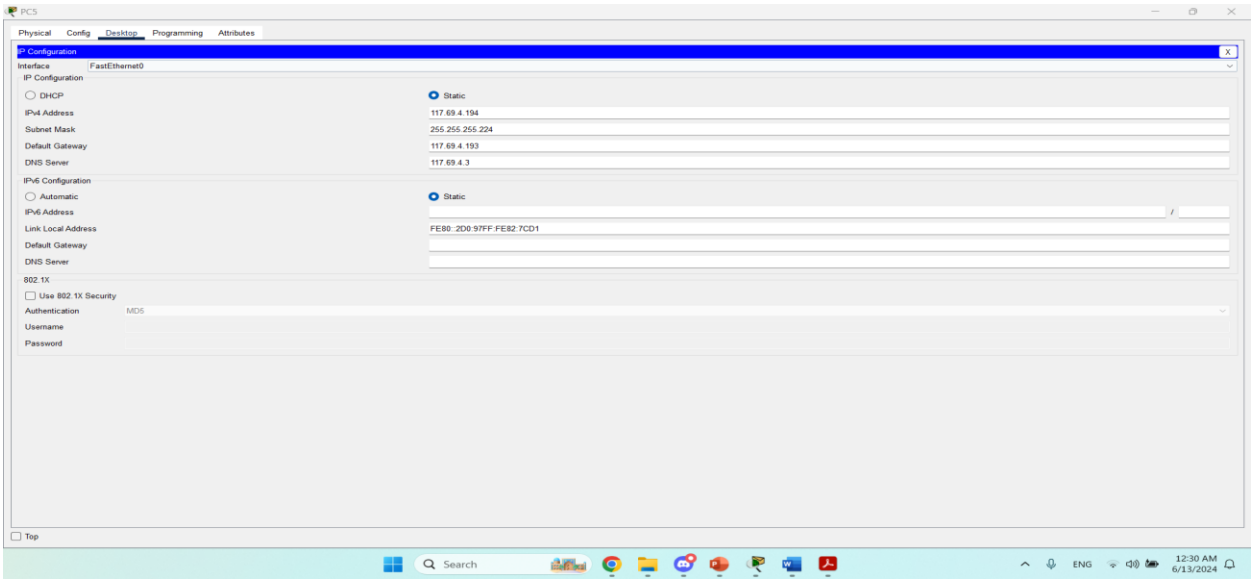


Figure 30: PC C2_5 configuration

For PC C2_5 configuration we give it the first IP after the router IP 117.69.4.194 and subnet mask 255.255.255.224 and put the gateway Router(R5) 117.69.4.193 and the DNS 117.69.4.3.

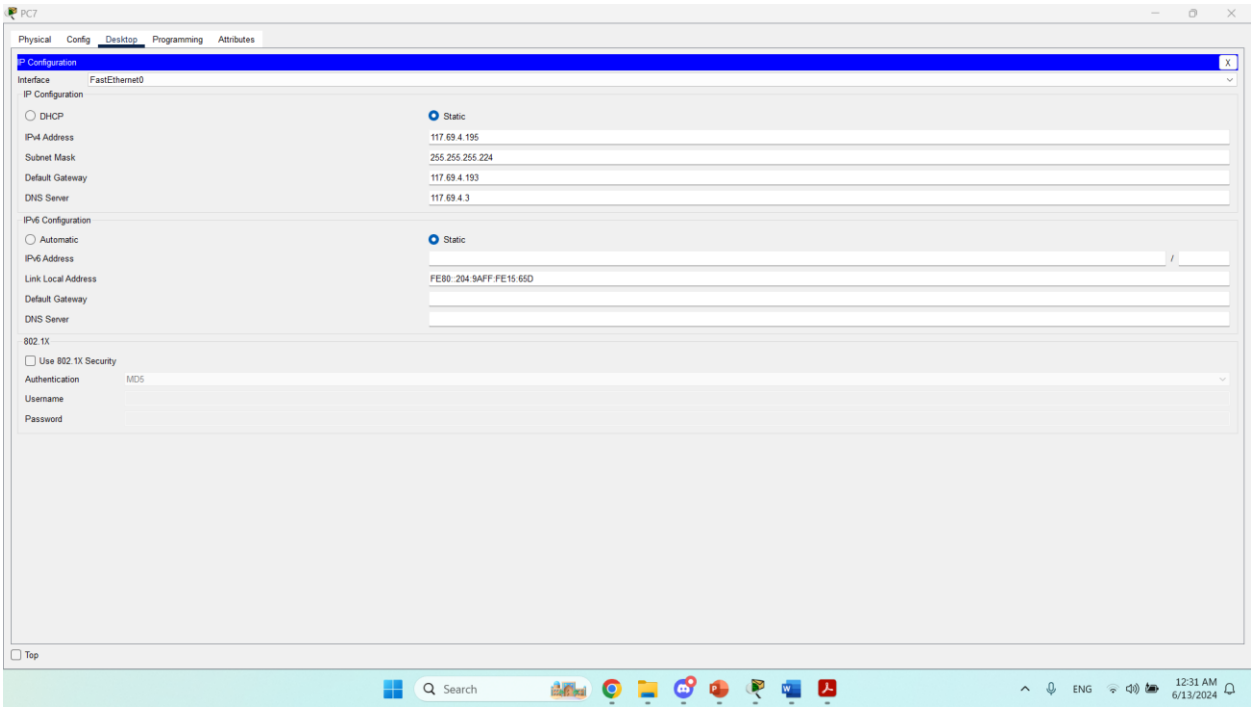


Figure 31: PC C2_7 configuration

For PC C2_7 configuration we give it the first IP after the router IP 117.69.4.195 and subnet mask 255.255.255.224 and put the gateway Router(R5) 117.69.4.193 and the DNS 117.69.4.3.

2.3. Configuring Servers

In this part, we set the services for the servers. We configured the DNS server and WEB server with a domain name.

2.3.1. Http Server

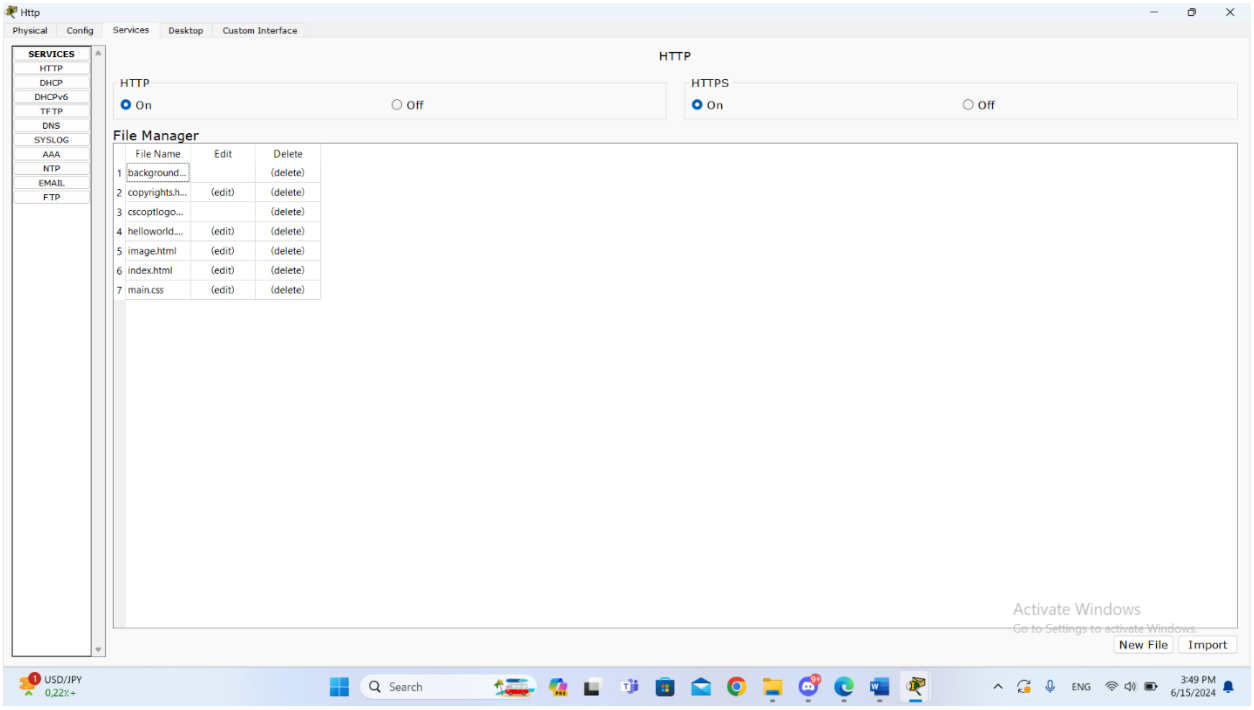


Figure 32: Http server services configuration

For this server, we turned on the HTTP and HTTPS protocols, since they are web protocols, then we created our website by modifying the index.html file, we have also added a css file to make the page look nice, as well as the required images files.

Html code for the page:

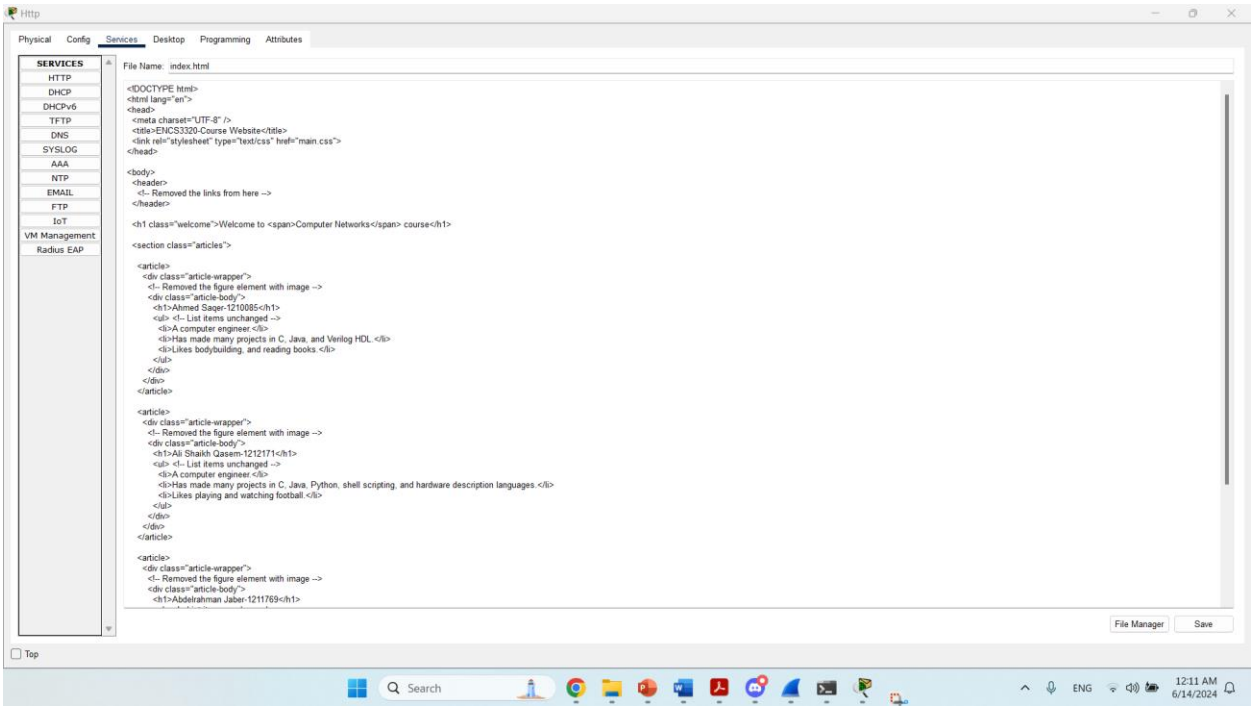


Figure 33L Html code part 1

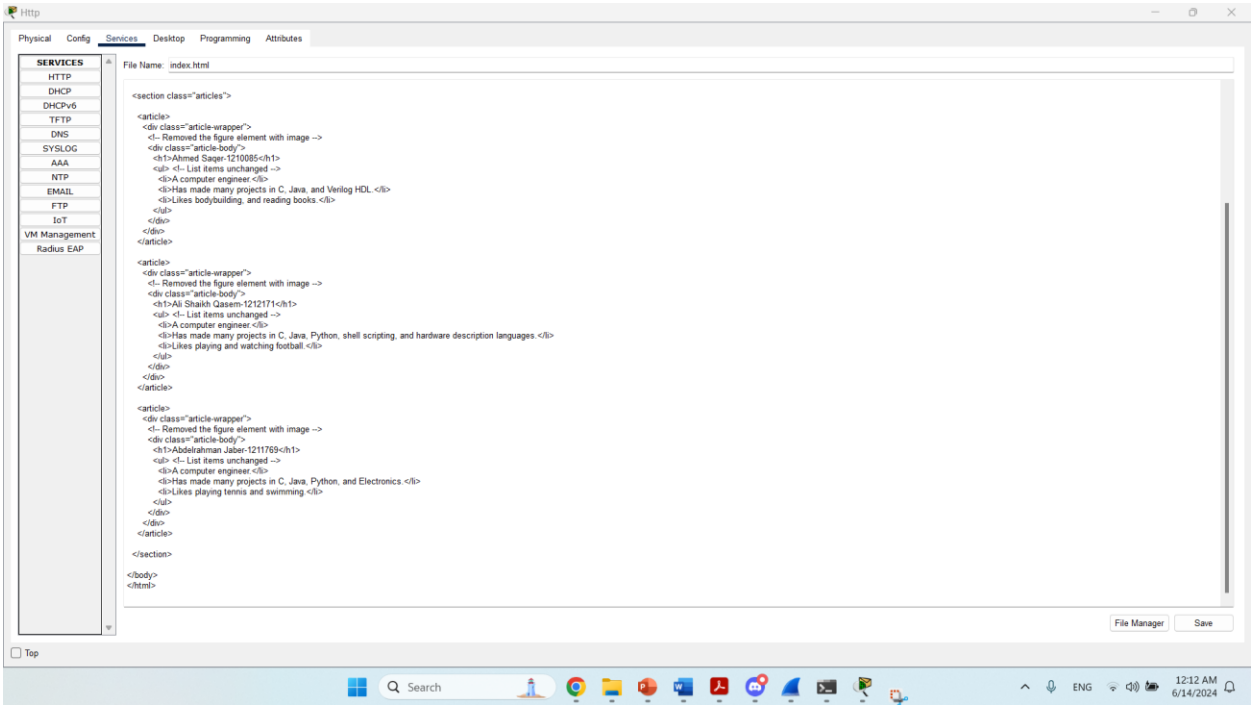


Figure 34: Html code part 2

2.3.2. DNS Server

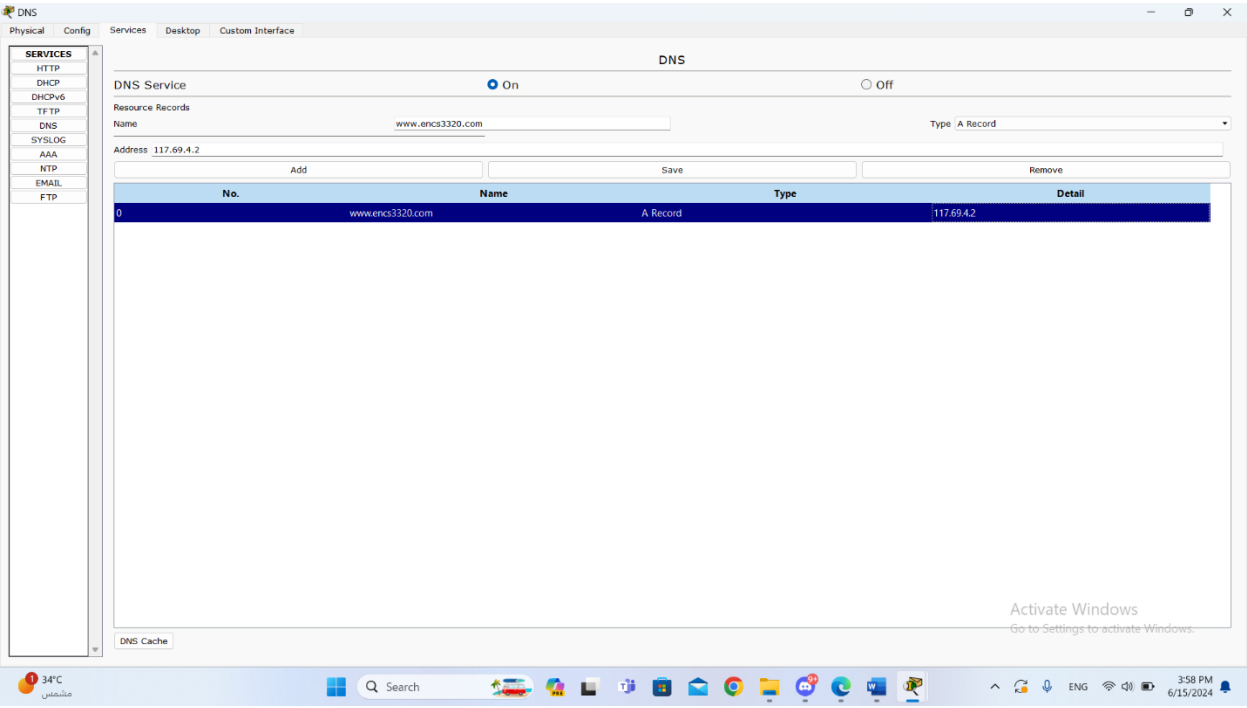


Figure 35: DNS server service configuration

For DNS server, we set the DNS service on then we add a record for the Http server with IP = 117.69.4.2 and domain name www.ENCS3320.com.

2.4. Applying routing protocol

In this part, we used open shortest path protocol (OSPF) on all routers with process ID 1, so we can connect all the routers together and we have only one Area.

2.4.1. Router R1

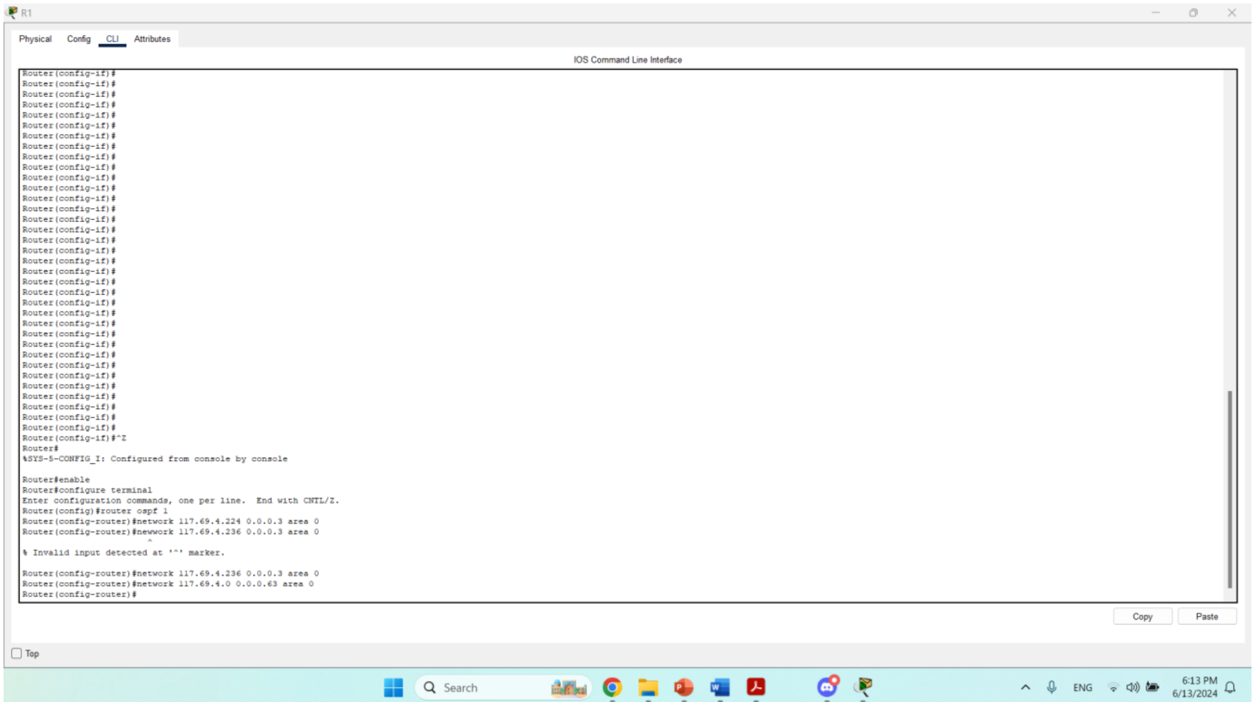


Figure 36: configuring OSPF for router 1

- Connect 117.69.4.224 with area 0
- Connect 117.69.4.236 with area 0
- Connect 117.69.4.0 with area 0

2.4.2. Router R2

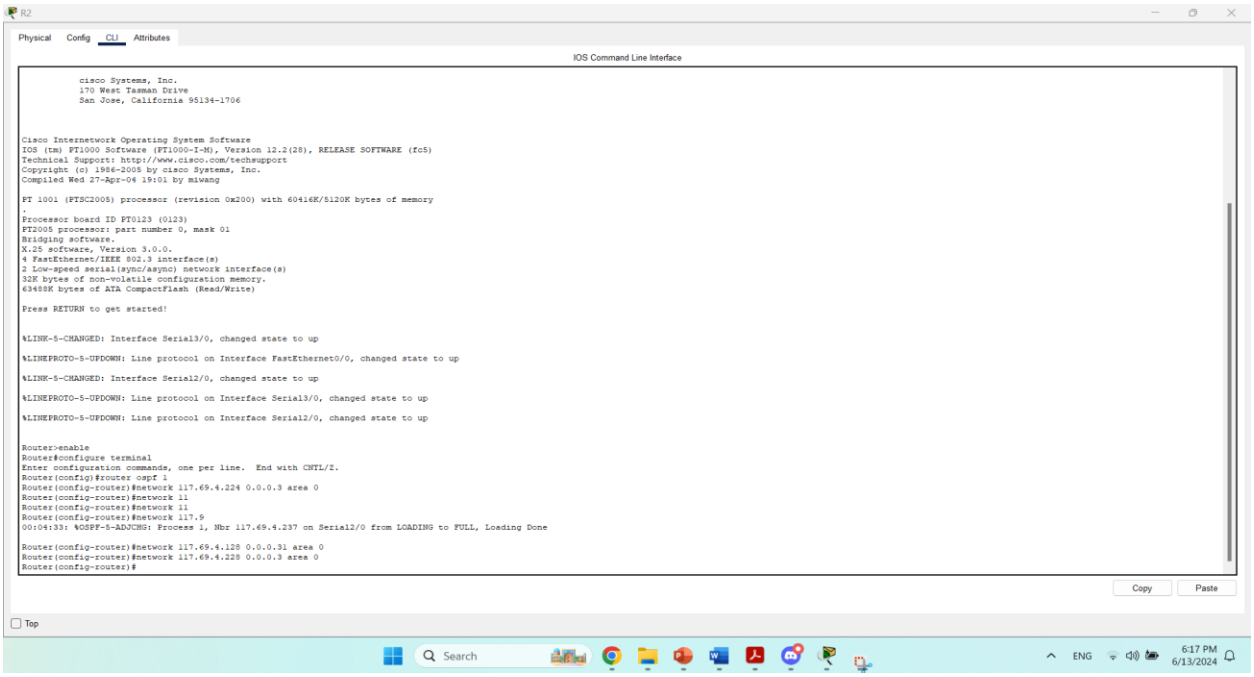


Figure 37: configuring OSPF for router

- Connect 117.69.4.224 with area 0
- Connect 117.69.4.128 with area 0
- Connect 117.69.4.228 with area 0

2.4.3. Router R3

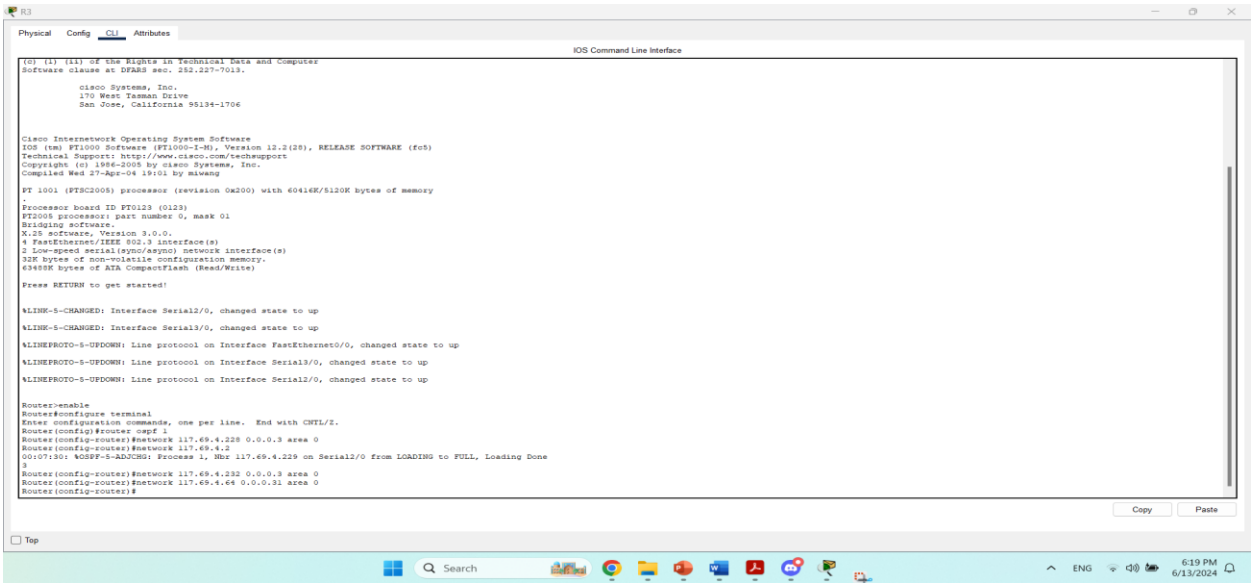


Figure 38: configuring OSPF for router 3

- Connect 117.69.4.228 with area 0
- Connect 117.69.4.232 with area 0
- Connect 117.69.4.64 with area 0

2.4.4. Router R4

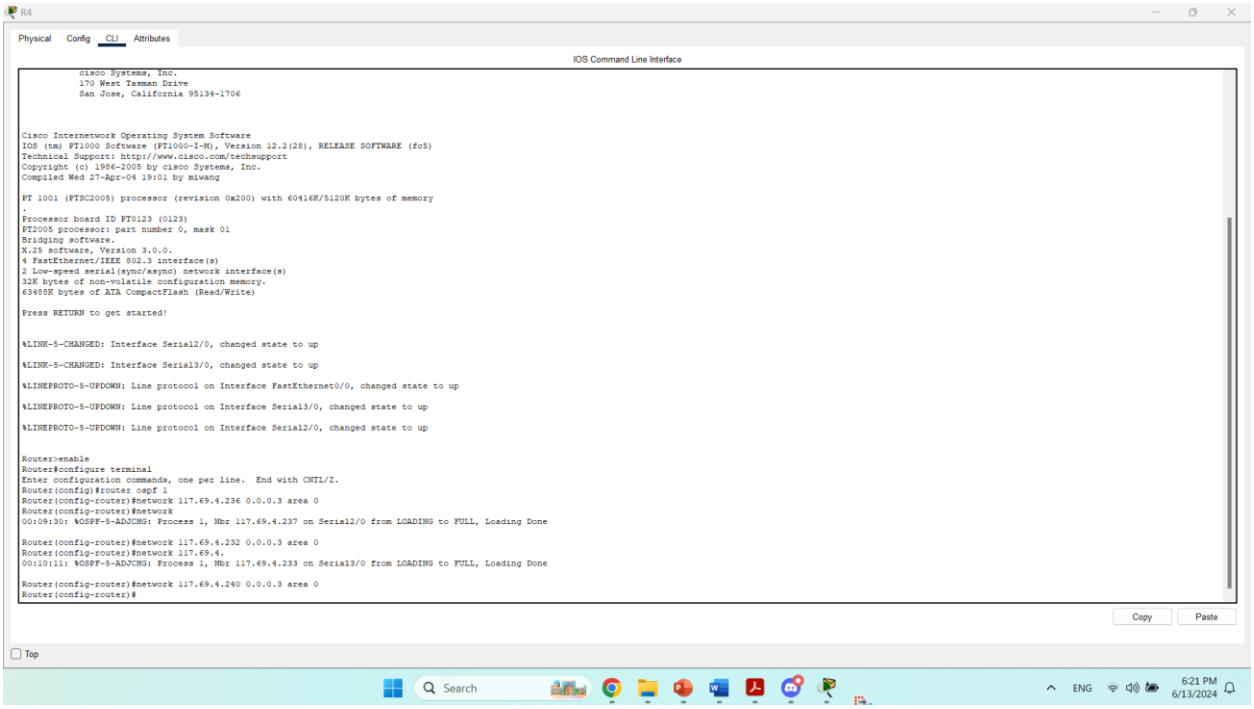


Figure 39: configuring OSPF for router 4

- Connect 117.69.4.236 with area 0
- Connect 117.69.4.232 with area 0
- Connect 117.69.4.240 with area 0

