Universidad De Las Américas Puebla

Ingeniería en Robótica y Telecomunicaciones

Departamento de computación, electrónica y mecatrónica.

En el curso:
LABORATORIO DE REDES DE COMPUTADORAS

O23-LRT4052-1

Impartido por:

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Práctica 6:

Equipo 3

Proyecto que presentan:

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Abstract

There are two methods for connecting networks that are static (network manager defines the route) and dynamic (algorithms are used for defining the routes).

In this practice we will learn how to simulate and verify the functionality of two local networks interconnected by static routing.

Theorical Analysis

Routing refers to the process where routers learn about remote networks, they find the possible routes to reach those networks and then they choose the best routes (faster routes) to change data between them.

With static routing, the router follows the orders from the manager of the network that he configures manually.

This kind of routing have some disadvantages compared to dynamic routing, regarding performance and scalability, however it has its advantages too like full control over route selection, availability, is easy to implement, low overhead costs.

Static routing is useful in situations where the network design or parameters are expected to remain constant. (*¿Qué Es El Enrutamiento? - Explicación Del Enrutamiento De Redes - AWS*, n.d.)

Methodology

1. With the instructor's advice, develop and simulate a double interconnected network using routers like the one shown in figure 1.

Figure 1.

2. Use Ethernet cable for the connections marked in black and serial cable for the connection between routers marked in red, before making this last connection install serial connection adapters on routers.

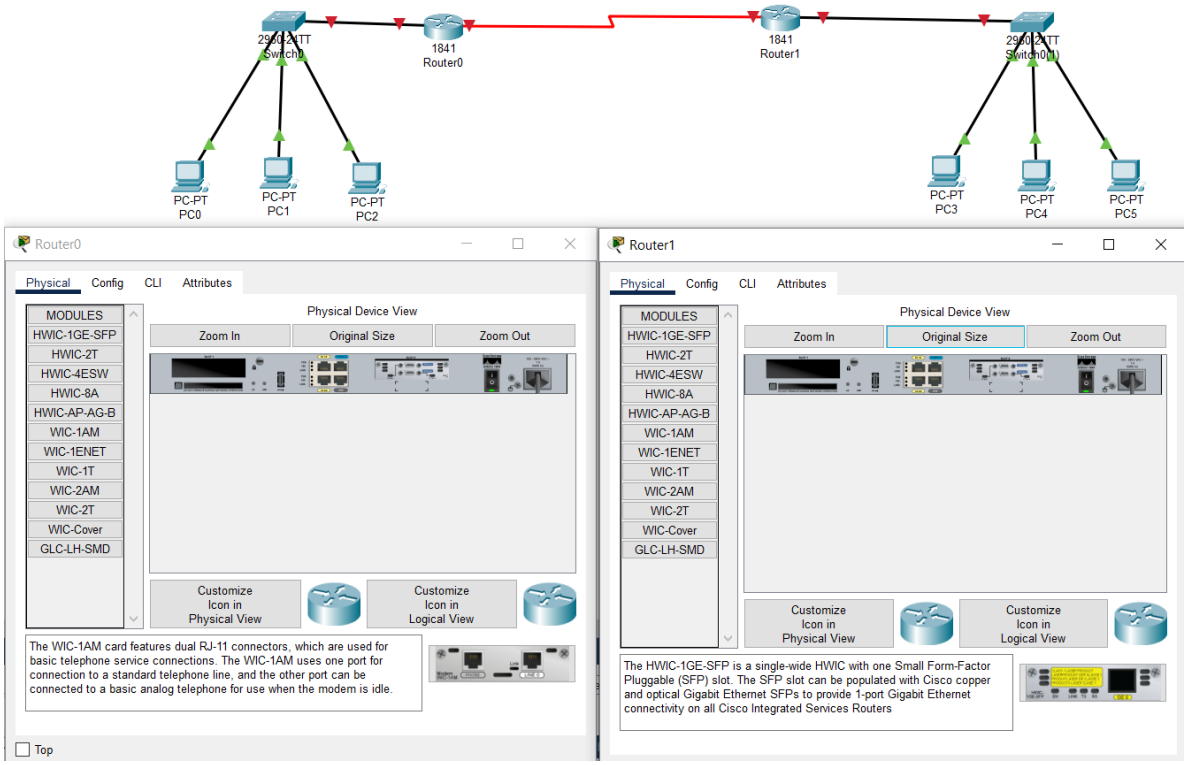

Figure 2. Adapters

3. Assign IP addresses to the client computers on the left side LAN with the format: 192.168.80.X, where X is a digit between 1 and 3, use subnet mask 24 bit.

