Objectives:

- Whether or not your network will benefit from switching.
- To know how you add switches to your network design for the most benefit.

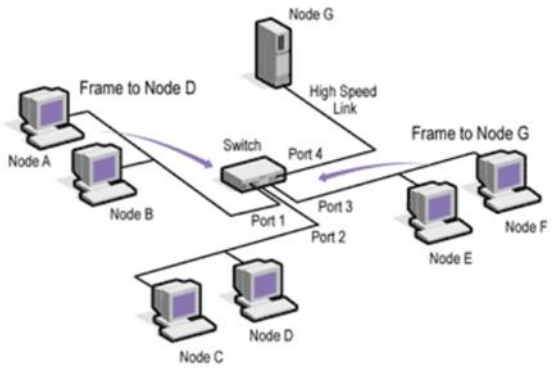
Introduction

Organizations use networks to support their applications in an effective and efficient way. While adding new users to the network, applications with high bandwidth and high capability computers can cause the network to slow down.

There are many LAN technologies but ethernet networks are the most used which are based on a single segment topology which means only one user at a time can access the bus where stations are connected physically to it using a hub making a broadcast domain. Stations are in a half-duplex mode which means they can only send or receive at one time but not at the same time. Moreover, it's a shared medium meaning if something is sent it sent to all PCs on the network. Collisions can occur because of traffic it's when data is sent from two stations at the same time and the collided data must be retransmitted again which will cause more traffic. Performance starts to get lower with congestion as the network gets larger, which is a common case nowadays, switches are one solution to segment networks.

The MAC address is a unique address for every single network adapter which is given by the manufacturer. The form of the MAC address is MM:MM:MM: SS: SS: SS the first half of the address which is MM is the manufacturer ID while the other half which is SS is the serial number given to each adapter. The MAC address is fixed and can't be modified while the IP address changes when a device goes from one network to another.

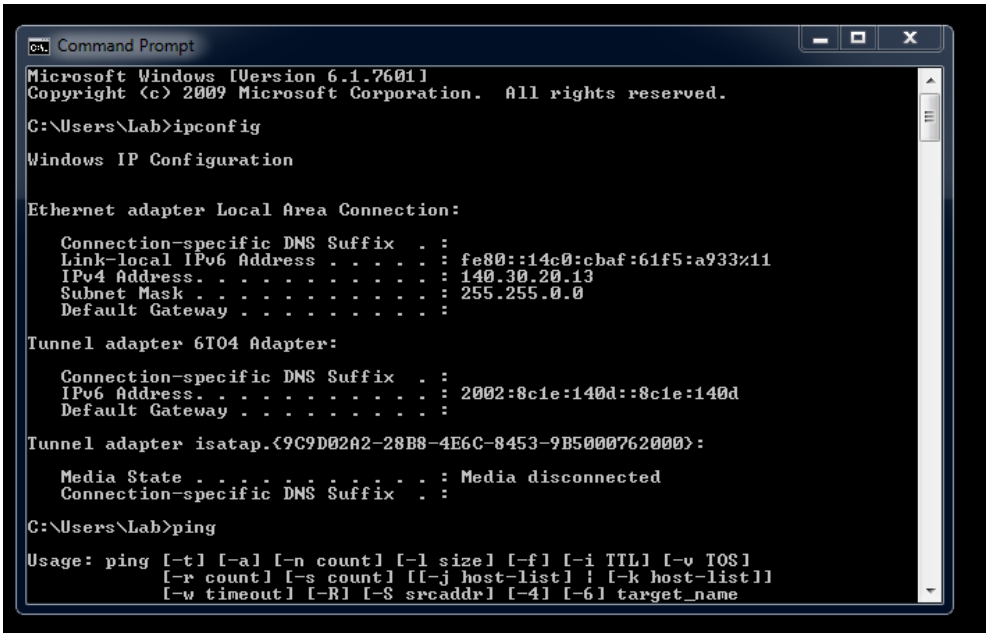
Switching hubs are devices used to perform filtering and forwarding frames between local area network segments. Based on the destination address of the packet switches decide where to send network traffic which reduced congestion. Switches are considered data link layer devices (layer 2) since they forward operations by evaluating the destination MAC address in the frame and switching the individual frames to the correct port.



A repeater hub is a device used to extend the reach of the network by repeating the signal for segments using only the same LAN technology and data rate. It sends the packet to all PCs on the segment. On the other hand, a bridge is s a device that connects two segments of the same LAN or connects two LANs that use the same protocol. If a packet on one LAN is intended for a destination on an interconnected LAN, the bridge forwards the packet to that LAN; otherwise, it passes it along on the same LAN. The main difference or advantage for switches over the bridge is the bridges have 2 ports only while switches can have 12, 24 or 48 ports which allows them to have more complex architecture inside them to allow multiple conversations to simultaneously occur between ports of the hub.