2.4.5. Router R5

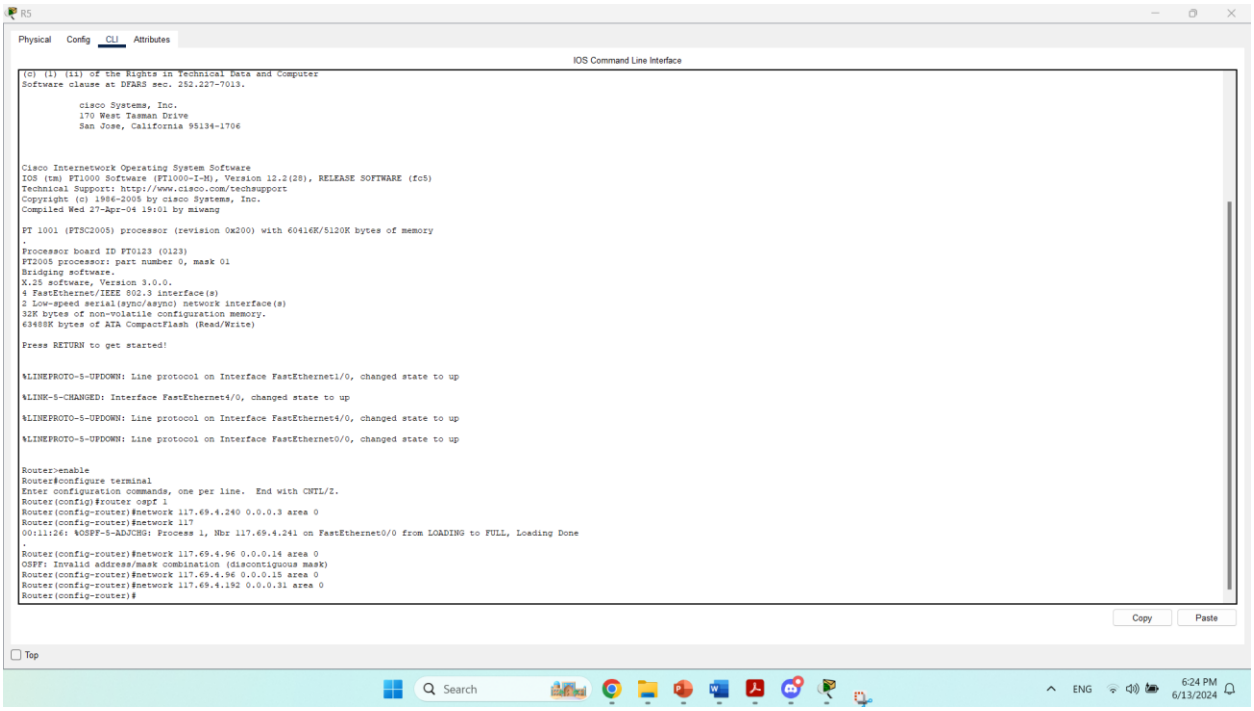


Figure 40: configuring OSPF for router 5

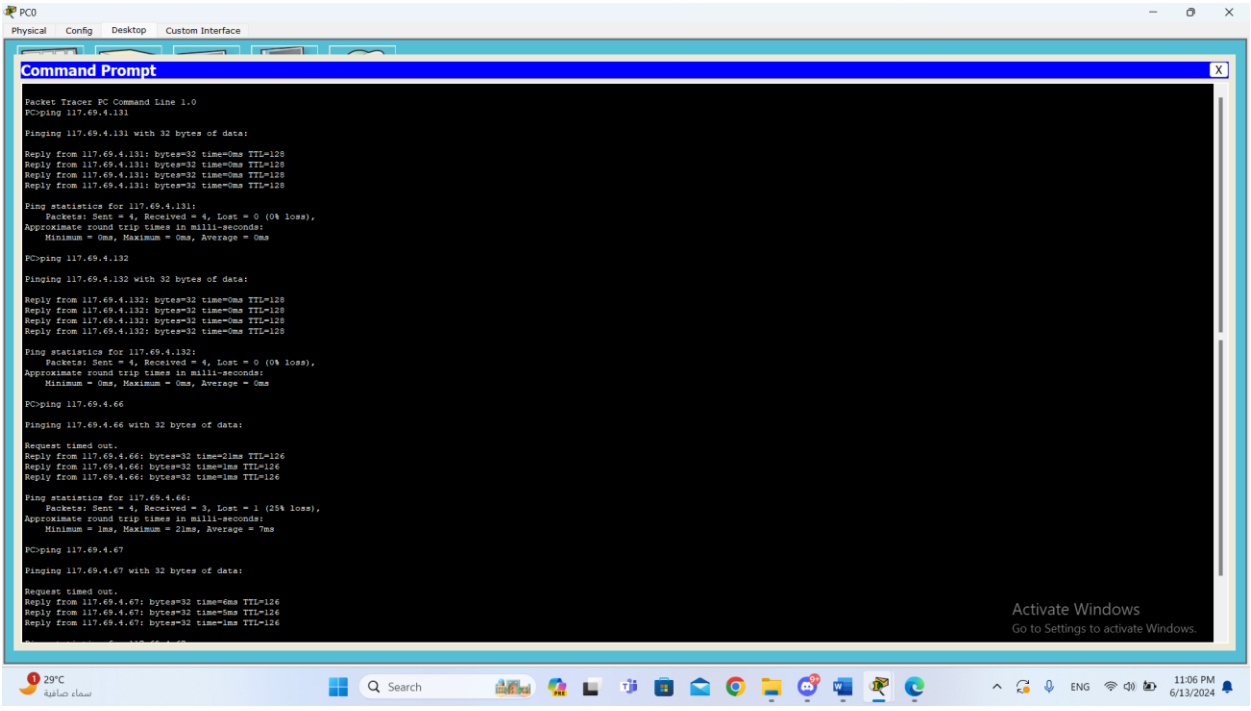
- Connect 117.69.4.240 with area 0
- Connect 117.69.4.96 with area 0
- Connect 117.69.4.192 with area 0

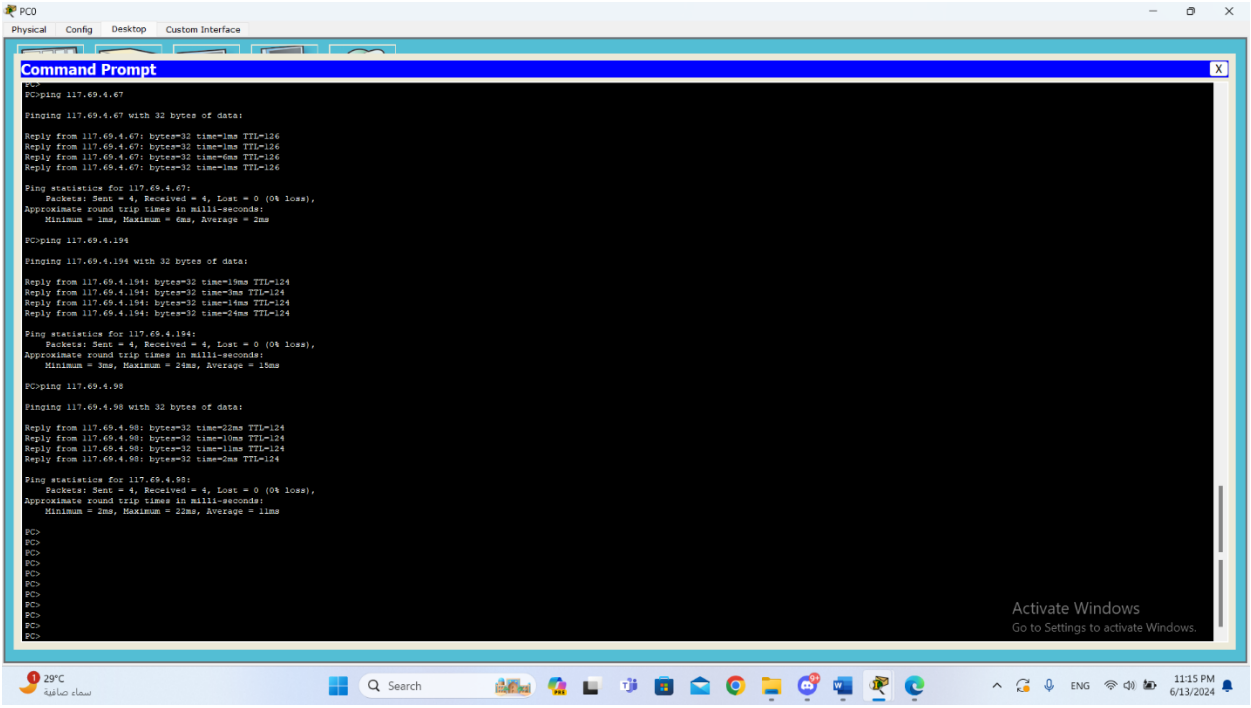
2.5. Testing and Troubleshooting

In this part, we test the connectivity between all PCs and servers by using ping and tracert commands, as well as accessing the web page from all PCs in the topology. This testing examines the correctness of our topology especially routing protocol and IP configurations.

2.5.1. Ping from all PCs

- **PC0:**





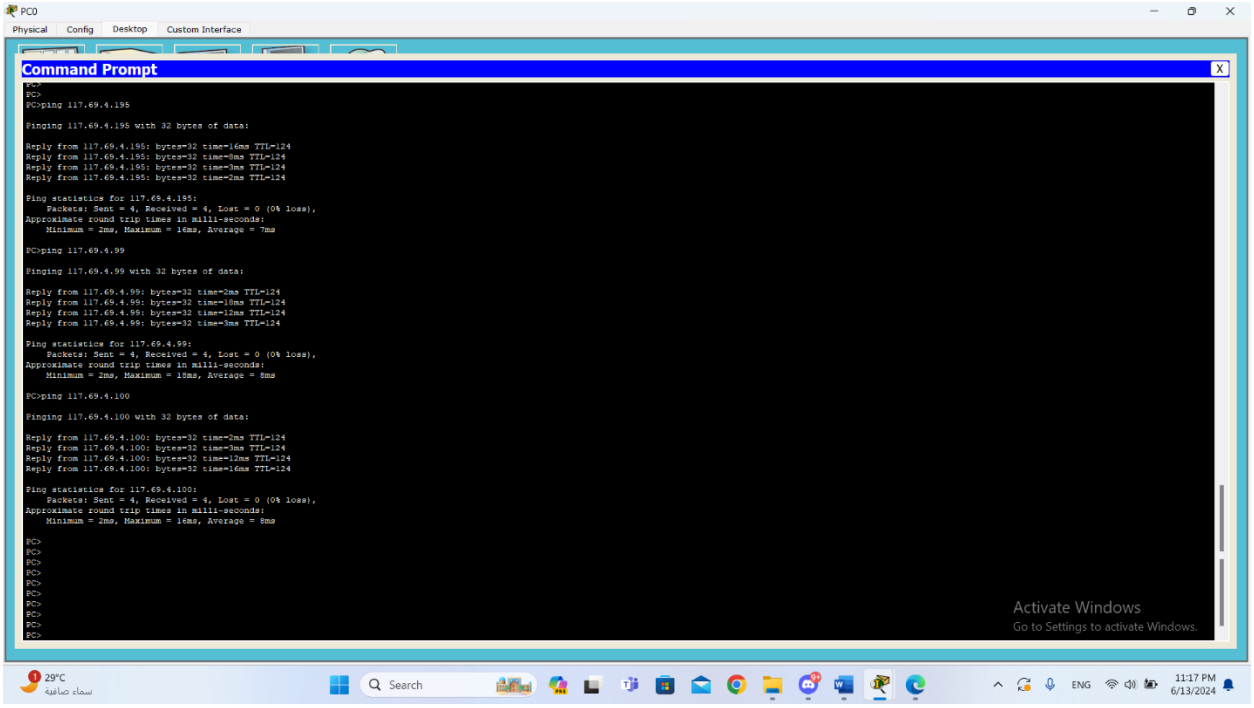
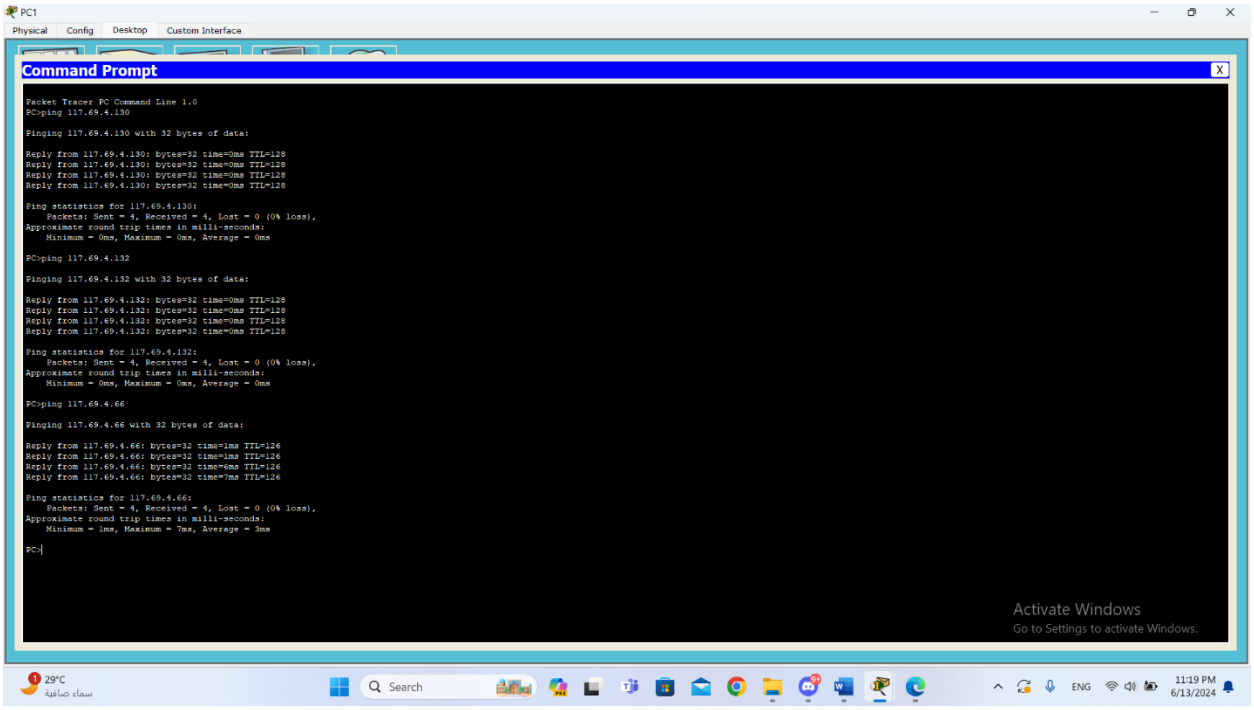
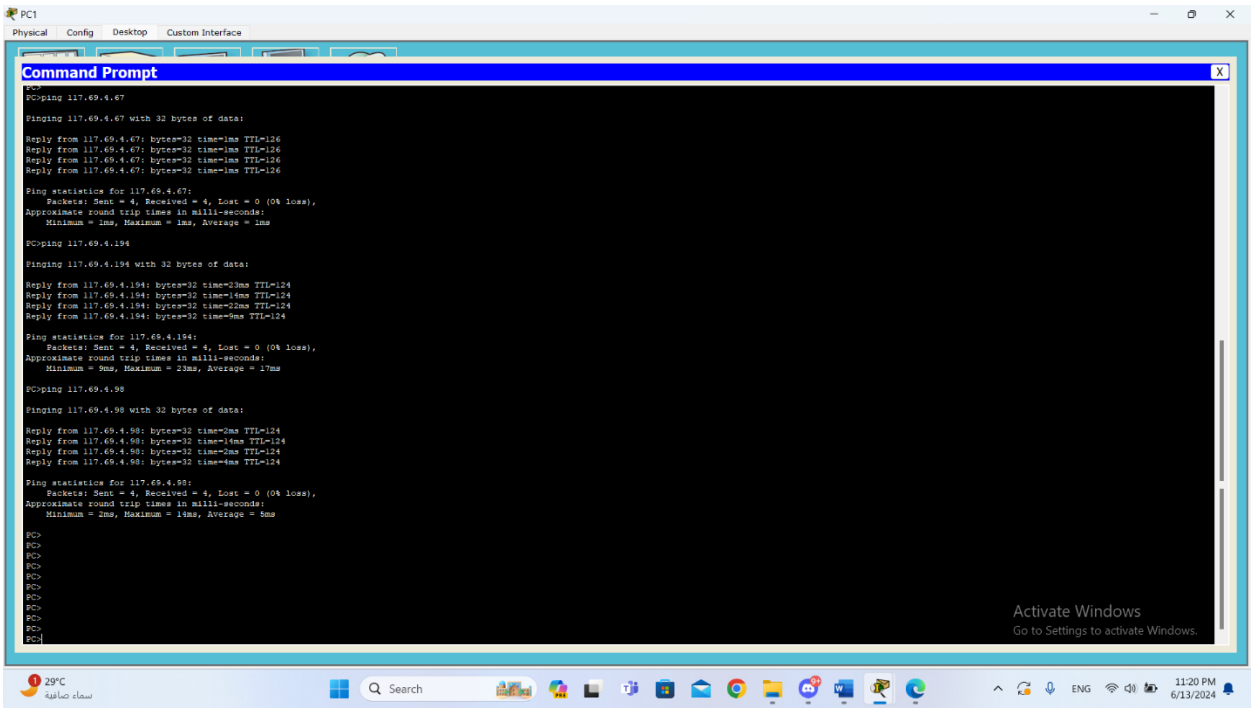


Figure 41: ping command from PC0

As shown from results above, we test all other PCs from PC0. 4 packets are sent each time, and it's noticed that all packets arrive without request lost or time out, this means the topology works well.

- **PC1:**


PC1
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 117.69.4.130
Pinging 117.69.4.130 with 32 bytes of data:
Reply from 117.69.4.130: bytes=32 time=0ms TTL=128
Reply from 117.69.4.130: bytes=32 time=0ms TTL=128
Reply from 117.69.4.130: bytes=32 time=0ms TTL=128
Reply from 117.69.4.130: bytes=32 time=0ms TTL=128
Ping statistics for 117.69.4.130:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
PC>ping 117.69.4.132
Pinging 117.69.4.132 with 32 bytes of data:
Reply from 117.69.4.132: bytes=32 time=0ms TTL=128
Reply from 117.69.4.132: bytes=32 time=0ms TTL=128
Reply from 117.69.4.132: bytes=32 time=0ms TTL=128
Reply from 117.69.4.132: bytes=32 time=0ms TTL=128
Ping statistics for 117.69.4.132:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
PC>ping 117.69.4.66
Pinging 117.69.4.66 with 32 bytes of data:
Reply from 117.69.4.66: bytes=32 time=1ms TTL=126
Reply from 117.69.4.66: bytes=32 time=1ms TTL=126
Reply from 117.69.4.66: bytes=32 time=6ms TTL=126
Reply from 117.69.4.66: bytes=32 time=7ms TTL=126
Ping statistics for 117.69.4.66:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 7ms, Average = 3ms
PC>
Activate Windows
Go to Settings to activate Windows.
29°C
Search
ENG
11:19 PM
6/13/2024


PC1
Physical
Config
Desktop
Custom Interface
Command Prompt
PC>
PC>ping 117.69.4.67
Pinging 117.69.4.67 with 32 bytes of data:
Reply from 117.69.4.67: bytes=32 time=1ms TTL=126
Reply from 117.69.4.67: bytes=32 time=1ms TTL=126
Reply from 117.69.4.67: bytes=32 time=1ms TTL=126
Reply from 117.69.4.67: bytes=32 time=1ms TTL=126
Ping statistics for 117.69.4.67:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 1ms, Average = 1ms
PC>ping 117.69.4.194
Pinging 117.69.4.194 with 32 bytes of data:
Reply from 117.69.4.194: bytes=32 time=23ms TTL=124
Reply from 117.69.4.194: bytes=32 time=14ms TTL=124
Reply from 117.69.4.194: bytes=32 time=22ms TTL=124
Reply from 117.69.4.194: bytes=32 time=9ms TTL=124
Ping statistics for 117.69.4.194:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 9ms, Maximum = 23ms, Average = 17ms
PC>ping 117.69.4.98
Pinging 117.69.4.98 with 32 bytes of data:
Reply from 117.69.4.98: bytes=32 time=2ms TTL=124
Reply from 117.69.4.98: bytes=32 time=14ms TTL=124
Reply from 117.69.4.98: bytes=32 time=2ms TTL=124
Reply from 117.69.4.98: bytes=32 time=4ms TTL=124
Ping statistics for 117.69.4.98:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 14ms, Average = 5ms
PC>
PC>
PC>
PC>
PC>
PC>
PC>
PC>
PC>
PC>
PC>
Activate Windows
Go to Settings to activate Windows.
29°C
Search
ENG
11:20 PM
6/13/2024

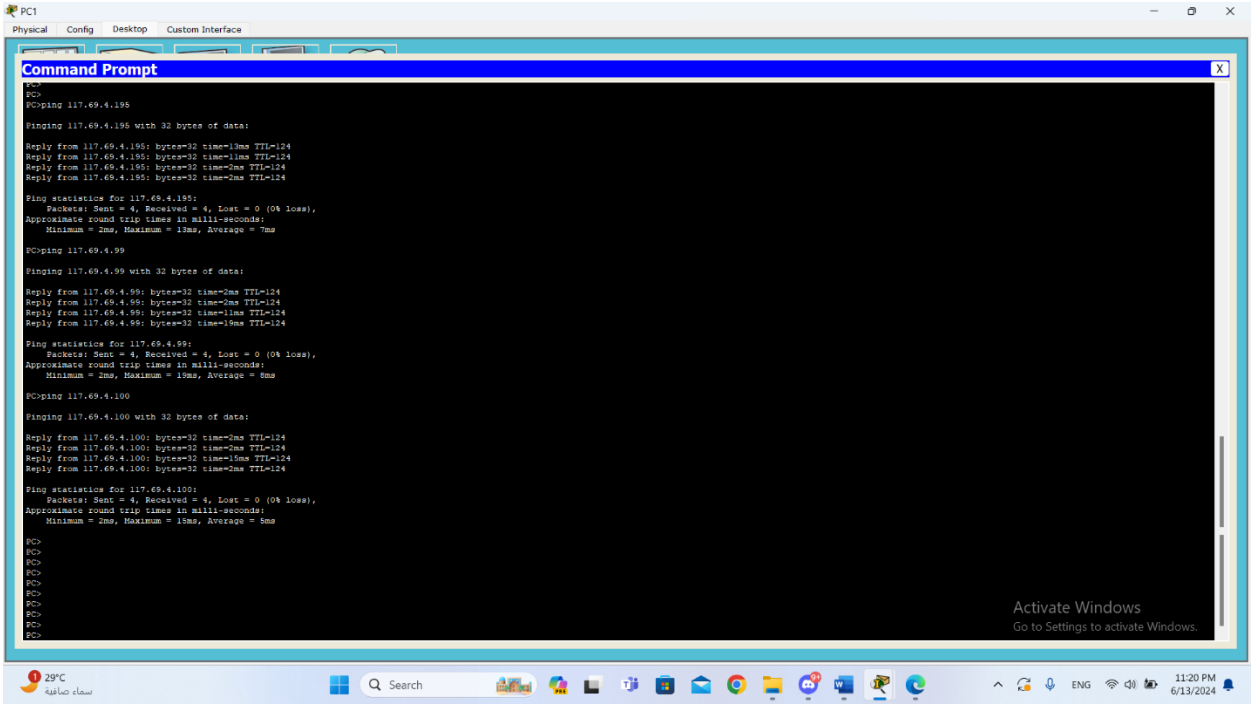
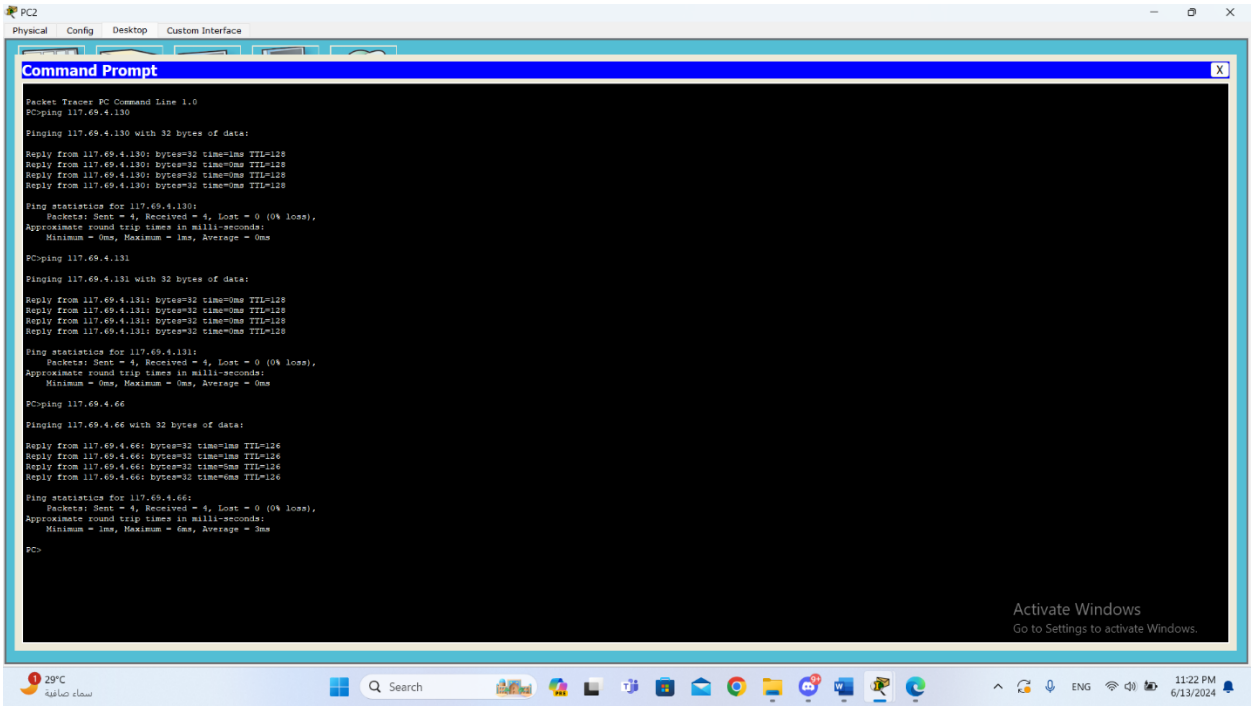
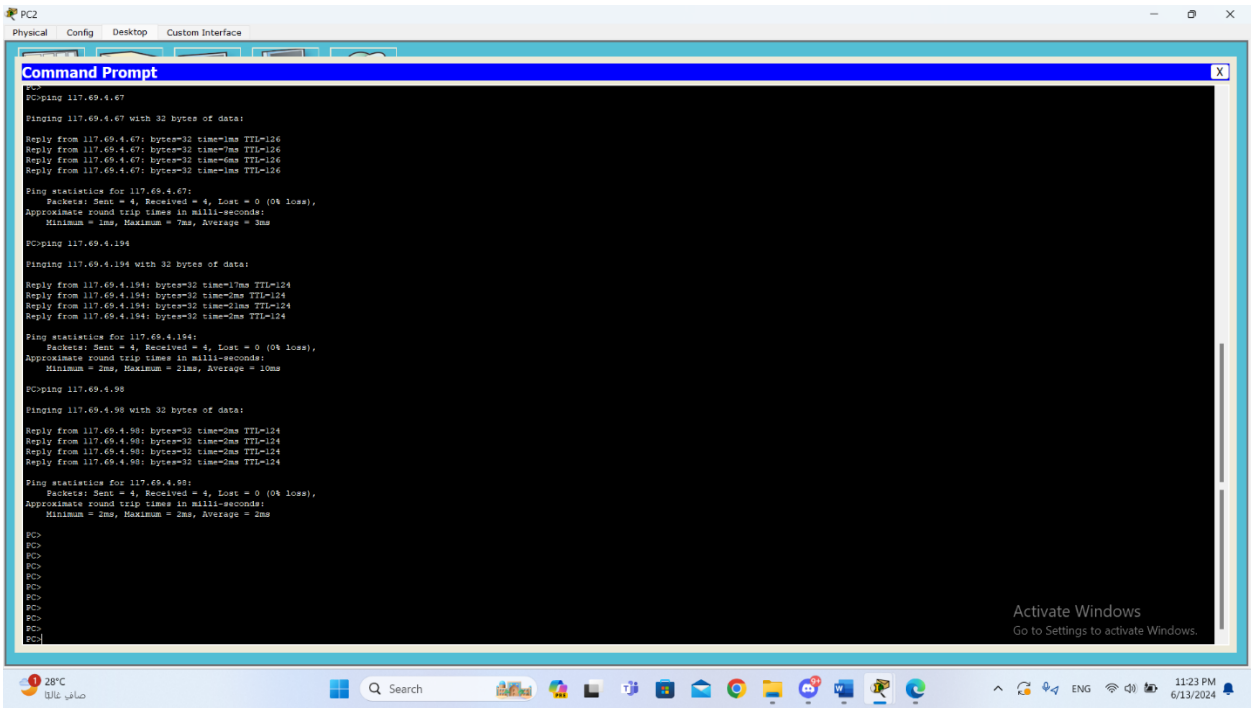


Figure 42: ping command from PC1

As shown from results above, we test all other PCs from PC1. 4 packets are sent each time, and it's noticed that all packets arrive without request lost or time out, this means the topology works well.

