



*Faculty of Engineering & Technology*

*Electrical & Computer Engineering Department*

*ENCS3320*

*Project 2 Report*

---

*Prepared by:*

*Ayham Maree 1191408*

*Sara Ammar 1191052*

*Alaa Sehwil 1191741*

*Instructor: Dr. AbdelKarim Awwad*

*Date: 10/1/2022*

*Section#:3*

## Part 1:

Using Wireshark, capture few DHCP and ICMP packets. Show the packets, write some comments about each picture and explain at least 3 fields of each packet.

Capture a TCP session for transferring a large file, show the sequence number of three packets and the ACK numbers, and conclude the data size on two packets.

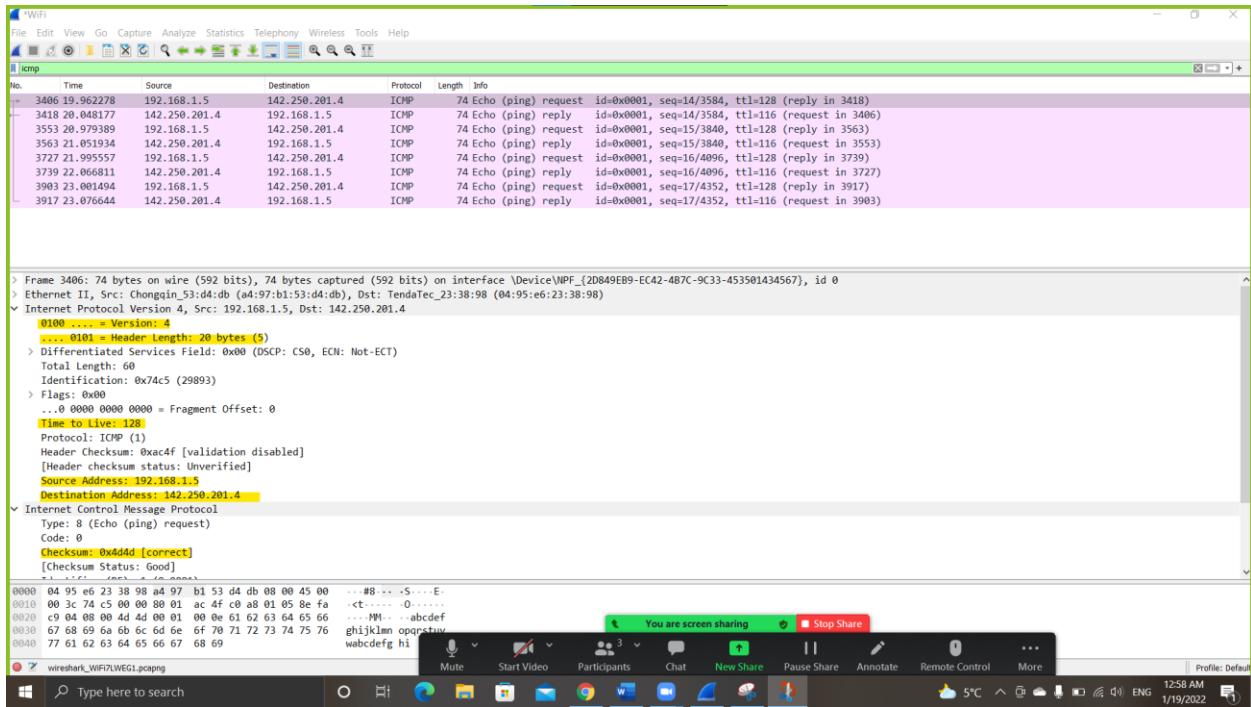
Answer:

### DHCP:

The screenshot shows a Wireshark capture window titled "dhcp". It displays a list of 14 captured DHCP frames. The columns are: No., Time, Source, Destination, Protocol, Length, and Info. The "Info" column provides detailed protocol analysis for each frame. Below the list, the "Details" pane shows the full hex and ASCII representation of the selected frame (Frame 1560). The ASCII dump highlights specific fields like Version (4), Header Length (20 bytes), and Destination Address (192.168.1.1).

1. Version: the internet protocol addressing version is IPV4.
2. Header Length: the total length of the header is 20 bytes.
3. Total length of the packets is 344 Bits.
4. TTL: The packet can travel through 128 routers.
5. Source Address: the local IP address = 0.0.0.0.
6. Destination Address: the IP address of the destination = 255. 255. 255. 255.
7. Source Port: the source port of the packets = 68.
8. Destination Port: the destination port of the packets = 67.

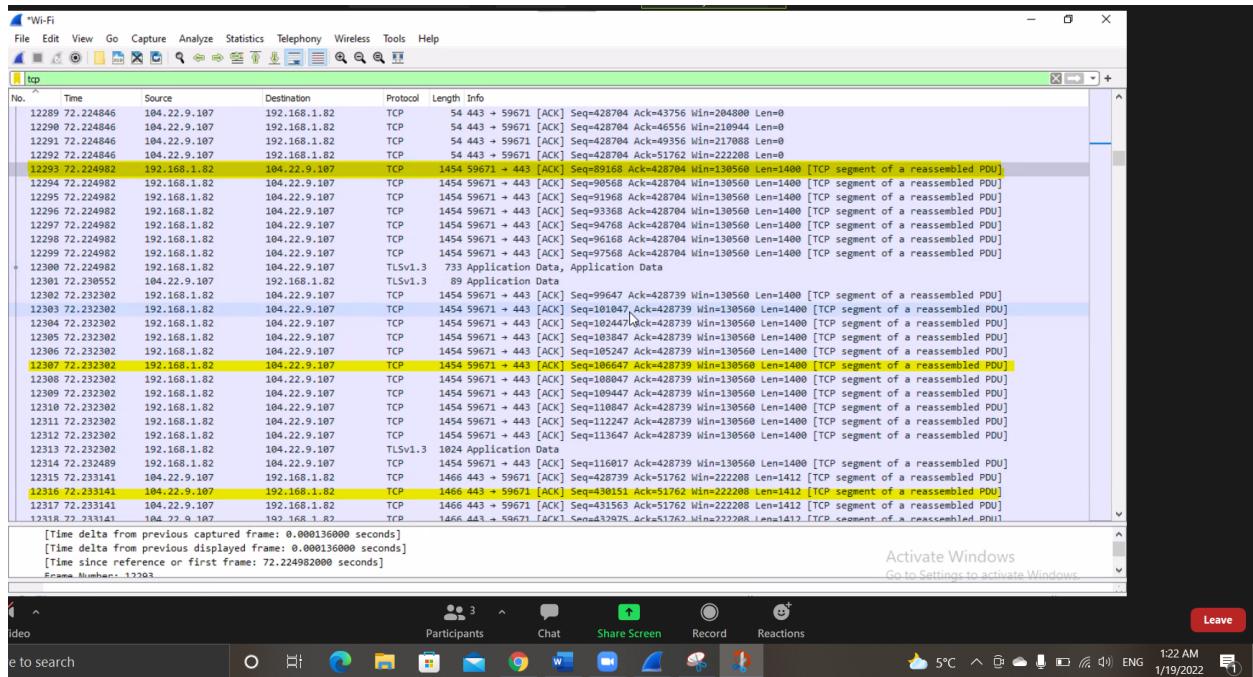
## ICMP:



We wrote in CMD the following command: ping www.google.com, to obtain the previous packets.