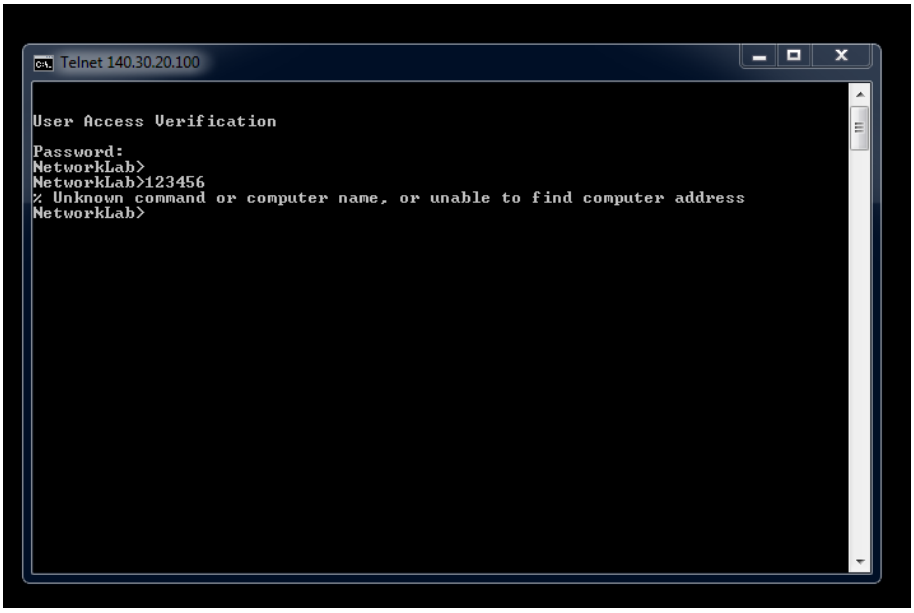
Procedures

Step 1- setting up an IP address and pinging the switch.

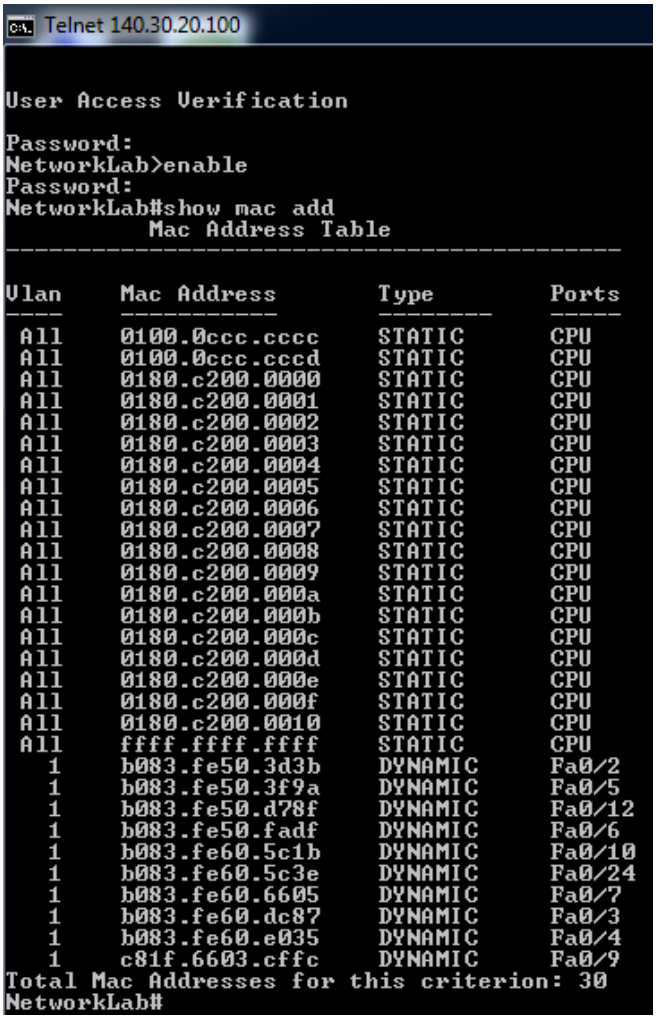


- In this step we set up IP address 140.30.20.13 to access the switch.

Step 2- we use telnet to login to the switch & show mac address.



