DHCP CONFIGURATION

AIM

The aim of the experiment is to implement the Dynamic Host Configuration Protocol (DHCP).

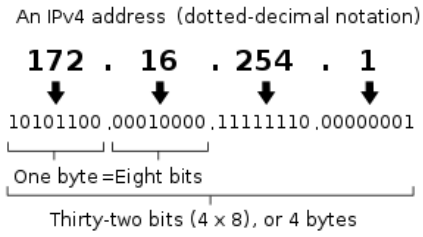
APPARATUS REQUIRED

Cisco Packet Tracer

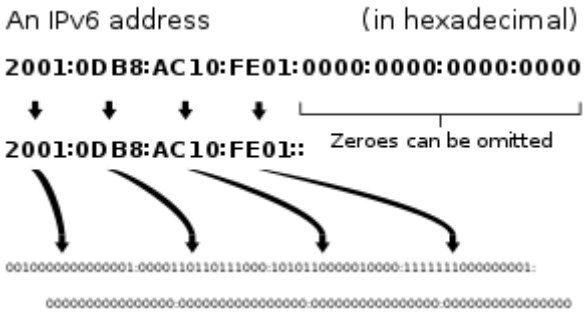
THEORY

An Internet Protocol address (IP address) is a numerical label assigned to each device connected to a computer network that uses the Internet Protocol for communication. An IP address serves two principal functions: host or network interface identification and location addressing. The Internet Corporation for Assigned Names and Numbers (ICANN) is responsible for assigning IP addresses.

Class	Address Range	Supports
Class A	1.0.0.1 to 126.255.255.254	16 million hosts on each of 127 networks.
Class B	128.1.0.1 to 191.255.255.254	65,000 hosts on each of 16,000 networks.
Class C	192.0.1.1 to 223.255.254.254	254 hosts on each of 2 million networks.
Class D	224.0.0.0 to 239.255.255.255	Reserved for multicast groups.
Class E	240.0.0.0 to 254.255.255.254	For future use, Research and Development.



IPv6 addresses are 128 bits in length and are made up of hexadecimal characters.

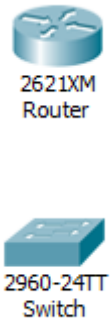


The Dynamic Host Configuration Protocol (DHCP) is a network management protocol used on TCP/IP networks whereby a DHCP server dynamically assigns an IP address and other network configuration parameters to each device on a network so they can communicate with other IP networks. A DHCP server enables computers to request IP addresses and networking parameters automatically from the Internet service provider (ISP), reducing the need for a network administrator or a user to manually assign IP addresses to all network devices. In the absence of a DHCP server, a computer or other device on the network needs to be manually assigned an IP address. DHCP can be implemented on networks ranging in size from home networks to large campus networks and regional Internet service provider networks. A router or a residential gateway can be enabled to act as a DHCP server. Most residential network routers receive a globally unique IP address within the ISP network. Within a local network, a DHCP server assigns a local IP address to each device connected to the network.

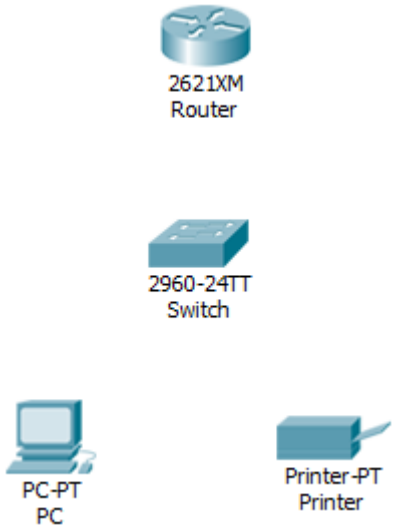
PROCEDURE

1. Press Ctrl+Alt+R to display the Routers panel and place the 2621XM router as shown by dragging it from the panel and dropping it onto the window.

2. Press Ctrl+Alt+S to display the Switches panel and place the 2660-24TT switch below the Router by dragging it from the panel and dropping it onto the window as shown.