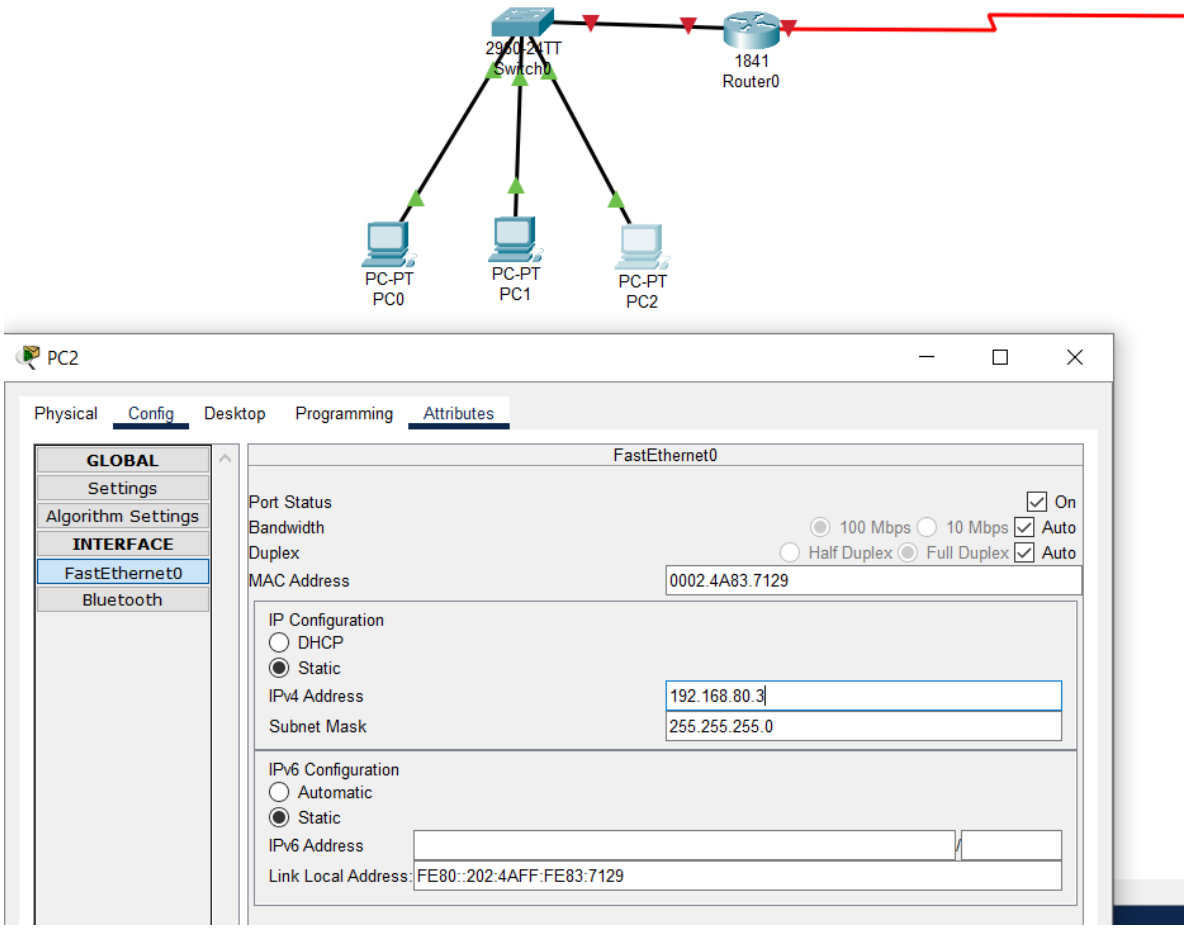

Figure 3. IP Adresses

4. Do the same with the VLAN on the right, but with format 192.168.70.X, with

same subnet mask.