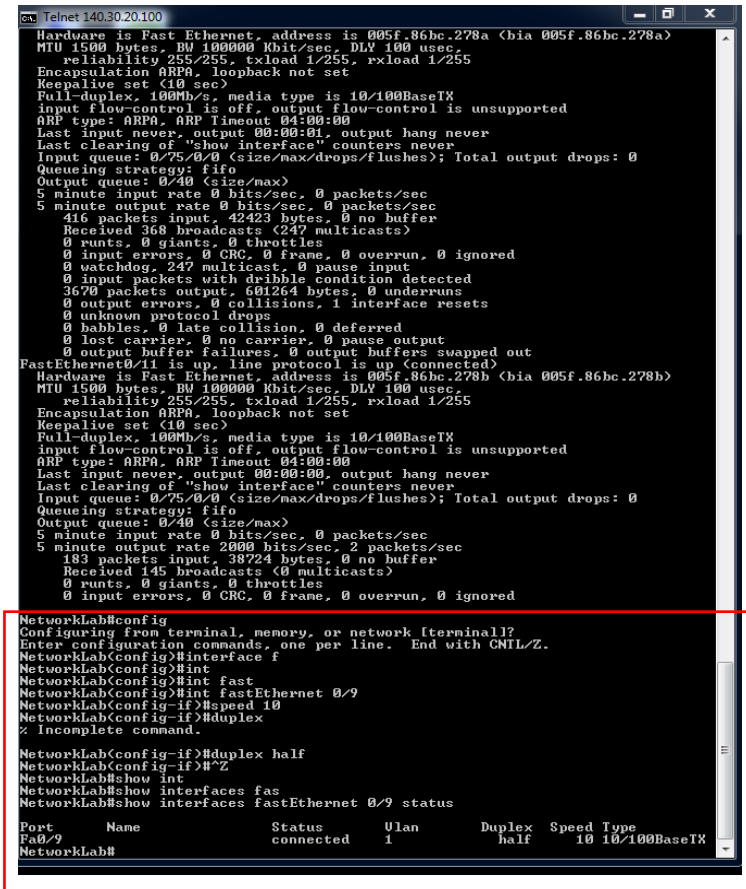
- In this step we used telnet and added the IP address to connect it



- After we access the telnet command we used the show mac address-table command to verify which port that machine is connected to on the switch.

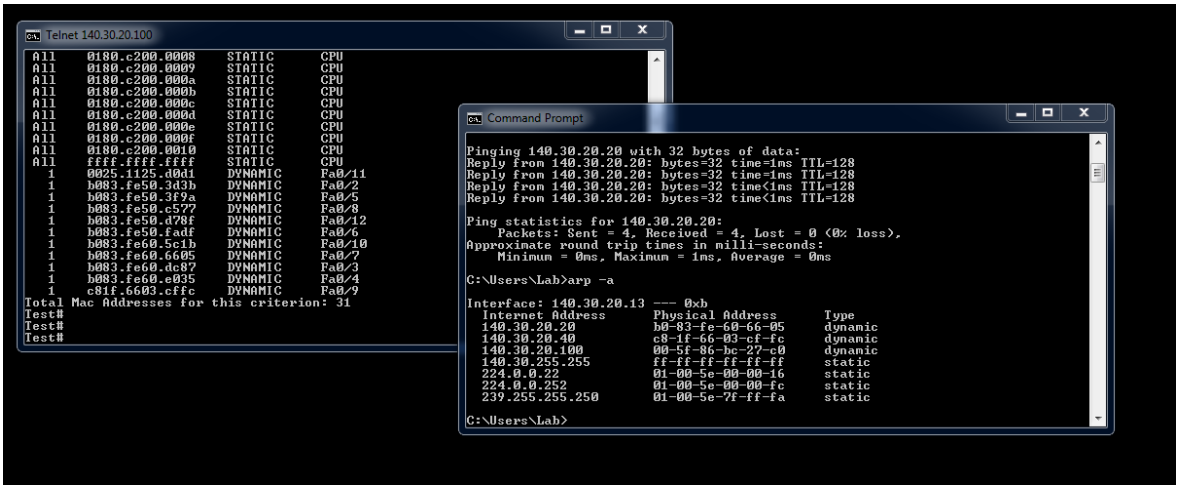
Step 3- Configuring the switch & Show interface Fast Ethernet

- In this step we will use show interface fast Ethernet to display all configuring details regarding this command
- We used duplex half and speed to change the value and the speed.
- We used show interface fast Ethernet status to get the transmitted data of the speed which is 10/100 base TX in duplex half.