1. Version: the internet protocol addressing version is IPV4.
2. Header Length: the total length of the header is 20 bytes.
3. TTL: The packet can travel through 128 routers.
4. Source Address: the local IP address of my PC = 192.168.1.5.
5. Destination Address: the IP address of the destination = 142.250.201.4 which is google address.
6. Checksum: 0xd4d4[correct] means that there is no error in the received packets.

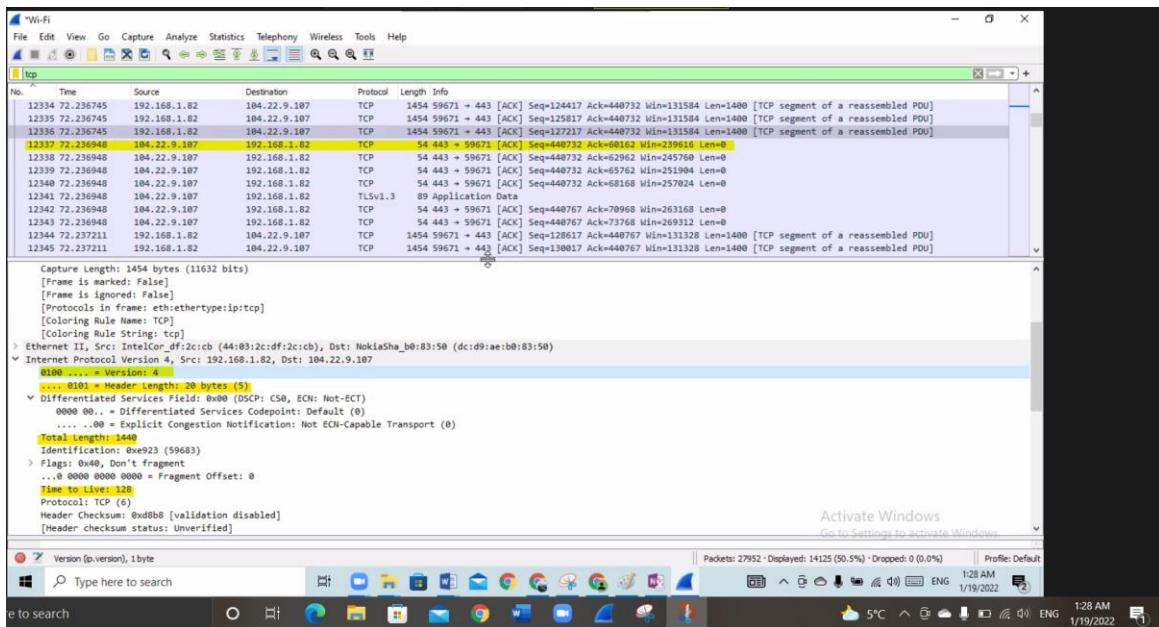
TCP:



Packet 1: No. 12293, Sequence Number: 89168, Ack Number: 428704

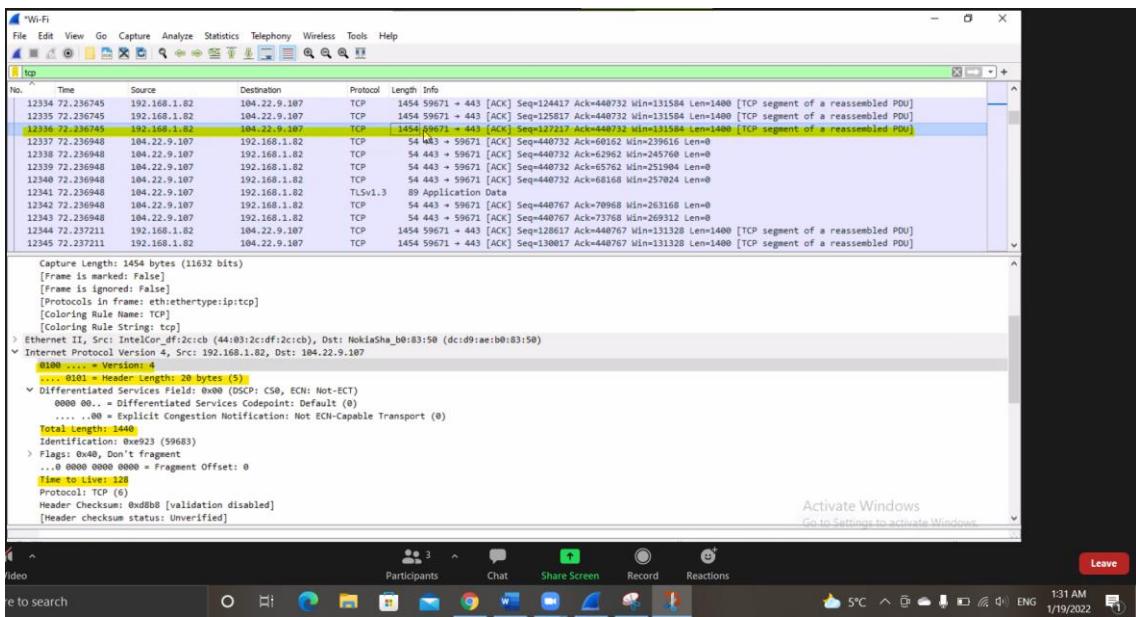
Packet 2: No. 12307, Sequence Number: 106647, Ack Number: 428739

Packet 3: No. 12316, Sequence Number: 430151, Ack Number: 51762



The Data Size of first packet:

$$\text{Data size} = \text{Total Length} - \text{Header Length} = 1440 - 20 = 1420 \text{ bytes}$$