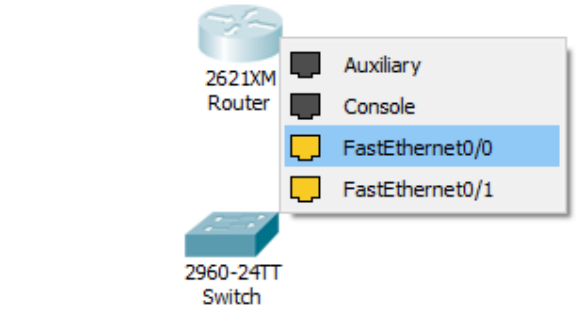


3. Press Ctrl+Alt+V to display the End Devices panel and place the Generic PC and Generic Printer as shown.

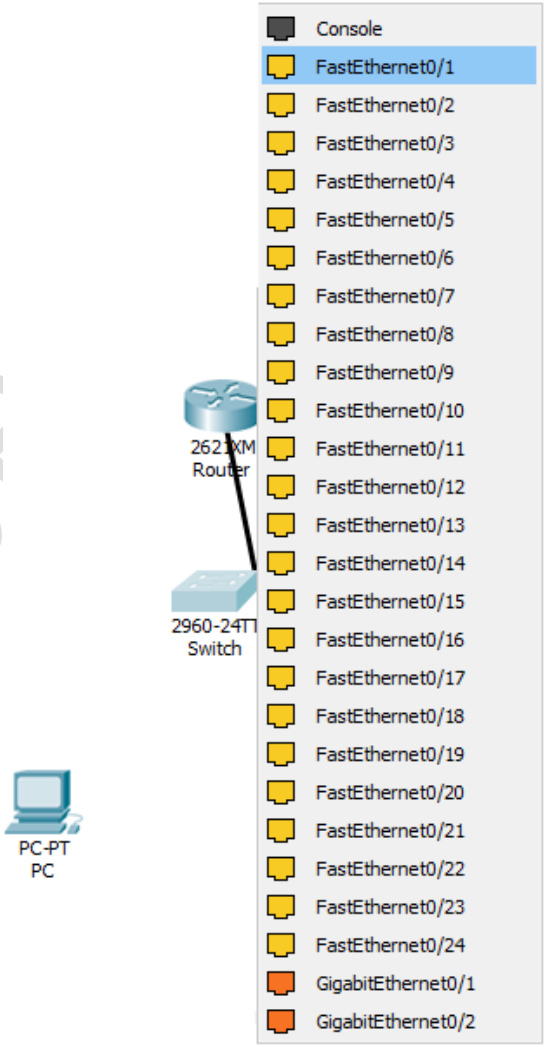


4. Press Ctrl+Alt+O to display the connections panel and select the Copper Straight-Through cable.

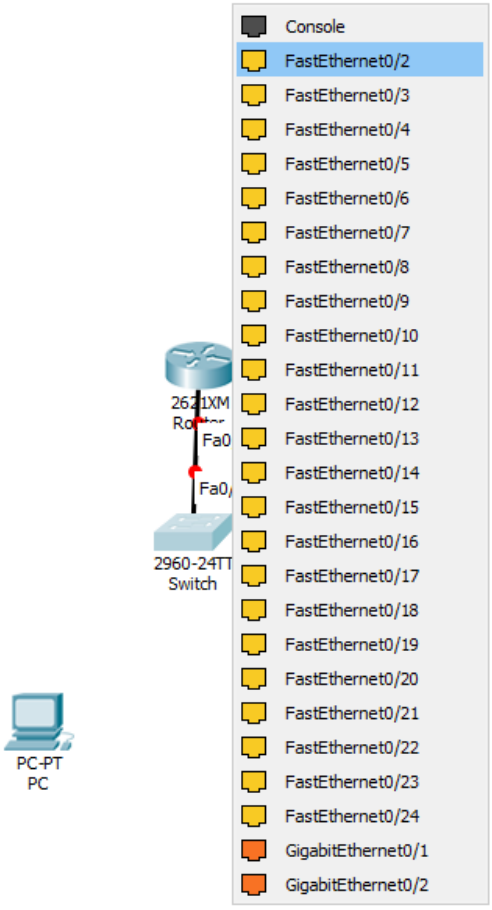
5. Click on the Router and select the FastEthernet0/0 interface.