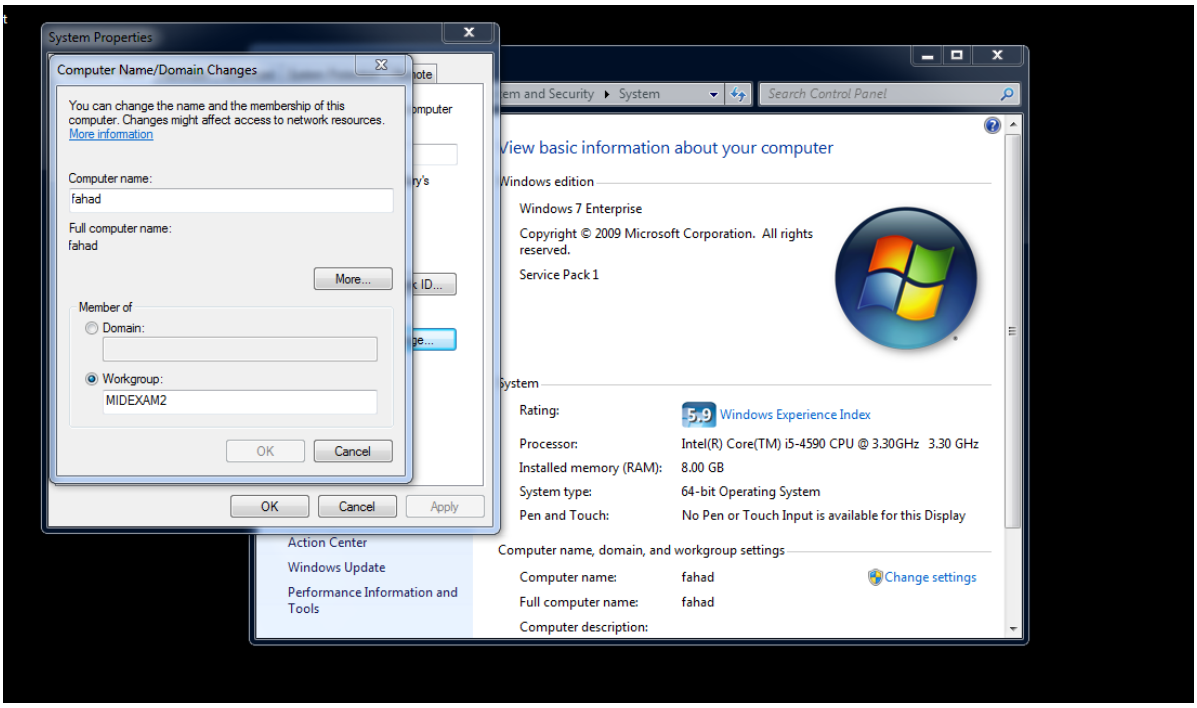
Step 4- pinging another host & Arp.

- In this step we ping the address 140.30.20.20 to get a response and we used Arp to get all the connected devices.



Step 5- changing the computer name.

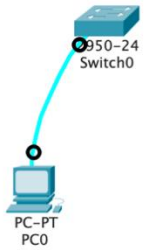
- In this step we change the computer name by going to the system properties and restarting the device.

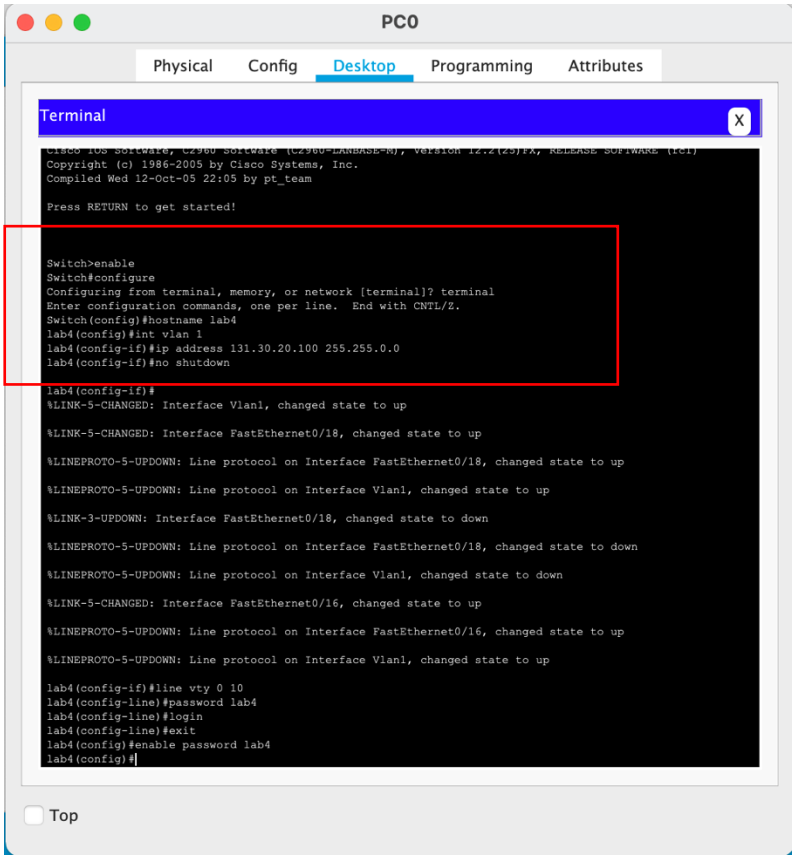


(Packet tracer part)