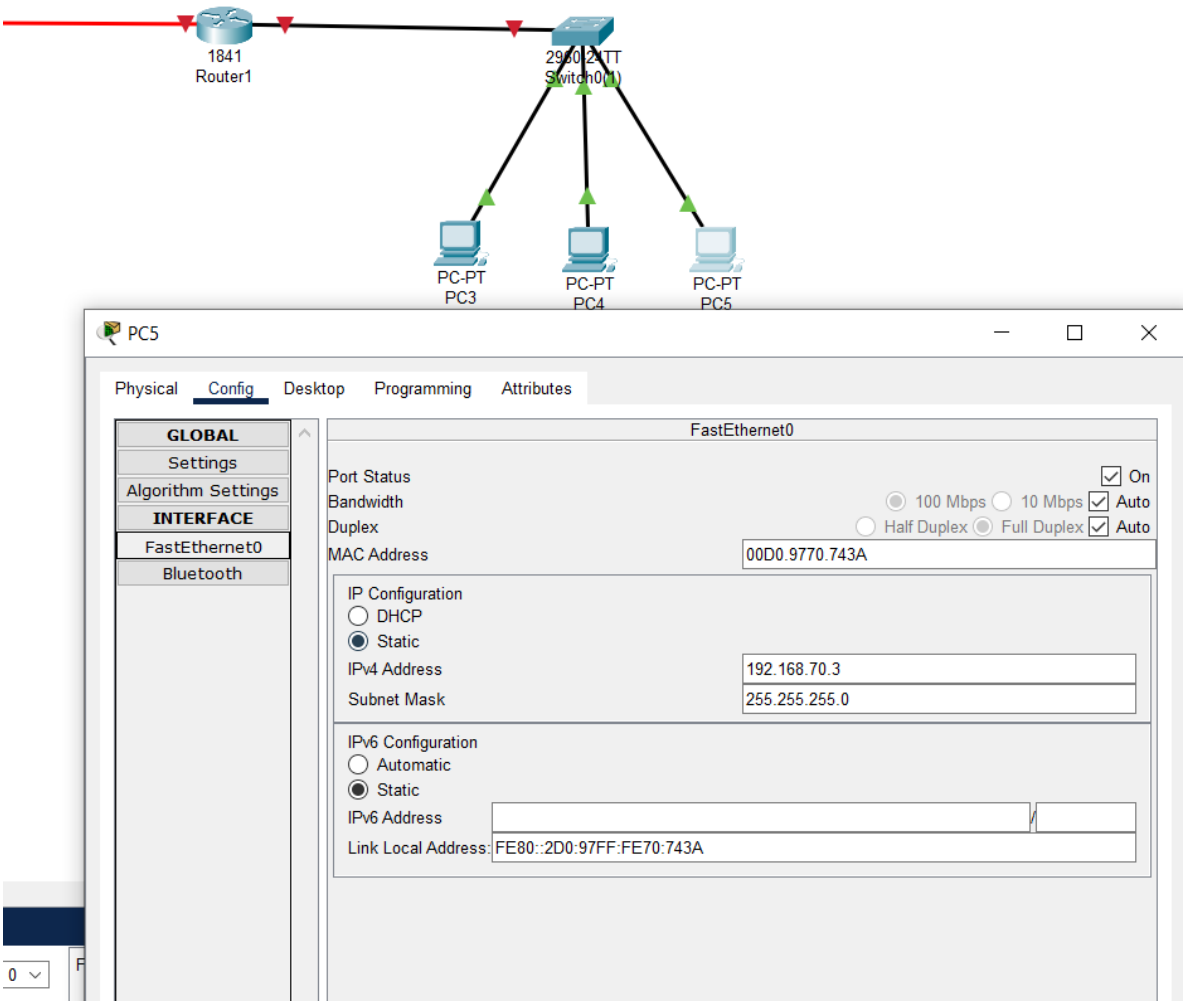

Figure 4. IP Adresses

5. Verify the client-to-client connection on the same LAN with a ping command.

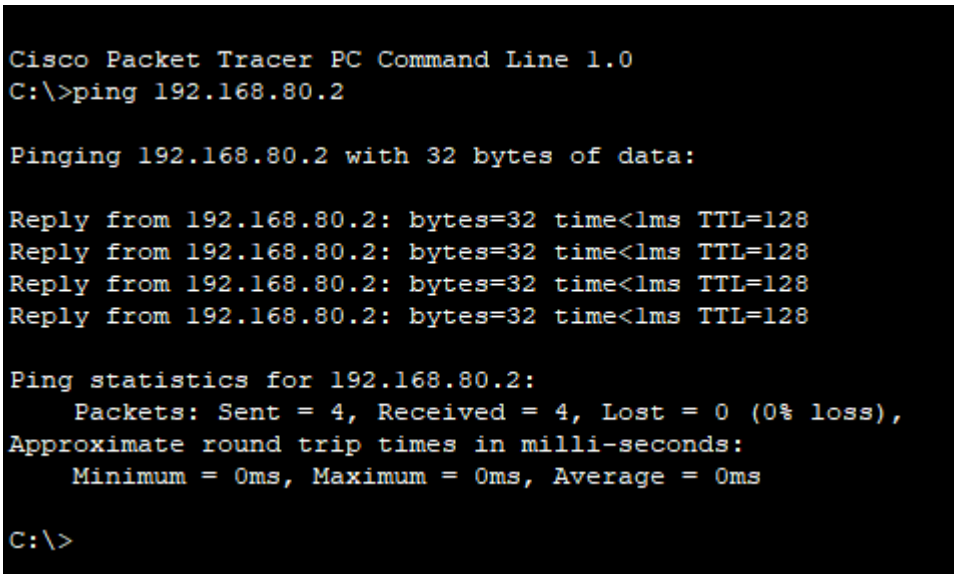

Figure 5. Ping 192.168.80.X

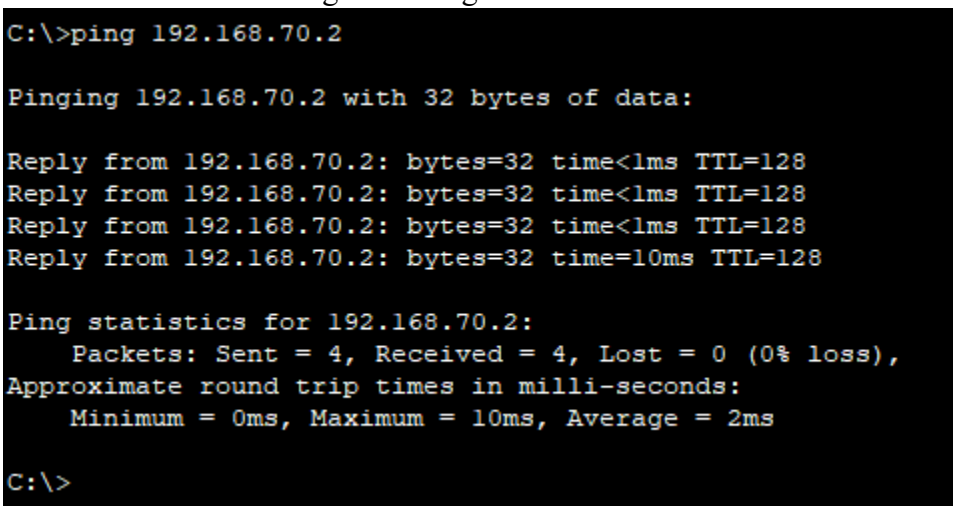

Figure 6. Ping 192.168.70.X

6. With the instructor's advice, configure the addresses of the interfaces of the routers using the configuration window in one and command line in the other. For the Ethernet interface use IP within the same LAN subnet. For the interfaces that interconnect routers use IP addresses with the following format: 10.0.0.X where X is a digit between 1 and 2, use 8-bit subnet mask for this connection.

   Commands:
   enable
   configure terminal
   interface fastEthernet x/x
   ip address 192.168.80.4 255.255.255.0
   no shut down

ctrl z

```
Router>enable
Router#config terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface fastEthernet0/0
Router(config-if)#ip address 192.168.80.4 255.255.255.0
Router(config-if)#no shut down

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
^Z
Router#
%SYS-5-CONFIG_I: Configured from console by console
```

Figure 7. Fast Ethernet X.X.80.X

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface fastEthernet0/0
Router(config-if)#ip address 192.168.70.4 255.255.255.0
Router(config-if)#no shut down