- **PC2:**


PC2
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 117.69.4.130
Pinging 117.69.4.130 with 32 bytes of data:
Reply from 117.69.4.130: bytes=32 time=1ms TTL=128
Reply from 117.69.4.130: bytes=32 time=0ms TTL=128
Reply from 117.69.4.130: bytes=32 time=0ms TTL=128
Reply from 117.69.4.130: bytes=32 time=0ms TTL=128
Ping statistics for 117.69.4.130:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
PC>ping 117.69.4.131
Pinging 117.69.4.131 with 32 bytes of data:
Reply from 117.69.4.131: bytes=32 time=0ms TTL=128
Reply from 117.69.4.131: bytes=32 time=0ms TTL=128
Reply from 117.69.4.131: bytes=32 time=0ms TTL=128
Reply from 117.69.4.131: bytes=32 time=0ms TTL=128
Ping statistics for 117.69.4.131:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
PC>ping 117.69.4.66
Pinging 117.69.4.66 with 32 bytes of data:
Reply from 117.69.4.66: bytes=32 time=1ms TTL=126
Reply from 117.69.4.66: bytes=32 time=1ms TTL=126
Reply from 117.69.4.66: bytes=32 time=5ms TTL=126
Reply from 117.69.4.66: bytes=32 time=6ms TTL=126
Ping statistics for 117.69.4.66:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 6ms, Average = 3ms
PC>
Activate Windows
Go to Settings to activate Windows.
29°C
سماء صافية
Search
ENG
11:22 PM
6/13/2024


PC2
Physical
Config
Desktop
Custom Interface
Command Prompt
PC>ping 117.69.4.67
Pinging 117.69.4.67 with 32 bytes of data:
Reply from 117.69.4.67: bytes=32 time=1ms TTL=126
Reply from 117.69.4.67: bytes=32 time=7ms TTL=126
Reply from 117.69.4.67: bytes=32 time=6ms TTL=126
Reply from 117.69.4.67: bytes=32 time=1ms TTL=126
Ping statistics for 117.69.4.67:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 7ms, Average = 3ms
PC>ping 117.69.4.194
Pinging 117.69.4.194 with 32 bytes of data:
Reply from 117.69.4.194: bytes=32 time=17ms TTL=124
Reply from 117.69.4.194: bytes=32 time=2ms TTL=124
Reply from 117.69.4.194: bytes=32 time=21ms TTL=124
Reply from 117.69.4.194: bytes=32 time=2ms TTL=124
Ping statistics for 117.69.4.194:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 21ms, Average = 10ms
PC>ping 117.69.4.98
Pinging 117.69.4.98 with 32 bytes of data:
Reply from 117.69.4.98: bytes=32 time=2ms TTL=124
Reply from 117.69.4.98: bytes=32 time=2ms TTL=124
Reply from 117.69.4.98: bytes=32 time=2ms TTL=124
Reply from 117.69.4.98: bytes=32 time=2ms TTL=124
Ping statistics for 117.69.4.98:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 2ms, Average = 2ms
PC>
Activate Windows
Go to Settings to activate Windows.
28°C
صافي غالبًا
Search
ENG
11:23 PM
6/13/2024

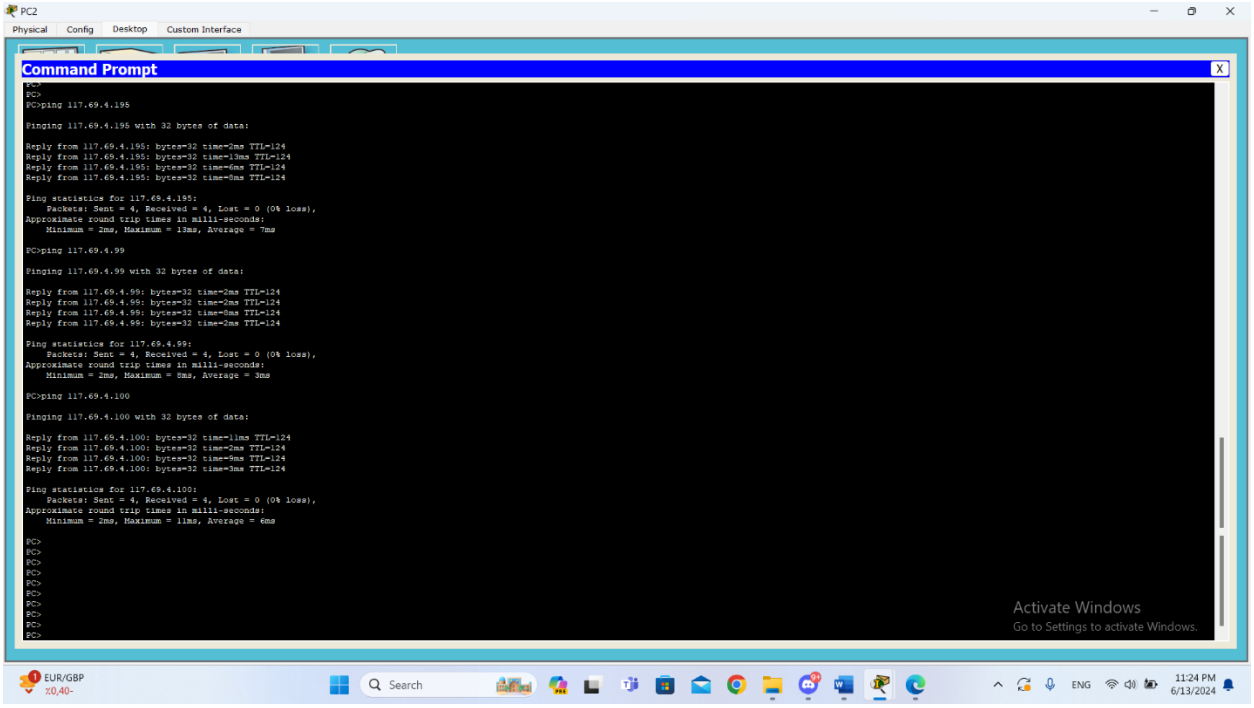
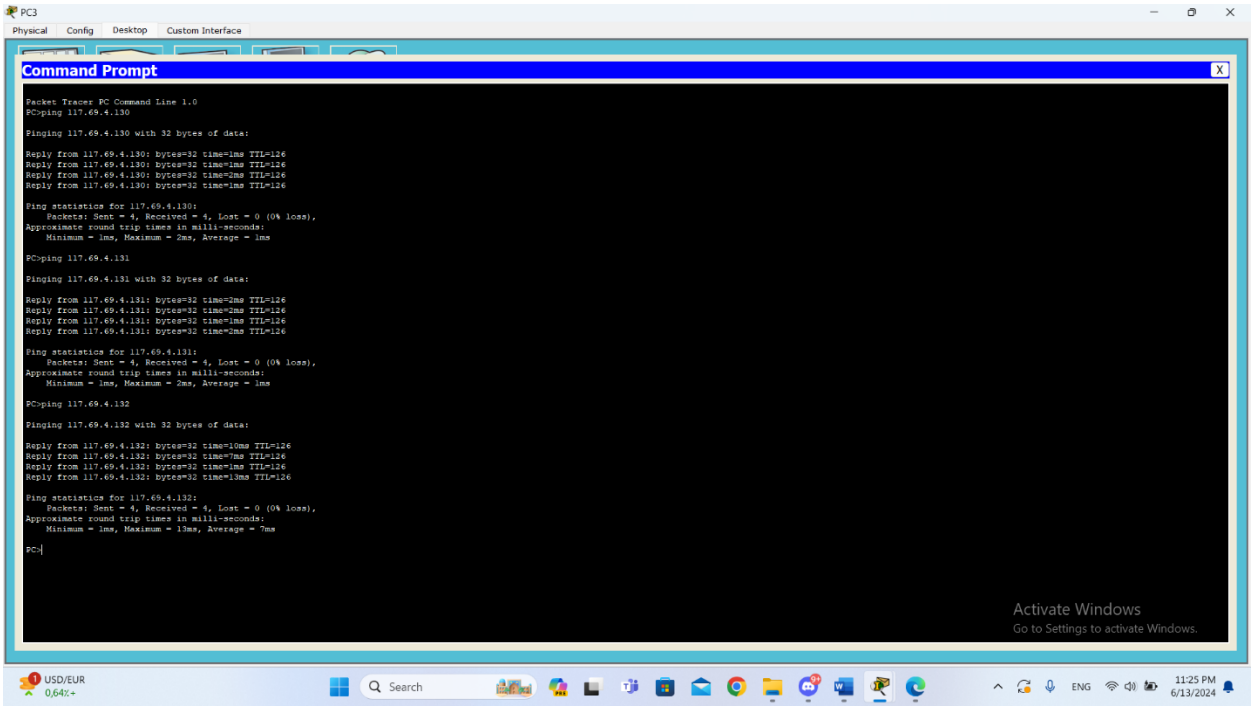
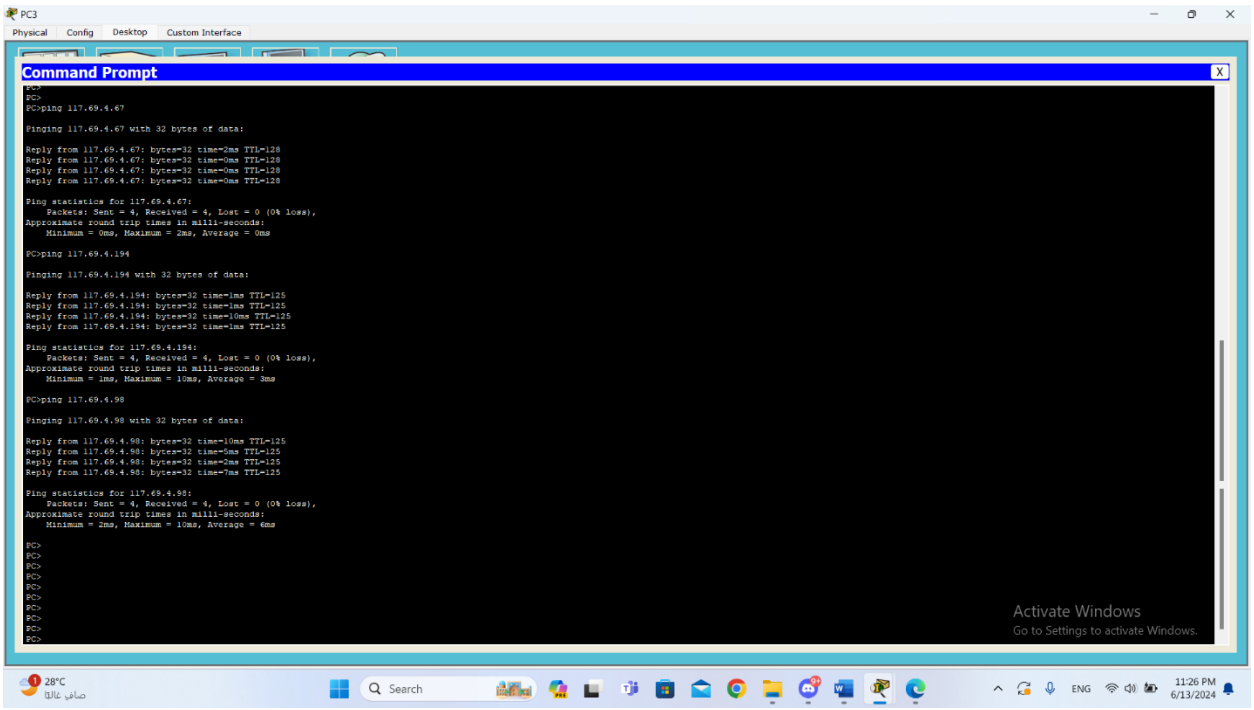


Figure 43: ping command from PC2

As shown from results above, we test all other PCs from PC2. 4 packets are sent each time, and it's noticed that all packets arrive without request lost or time out, this means the topology works well.

- **PC3**:


PC3
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 117.69.4.130
Pinging 117.69.4.130 with 32 bytes of data:
Reply from 117.69.4.130: bytes=32 time=1ms TTL=126
Reply from 117.69.4.130: bytes=32 time=1ms TTL=126
Reply from 117.69.4.130: bytes=32 time=2ms TTL=126
Reply from 117.69.4.130: bytes=32 time=1ms TTL=126
Ping statistics for 117.69.4.130:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 2ms, Average = 1ms
PC>ping 117.69.4.131
Pinging 117.69.4.131 with 32 bytes of data:
Reply from 117.69.4.131: bytes=32 time=2ms TTL=126
Reply from 117.69.4.131: bytes=32 time=2ms TTL=126
Reply from 117.69.4.131: bytes=32 time=1ms TTL=126
Reply from 117.69.4.131: bytes=32 time=2ms TTL=126
Ping statistics for 117.69.4.131:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 2ms, Average = 1ms
PC>ping 117.69.4.132
Pinging 117.69.4.132 with 32 bytes of data:
Reply from 117.69.4.132: bytes=32 time=10ms TTL=126
Reply from 117.69.4.132: bytes=32 time=7ms TTL=126
Reply from 117.69.4.132: bytes=32 time=1ms TTL=126
Reply from 117.69.4.132: bytes=32 time=13ms TTL=126
Ping statistics for 117.69.4.132:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 13ms, Average = 7ms
PC>
Activate Windows
Go to Settings to activate Windows.
USD/EUR
0,64%
Search
ENG
11:25 PM
6/13/2024


PC3
Physical
Config
Desktop
Custom Interface
Command Prompt
PC>
PC>ping 117.69.4.67
Pinging 117.69.4.67 with 32 bytes of data:
Reply from 117.69.4.67: bytes=32 time=2ms TTL=128
Reply from 117.69.4.67: bytes=32 time=0ms TTL=128
Reply from 117.69.4.67: bytes=32 time=0ms TTL=128
Reply from 117.69.4.67: bytes=32 time=0ms TTL=128
Ping statistics for 117.69.4.67:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 2ms, Average = 0ms
PC>ping 117.69.4.194
Pinging 117.69.4.194 with 32 bytes of data:
Reply from 117.69.4.194: bytes=32 time=1ms TTL=125
Reply from 117.69.4.194: bytes=32 time=1ms TTL=125
Reply from 117.69.4.194: bytes=32 time=10ms TTL=125
Reply from 117.69.4.194: bytes=32 time=1ms TTL=125
Ping statistics for 117.69.4.194:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 10ms, Average = 3ms
PC>ping 117.69.4.98
Pinging 117.69.4.98 with 32 bytes of data:
Reply from 117.69.4.98: bytes=32 time=10ms TTL=125
Reply from 117.69.4.98: bytes=32 time=5ms TTL=125
Reply from 117.69.4.98: bytes=32 time=2ms TTL=125
Reply from 117.69.4.98: bytes=32 time=7ms TTL=125
Ping statistics for 117.69.4.98:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 10ms, Average = 6ms
PC>
Activate Windows
Go to Settings to activate Windows.
28°C
Search
ENG
11:26 PM
6/13/2024

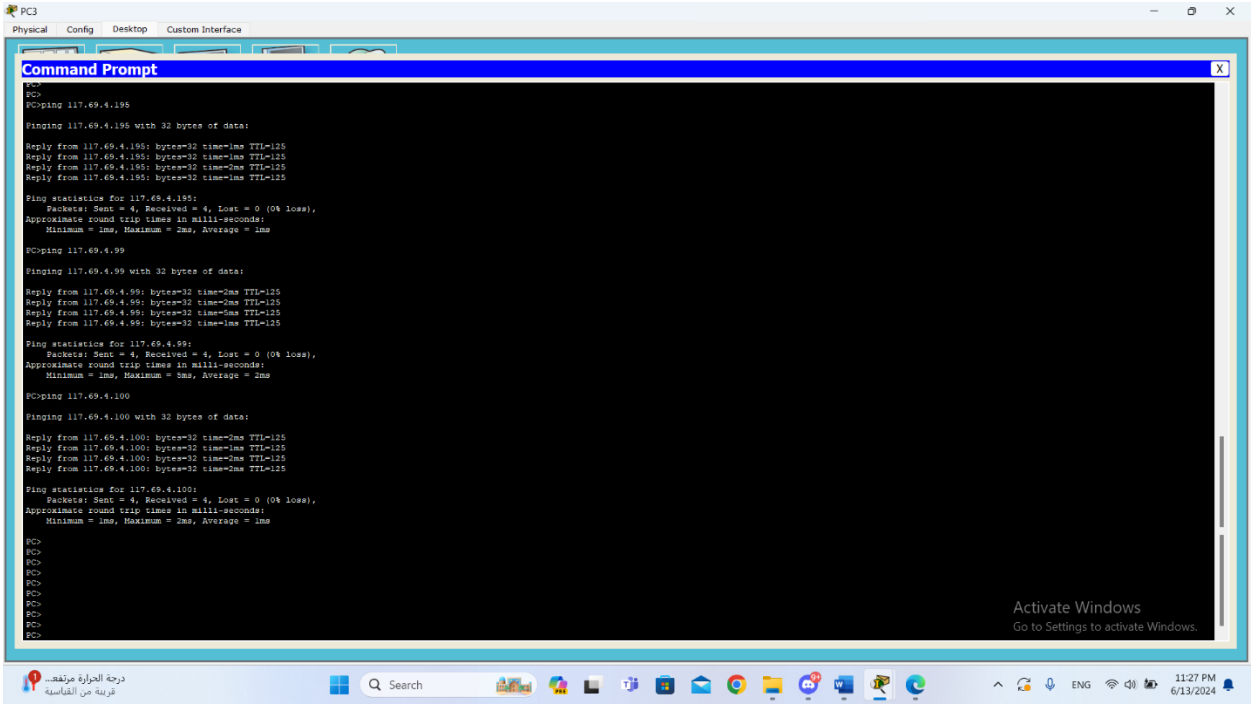
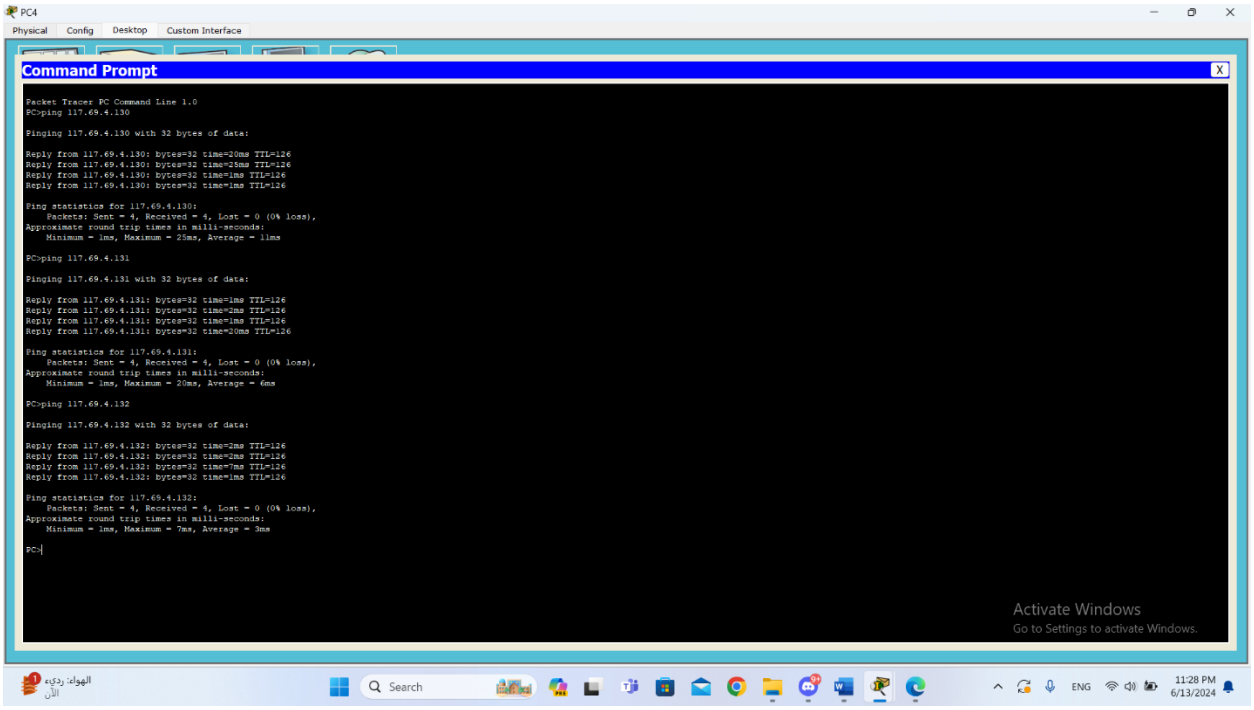
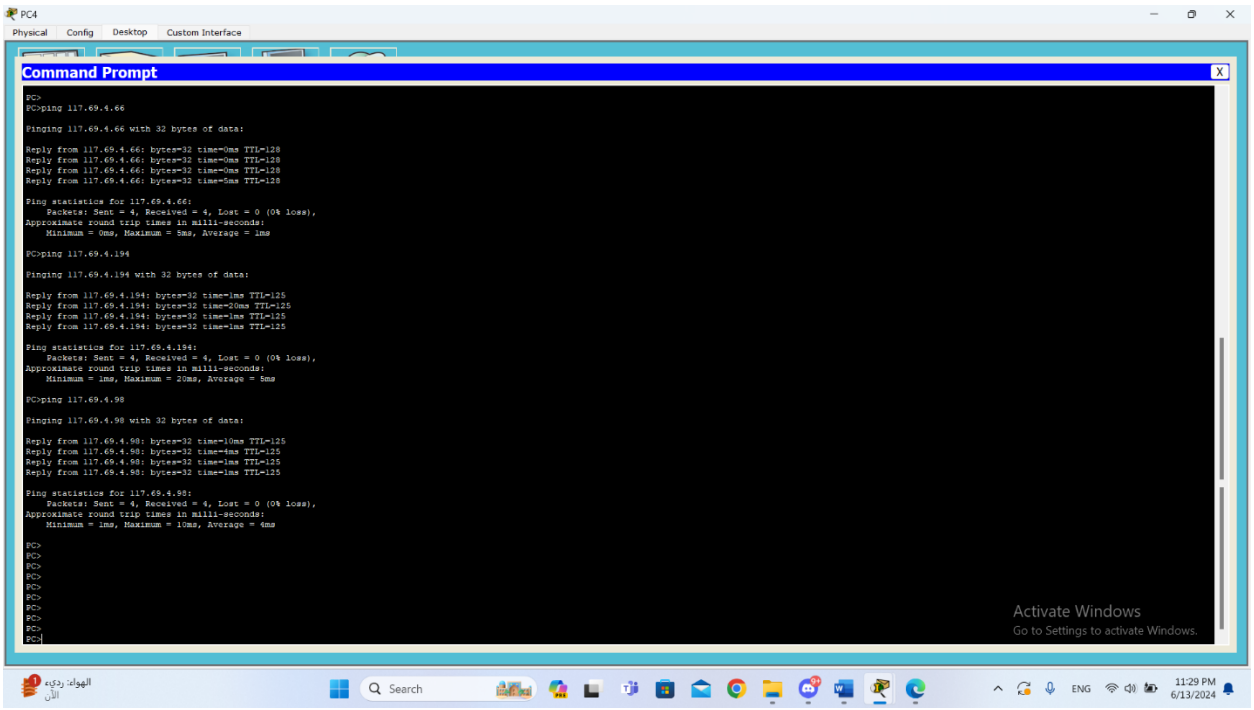


Figure 44: ping command from PC3

As shown from results above, we test all other PCs from PC3. 4 packets are sent each time, and it's noticed that all packets arrive without request lost or time out, this means the topology works well.