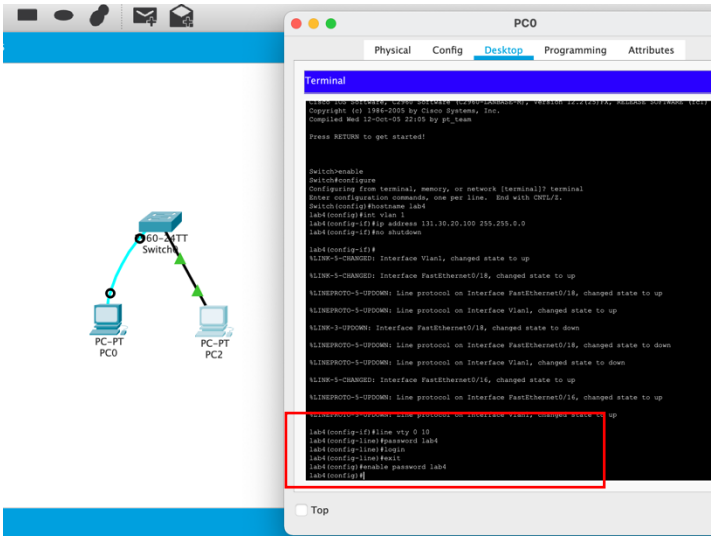
- We access the switch by enable then we use configure the terminal and change the host name by hostname lab4.
- Int clan 1 used to config-if and enter the Ip address.

Step 1- Accessing the switch.

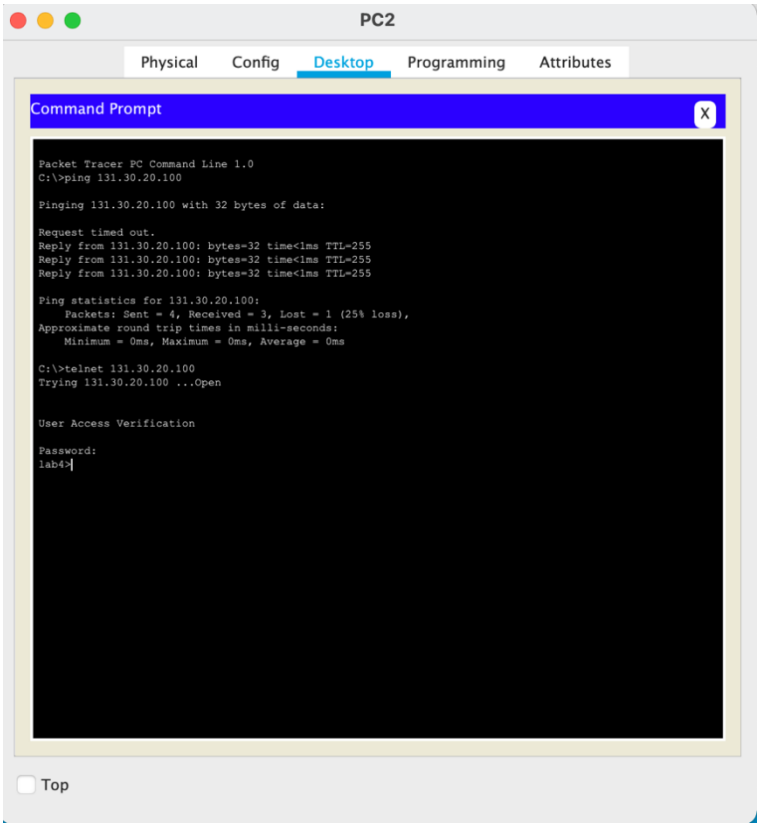




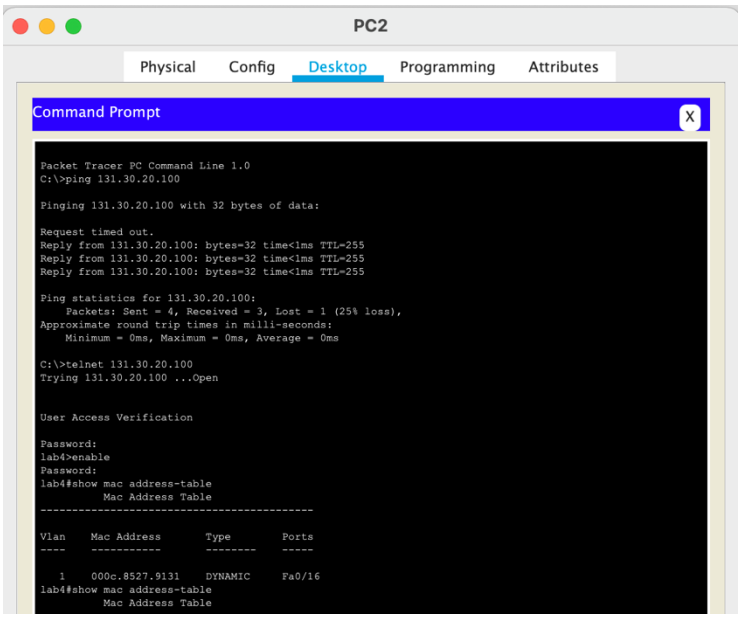
Step 2- Accessing the switch using telnet.