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
^Z
Router#
%SYS-5-CONFIG_I: Configured from console by console
```

Figure 8. Fast Ethernet X.X.80.X

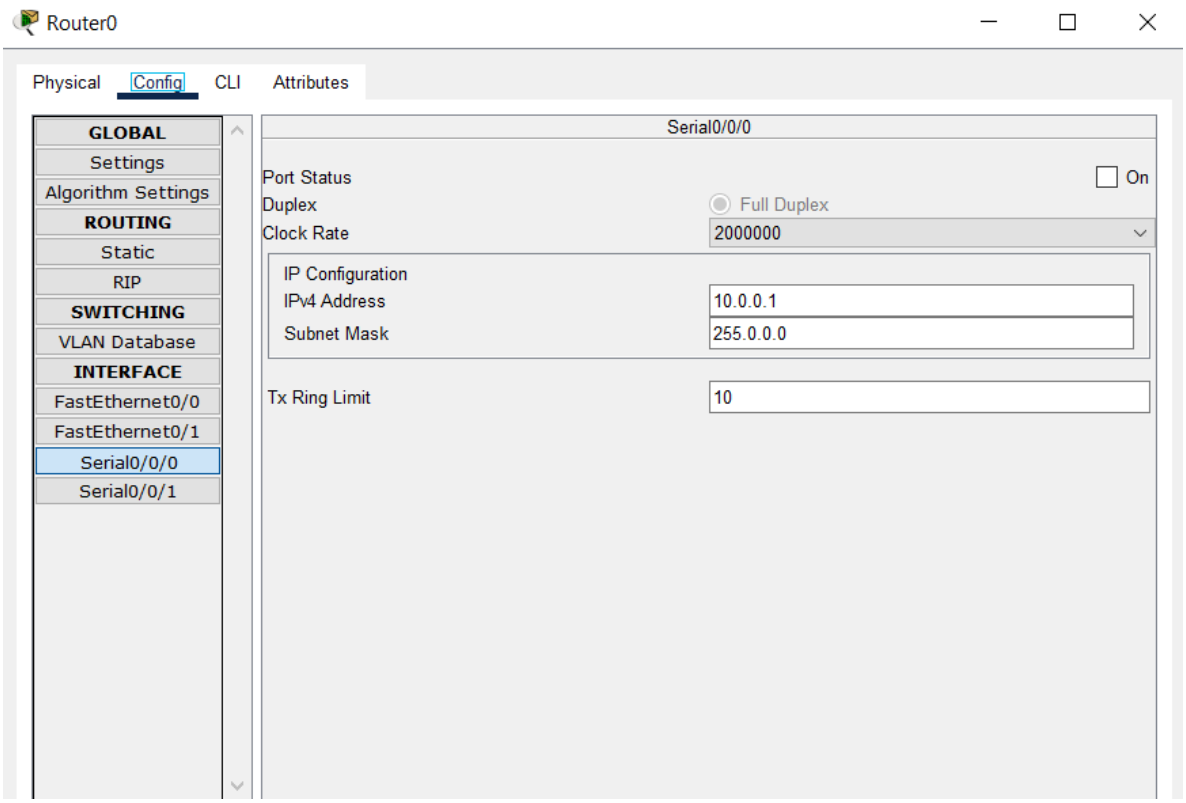

Figure 9. Serial 10.0.0.1

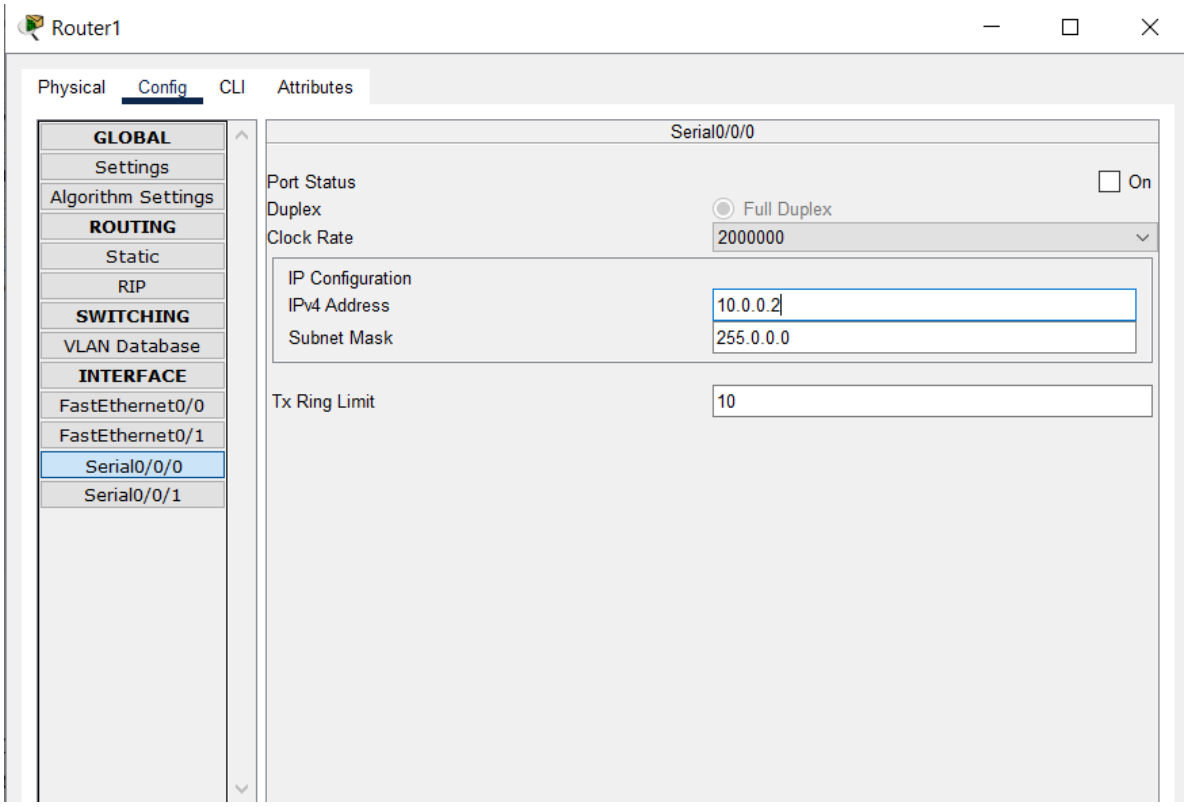

Figure 10. Serial 10.0.0.2

7. With the instructor's advice, configure static routing on each router, using both methods, one in each.

   Commands:
   enable
   configure terminal
   ip route <dirección destino con mascara><dirección de salto>
   ctrl z

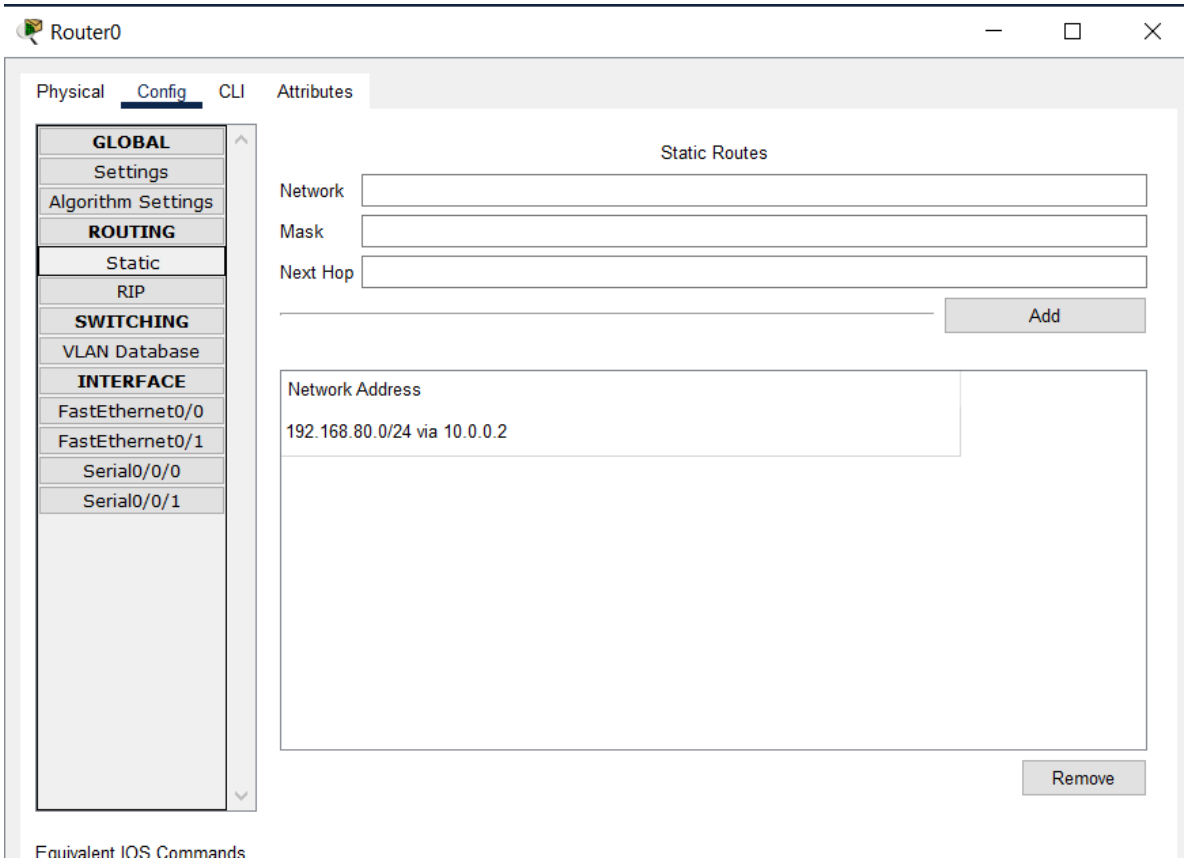