- **PC4:**


PC4
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 117.69.4.130
Pinging 117.69.4.130 with 32 bytes of data:
Reply from 117.69.4.130: bytes=32 time=20ms TTL=126
Reply from 117.69.4.130: bytes=32 time=25ms TTL=126
Reply from 117.69.4.130: bytes=32 time=1ms TTL=126
Reply from 117.69.4.130: bytes=32 time=1ms TTL=126
Ping statistics for 117.69.4.130:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 25ms, Average = 11ms
PC>ping 117.69.4.131
Pinging 117.69.4.131 with 32 bytes of data:
Reply from 117.69.4.131: bytes=32 time=1ms TTL=126
Reply from 117.69.4.131: bytes=32 time=2ms TTL=126
Reply from 117.69.4.131: bytes=32 time=1ms TTL=126
Reply from 117.69.4.131: bytes=32 time=20ms TTL=126
Ping statistics for 117.69.4.131:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 20ms, Average = 6ms
PC>ping 117.69.4.132
Pinging 117.69.4.132 with 32 bytes of data:
Reply from 117.69.4.132: bytes=32 time=2ms TTL=126
Reply from 117.69.4.132: bytes=32 time=2ms TTL=126
Reply from 117.69.4.132: bytes=32 time=7ms TTL=126
Reply from 117.69.4.132: bytes=32 time=1ms TTL=126
Ping statistics for 117.69.4.132:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 7ms, Average = 3ms
PC>
Activate Windows
Go to Settings to activate Windows.
Search
ENG
11:28 PM
6/13/2024


PC4
Physical
Config
Desktop
Custom Interface
Command Prompt
PC>
PC>ping 117.69.4.66
Pinging 117.69.4.66 with 32 bytes of data:
Reply from 117.69.4.66: bytes=32 time=0ms TTL=128
Reply from 117.69.4.66: bytes=32 time=0ms TTL=128
Reply from 117.69.4.66: bytes=32 time=0ms TTL=128
Reply from 117.69.4.66: bytes=32 time=5ms TTL=128
Ping statistics for 117.69.4.66:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 5ms, Average = 1ms
PC>ping 117.69.4.194
Pinging 117.69.4.194 with 32 bytes of data:
Reply from 117.69.4.194: bytes=32 time=1ms TTL=125
Reply from 117.69.4.194: bytes=32 time=20ms TTL=125
Reply from 117.69.4.194: bytes=32 time=1ms TTL=125
Reply from 117.69.4.194: bytes=32 time=1ms TTL=125
Ping statistics for 117.69.4.194:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 20ms, Average = 5ms
PC>ping 117.69.4.98
Pinging 117.69.4.98 with 32 bytes of data:
Reply from 117.69.4.98: bytes=32 time=10ms TTL=125
Reply from 117.69.4.98: bytes=32 time=4ms TTL=125
Reply from 117.69.4.98: bytes=32 time=1ms TTL=125
Reply from 117.69.4.98: bytes=32 time=1ms TTL=125
Ping statistics for 117.69.4.98:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 10ms, Average = 4ms
PC>
PC>
PC>
PC>
PC>
PC>
PC>
PC>
PC>
PC>
Activate Windows
Go to Settings to activate Windows.
Search
ENG
11:29 PM
6/13/2024

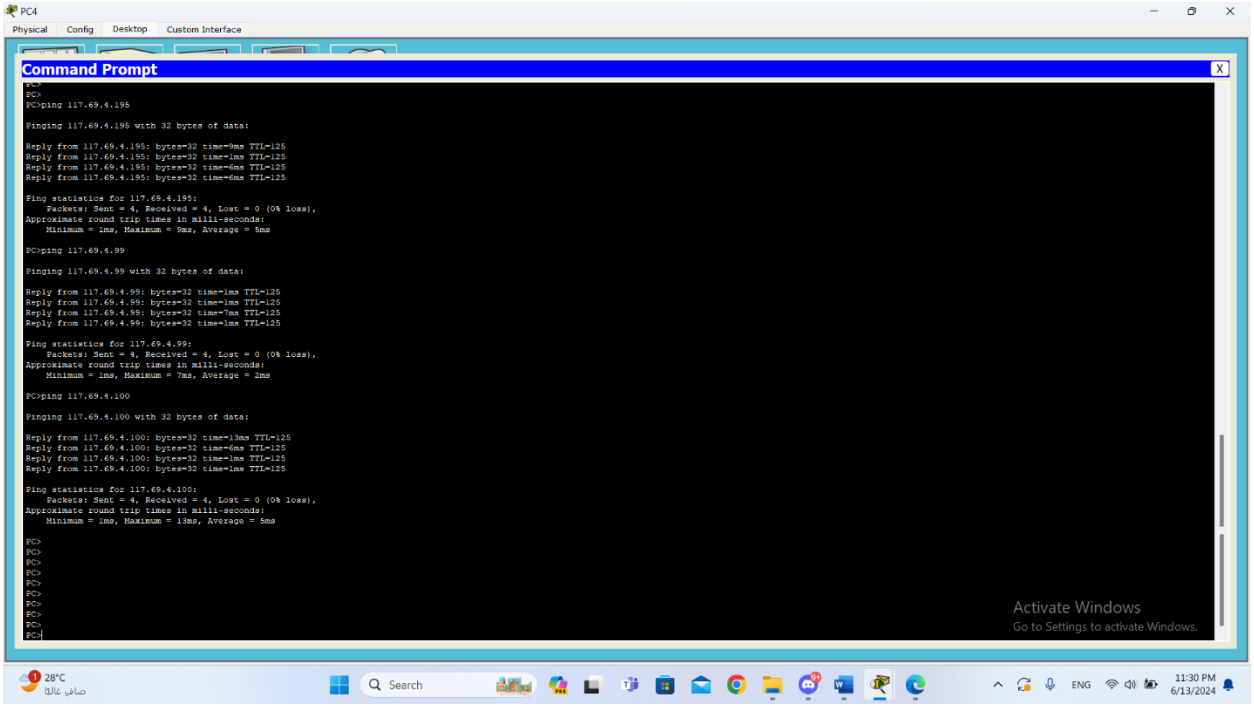
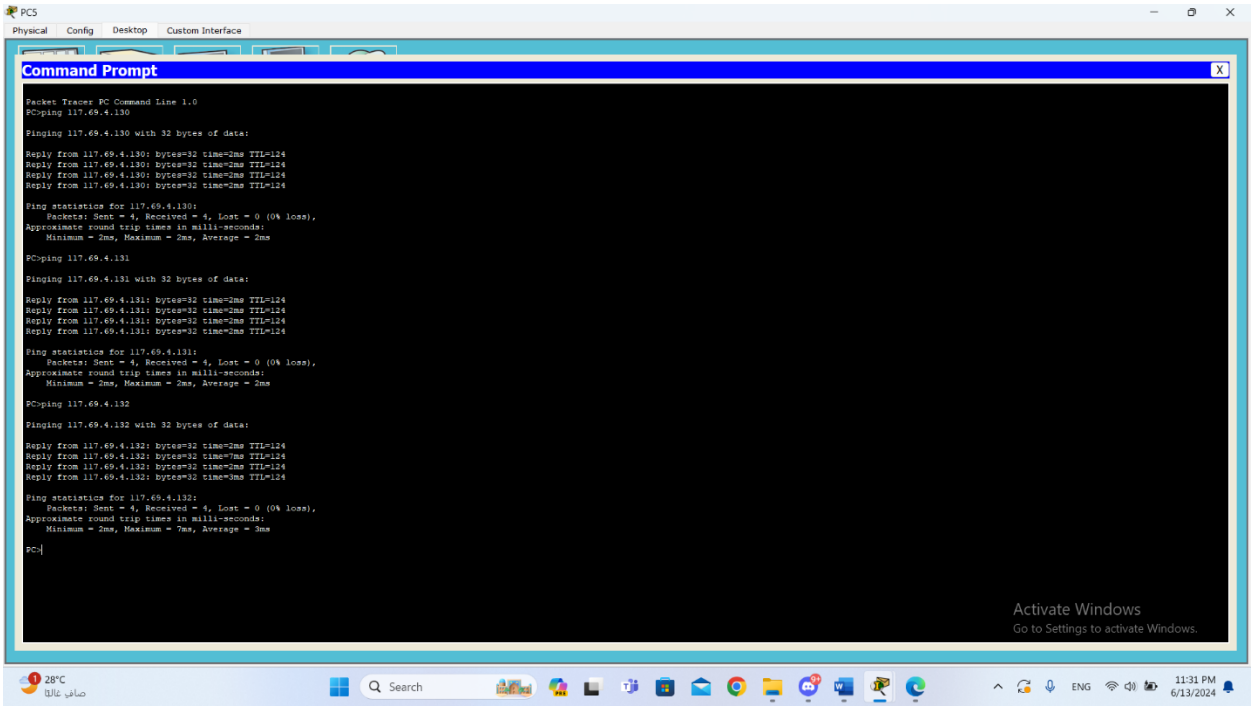
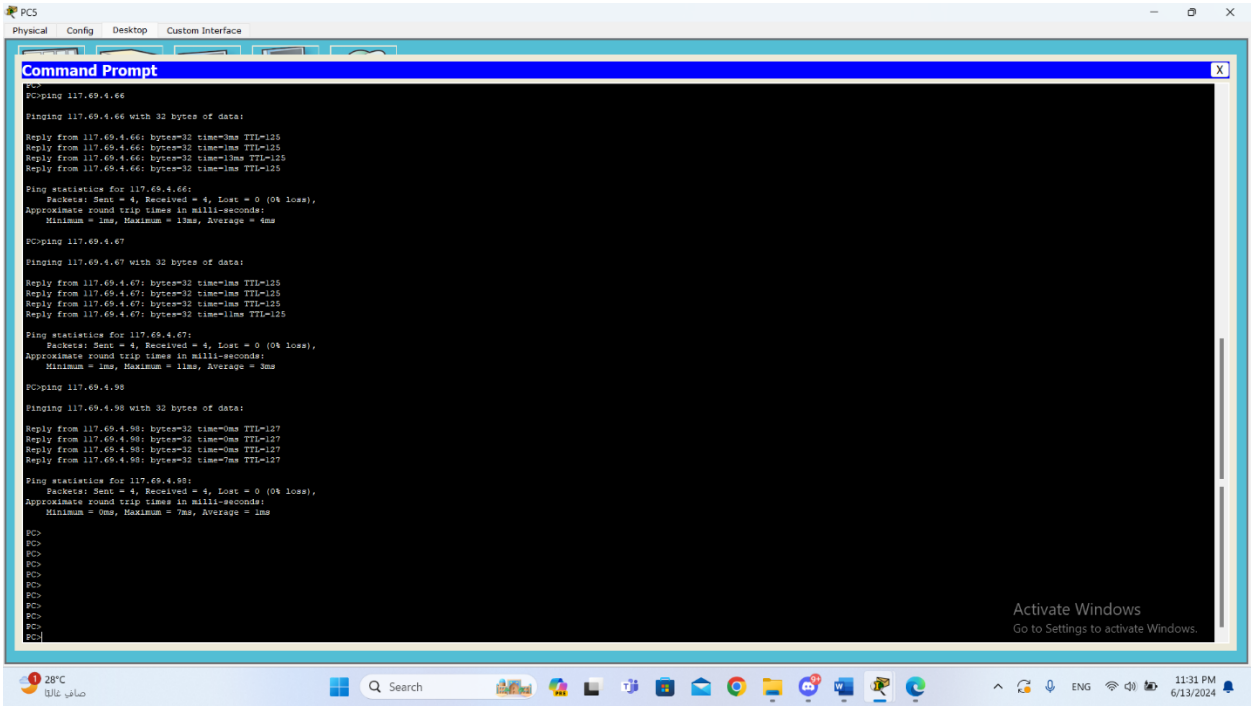


Figure 45: ping command from PC4

As shown from results above, we test all other PCs from PC4. 4 packets are sent each time, and it's noticed that all packets arrive without request lost or time out, this means the topology works well.

- **PC5:**


PC5
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 117.69.4.130
Pinging 117.69.4.130 with 32 bytes of data:
Reply from 117.69.4.130: bytes=32 time=2ms TTL=124
Reply from 117.69.4.130: bytes=32 time=2ms TTL=124
Reply from 117.69.4.130: bytes=32 time=2ms TTL=124
Reply from 117.69.4.130: bytes=32 time=2ms TTL=124
Ping statistics for 117.69.4.130:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 2ms, Average = 2ms
PC>ping 117.69.4.131
Pinging 117.69.4.131 with 32 bytes of data:
Reply from 117.69.4.131: bytes=32 time=2ms TTL=124
Reply from 117.69.4.131: bytes=32 time=2ms TTL=124
Reply from 117.69.4.131: bytes=32 time=2ms TTL=124
Reply from 117.69.4.131: bytes=32 time=2ms TTL=124
Ping statistics for 117.69.4.131:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 2ms, Average = 2ms
PC>ping 117.69.4.132
Pinging 117.69.4.132 with 32 bytes of data:
Reply from 117.69.4.132: bytes=32 time=2ms TTL=124
Reply from 117.69.4.132: bytes=32 time=7ms TTL=124
Reply from 117.69.4.132: bytes=32 time=2ms TTL=124
Reply from 117.69.4.132: bytes=32 time=3ms TTL=124
Ping statistics for 117.69.4.132:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 7ms, Average = 3ms
PC>
Activate Windows
Go to Settings to activate Windows.
28°C
صافي غالبًا
Search
ENG
11:31 PM
6/13/2024


PC5
Physical
Config
Desktop
Custom Interface
Command Prompt
PC>ping 117.69.4.66
Pinging 117.69.4.66 with 32 bytes of data:
Reply from 117.69.4.66: bytes=32 time=3ms TTL=125
Reply from 117.69.4.66: bytes=32 time=1ms TTL=125
Reply from 117.69.4.66: bytes=32 time=13ms TTL=125
Reply from 117.69.4.66: bytes=32 time=1ms TTL=125
Ping statistics for 117.69.4.66:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 13ms, Average = 4ms
PC>ping 117.69.4.67
Pinging 117.69.4.67 with 32 bytes of data:
Reply from 117.69.4.67: bytes=32 time=1ms TTL=125
Reply from 117.69.4.67: bytes=32 time=1ms TTL=125
Reply from 117.69.4.67: bytes=32 time=1ms TTL=125
Reply from 117.69.4.67: bytes=32 time=11ms TTL=125
Ping statistics for 117.69.4.67:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 11ms, Average = 3ms
PC>ping 117.69.4.98
Pinging 117.69.4.98 with 32 bytes of data:
Reply from 117.69.4.98: bytes=32 time=0ms TTL=127
Reply from 117.69.4.98: bytes=32 time=0ms TTL=127
Reply from 117.69.4.98: bytes=32 time=0ms TTL=127
Reply from 117.69.4.98: bytes=32 time=7ms TTL=127
Ping statistics for 117.69.4.98:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 7ms, Average = 1ms
PC>
Activate Windows
Go to Settings to activate Windows.
28°C
صافي غالبًا
Search
ENG
11:31 PM
6/13/2024

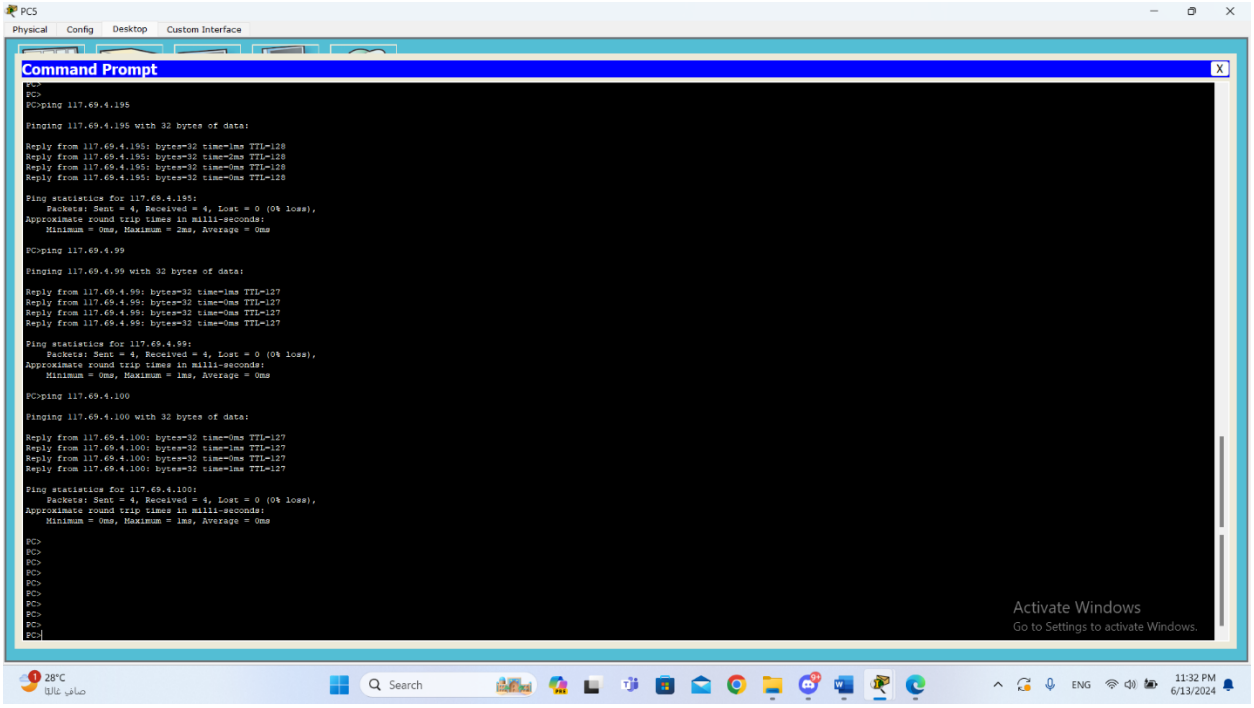
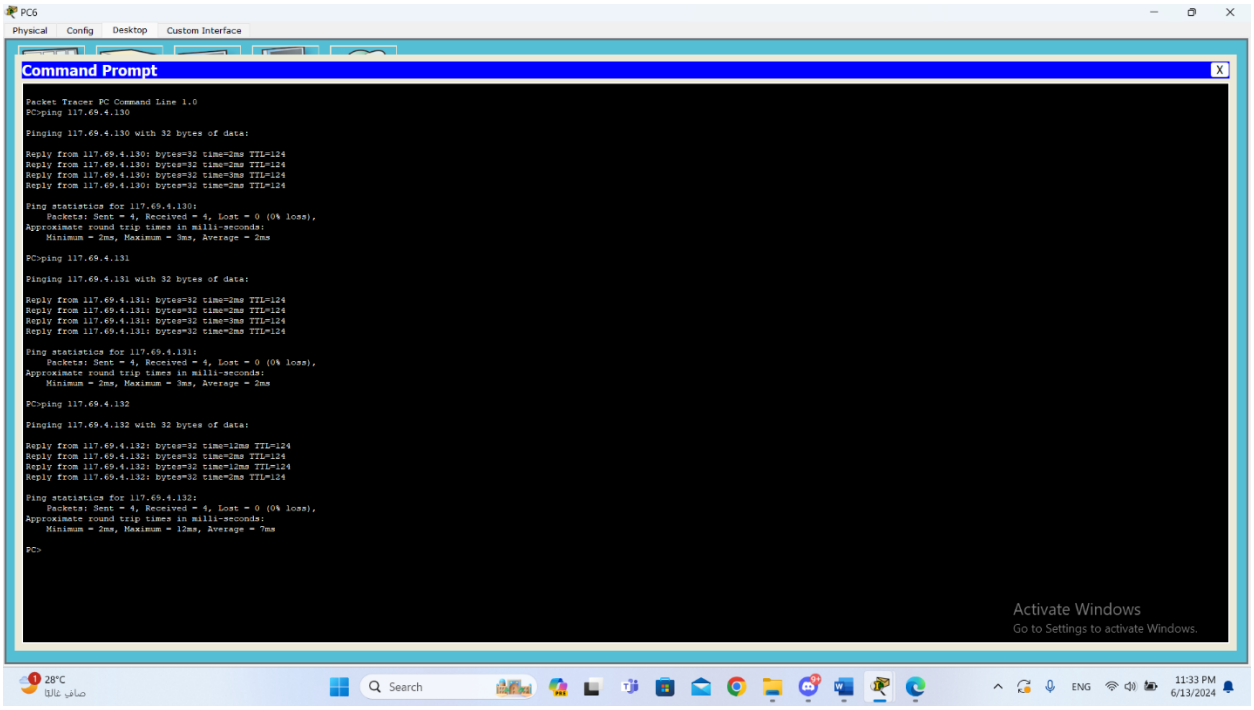
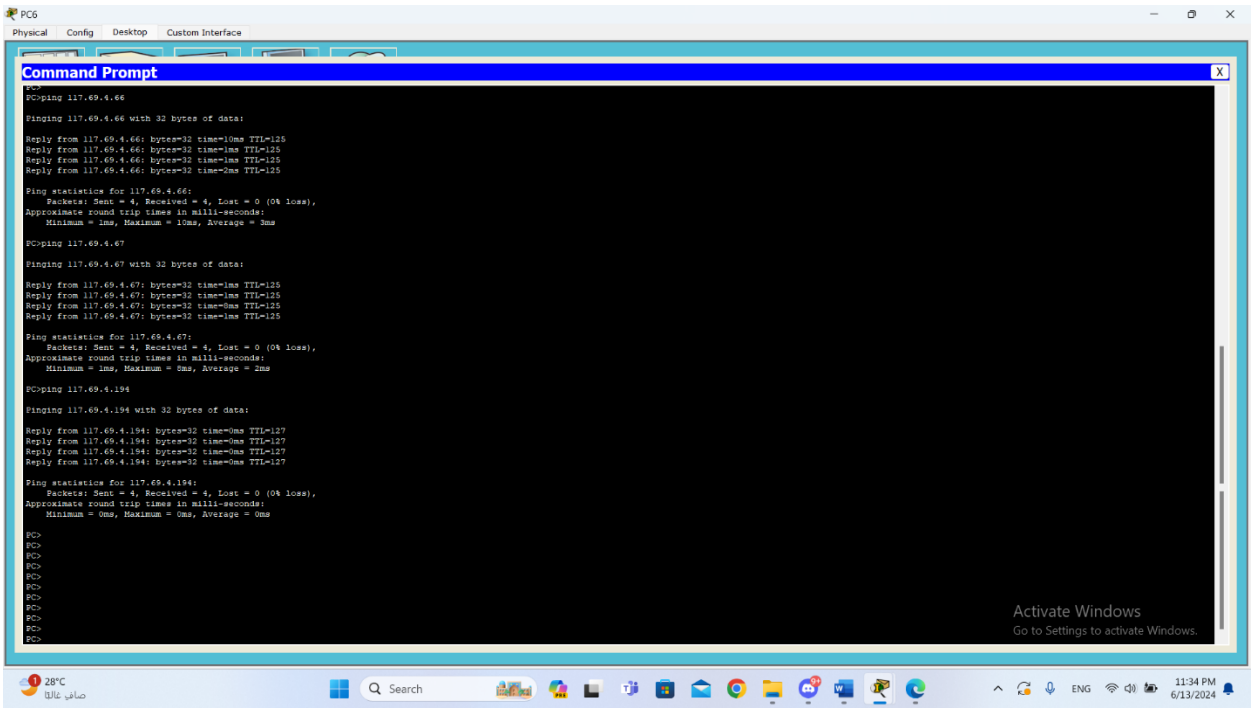


Figure 46: ping command from PC5

As shown from results above, we test all other PCs from PC5. 4 packets are sent each time, and it's noticed that all packets arrive without request lost or time out, this means the topology works well.

- **PC6:**


PC6
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 117.69.4.130
Pinging 117.69.4.130 with 32 bytes of data:
Reply from 117.69.4.130: bytes=32 time=2ms TTL=124
Reply from 117.69.4.130: bytes=32 time=2ms TTL=124
Reply from 117.69.4.130: bytes=32 time=3ms TTL=124
Reply from 117.69.4.130: bytes=32 time=2ms TTL=124
Ping statistics for 117.69.4.130:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 3ms, Average = 2ms
PC>ping 117.69.4.131
Pinging 117.69.4.131 with 32 bytes of data:
Reply from 117.69.4.131: bytes=32 time=2ms TTL=124
Reply from 117.69.4.131: bytes=32 time=2ms TTL=124
Reply from 117.69.4.131: bytes=32 time=2ms TTL=124
Reply from 117.69.4.131: bytes=32 time=2ms TTL=124
Ping statistics for 117.69.4.131:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 3ms, Average = 2ms
PC>ping 117.69.4.132
Pinging 117.69.4.132 with 32 bytes of data:
Reply from 117.69.4.132: bytes=32 time=12ms TTL=124
Reply from 117.69.4.132: bytes=32 time=2ms TTL=124
Reply from 117.69.4.132: bytes=32 time=12ms TTL=124
Reply from 117.69.4.132: bytes=32 time=2ms TTL=124
Ping statistics for 117.69.4.132:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 12ms, Average = 7ms
PC>
Activate Windows
Go to Settings to activate Windows.
28°C
Search
ENG
11:33 PM
6/13/2024


PC6
Physical
Config
Desktop
Custom Interface
Command Prompt
PC>ping 117.69.4.66
Pinging 117.69.4.66 with 32 bytes of data:
Reply from 117.69.4.66: bytes=32 time=10ms TTL=125
Reply from 117.69.4.66: bytes=32 time=1ms TTL=125
Reply from 117.69.4.66: bytes=32 time=1ms TTL=125
Reply from 117.69.4.66: bytes=32 time=2ms TTL=125
Ping statistics for 117.69.4.66:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 10ms, Average = 3ms
PC>ping 117.69.4.67
Pinging 117.69.4.67 with 32 bytes of data:
Reply from 117.69.4.67: bytes=32 time=1ms TTL=125
Reply from 117.69.4.67: bytes=32 time=1ms TTL=125
Reply from 117.69.4.67: bytes=32 time=8ms TTL=125
Reply from 117.69.4.67: bytes=32 time=1ms TTL=125
Ping statistics for 117.69.4.67:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 8ms, Average = 2ms
PC>ping 117.69.4.194
Pinging 117.69.4.194 with 32 bytes of data:
Reply from 117.69.4.194: bytes=32 time=0ms TTL=127
Reply from 117.69.4.194: bytes=32 time=0ms TTL=127
Reply from 117.69.4.194: bytes=32 time=0ms TTL=127
Reply from 117.69.4.194: bytes=32 time=0ms TTL=127
Ping statistics for 117.69.4.194:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
PC>
Activate Windows
Go to Settings to activate Windows.
28°C
Search
ENG
11:34 PM
6/13/2024

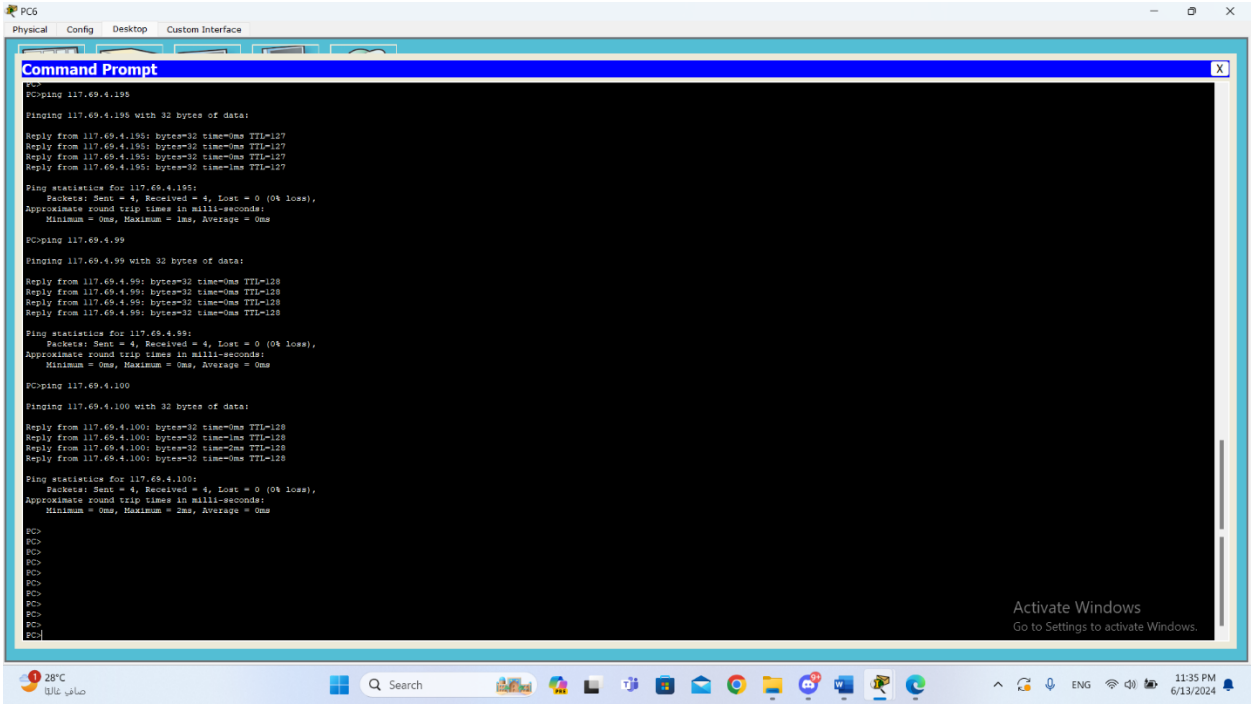
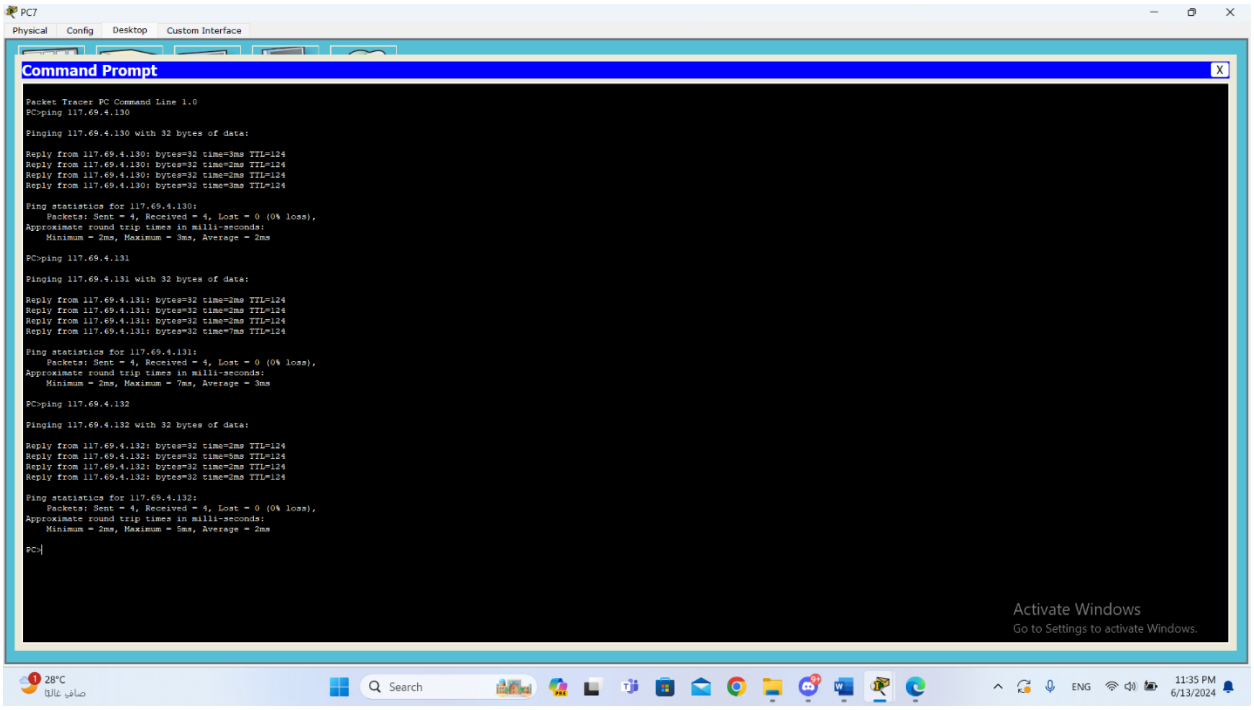
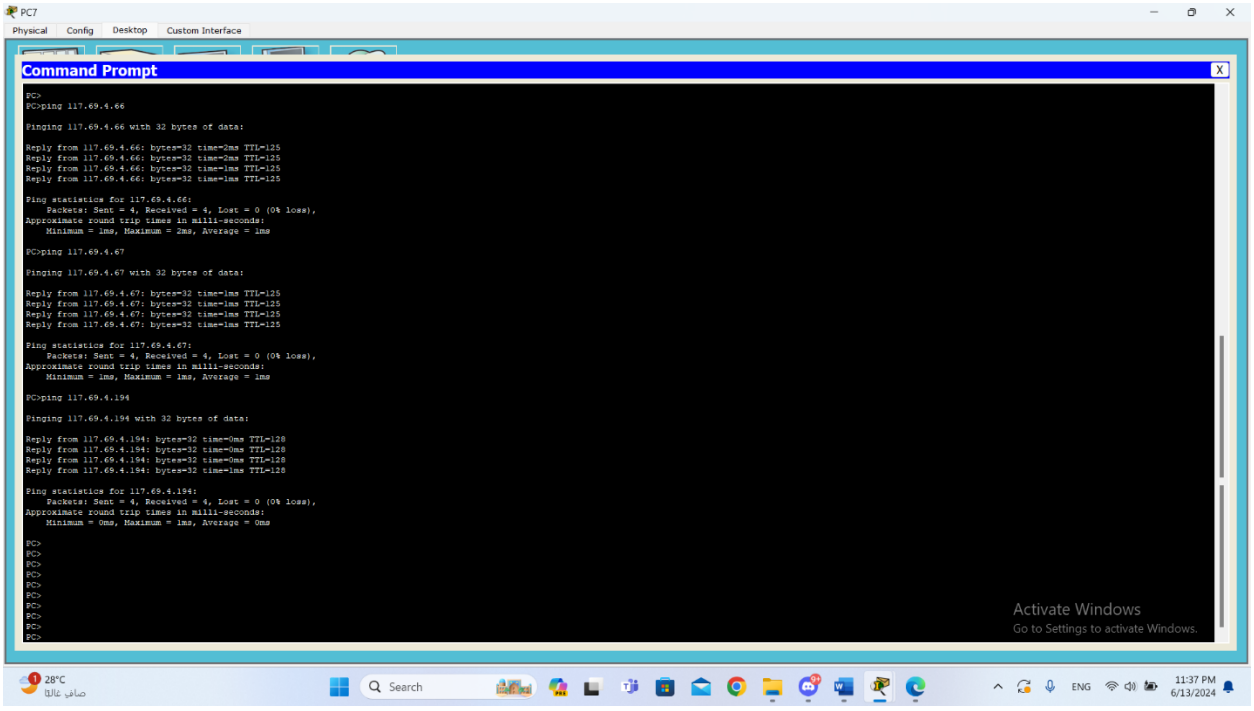


Figure 47: ping command from PC6

As shown from results above, we test all other PCs from PC6. 4 packets are sent each time, and it's noticed that all packets arrive without request lost or time out, this means the topology works well.