- We add another pc and use. line vet to enter the config-line and login and exit with enable password.

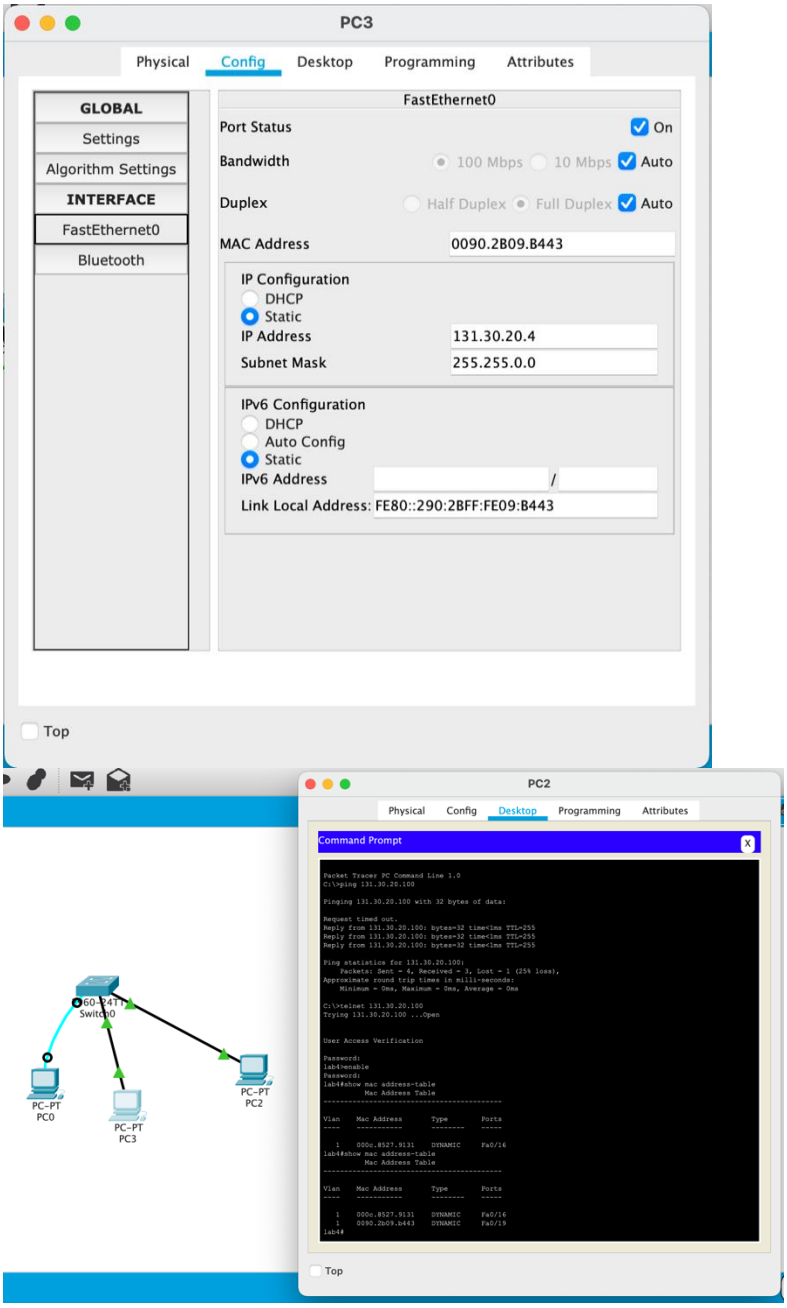


- After adding the new pc, we ping the switch and telnet to access.



- After accessing the telnet, we use show mac address-table to see the pc connected.