Figure 11. Static Routing Router 0

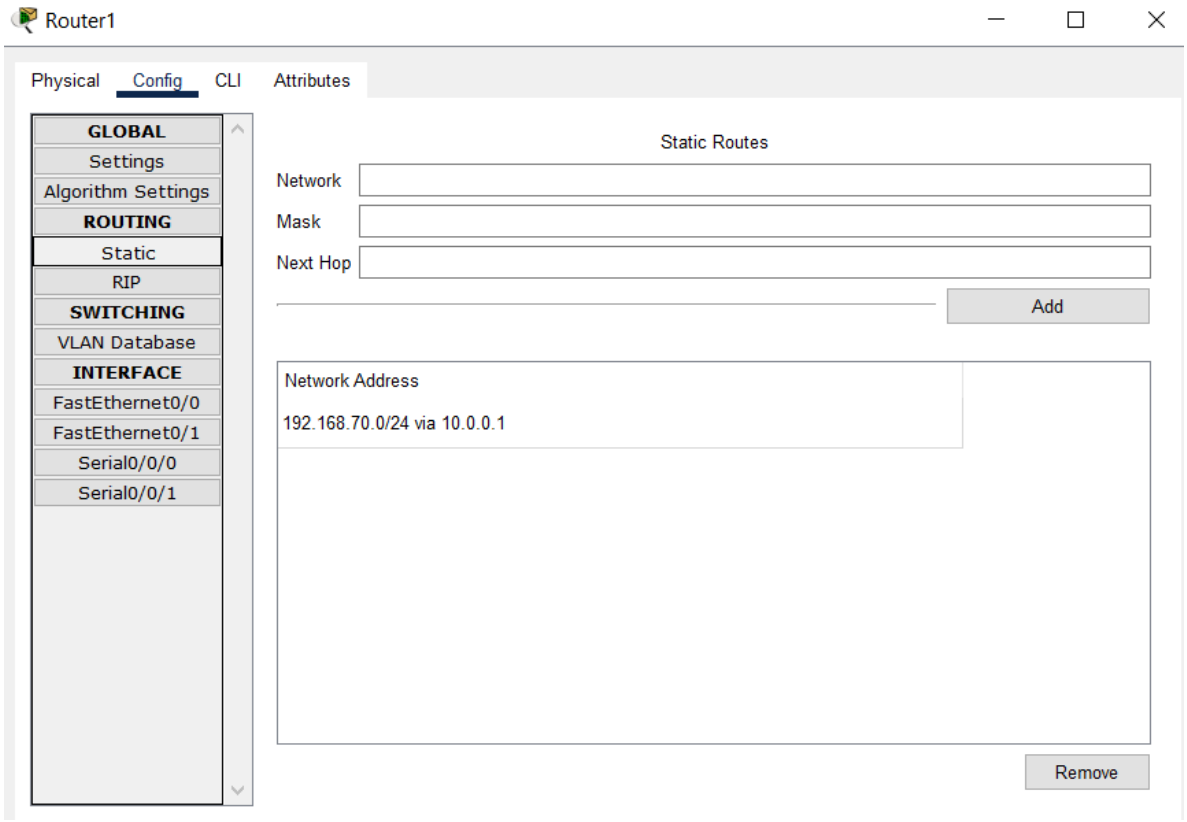

Figure 12. Static Routing Router 1

8. Check the connection and routing by making ping requests from the clients on the left VLAN to those on the right VLAN.

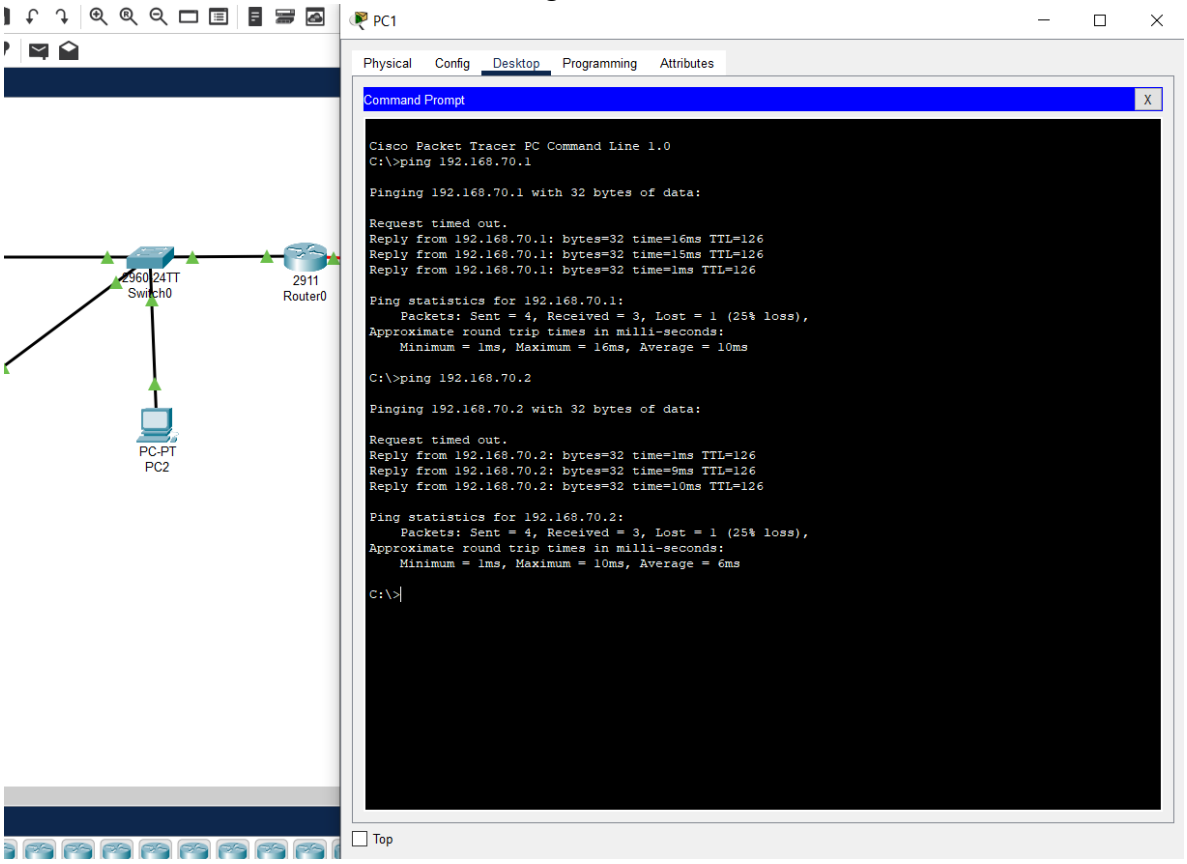

Figure 13. Ping from clients on the left

9. Make the necessary network modifications to add a third VLAN connected to router 2 with 2 client computers with IP addresses with the following format: 192.168.60.X and 24-bit subnet mask.

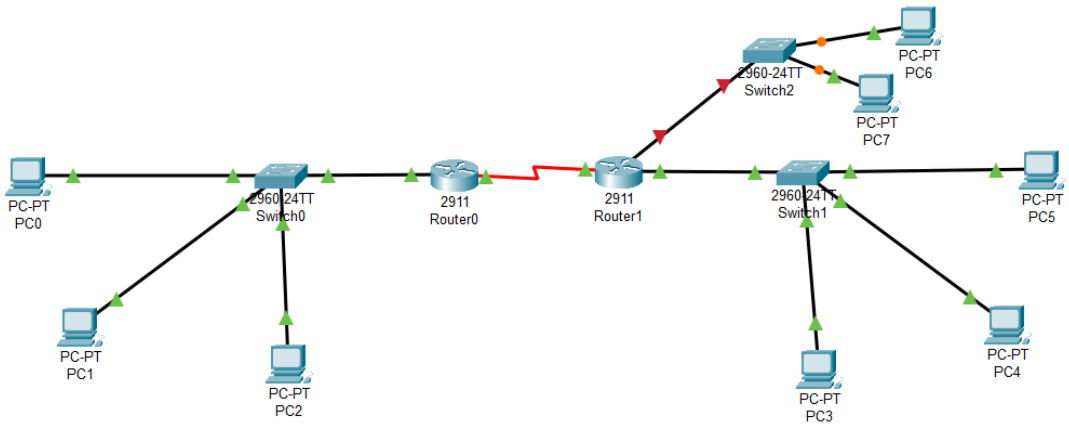