- **PC7:**


PC7
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 117.69.4.130
Pinging 117.69.4.130 with 32 bytes of data:
Reply from 117.69.4.130: bytes=32 time=3ms TTL=124
Reply from 117.69.4.130: bytes=32 time=2ms TTL=124
Reply from 117.69.4.130: bytes=32 time=2ms TTL=124
Reply from 117.69.4.130: bytes=32 time=3ms TTL=124
Ping statistics for 117.69.4.130:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 3ms, Average = 2ms
PC>ping 117.69.4.131
Pinging 117.69.4.131 with 32 bytes of data:
Reply from 117.69.4.131: bytes=32 time=2ms TTL=124
Reply from 117.69.4.131: bytes=32 time=2ms TTL=124
Reply from 117.69.4.131: bytes=32 time=2ms TTL=124
Reply from 117.69.4.131: bytes=32 time=7ms TTL=124
Ping statistics for 117.69.4.131:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 7ms, Average = 3ms
PC>ping 117.69.4.132
Pinging 117.69.4.132 with 32 bytes of data:
Reply from 117.69.4.132: bytes=32 time=2ms TTL=124
Reply from 117.69.4.132: bytes=32 time=5ms TTL=124
Reply from 117.69.4.132: bytes=32 time=2ms TTL=124
Reply from 117.69.4.132: bytes=32 time=2ms TTL=124
Ping statistics for 117.69.4.132:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 5ms, Average = 2ms
PC>
Activate Windows
Go to Settings to activate Windows.
28°C
Search
ENG
11:35 PM
6/13/2024


PC7
Physical
Config
Desktop
Custom Interface
Command Prompt
PC>
PC>ping 117.69.4.66
Pinging 117.69.4.66 with 32 bytes of data:
Reply from 117.69.4.66: bytes=32 time=2ms TTL=125
Reply from 117.69.4.66: bytes=32 time=2ms TTL=125
Reply from 117.69.4.66: bytes=32 time=1ms TTL=125
Reply from 117.69.4.66: bytes=32 time=1ms TTL=125
Ping statistics for 117.69.4.66:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 2ms, Average = 1ms
PC>ping 117.69.4.67
Pinging 117.69.4.67 with 32 bytes of data:
Reply from 117.69.4.67: bytes=32 time=1ms TTL=125
Reply from 117.69.4.67: bytes=32 time=1ms TTL=125
Reply from 117.69.4.67: bytes=32 time=1ms TTL=125
Reply from 117.69.4.67: bytes=32 time=1ms TTL=125
Ping statistics for 117.69.4.67:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 1ms, Average = 1ms
PC>ping 117.69.4.194
Pinging 117.69.4.194 with 32 bytes of data:
Reply from 117.69.4.194: bytes=32 time=0ms TTL=128
Reply from 117.69.4.194: bytes=32 time=0ms TTL=128
Reply from 117.69.4.194: bytes=32 time=0ms TTL=128
Reply from 117.69.4.194: bytes=32 time=1ms TTL=128
Ping statistics for 117.69.4.194:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
PC>
PC>
PC>
PC>
PC>
PC>
PC>
PC>
PC>
PC>
Activate Windows
Go to Settings to activate Windows.
28°C
Search
ENG
11:37 PM
6/13/2024

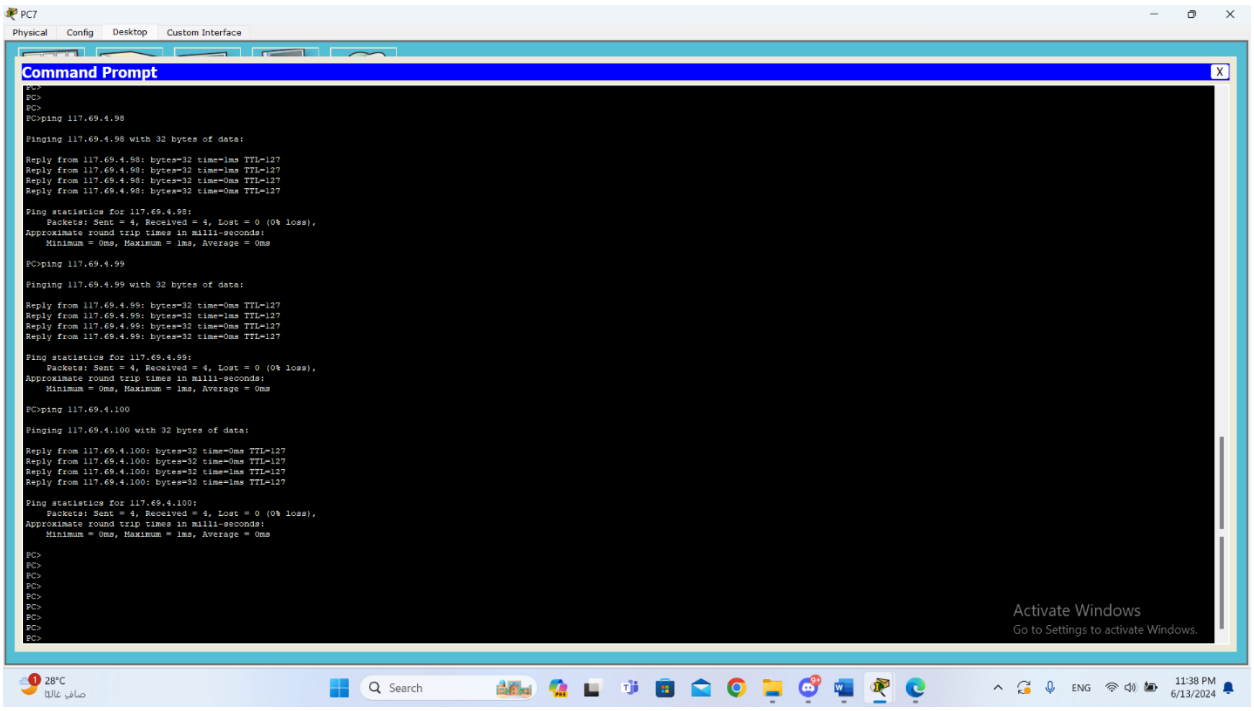
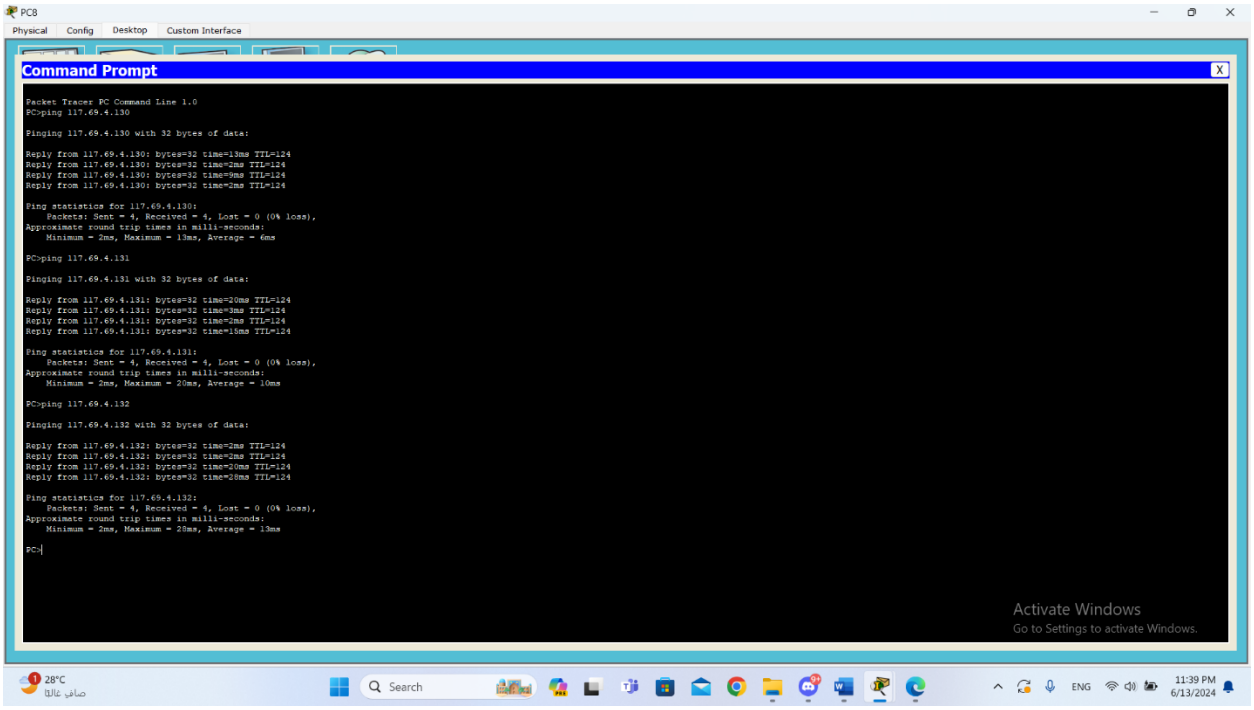
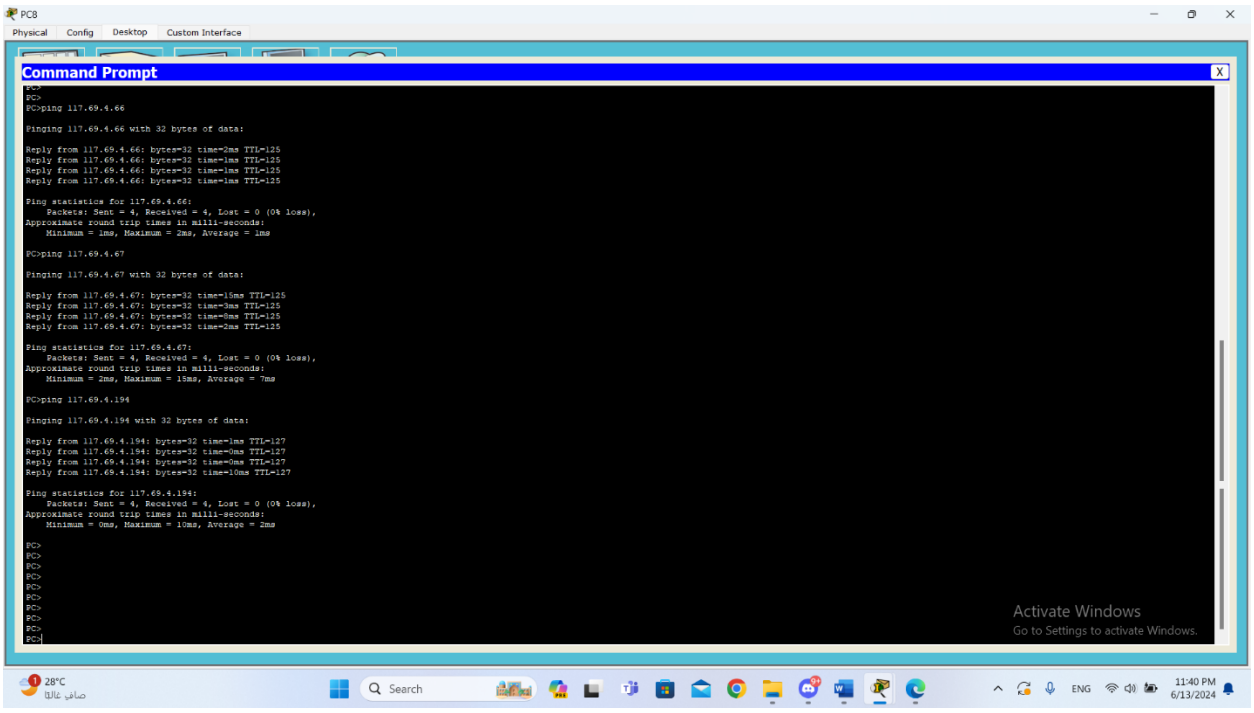


Figure 48: ping command from PC7

As shown from results above, we test all other PCs from PC7. 4 packets are sent each time, and it's noticed that all packets arrive without request lost or time out, this means the topology works well.

- **PC8:**


PC8
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 117.69.4.130
Pinging 117.69.4.130 with 32 bytes of data:
Reply from 117.69.4.130: bytes=32 time=13ms TTL=124
Reply from 117.69.4.130: bytes=32 time=2ms TTL=124
Reply from 117.69.4.130: bytes=32 time=9ms TTL=124
Reply from 117.69.4.130: bytes=32 time=2ms TTL=124
Ping statistics for 117.69.4.130:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 13ms, Average = 6ms
PC>ping 117.69.4.131
Pinging 117.69.4.131 with 32 bytes of data:
Reply from 117.69.4.131: bytes=32 time=20ms TTL=124
Reply from 117.69.4.131: bytes=32 time=3ms TTL=124
Reply from 117.69.4.131: bytes=32 time=2ms TTL=124
Reply from 117.69.4.131: bytes=32 time=16ms TTL=124
Ping statistics for 117.69.4.131:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 20ms, Average = 10ms
PC>ping 117.69.4.132
Pinging 117.69.4.132 with 32 bytes of data:
Reply from 117.69.4.132: bytes=32 time=2ms TTL=124
Reply from 117.69.4.132: bytes=32 time=2ms TTL=124
Reply from 117.69.4.132: bytes=32 time=20ms TTL=124
Reply from 117.69.4.132: bytes=32 time=28ms TTL=124
Ping statistics for 117.69.4.132:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 28ms, Average = 13ms
PC>
Activate Windows
Go to Settings to activate Windows.
28°C
صافي غالبا
Search
ENG
11:39 PM
6/13/2024


PC8
Physical
Config
Desktop
Custom Interface
Command Prompt
PC>
PC>ping 117.69.4.66
Pinging 117.69.4.66 with 32 bytes of data:
Reply from 117.69.4.66: bytes=32 time=2ms TTL=125
Reply from 117.69.4.66: bytes=32 time=1ms TTL=125
Reply from 117.69.4.66: bytes=32 time=1ms TTL=125
Reply from 117.69.4.66: bytes=32 time=1ms TTL=125
Ping statistics for 117.69.4.66:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 2ms, Average = 1ms
PC>ping 117.69.4.67
Pinging 117.69.4.67 with 32 bytes of data:
Reply from 117.69.4.67: bytes=32 time=15ms TTL=125
Reply from 117.69.4.67: bytes=32 time=3ms TTL=125
Reply from 117.69.4.67: bytes=32 time=8ms TTL=125
Reply from 117.69.4.67: bytes=32 time=2ms TTL=125
Ping statistics for 117.69.4.67:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 15ms, Average = 7ms
PC>ping 117.69.4.194
Pinging 117.69.4.194 with 32 bytes of data:
Reply from 117.69.4.194: bytes=32 time=1ms TTL=127
Reply from 117.69.4.194: bytes=32 time=0ms TTL=127
Reply from 117.69.4.194: bytes=32 time=0ms TTL=127
Reply from 117.69.4.194: bytes=32 time=10ms TTL=127
Ping statistics for 117.69.4.194:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 10ms, Average = 2ms
PC>
Activate Windows
Go to Settings to activate Windows.
28°C
صافي غالبا
Search
ENG
11:40 PM
6/13/2024

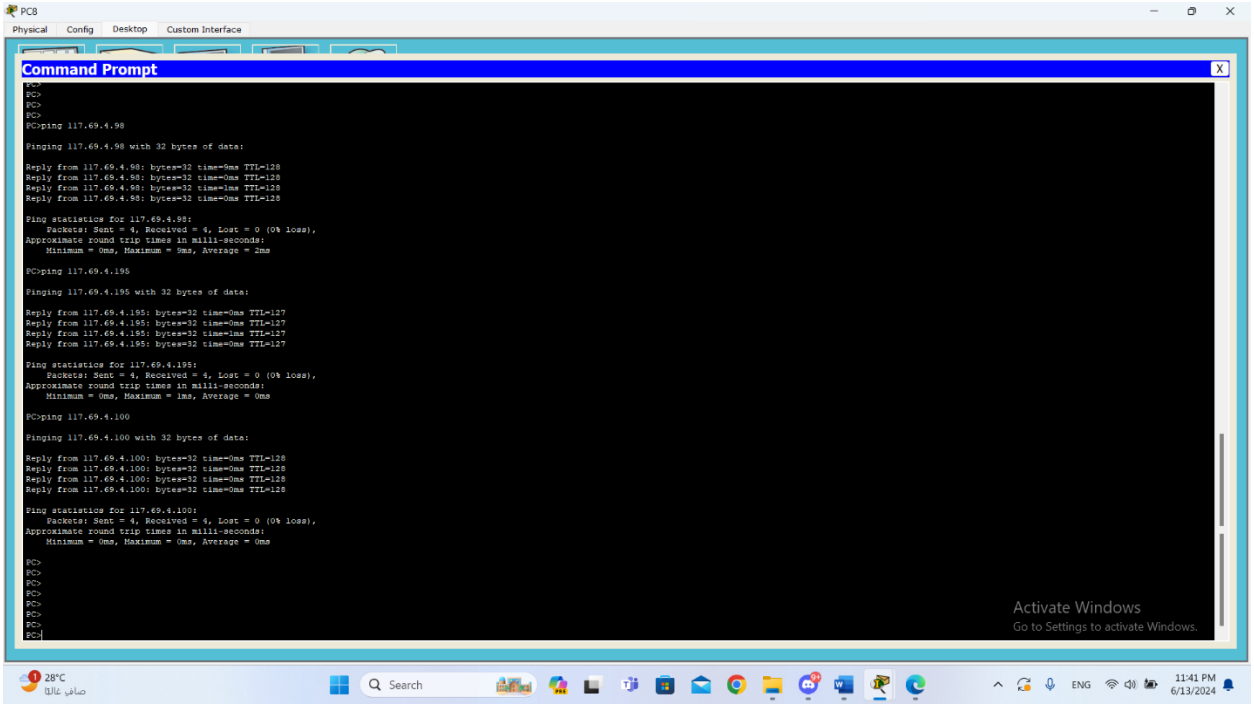
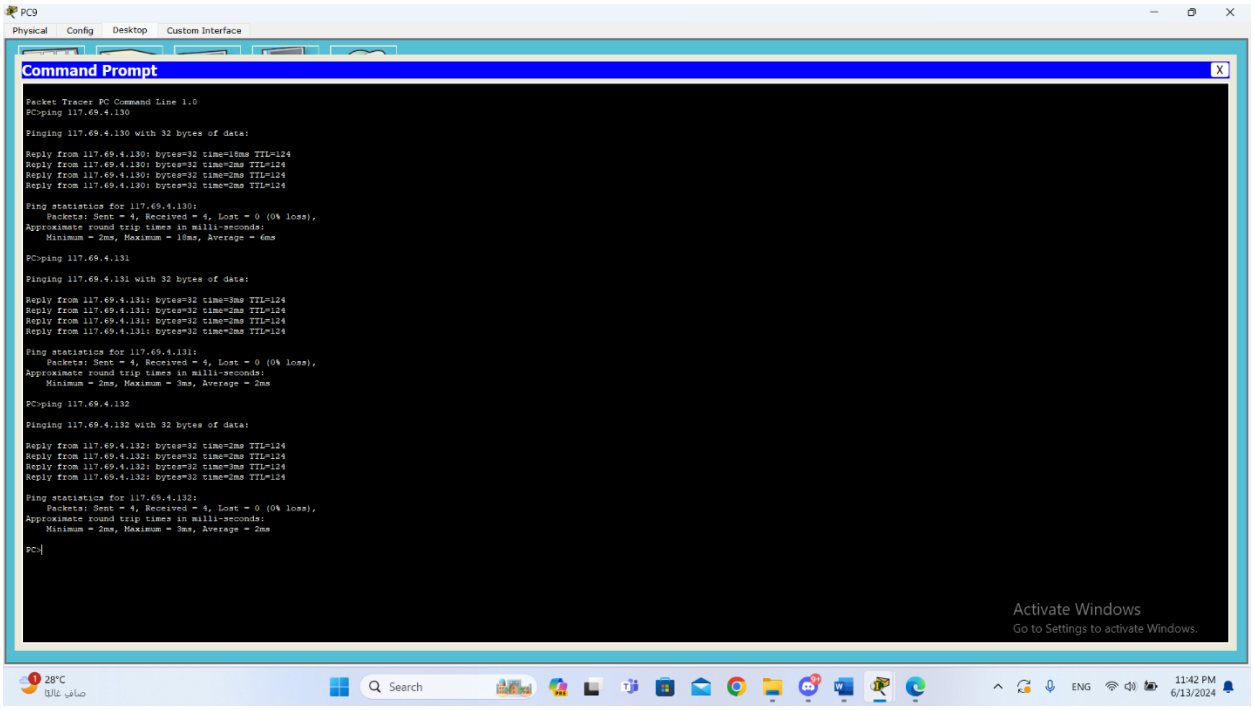
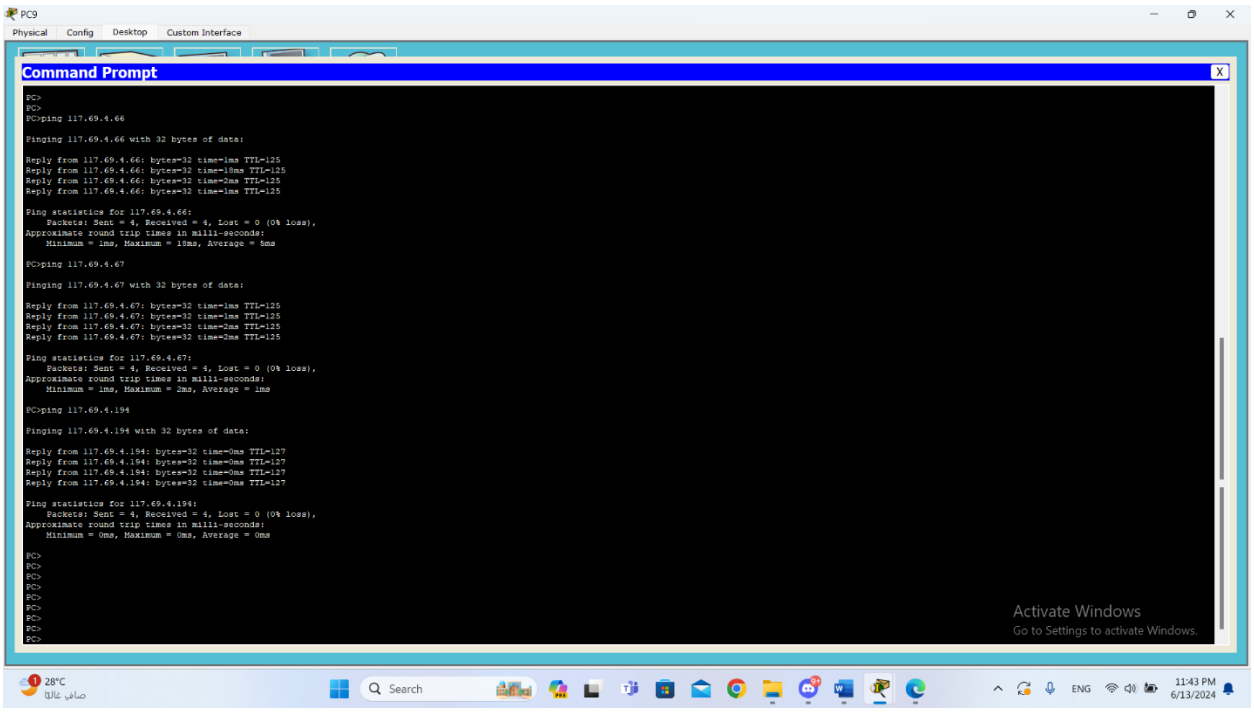


Figure 49: ping command from PC8

As shown from results above, we test all other PCs from PC8. 4 packets are sent each time, and it's noticed that all packets arrive without request lost or time out, this means the topology works well.