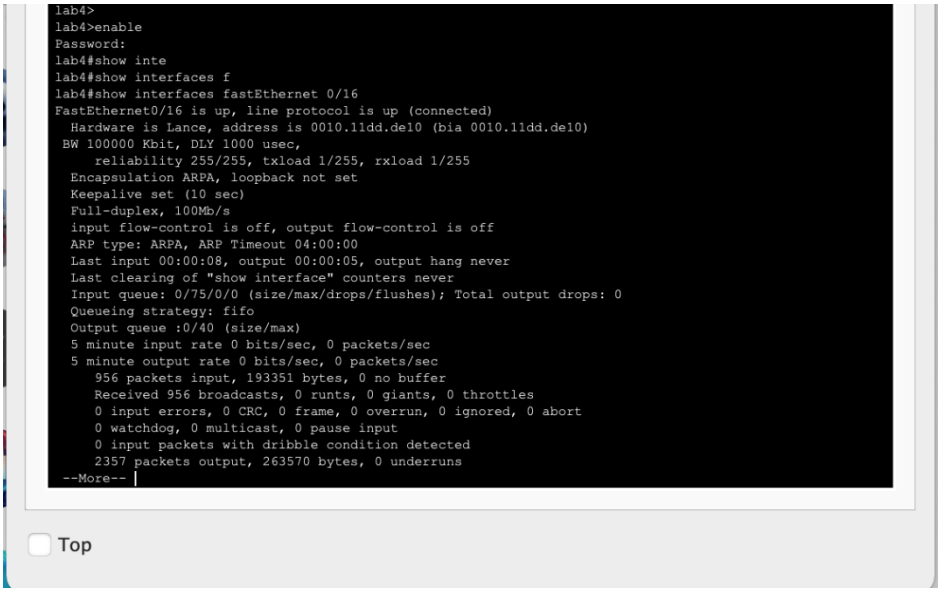
Step 3- Accessing the switch using telnet.

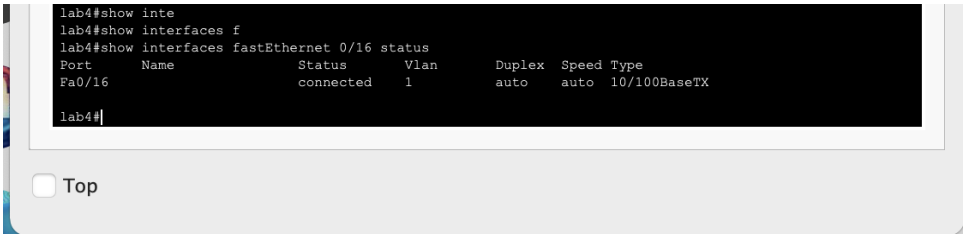


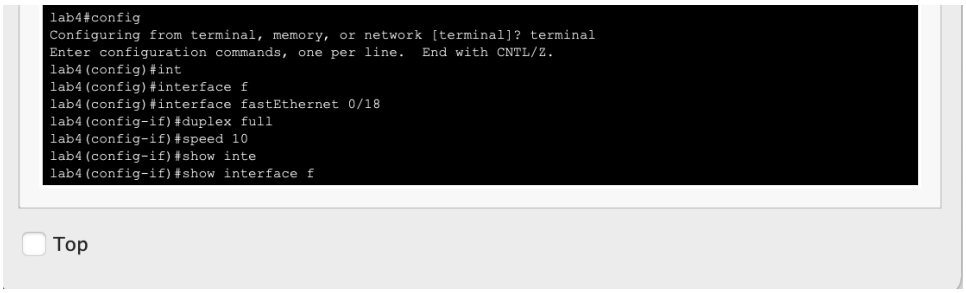
- We add a third pc and ping it the use telnet and show mac address to see the connecting devices.