The Data Size of second packet:

$$\text{Data size} = \text{Total Length} - \text{Header Length} = 40 - 20 = 20 \text{ bytes}$$

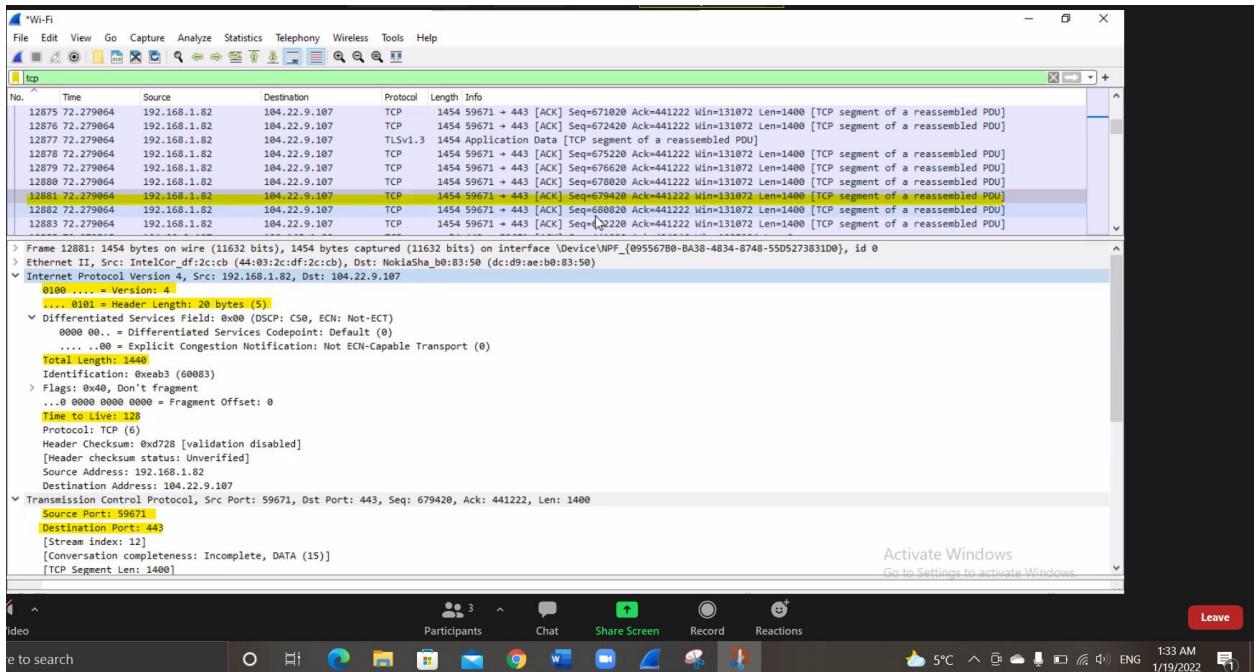
The Information about the file I send to get the packets information:

IP Source: 192.168.1.82

IP Destination: 104.22.9.107 (I check if this IP is correct using nslookup, by the way this IP for [www.ritaj.birzeit.edu](http://www.ritaj.birzeit.edu))

Source Port: 59671

Destination Port: 443



1. Version: the internet protocol addressing version is IPV4.
2. Header Length: the total length of the header is 20 bytes.
3. TTL: The packet can travel through 128 routers.
4. Source Address: the local IP address of my PC = 192.168.1.82.
5. Destination Address: the IP address of the destination = 104.22.9.107
6. Source Port: the source port of the packets = 59671
7. Destination Port: the destination port of the packets = 443.