Figure 14. Third VLAN

10. Make the necessary modifications to add a third router with a fourth VLAN with two client computers, so that these clients can communicate communicate with the rest of the VLANs.

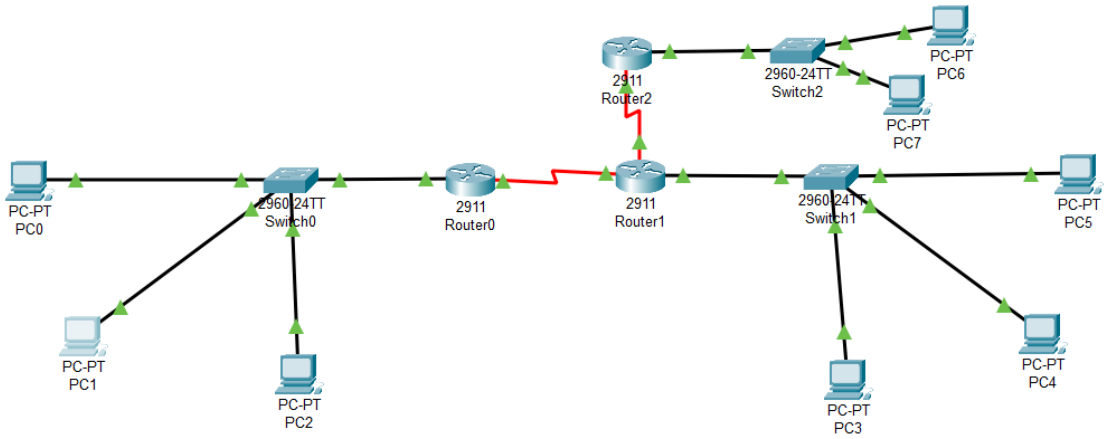

Figure 15. Third Router

11. Check with a ping command, the communication between the computers of the new VLANs and the rest of the client computers.

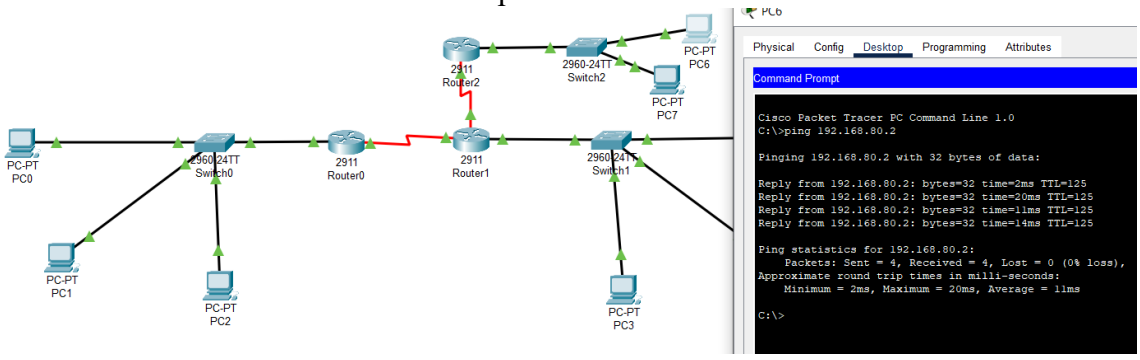

Figure 16. Ping from PC6

Experimental Results