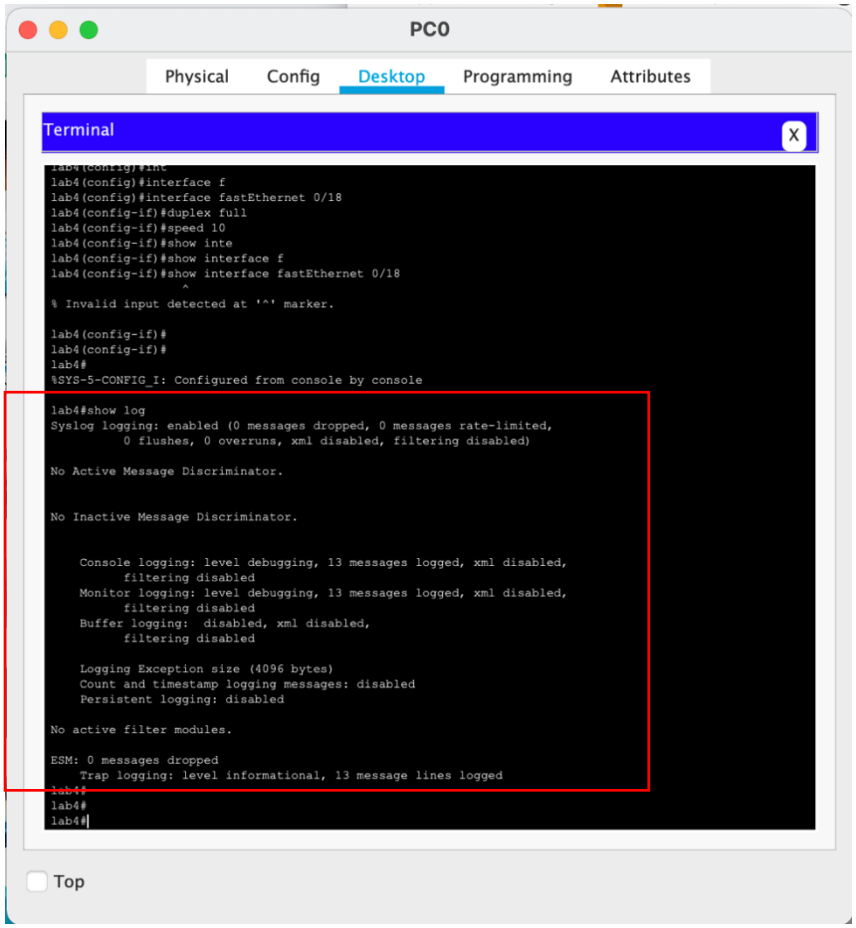
Step 4- configuring the speed and duplex with telnet.

- In this step we use config, interface fast Ethernet 0/16 commands to configure the interface duplex and speed.
- We used the second figure interface fast Ethernet 0/16 status to display the duplex and speed.
- Finally in this step we set the duplex to full and the speed to 10.



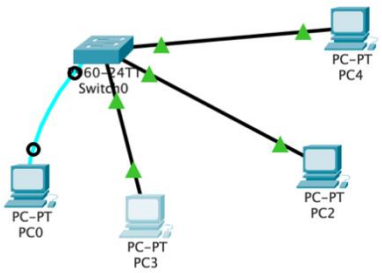




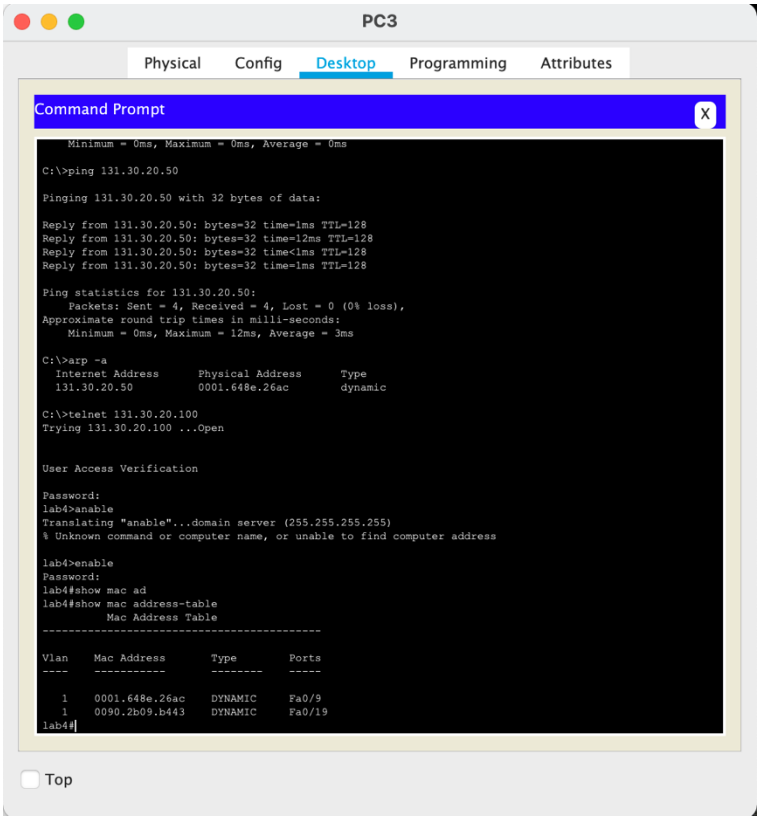


- We used show log to track errors and check the updates.

Step 5- checking interface by pinging another host & Arp.



- We add a 4th pc and ping its Ip address that we set as 131.30.20.50
- We used Arp -a to get the physical address.
- Finally, we used telnet to get the mac address table to check all connected devices.



Conclusion

In this lab, we learned new commands to use. We accessed the switch and did multiple commands on the switch like telnet which is used to configure the IP address to access the network for other machines. We learned how to modify the speed and duplex of ports. We also used the mac address table to see the status and connections of computers. We are using “show interface status” to check status, speed, and duplex of interfaces. We've seen how to map an IP address to a MAC The address and how to disable it.