## Part 2:

### a. All PCs, Routers and switches in packet tracer:

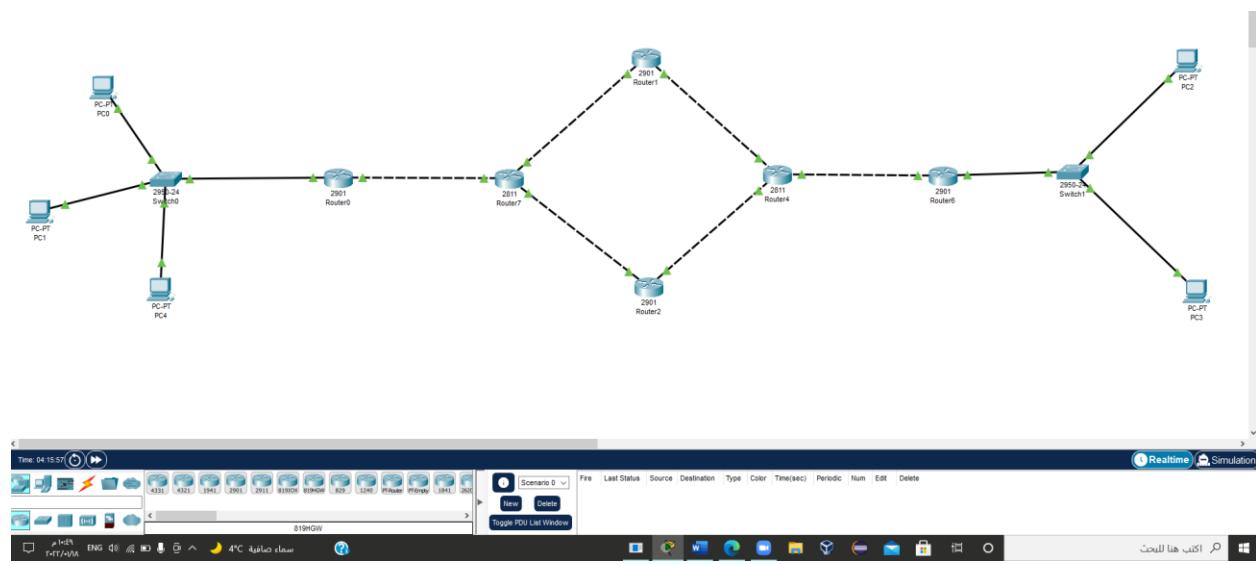


Figure (1): All system in packet tracer

### b. IPv6 assigned to PC0 :

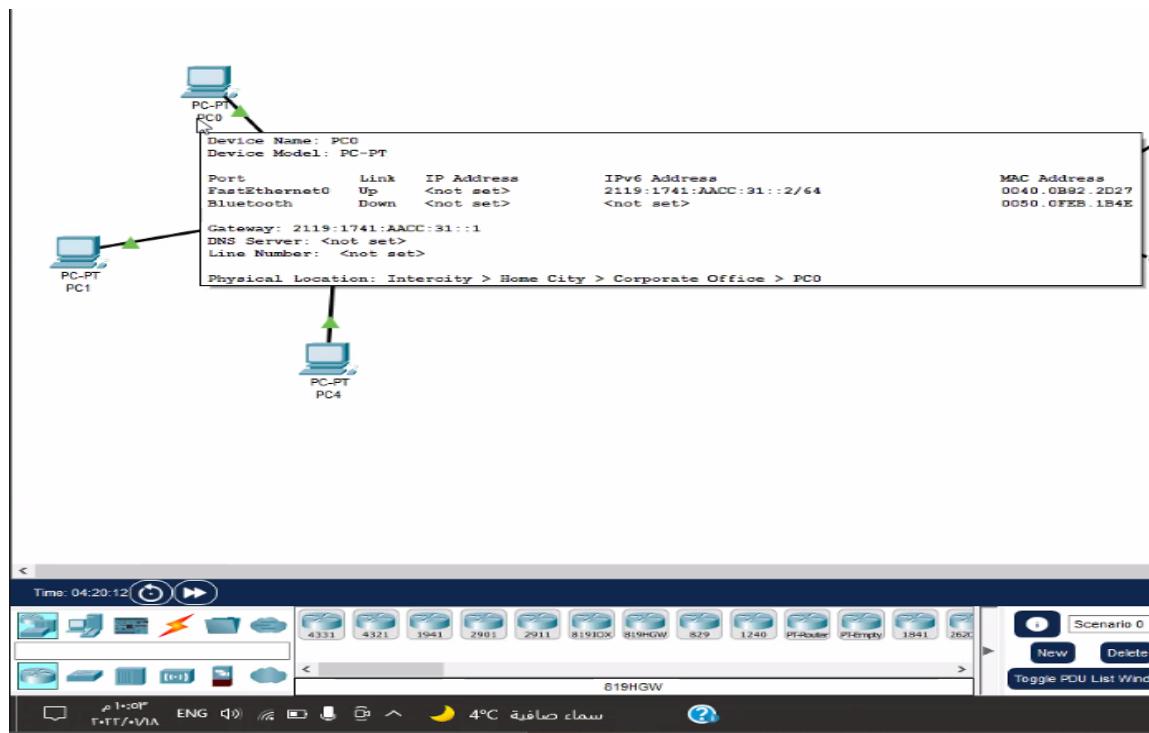


Figure (2): Information's with IPs for PC0

### c. IPv6 and IPv4 assigned to Router 0:

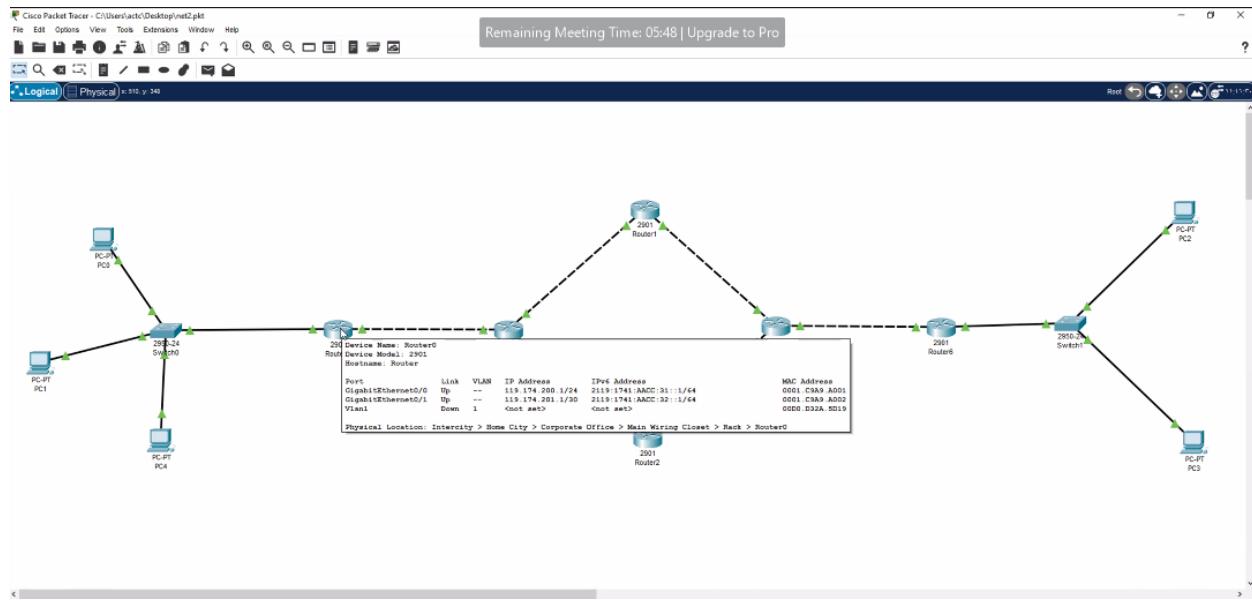


Figure (3): Information's with IPs for R0

### d. IPv6 and IPv4 assigned to Router 7:

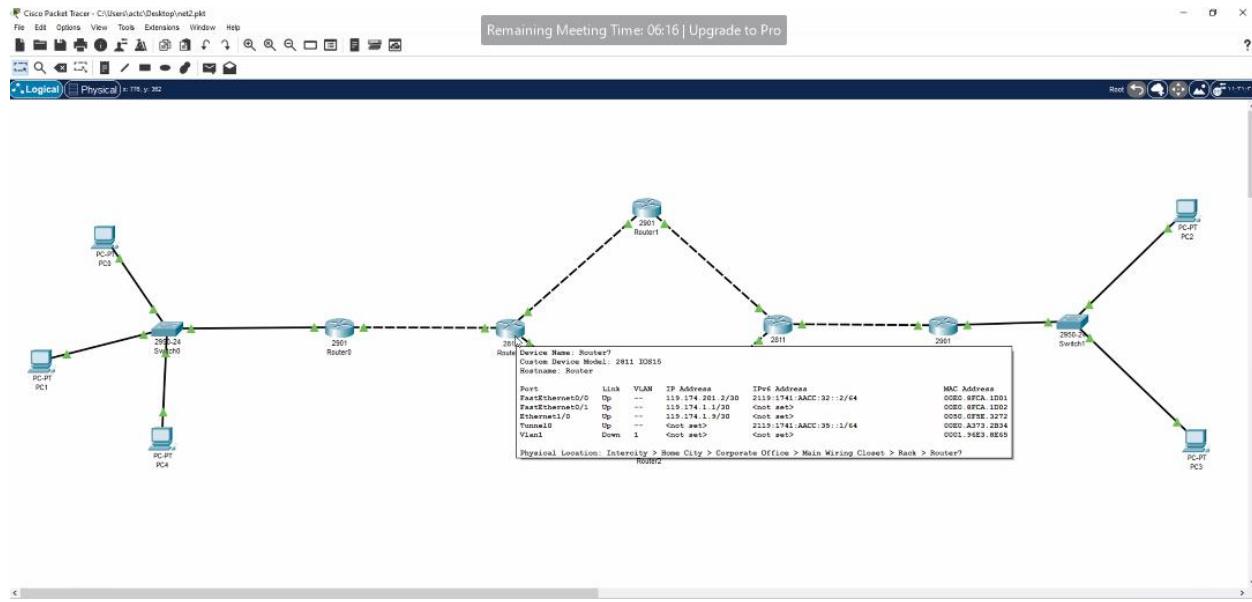


Figure (4): Information's with IPs for R7

### e. IPv4 assigned to Router 1:

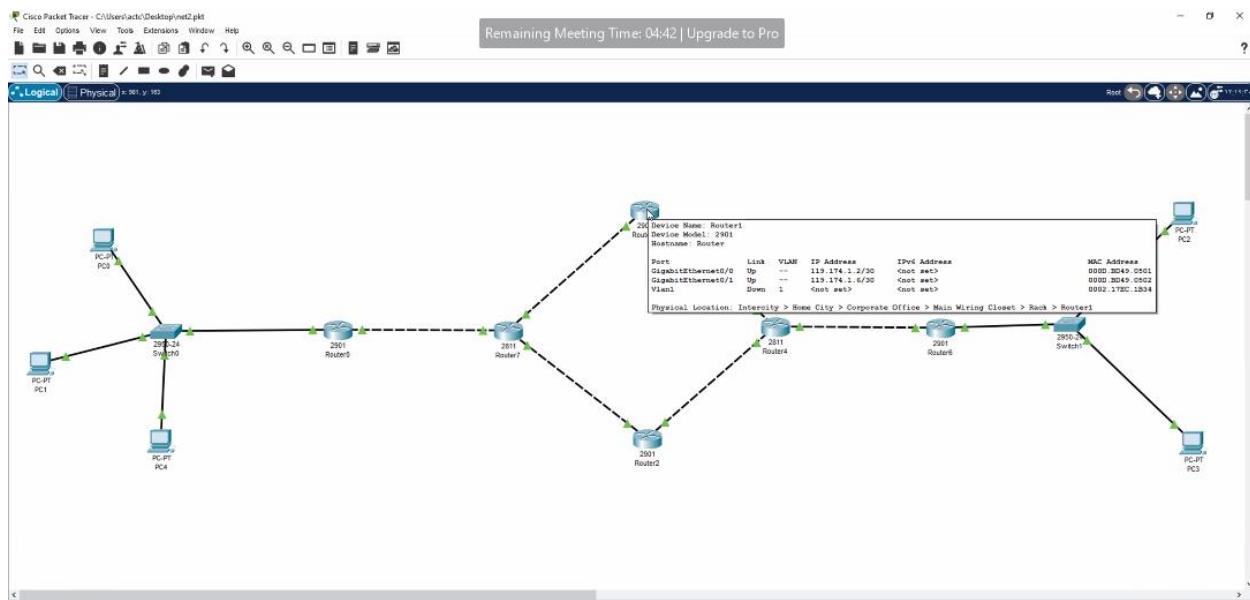


Figure (5): Information's with IPs for R1

### f. IPv4 assigned to Router 2:

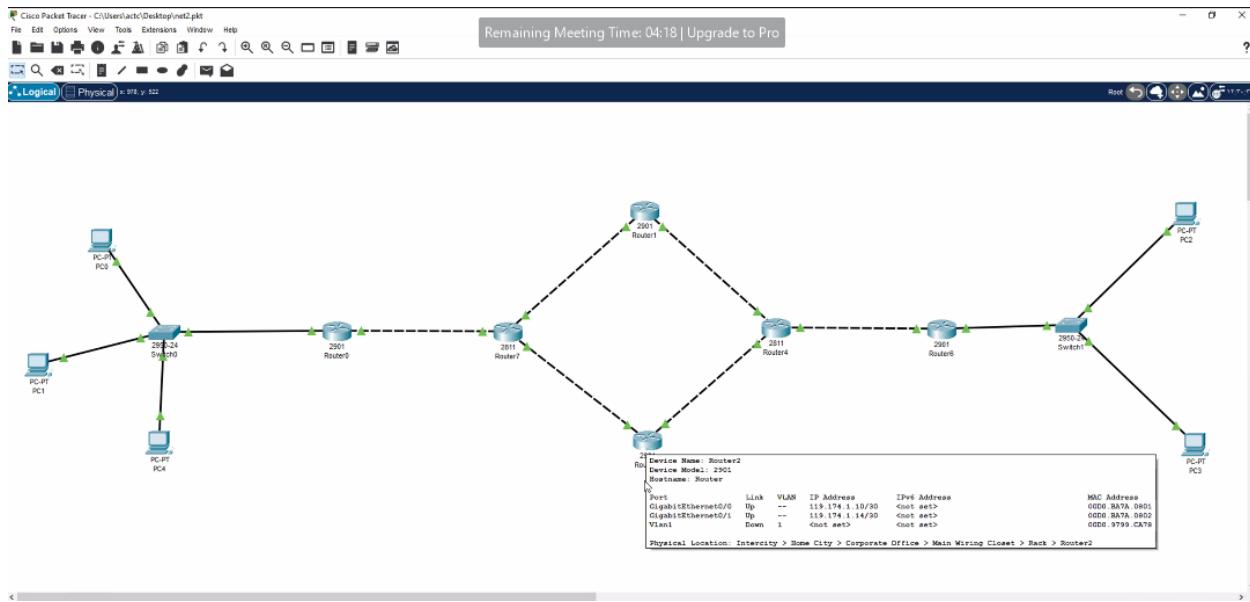


Figure (6): Information's with IPs for R2

### g. IPv6 and IPv4 assigned to Router 4:

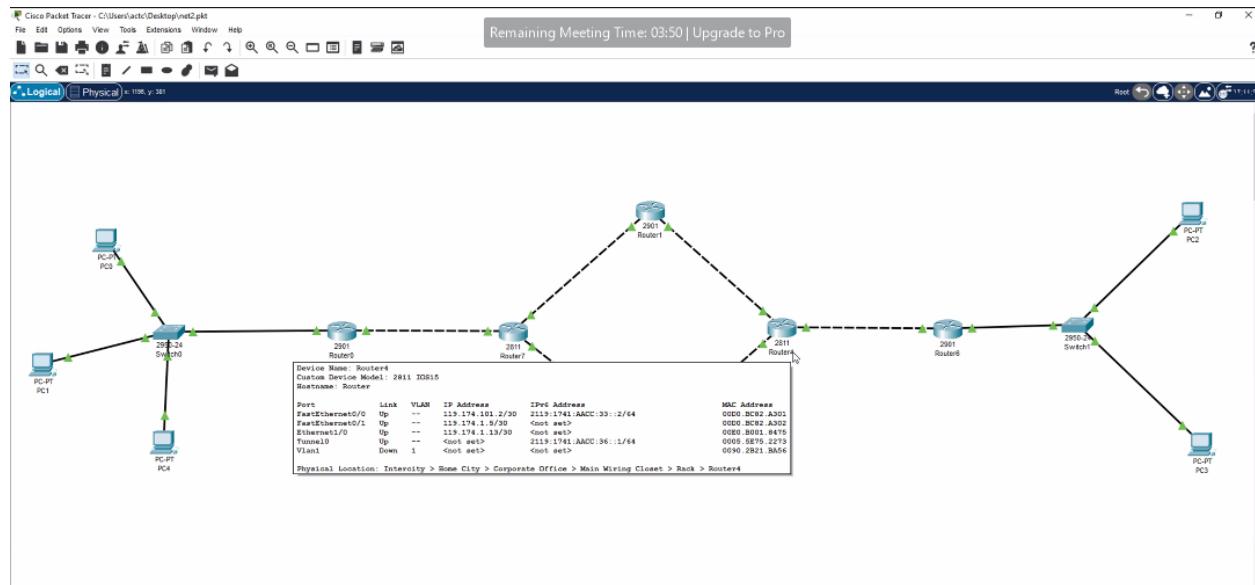


Figure (6): Information's with IPs for R4

### h. IPv4 and IPv6 assigned to Router 6:

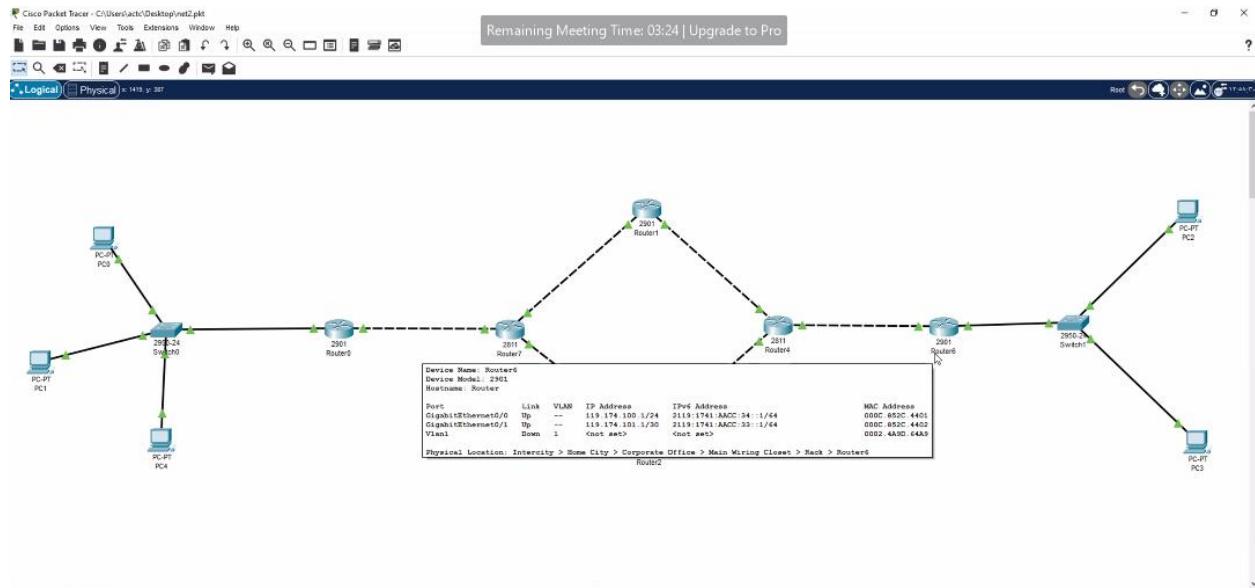