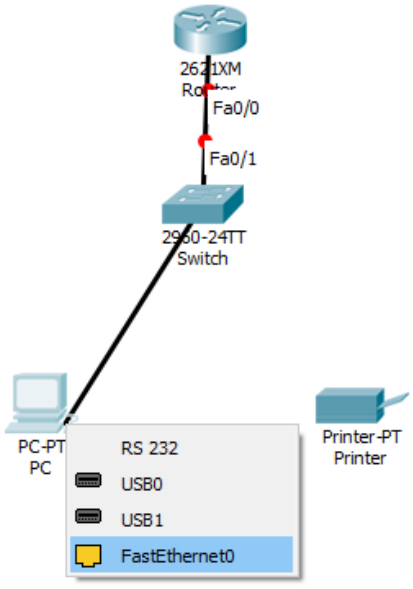
6. Then click on the Switch and select the FastEthernet0/1 interface to complete the connection between the Router and Switch.



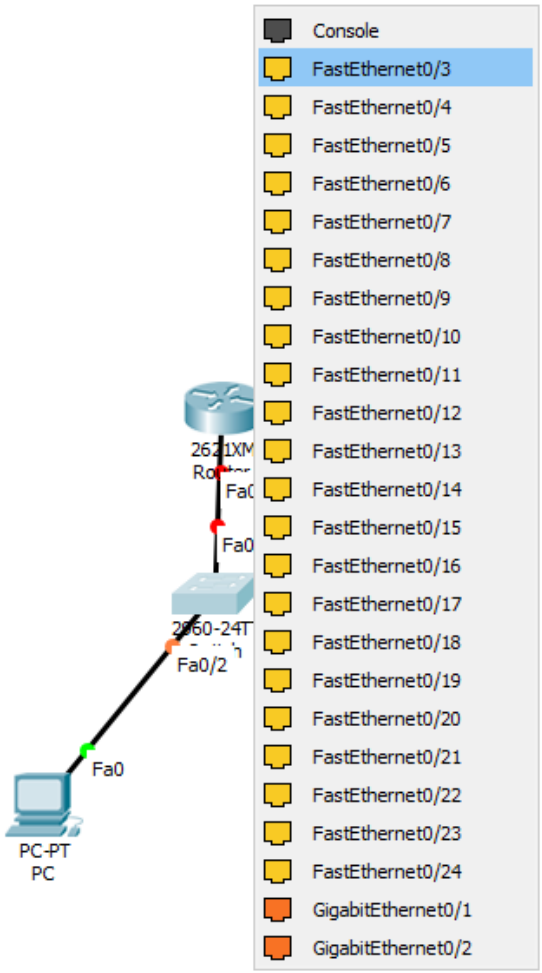
7. Select the copper straight- through cable, then click on the Switch again and select the FastEthernet0/2 interface.



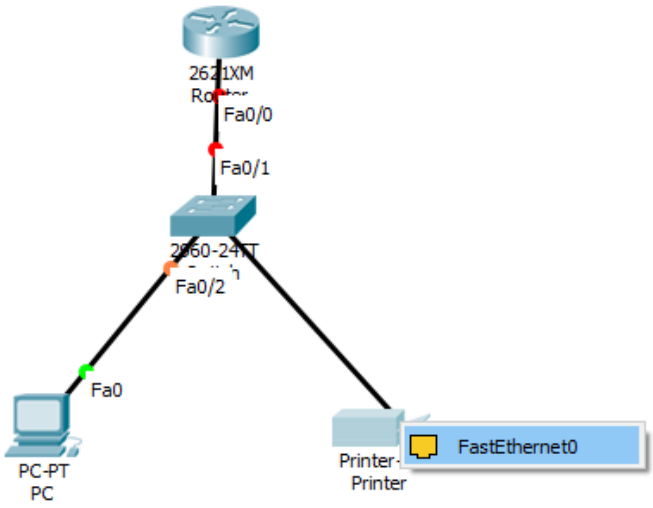
8. Next, click on the PC and select the FastEthernet0 interface to complete the connection between the Switch and PC.



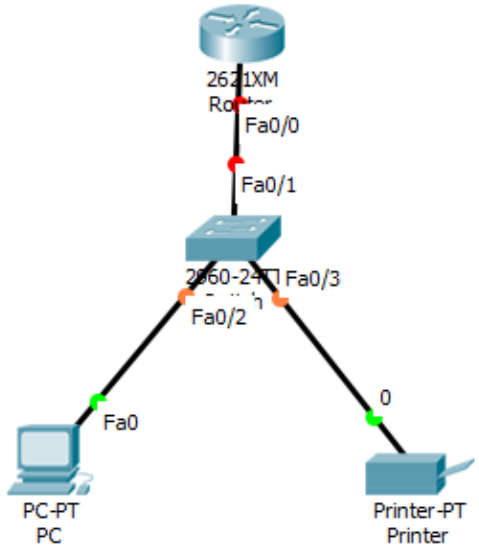
9. Select the copper straight- through cable again, then click on the Switch once more and select the FastEthernet0/3 interface.