- **PC9**:


PC9
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 117.69.4.130
Pinging 117.69.4.130 with 32 bytes of data:
Reply from 117.69.4.130: bytes=32 time=18ms TTL=124
Reply from 117.69.4.130: bytes=32 time=2ms TTL=124
Reply from 117.69.4.130: bytes=32 time=2ms TTL=124
Reply from 117.69.4.130: bytes=32 time=2ms TTL=124
Ping statistics for 117.69.4.130:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 18ms, Average = 6ms
PC>ping 117.69.4.131
Pinging 117.69.4.131 with 32 bytes of data:
Reply from 117.69.4.131: bytes=32 time=3ms TTL=124
Reply from 117.69.4.131: bytes=32 time=2ms TTL=124
Reply from 117.69.4.131: bytes=32 time=2ms TTL=124
Reply from 117.69.4.131: bytes=32 time=2ms TTL=124
Ping statistics for 117.69.4.131:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 3ms, Average = 2ms
PC>ping 117.69.4.132
Pinging 117.69.4.132 with 32 bytes of data:
Reply from 117.69.4.132: bytes=32 time=2ms TTL=124
Reply from 117.69.4.132: bytes=32 time=2ms TTL=124
Reply from 117.69.4.132: bytes=32 time=3ms TTL=124
Reply from 117.69.4.132: bytes=32 time=2ms TTL=124
Ping statistics for 117.69.4.132:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 3ms, Average = 2ms
PC>
Activate Windows
Go to Settings to activate Windows.
28°C
Search
ENG
11:42 PM
6/13/2024


PC9
Physical
Config
Desktop
Custom Interface
Command Prompt
PC>
PC>ping 117.69.4.66
Pinging 117.69.4.66 with 32 bytes of data:
Reply from 117.69.4.66: bytes=32 time=1ms TTL=125
Reply from 117.69.4.66: bytes=32 time=18ms TTL=125
Reply from 117.69.4.66: bytes=32 time=2ms TTL=125
Reply from 117.69.4.66: bytes=32 time=1ms TTL=125
Ping statistics for 117.69.4.66:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 18ms, Average = 5ms
PC>ping 117.69.4.67
Pinging 117.69.4.67 with 32 bytes of data:
Reply from 117.69.4.67: bytes=32 time=1ms TTL=125
Reply from 117.69.4.67: bytes=32 time=1ms TTL=125
Reply from 117.69.4.67: bytes=32 time=2ms TTL=125
Reply from 117.69.4.67: bytes=32 time=2ms TTL=125
Ping statistics for 117.69.4.67:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 2ms, Average = 1ms
PC>ping 117.69.4.194
Pinging 117.69.4.194 with 32 bytes of data:
Reply from 117.69.4.194: bytes=32 time=0ms TTL=127
Reply from 117.69.4.194: bytes=32 time=0ms TTL=127
Reply from 117.69.4.194: bytes=32 time=0ms TTL=127
Reply from 117.69.4.194: bytes=32 time=0ms TTL=127
Ping statistics for 117.69.4.194:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
PC>
Activate Windows
Go to Settings to activate Windows.
28°C
Search
ENG
11:43 PM
6/13/2024

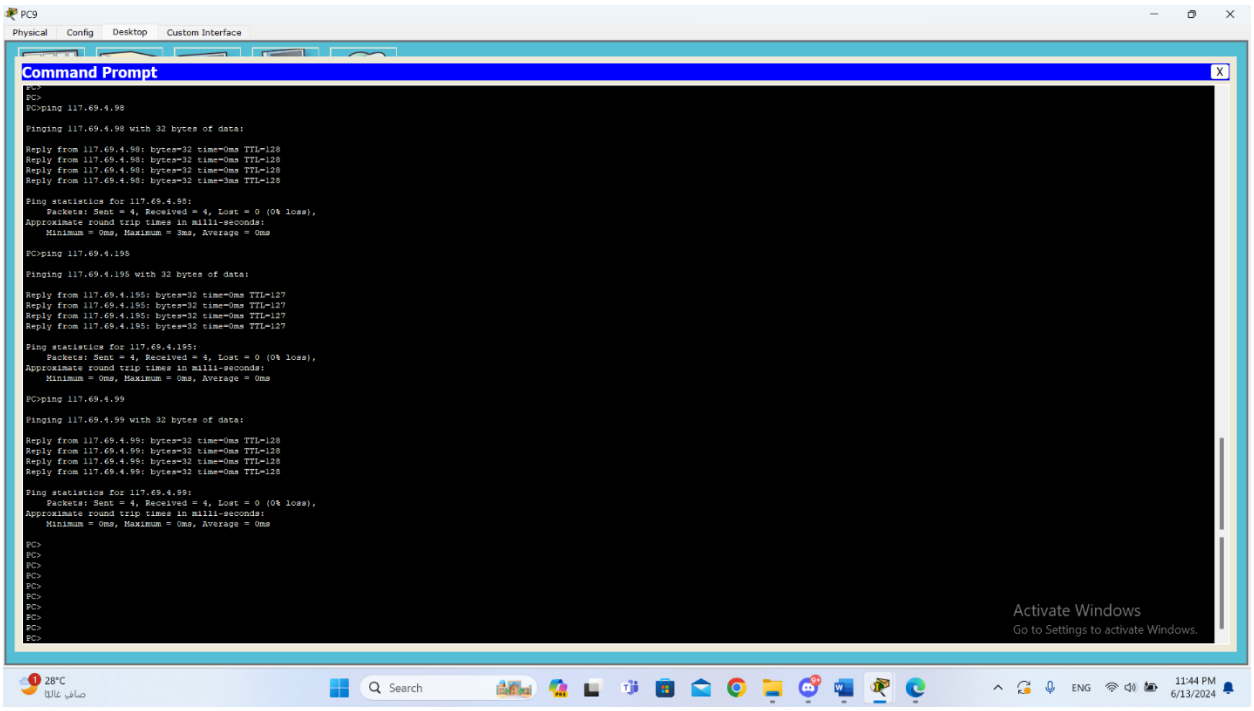


Figure 50: ping command from PC9

As shown from results above, we test all other PCs from PC9. 4 packets are sent each time, and it's noticed that all packets arrive without request lost or time out, this means the topology works well.

2.5.2. Tracert From all PCs

- **PC0**

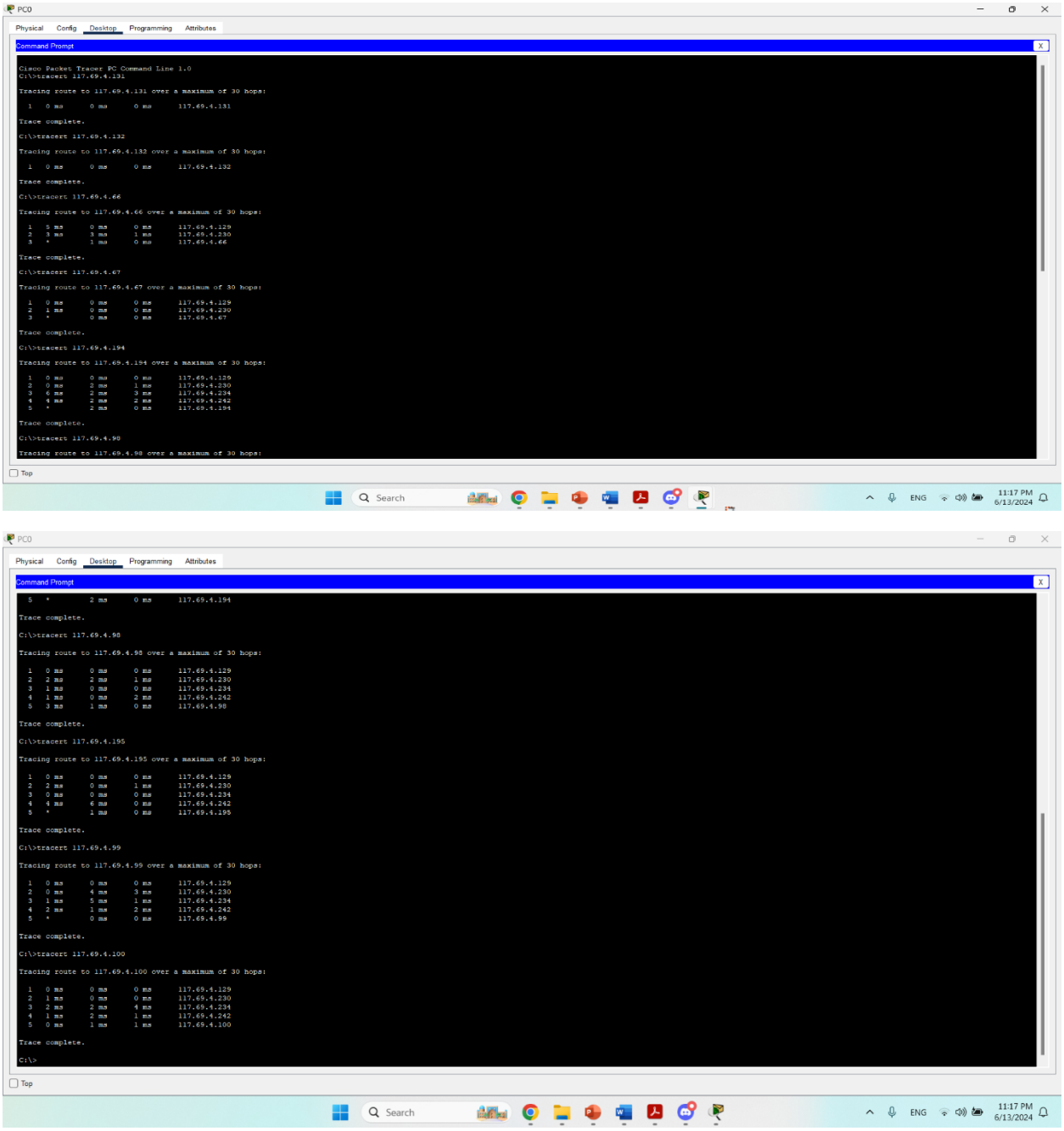


Figure 51: testing the tracert command from PC0

Trace Route Analysis for PC0:
When we use the tracert command from PC0 to various PCs, we can observe the paths that the packets take to reach their destinations. Here are the detailed paths for each trace route:

- **To 117.69.4.131**:
- The packets arrive directly since 117.69.4.131 is in the same network area as PC0.

- **To 117.69.4.132**:
- The packets arrive directly since 117.69.4.132 is in the same network area as PC0.

- **To 117.69.4.66**:
- The packets first go through the gateway at 117.69.4.129, then directly to 117.69.4.66.

- **To 117.69.4.67**:
- The packets first go through the gateway at 117.69.4.129, then through the interface 117.69.4.230 in the core network, and finally to 117.69.4.67.

- **To 117.69.4.194**:
- The packets first go through the gateway at 117.69.4.129, then through the interfaces 117.69.4.230 and 117.69.4.234 in the core network, and finally to 117.69.4.194.

- **To 117.69.4.98**:
- The packets first go through the gateway at 117.69.4.129, then through the interfaces 117.69.4.230 and 117.69.4.234 in the core network, and finally to 117.69.4.98.

- **To 117.69.4.195**:
- The packets follow the same path as to 117.69.4.194, going through 117.69.4.129, 117.69.4.230, 117.69.4.234, and finally to 117.69.4.195.

- **To 117.69.4.99**:
- The packets first go through the gateway at 117.69.4.129, then through the interfaces 117.69.4.230 and 117.69.4.242 in the core network, and finally to 117.69.4.99.

- **To 117.69.4.100**:
- The packets follow a similar path to 117.69.4.194, going through 117.69.4.129, 117.69.4.230, 117.69.4.234, and finally to 117.69.4.100.

- **PC1**

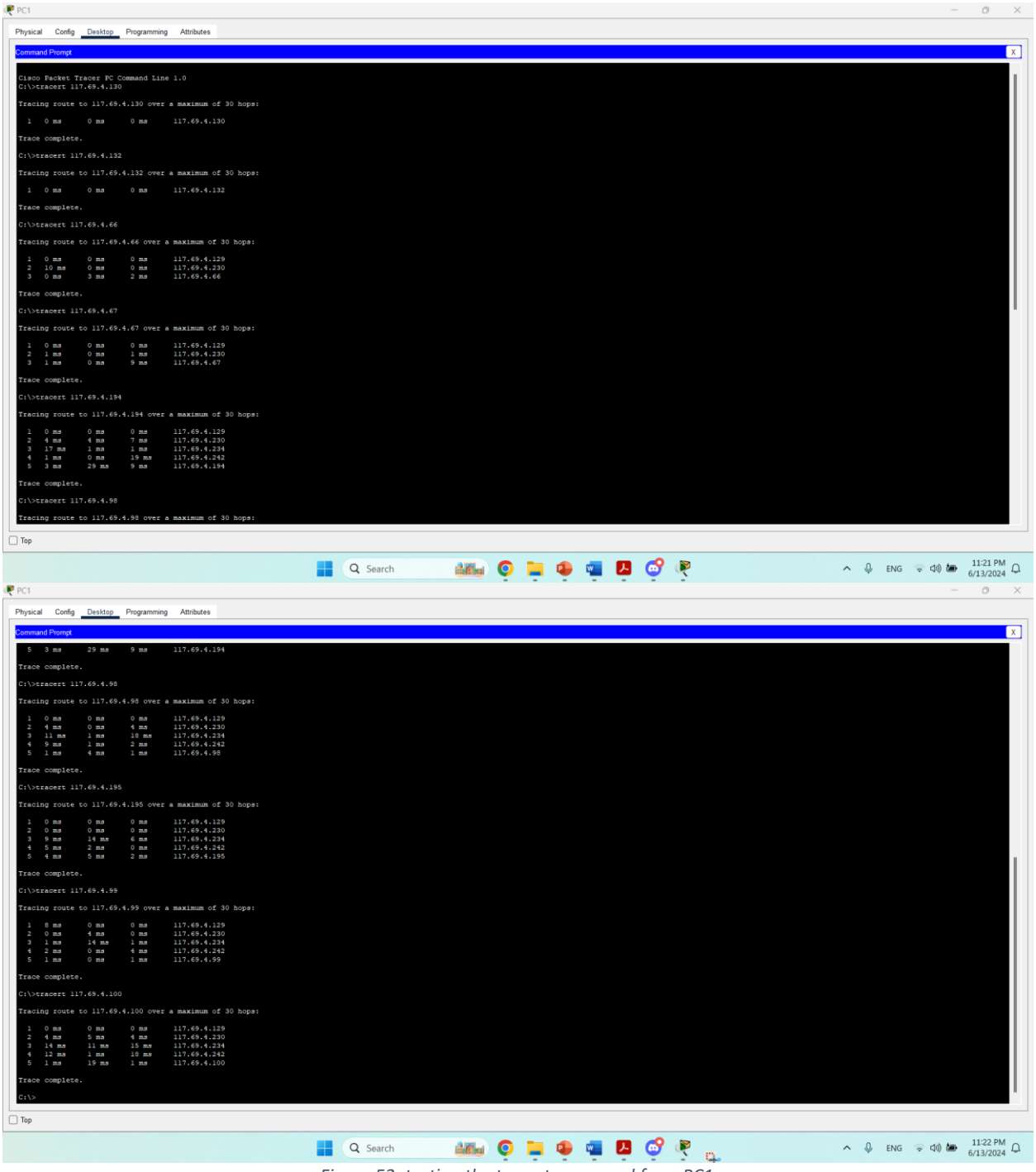


Figure 52: testing the tracert command from PC1

Trace Route Analysis for PC1:

When we use the tracert command from PC1 to various PCs, we can observe the paths that the packets take to reach their destinations. Here are the detailed paths for each trace route:

- **To 117.69.4.130**:
- The packets arrive directly since 117.69.4.130 is in the same network area as PC1.

- **To 117.69.4.132**:
- The packets arrive directly since 117.69.4.132 is in the same network area as PC1.

- **To 117.69.4.66**:
- The packets first go through the gateway at 117.69.4.129, then through 117.69.4.230, and finally to 117.69.4.66.

- **To 117.69.4.67**:
- The packets first go through the gateway at 117.69.4.129, then through 117.69.4.230, and finally to 117.69.4.67.

- **To 117.69.4.194**:
- The packets first go through the gateway at 117.69.4.129, then through 117.69.4.230, 117.69.4.234, and 117.69.4.242, and finally to 117.69.4.194.

- **To 117.69.4.98**:
- The packets first go through the gateway at 117.69.4.129, then through 117.69.4.230, 117.69.4.234, and 117.69.4.242, and finally to 117.69.4.98.

- **To 117.69.4.195**:
- The packets first go through the gateway at 117.69.4.129, then through 117.69.4.230, 117.69.4.234, and 117.69.4.242, and finally to 117.69.4.195.

- **To 117.69.4.99**:
- The packets first go through the gateway at 117.69.4.129, then through 117.69.4.230, 117.69.4.234, and 117.69.4.242, and finally to 117.69.4.99.

- **To 117.69.4.100**:
- The packets first go through the gateway at 117.69.4.129, then through 117.69.4.230, 117.69.4.234, and 117.69.4.242, and finally to 117.69.4.100.

- **PC2:**

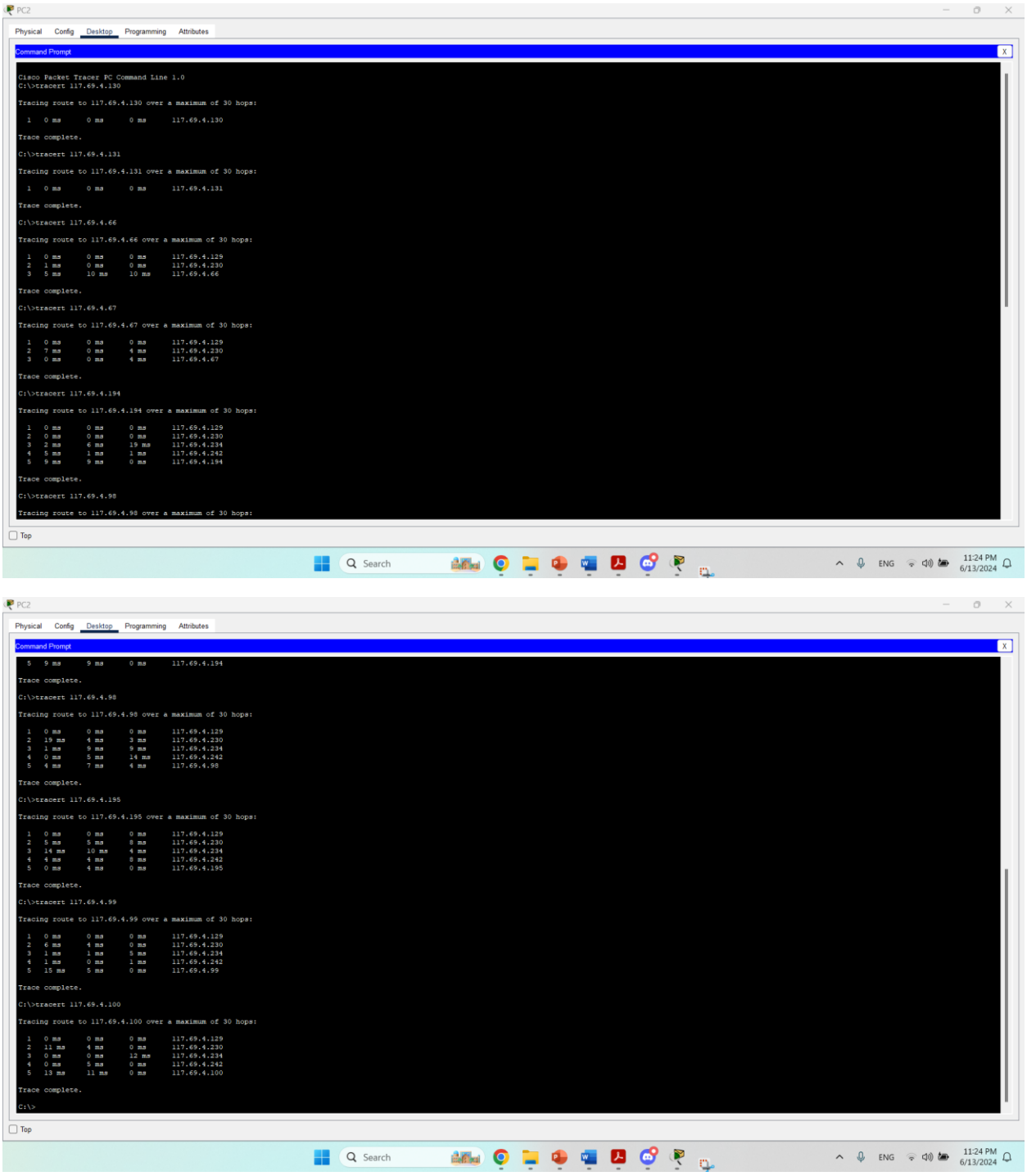


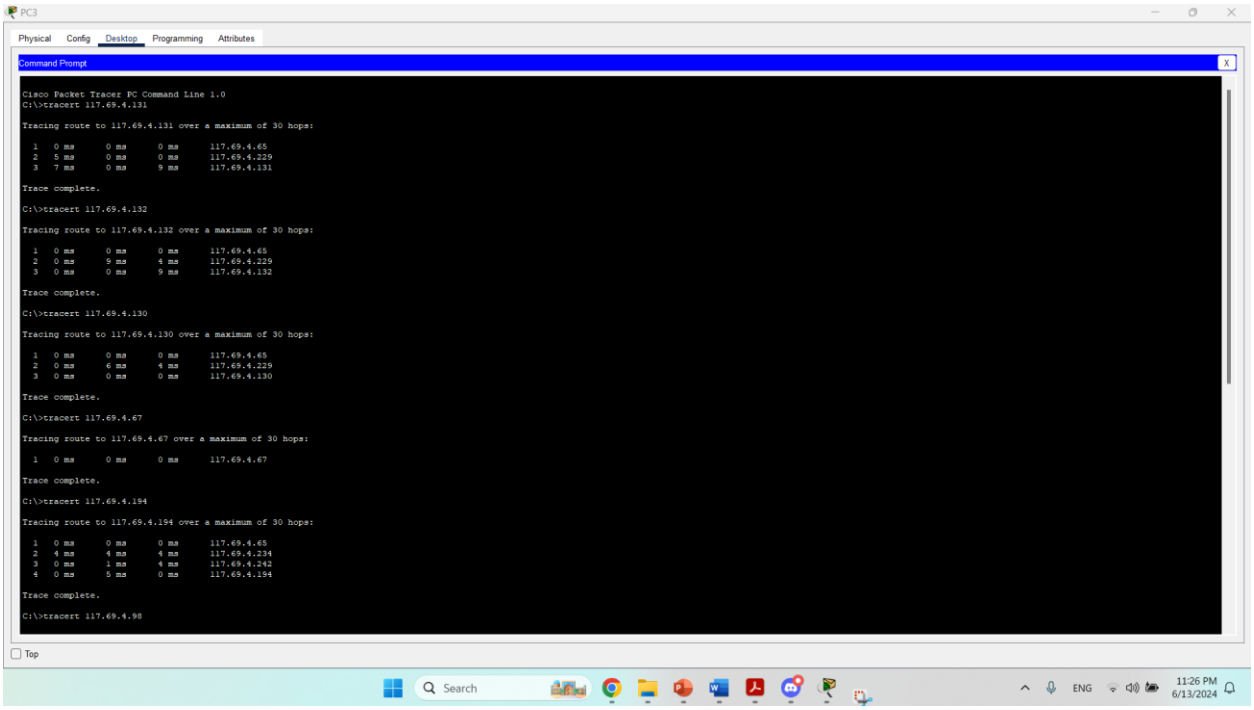
Figure 53: testing the tracert command from PC2

Trace Route Analysis for PC2

When we use the tracert command from PC2 to various destination IPs, we can observe the paths that the packets take to reach their destinations. Below is the detailed analysis of each trace route:

- **To 117.69.4.130**:
- The packets arrive directly since 117.69.4.130 is in the same network area as PC2
- **To 117.69.4.131**:
- The packets arrive directly since 117.69.4.131 is in the same network area as PC2
- **To 117.69.4.66**:
- The packet first passes through the gateway 117.69.4.129, then through the interface 117.69.4.230, and finally reaches 117.69.4.66.
- **To 117.69.4.67**:
- The packet first passes through the gateway 117.69.4.129, then through the interface 117.69.4.230, and finally reaches 117.69.4.67.
- **To 117.69.4.194**:
- The packet first passes through the gateway 117.69.4.129, then through the interface 117.69.4.230, then through 117.69.4.234, followed by 117.69.4.242, and finally reaches 117.69.4.194.
- **To 117.69.4.98**:
- The packet first passes through the gateway 117.69.4.129, then through the interface 117.69.4.230, then through 117.69.4.234, followed by 117.69.4.242, and finally reaches 117.69.4.98.
- **To 117.69.4.195**:
- The packet first passes through the gateway 117.69.4.129, then through the interface 117.69.4.230, then through 117.69.4.234, followed by 117.69.4.242, and finally reaches 117.69.4.195.
- The packet first passes through the gateway 117.69.4.129, then through the interface 117.69.4.230, then through 117.69.4.234, followed by 117.69.4.242, and finally reaches 117.69.4.99.
- **To 117.69.4.100**:
- The packet first passes through the gateway 117.69.4.129, then through the interface 117.69.4.230, then through 117.69.4.234, followed by 117.69.4.242, and finally reaches 117.69.4.100

- **PC3:**



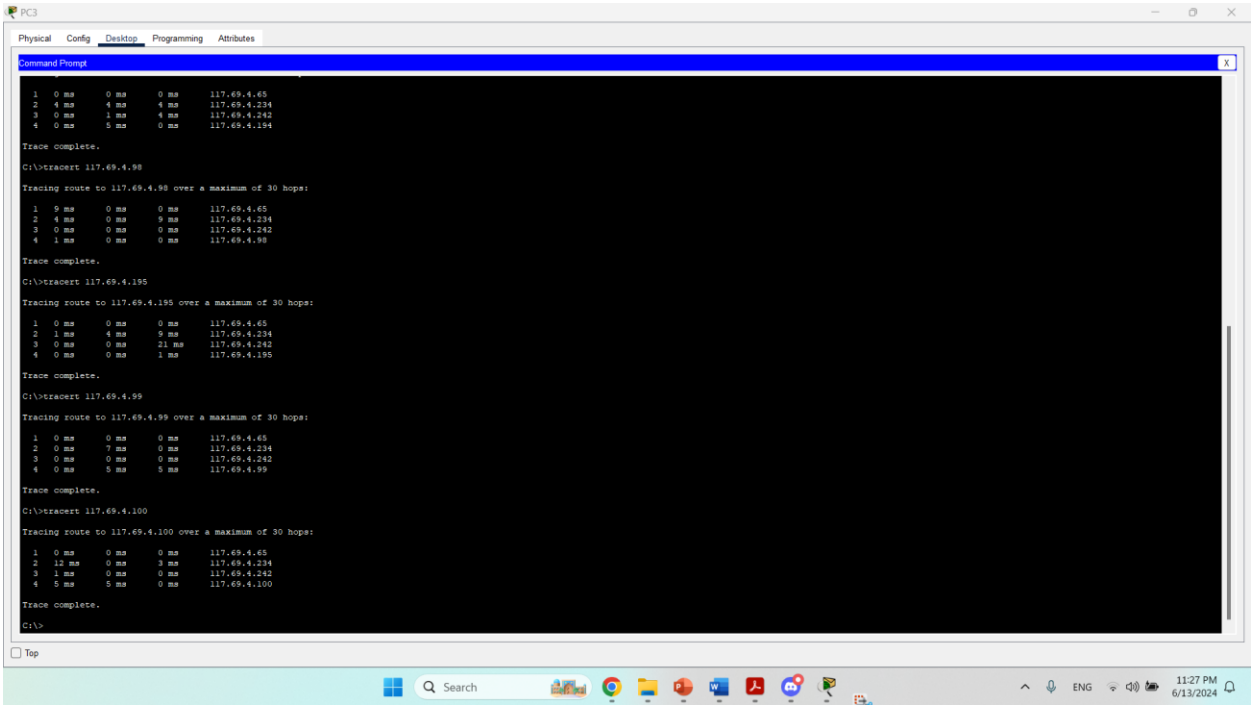


Figure 54: testing the tracert command from PC3

Trace Route Analysis for PC3:

- 117.69.4.131:
- Route: 117.69.4.65 -> 117.69.4.229 -> 117.69.4.131

- 117.69.4.132:
- Route: 117.69.4.65 -> 117.69.4.229 -> 117.69.4.132

- 117.69.4.130:
- Route: 117.69.4.65 -> 117.69.4.229 -> 117.69.4.130

- 117.69.4.67:
- Direct Route: 117.69.4.67

- 117.69.4.194:
- Route: 117.69.4.65 -> 117.69.4.234 -> 117.69.4.242 -> 117.69.4.194

- 117.69.4.98:
- Route: 117.69.4.65 -> 117.69.4.234 -> 117.69.4.242 -> 117.69.4.98

- 117.69.4.195:
- Route: 117.69.4.65 -> 117.69.4.234 -> 117.69.4.242 -> 117.69.4.195

- 117.69.4.99:
- Route: 117.69.4.65 -> 117.69.4.234 -> 117.69.4.242 -> 117.69.4.99

- 117.69.4.100:
- Route: 117.69.4.65 -> 117.69.4.234 -> 117.69.4.242 -> 117.69.4.100