Figure (7): Information's with IPs for R6

### i. IPv6 assigned to PC2:

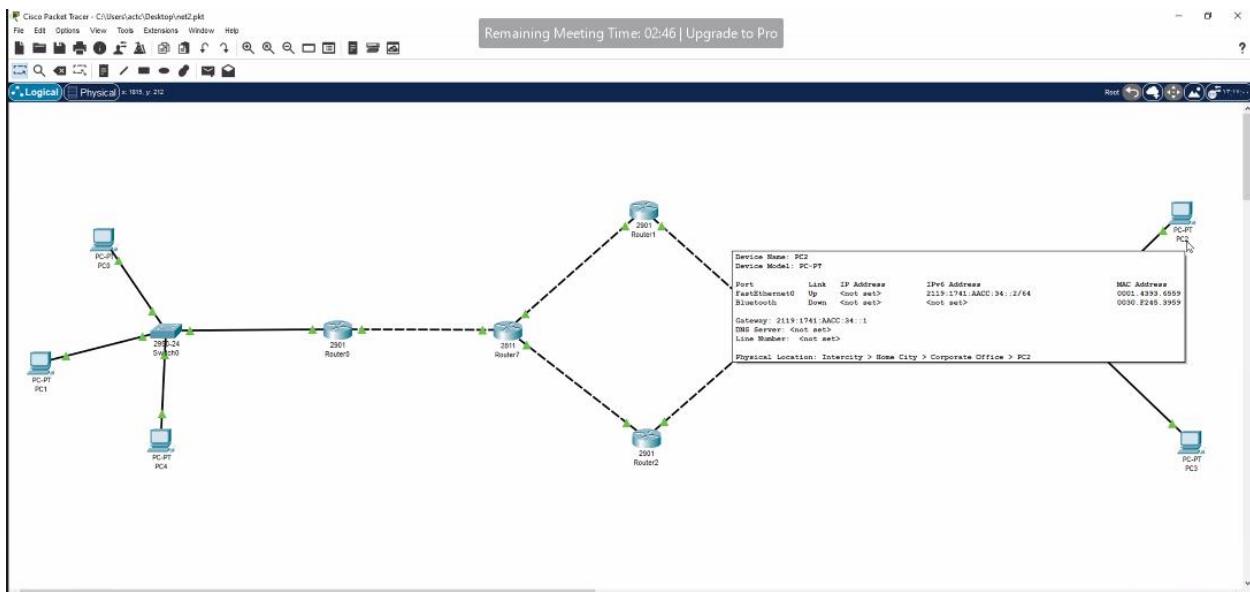


Figure (8): Information's with IPs for PC2

### j. IPv4 assigned to PC3

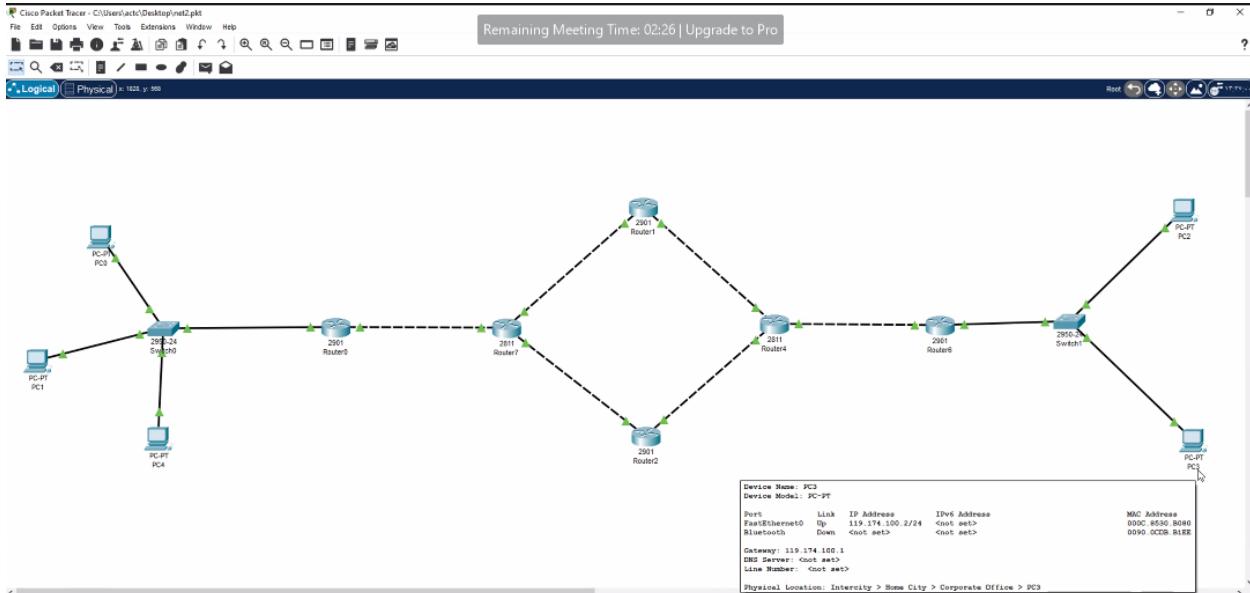


Figure (9): Information's with IPs for PC3

Testing and Ping our whole system:

a. Ping from PC1 to PC4:

```
C:\>
C:\>ping 119.174.200.3

Pinging 119.174.200.3 with 32 bytes of data:

Reply from 119.174.200.3: bytes=32 time<1ms TTL=128

Ping statistics for 119.174.200.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
C:\>
```

Figure (10): Result of Ping Hosts in the Same Network

b. Ping from PC3 to Router 1 (Interface GigabitEthernet0/0):

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 119.174.1.2

Pinging 119.174.1.2 with 32 bytes of data:

Reply from 119.174.1.2: bytes=32 time=1ms TTL=253
Reply from 119.174.1.2: bytes=32 time=13ms TTL=253
Reply from 119.174.1.2: bytes=32 time=10ms TTL=253
Reply from 119.174.1.2: bytes=32 time=1ms TTL=253