10. Next, click on the Printer and select the FastEthernet0 interface to complete the connection between the Switch and Printer.



11. Verify all connections are made.



12. Click on the 2621XM Router and select the CLI (Command Line Interface) tab and enter the following commands. Type “no” or “n” when asked if you would like to enter the initial configuration dialog and press Enter twice.

```
--- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/
no]: no
```

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 192.168.10.1 255.255.255.0

Router(config-if)#no shutdown

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

Router(config-if)#exit

Router(config)#service dhcp

Router(config)#ip dhcp pool DHCP-ROUTER

Router(dhcp-config)#network 192.168.10.0 255.255.255.0

Router(dhcp-config)#default-router 192.168.10.1

Router(dhcp-config)#exit

Router(config)#ip dhcp excluded-address 192.168.10.1 192.168.10.10

Router(config)#exit

Router#

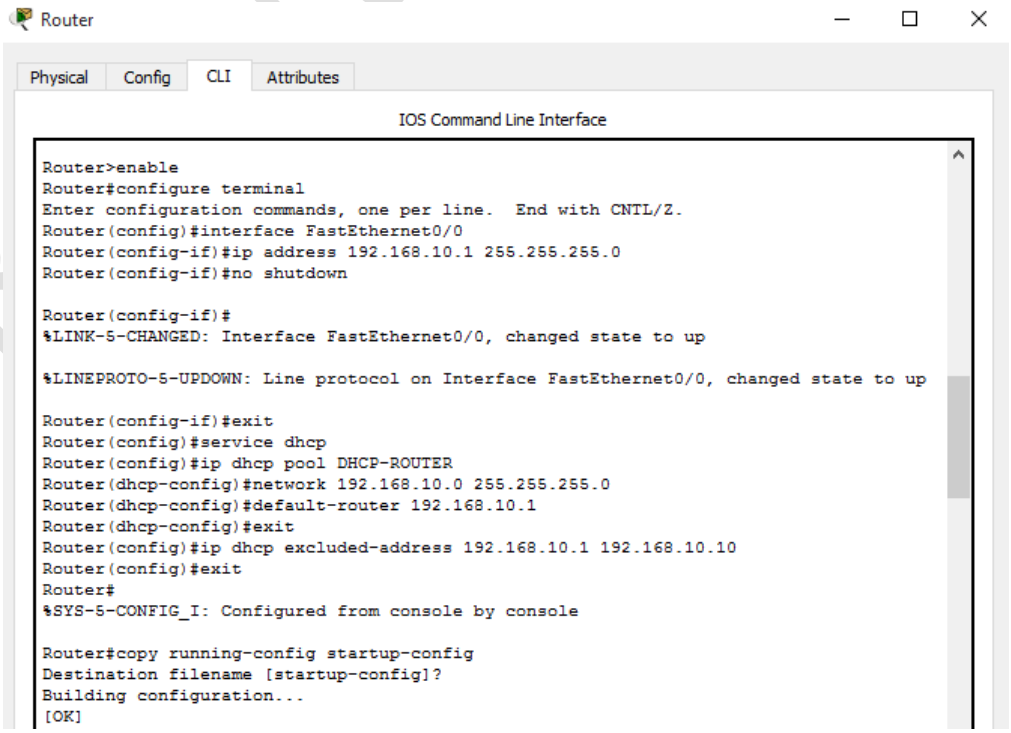
%SYS-5-CONFIG_I: Configured from console by console

Router#copy running-config startup-config

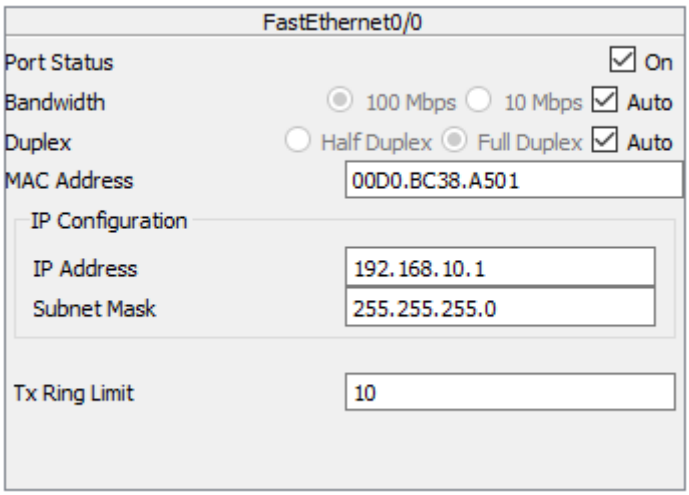
Destination filename [startup-config]?