- **PC4:**

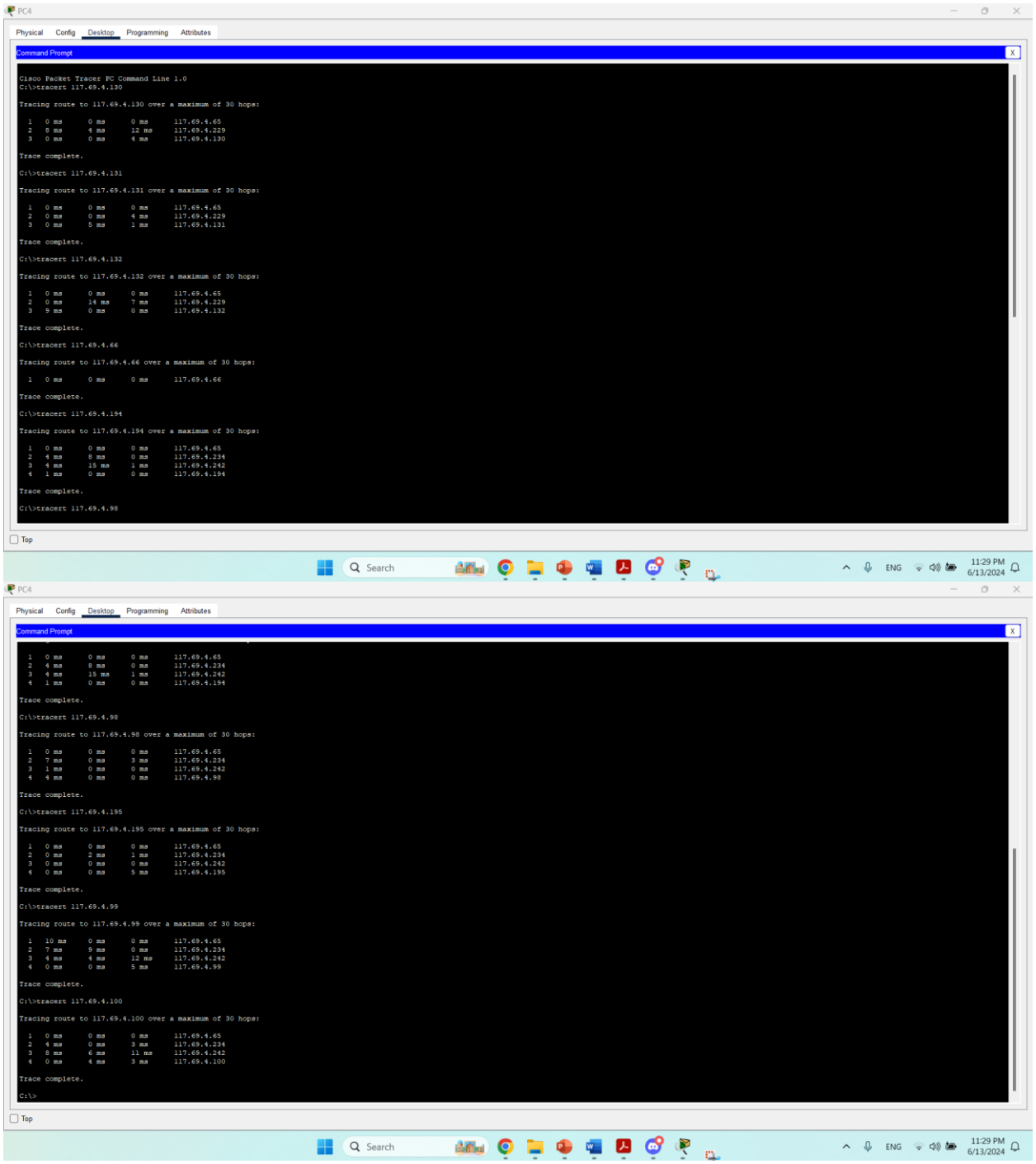


Figure 55: testing the tracert command from PC4

Trace Route Analysis for PC4:

1. **117.69.4.131:**

Route: 117.69.4.65 -> 117.69.4.229 -> 117.69.4.131

2. **117.69.4.132:**

Route: 117.69.4.65 -> 117.69.4.229 -> 117.69.4.132

3. **117.69.4.130:**

Route: 117.69.4.65 -> 117.69.4.229 -> 117.69.4.130

4. **117.69.4.67:**

Direct route: 117.69.4.67

5. **117.69.4.194:**

Route: 117.69.4.65 -> 117.69.4.234 -> 117.69.4.242 -> 117.69.4.194

6. **117.69.4.98:**

Route: 117.69.4.65 -> 117.69.4.234 -> 117.69.4.242 -> 117.69.4.98

7. **117.69.4.195:**

Route: 117.69.4.65 -> 117.69.4.234 -> 117.69.4.242 -> 117.69.4.195

8. **117.69.4.99:**

Route: 117.69.4.65 -> 117.69.4.234 -> 117.69.4.242 -> 117.69.4.99

9. **117.69.4.100:**

Route: 117.69.4.65 -> 117.69.4.234 -> 117.69.4.242 -> 117.69.4.100

- **PC5:**

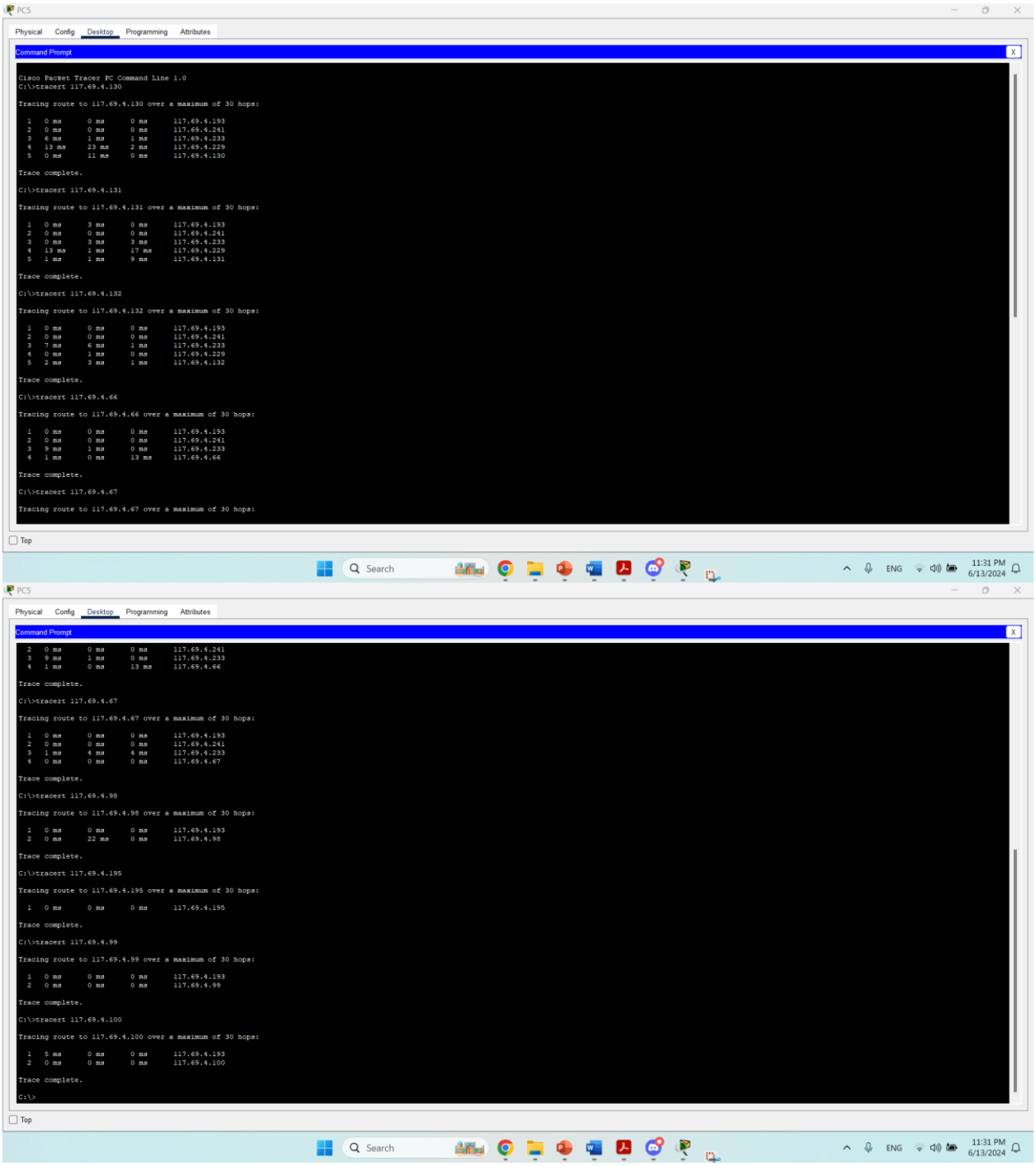


Figure 56: testing the tracert command from PC5

When we use tracert between PC5 and other pcs it gives us the path between PC5 and the other PCs:

- To PC7 packets arrive directly since they are in the same network area.
- To PC6 first we get through the gateway of the area 117.69.4.193 then through the interface 117.69.4.98 then to PC6.
- To PC8 first we get through the gateway of the area 117.69.4.193 then through the interface 117.69.4.99 then to PC8.
- To PC9 first we get through the gateway of the area 117.69.4.193 then through the interface 117.69.4.100 then to 117.69.4.100.
- To PC3 first we get through the gateway of the area 117.69.4.193 then through the interface 117.69.4.241 in the core network then to 117.69.4.233 then to PC3.
- To PC4 (same PC3, path)
- To PC0 we get through the gateway of the area 117.69.4.193 then to 117.69.4.241 then to 117.69.4.233 then to 117.69.4.229.
- 7 - To PC1 (same PC0, path)
- 8- To PC2 (same PC0, path)

- **PC6:**

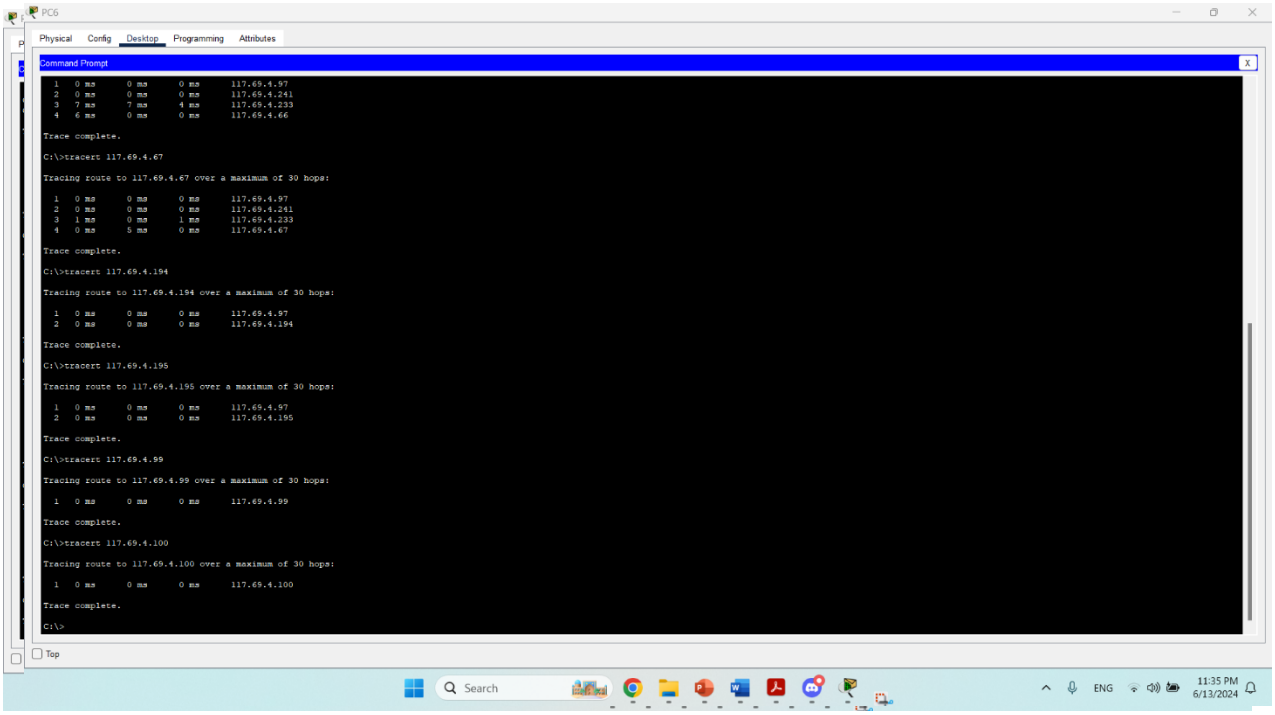


Figure 57: testing the tracert command from PC6

When we use tracert between PC6 and other pcs it gives us the path between PC6 and the other PCs:

- To PC5 first we get through the gateway of the area 117.69.4.97 then through the interface 117.69.4.194 .
- To PC8 packets arrive directly since they are in the same network area.
- To PC9 packets arrive directly since they are in the same network area.
- To PC3 first we get through the gateway of the area 117.69.4.97 then through the interface 117.69.4.241 in the core network then to 117.69.4.233 then to PC3.
- To PC4 (same PC3, path)
- To PC0 we get through the gateway of the area 117.69.4.97 then to 117.69.4.241 then to 117.69.4.233 then to 117.69.4.229.
- To PC1 (same PC0, path)
- To PC2 (same PC0, path)

- **PC7:**

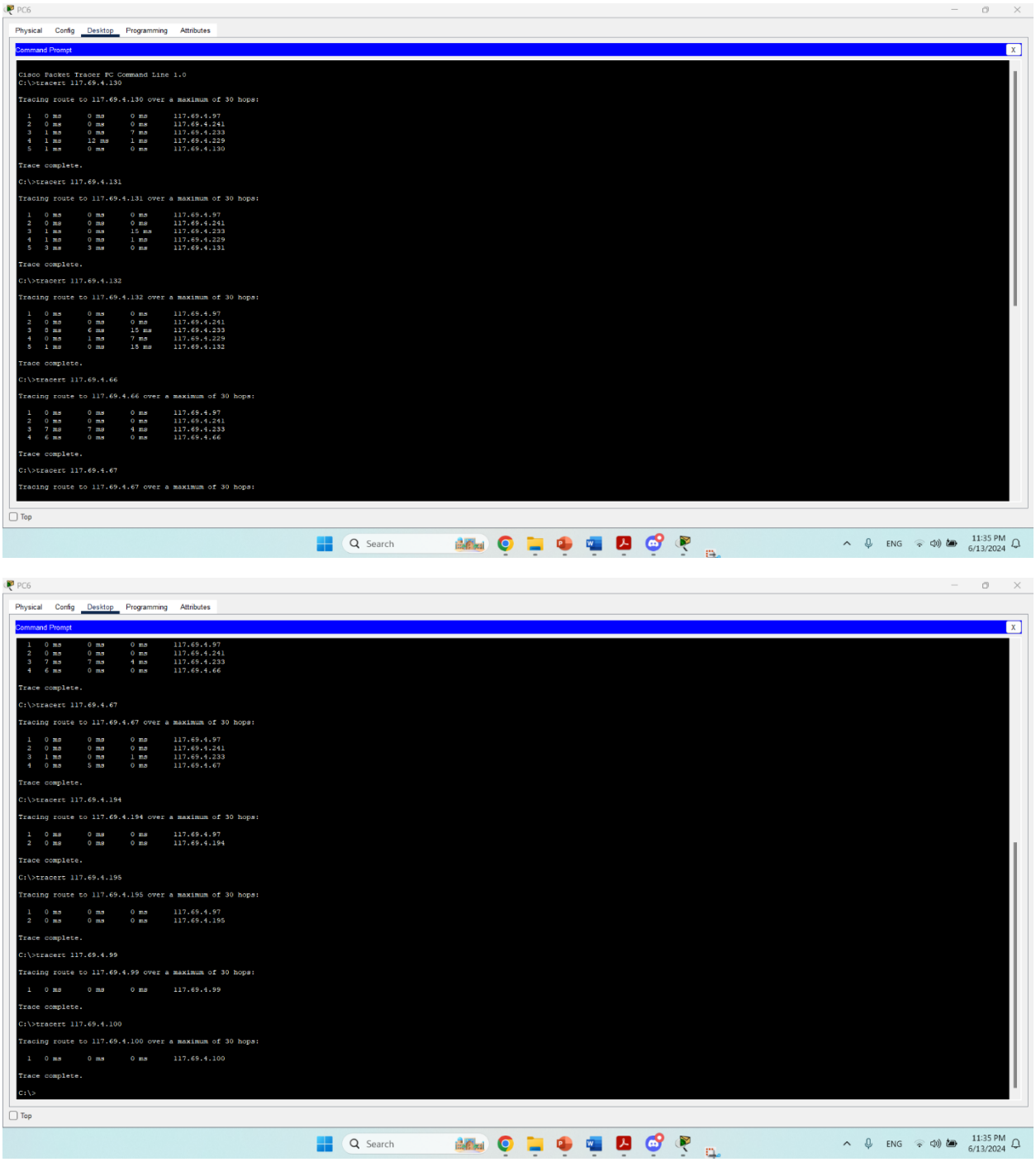


Figure 58: testing the tracert command from PC7

When we use tracert between PC7 and other pcs it gives us the path between PC7 and the other PCs:

- To PC5 packets arrive directly since they are in the same network area.
- To PC6 first we get through the gateway of the area 117.69.4.93 then through the interface 117.69.4.98 then to PC6.
- To PC8 first we get through the gateway of the area 117.69.4.93 then through the interface 117.69.4.99 then to PC8.
- To PC9 first we get through the gateway of the area 117.69.4.93 then through the interface 117.69.4.100 then to 117.69.4.100.
- To PC3 first we get through the gateway of the area 117.69.4.93 then through the interface 117.69.4.241 in the core network then to 117.69.4.233 then to PC3.
- To PC4 (same PC3, path)
- To PC0 we get through the gateway of the area 117.69.4.93 then to 117.69.4.241 then to 117.69.4.233 then to 117.69.4.229.
- To PC1 (same PC0, path)
- To PC2 (same PC0, path)

- **PC8:**

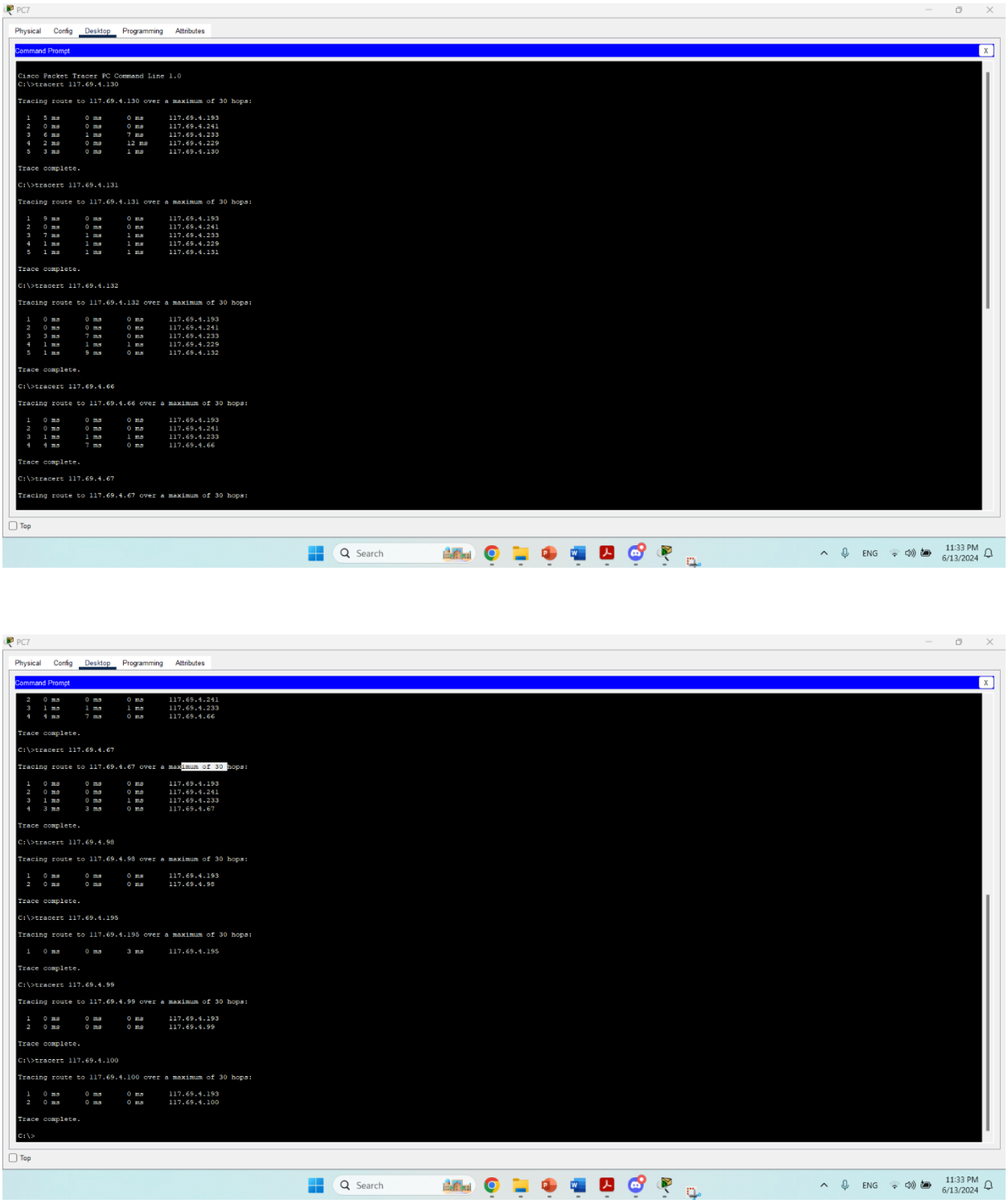
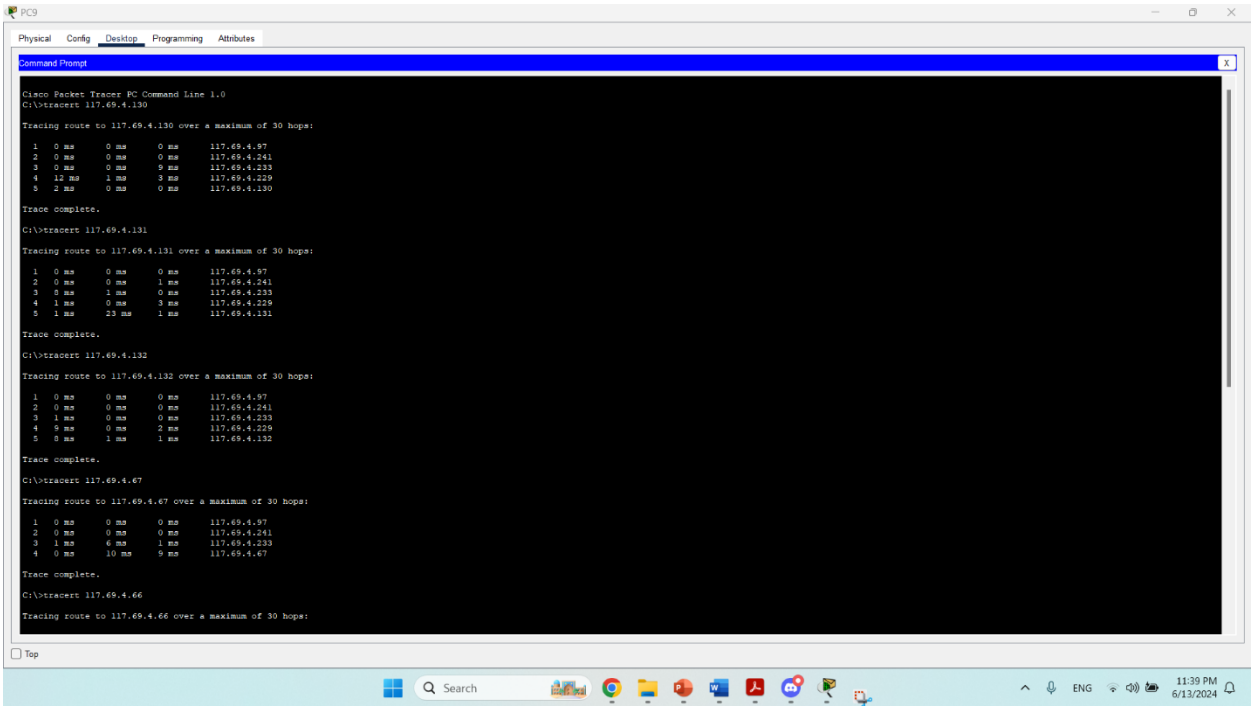


Figure 59: testing the tracert command from PC8

When we use tracert between PC8 and other pcs it gives us the path between PC8 and the other PCs:

- To PC5 first we get through the gateway of the area 117.69.4.193 then through the interface 117.69.4.194.
- To PC6 packets arrive directly since they are in the same network area.
- To PC9 packets arrive directly since they are in the same network area.
- To PC3 first we get through the gateway of the area 117.69.4. 193 then through the interface 117.69.4.241 in the core network then to 117.69.4.233 then to PC3.
- To PC4 (same PC3, path)
- To PC0 we get through the gateway of the area 117.69.4. 193 then to 117.69.4.241 then to 117.69.4.233 then to 117.69.4.229.
- To PC1 (same PC0, path)
- To PC2 (same PC0, path)

- **PC9:**



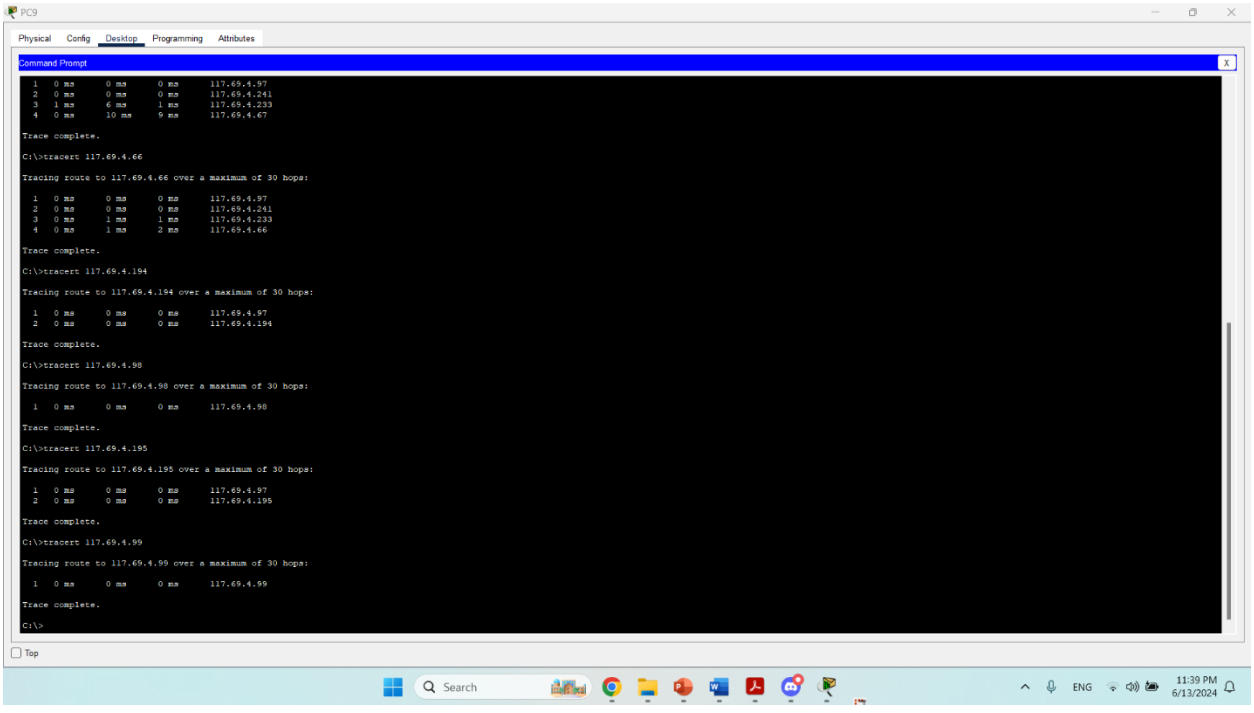


Figure 60: testing the tracert command from PC9

When we use tracert between PC9 and other pcs it gives us the path between PC9 and the other PCs:

- To PC5 first we get through the gateway of the area 117.69.4.97 then through the interface 117.69.4.194.
- To PC6 packets arrive directly since they are in the same network area.
- To PC8 packets arrive directly since they are in the same network area.
- To PC3 first we get through the gateway of the area 117.69.4. 97 then through the interface 117.69.4.241 in the core network then to 117.69.4.233 then to PC3.
- To PC4 (same PC3, path)
- To PC0 we get through the gateway of the area 117.69.4. 97 then to 117.69.4.241 then to 117.69.4.233 then to 117.69.4.229.
- To PC1 (same PC0, path)
- To PC2 (same PC0, path)