Ping statistics for 119.174.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 13ms, Average = 6ms

C:\>|
```

Figure (11): Test1. Result of Ping Router Using IPv4 in the Whole Network

c. Ping from PC4 to Router 4 (FastEthernet0/0):

```
Cisco Packet Tracer PC Command Line 1.0  
C:\>ping 119.174.101.2  
  
Pinging 119.174.101.2 with 32 bytes of data:  
  
Reply from 119.174.101.2: bytes=32 time<1ms TTL=252  
  
Ping statistics for 119.174.101.2:  
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
Approximate round trip times in milli-seconds:  
    Minimum = 0ms, Maximum = 0ms, Average = 0ms  
  
C:\>
```

Figure (12): Test2. Result of Ping Router Using IPv4 in the Whole Network

d. Ping From Router 0 to Router 6 (Interface GigabitEthernet0/1) and Ping From Router 0 to Router 6 (Interface GigabitEthernet0/0)

```
IOS Command Line Interface  
Router>  
Router>  
Router>ping 2119:1741:AACC:33::1  
  
Type escape sequence to abort.  
Sending 5, 100-byte ICMP Echos to 2119:1741:AACC:33::1, timeout is 2 seconds:  
!!!!!!  
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/8/12 ms  
  
Router>
```

Figure (13): Test1. Ping IPv6 from R0 to interface in R6 (Testing Tunnels)

```
Router>
Router>ping 2119:1741:AACC:34::1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2119:1741:AACC:34::1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/6/12 ms

Router>
```

Figure (14): Test2. Ping IPv6 from R0 to interface in R6 (Testing Tunnels)

### Explanation about tunnels:

Router 7 and Router 6 both have virgin ipv4 and ipv6 but in the way between them there are only routers that have virgin ipv4, so IPv4 traffic will only pass between them, two tunnel were implemented (IPv6 over IPv4) to allow IPv6 traffic to pass through those routers, the first tunnel from Router 7 to Router 6 and the other from Router 6 to Router 7.

#### e. Ping From PC0 to PC2:

```
PC0
Physical Config Desktop Programming Attributes

Command Prompt

C:\>
C:\>ping 2119:1741:AACC:34::2

Pinging 2119:1741:AACC:34::2 with 32 bytes of data:

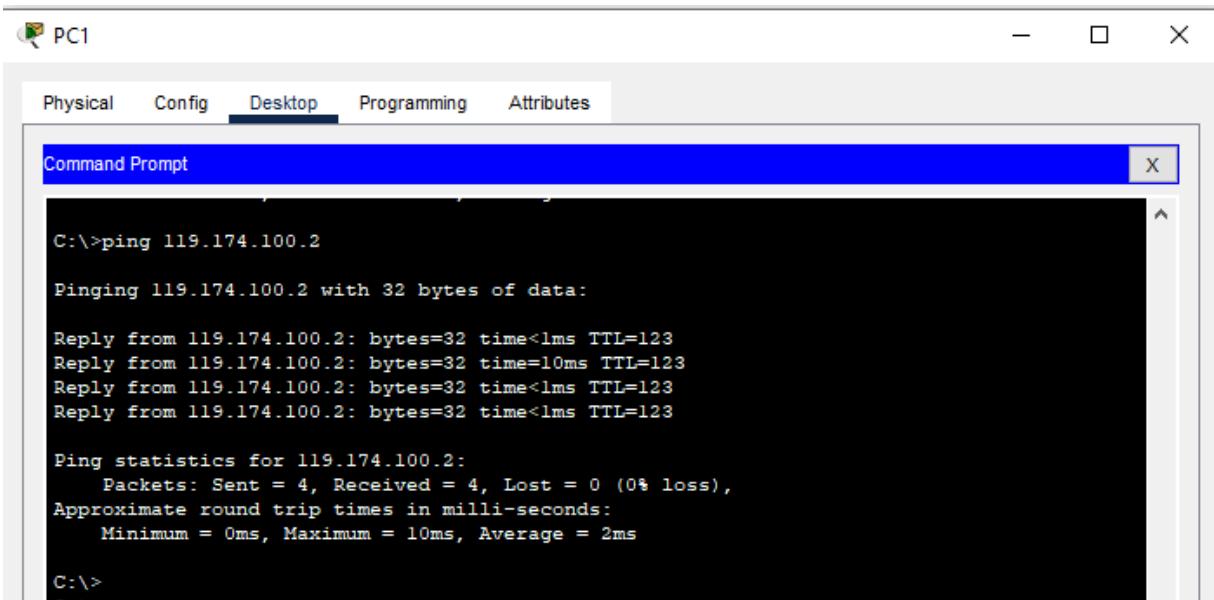
Reply from 2119:1741:AACC:34::2: bytes=32 time=18ms TTL=124
Reply from 2119:1741:AACC:34::2: bytes=32 time=10ms TTL=124
Reply from 2119:1741:AACC:34::2: bytes=32 time=22ms TTL=124
Reply from 2119:1741:AACC:34::2: bytes=32 time=2ms TTL=124

Ping statistics for 2119:1741:AACC:34::2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 22ms, Average = 13ms

C:\>
```

Figure (15): Ping from PC0 (IPv6) to PC2 (IPv6) (Testing Tunnels)

#### f. Ping From PC1 to PC3:



The screenshot shows a Windows Command Prompt window titled "PC1". The tab bar at the top has tabs for "Physical", "Config", "Desktop" (which is selected), "Programming", and "Attributes". The command prompt area displays the following output:

```
C:\>ping 119.174.100.2

Pinging 119.174.100.2 with 32 bytes of data:

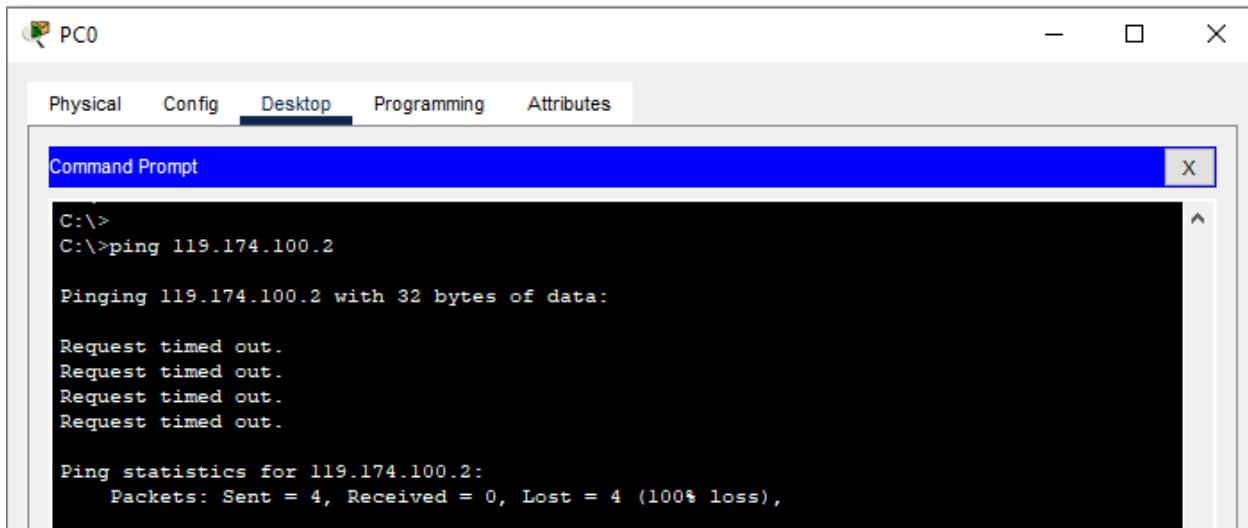
Reply from 119.174.100.2: bytes=32 time<1ms TTL=123
Reply from 119.174.100.2: bytes=32 time=10ms TTL=123
Reply from 119.174.100.2: bytes=32 time<1ms TTL=123
Reply from 119.174.100.2: bytes=32 time<1ms TTL=123

Ping statistics for 119.174.100.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 10ms, Average = 2ms

C:\>
```

Figure (16): Ping from PC1 (IPv4) to PC3 (IPv4)

#### g. Ping From PC0 to PC3:



The screenshot shows a Windows Command Prompt window titled "PC0". The tab bar at the top has tabs for "Physical", "Config", "Desktop" (which is selected), "Programming", and "Attributes". The command prompt area displays the following output:

```
C:\>
C:\>ping 119.174.100.2

Pinging 119.174.100.2 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 119.174.100.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Figure (16): Ping from PC0 (IPv6) to PC3 (IPv4)

The Result was Requested timed out because the versions of the PCs was different and when the version of the internet protocols and there's no packets can send from IPv6 to IPv4 and vice versa.

If we want to send a packet from IPv6 to IPv4 we must use a special tunnel to be connected and hopeful to arrive the packets.