The following captures are the results of our physical connections and configurations needed for this practice.

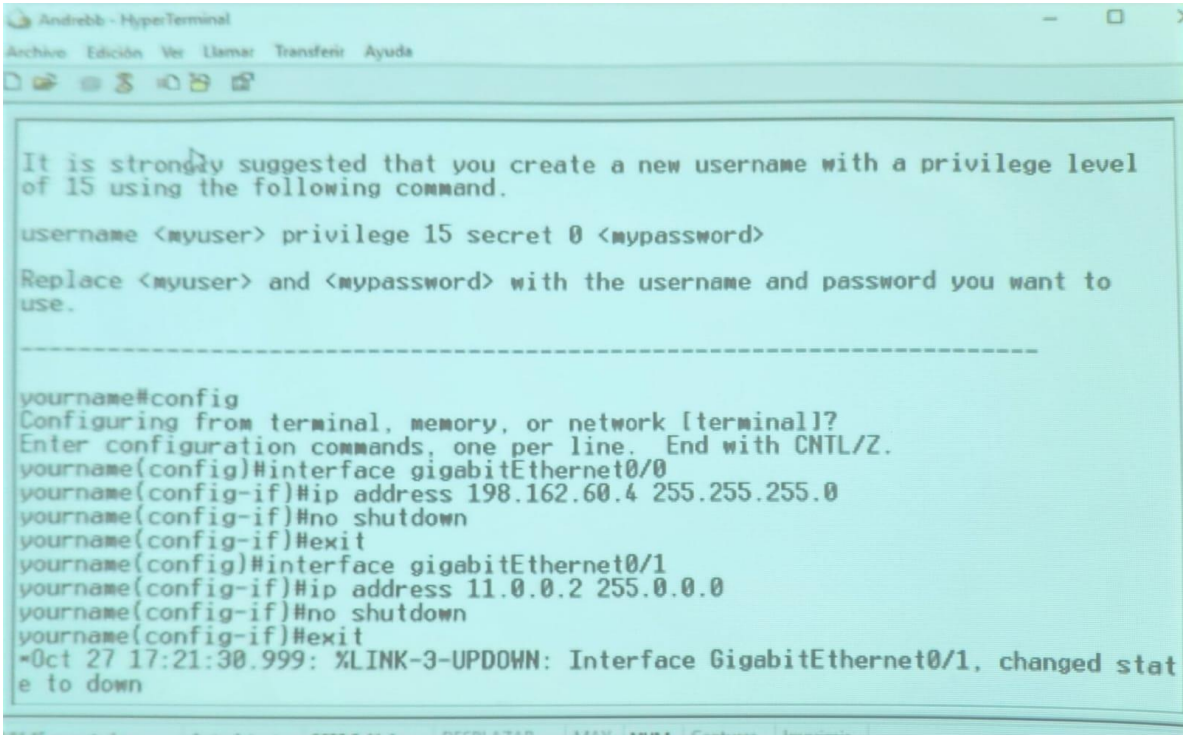

Figure 17. Physical IP

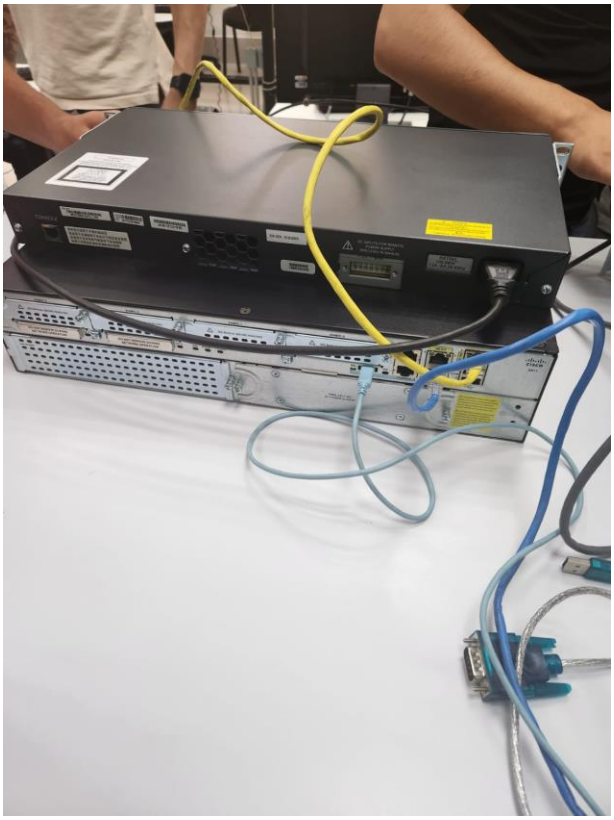

Figure 18. Physical Connection

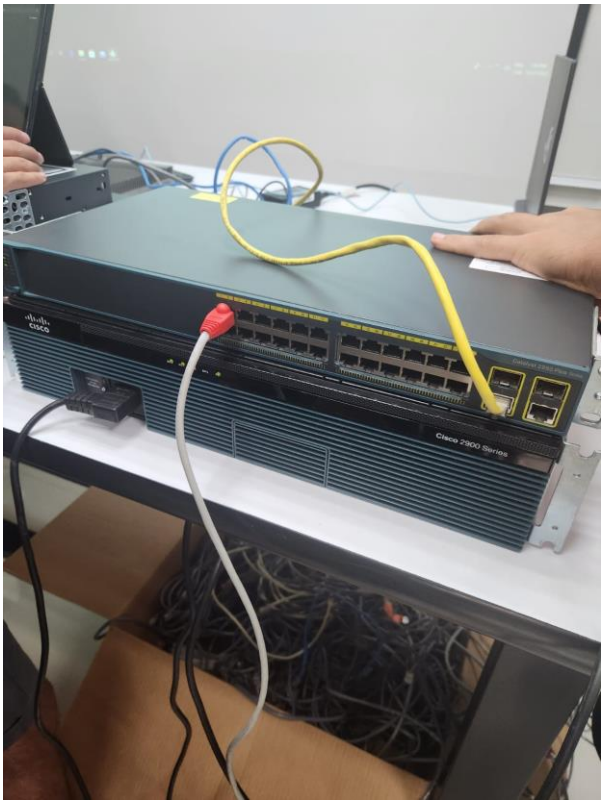

Figure 19. Physical Connection

Figure 20. Physical Connection

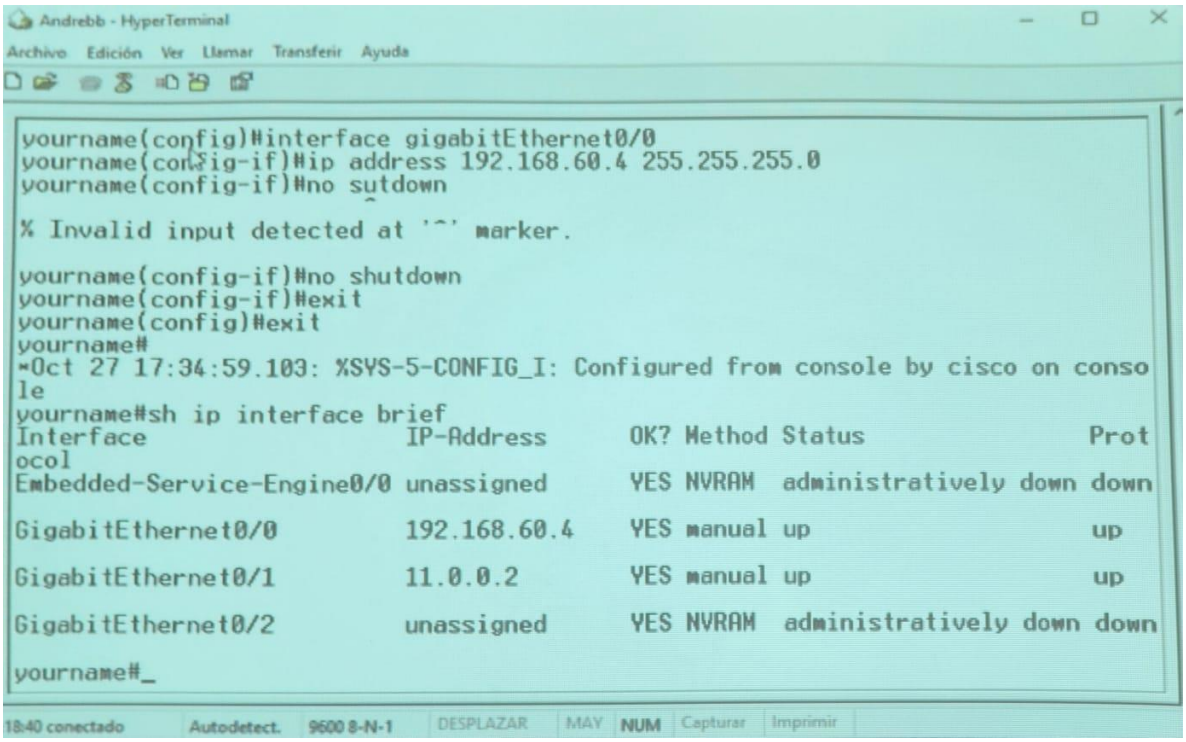

Figure 21. IP Interface Brief

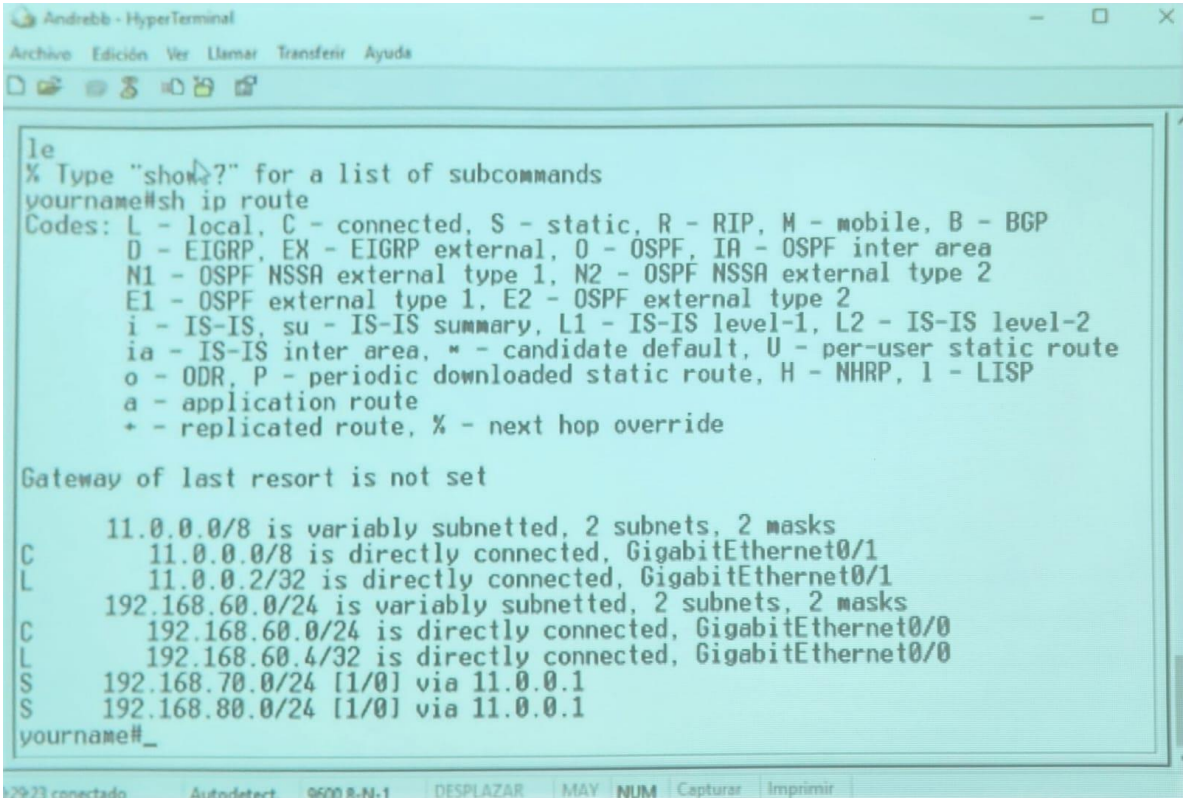

Figure 22. IP Route

Conclusions

We learn how to make static routing from one router to another and even by multiple routers. We made ping from different networks to prove that our work was successful. Physical practice was also very important and we include in our results the evidence of the connections we made where our professor help us. The importance of knowing how static routing works help us to have a most secure network.

Bibliography

¿Qué es el enrutamiento? - Explicación del enrutamiento de redes - AWS. (n.d.). Amazon Web Services, Inc. https://aws.amazon.com/es/what-is/routing/#:~:text=En%20el%20enrutamiento%20est%C3%A1tico%2C%20un,de%20la%20red%20permanezcan%20constantes.