2.5.3. Access www.ENCS3320.com from all PCs

- **PC0:**

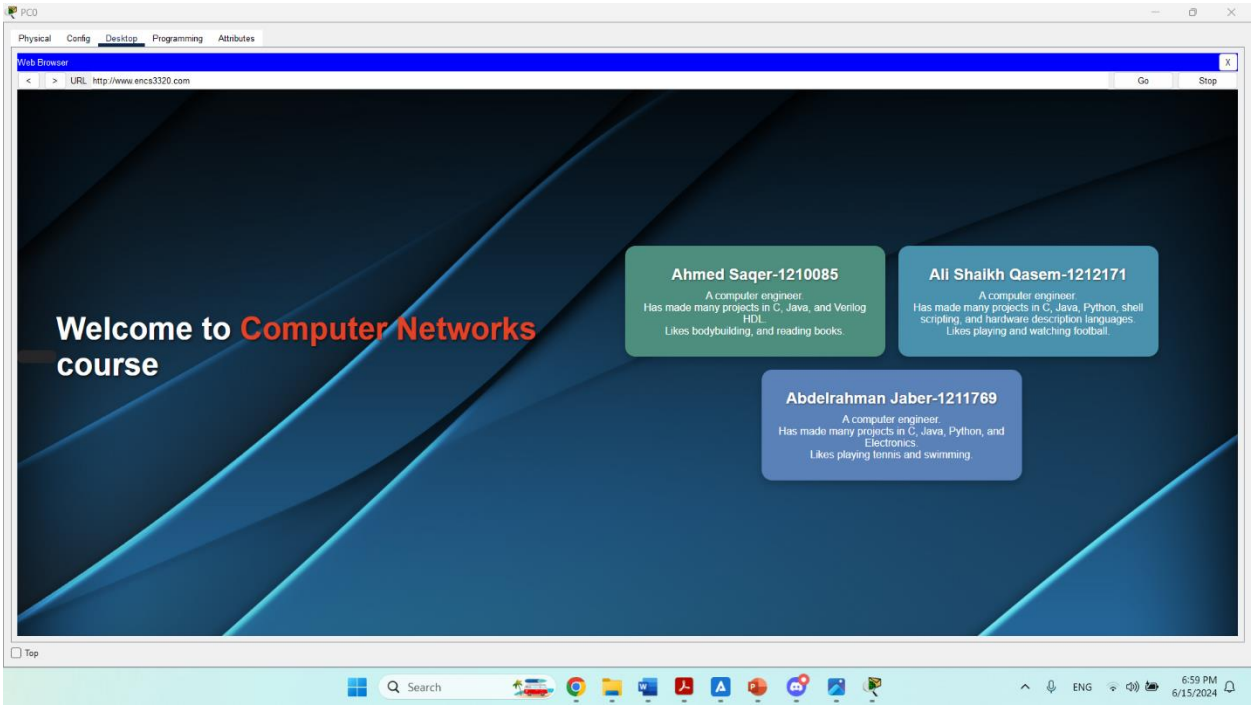


Figure 61: Access the website from PC0

- **PC1:**

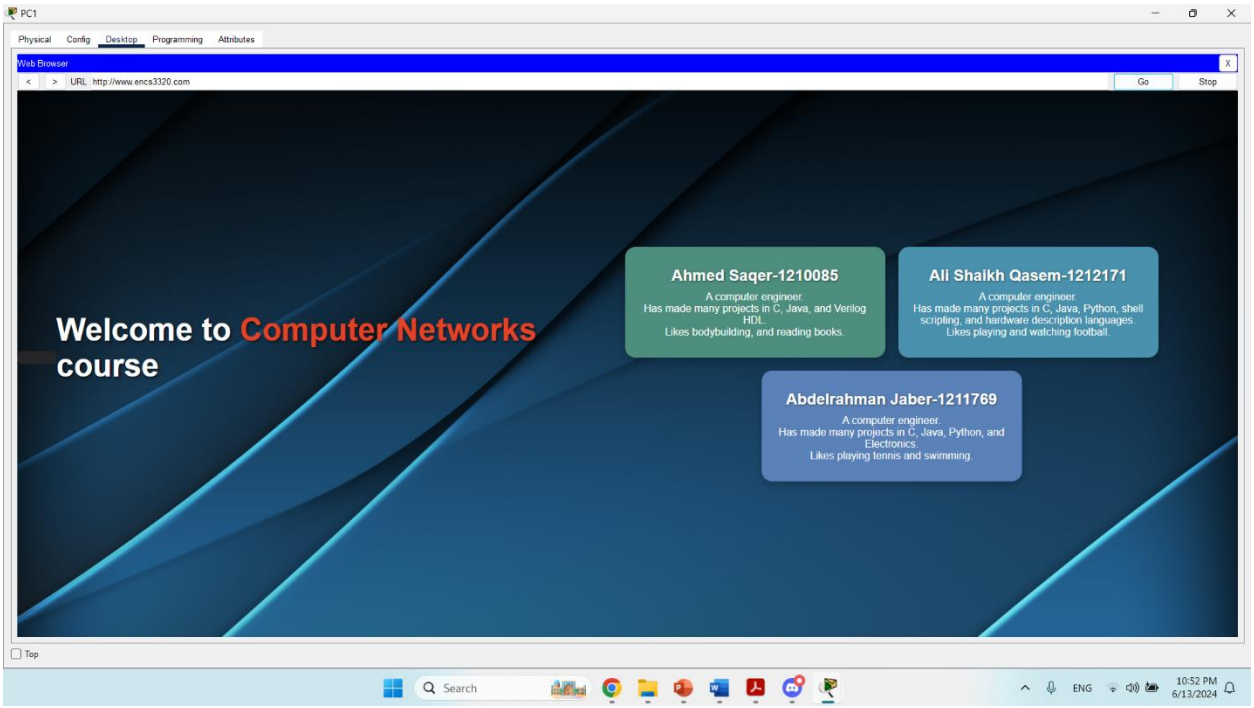


Figure 62: Access the website from PC1

- **PC2:**

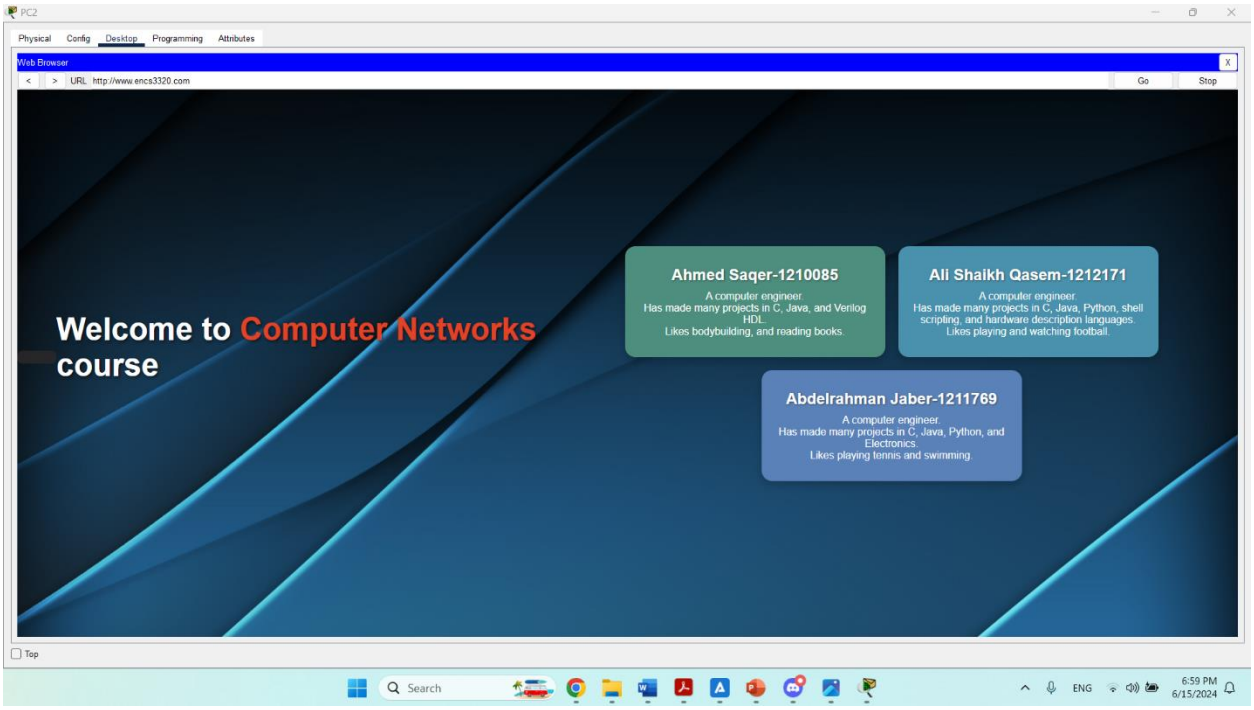


Figure 63: Access the website from PC2

- **PC3:**

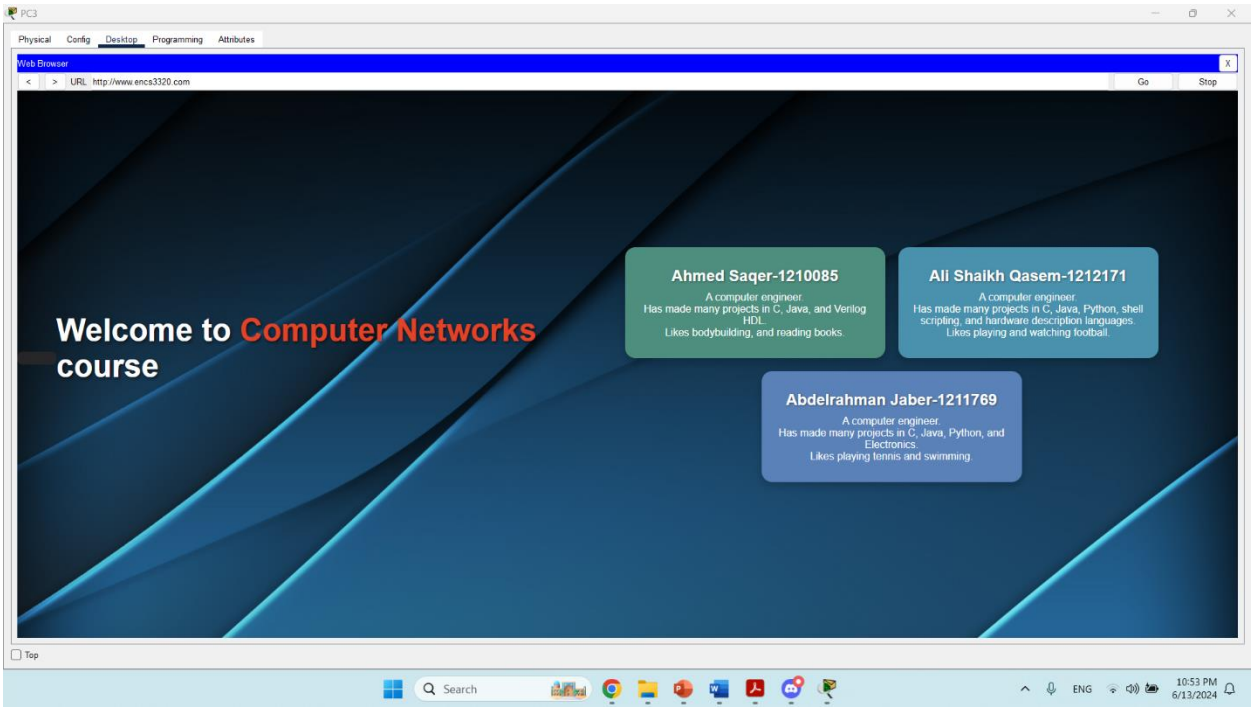


Figure 64: Access the website from PC3

- **PC4:**

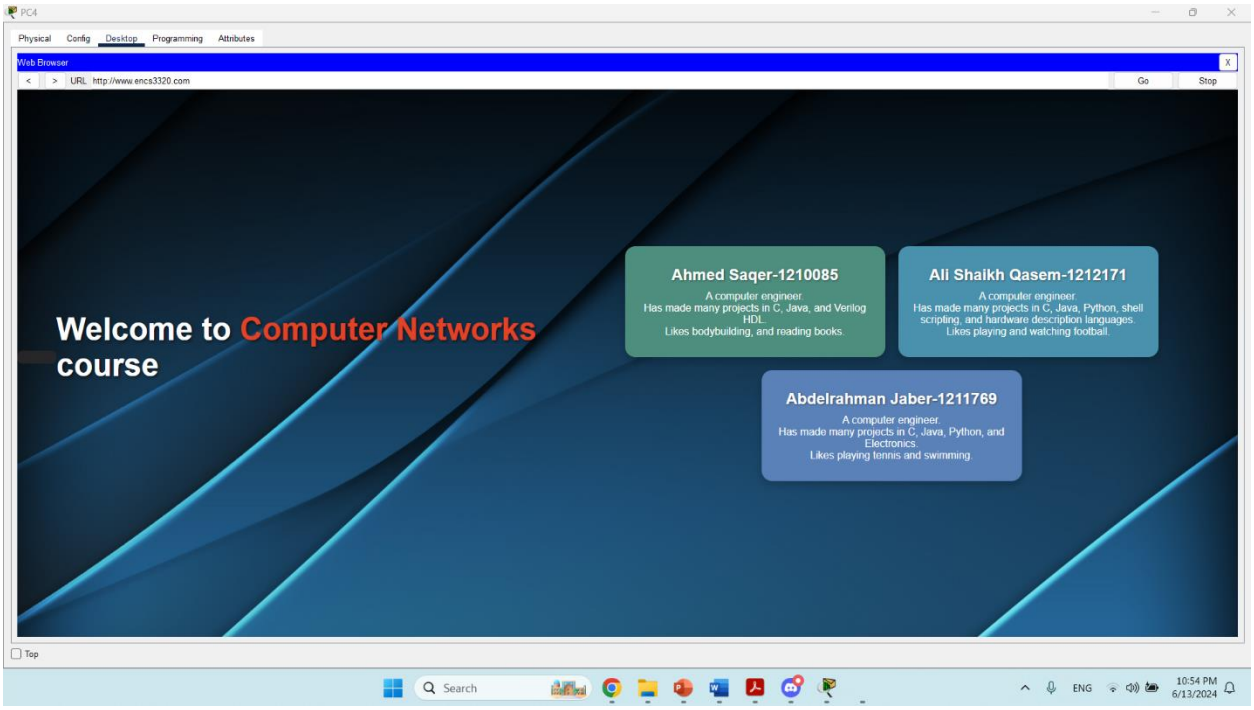


Figure 65: Access the website from PC4

- **PC5:**

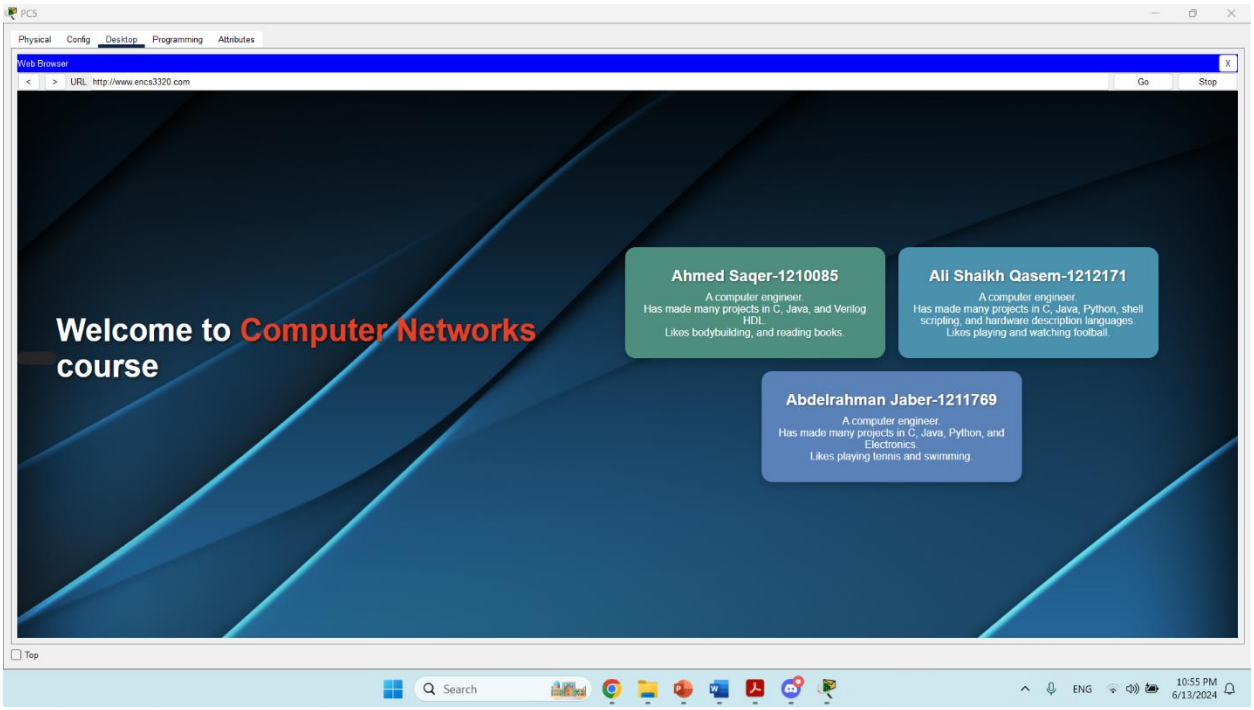


Figure 66: Access the website from PC5

- **PC6:**

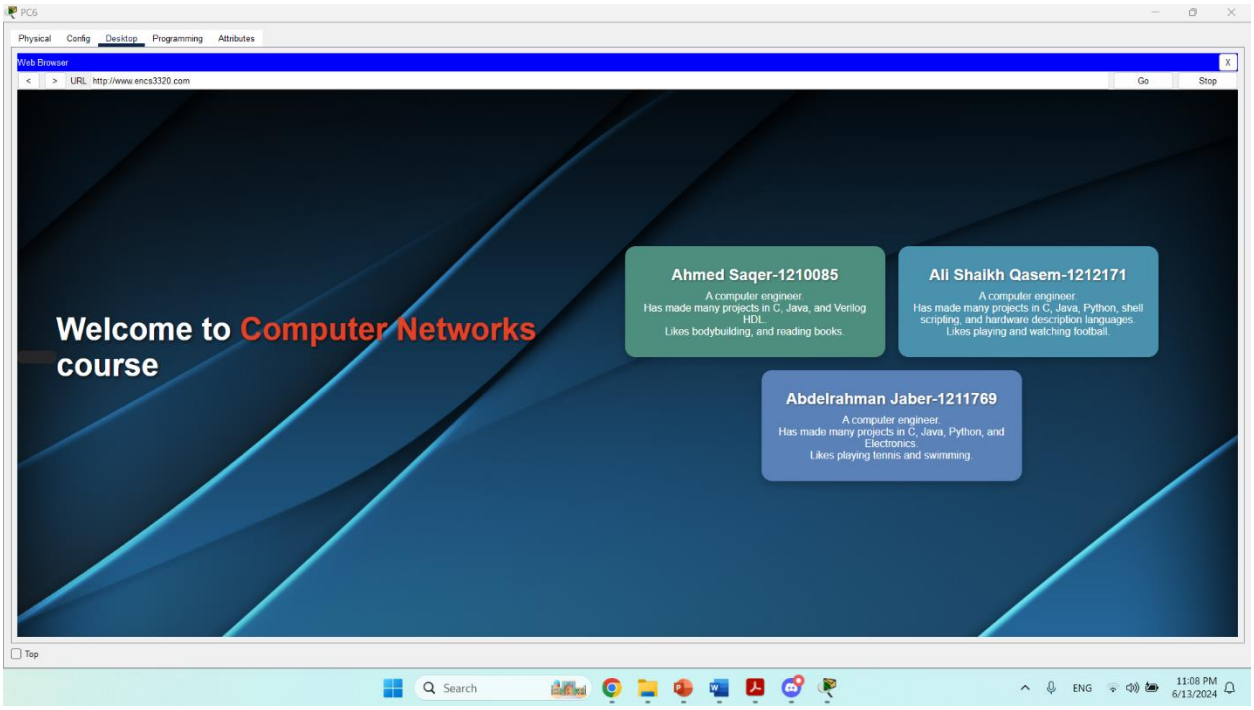


Figure 67: Access the website from PC6

- **PC7:**

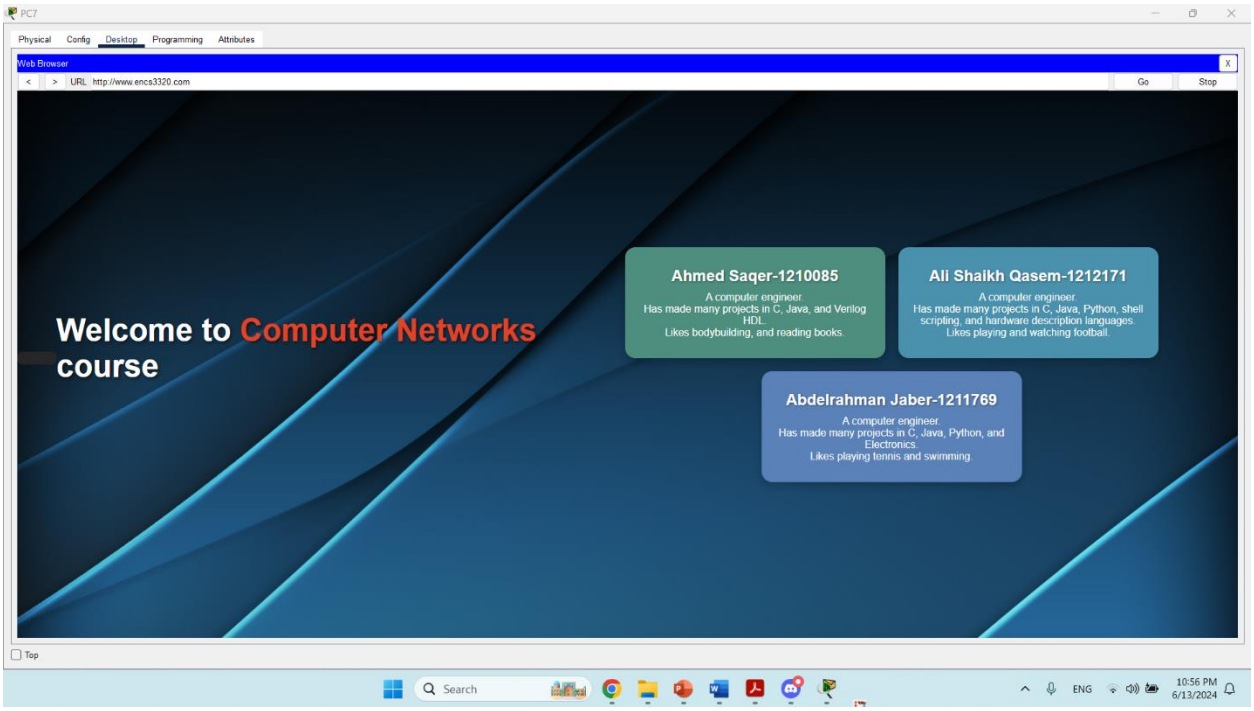


Figure 68: Access the website from PC7

- **PC8:**

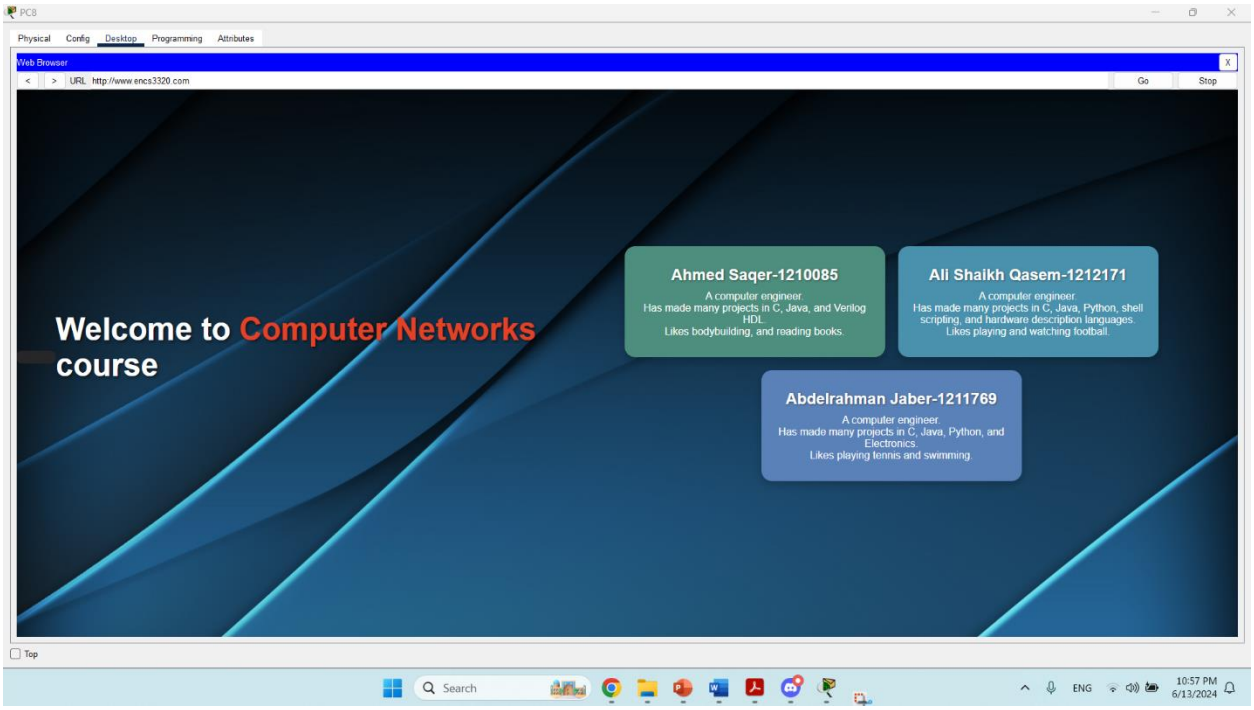


Figure 69: Access the website from PC8

- **PC9:**

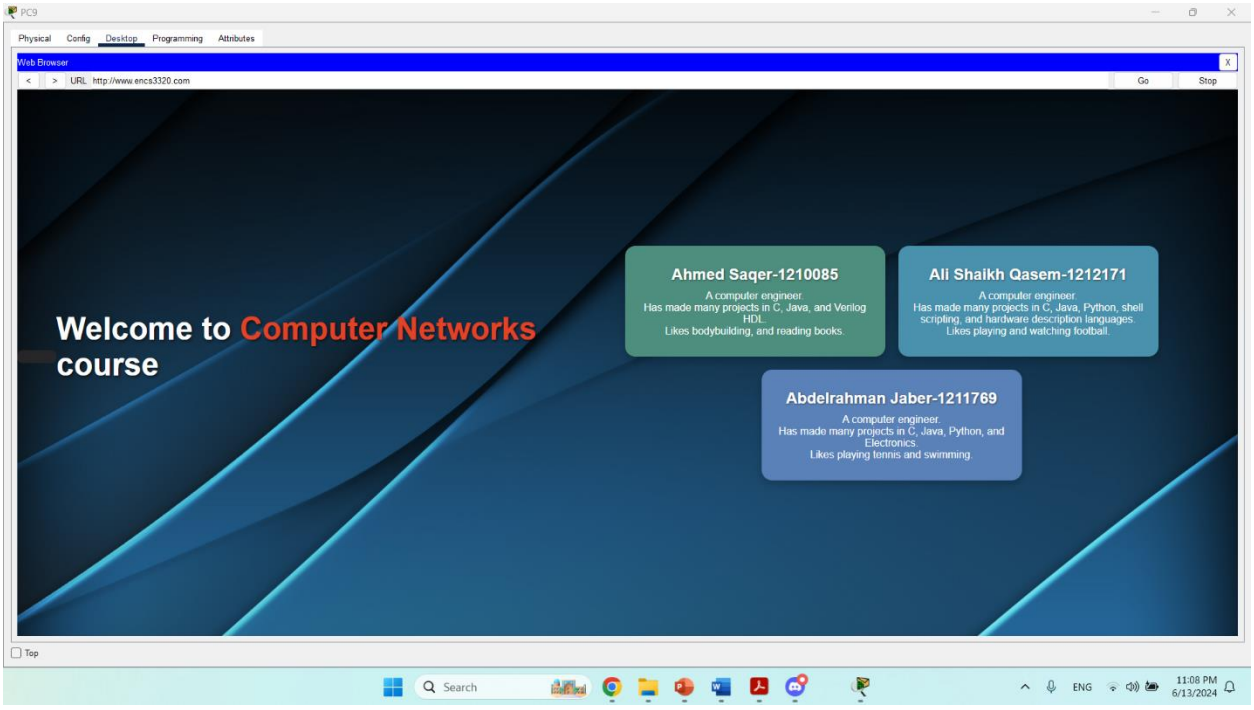


Figure 70: Access the website from PC9

As shown above, all PCs have accessed the website without issues, this means they can access the Http and DNS servers. Thus, out topology works well.

3. Conclusion

In conclusion, we have learned how to use Packet Tracer for building our project Also the WireShark programs. For the Packer Tracer we built a complete topology with different PCs, servers, routers and switches. After building them we calculated the subnetting for each device of those and assigned that subnet to it. Also, we built an HTTP server and DNS server and connected each PC with them. And Testing all PCs using PING and TRACERT command and testing the DNS server. Finally for the Wireshark we capture TCP, DHCP and ICMP packets and explain 4 fields for each packet. Overall, this project has developed our theoretical knowledge with computer networks principles and equipped us with essential practical skills. Furthermore, working in groups has improved our teamwork and communication skills.