Building configuration...

[OK]



13. Click on the Router and select the “Config” tab. Under the FastEthernet0/0 Interface tab, verify the configuration settings.



14. Check the Router’s Configuration settings via the Command Line Interface.

    Router>enable

    Router#show running-config

    Building configuration...

    Current configuration : 640 bytes

    !

    version 12.2

    no service timestamps log datetime msec

    no service timestamps debug datetime msec

    no service password-encryption

    !

    hostname Router

    !

    !

    !

!

ip dhcp excluded-address 192.168.10.1 192.168.10.10

!

ip dhcp pool DHCP-ROUTER

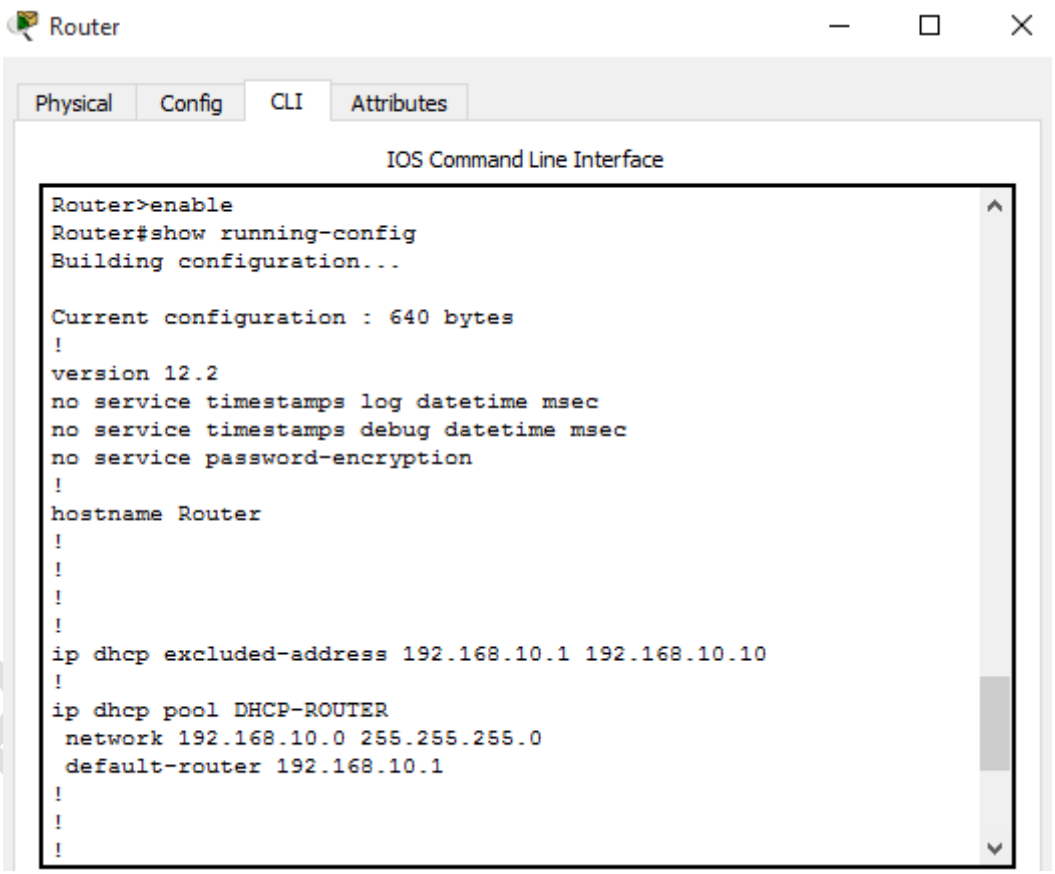
 network 192.168.10.0 255.255.255.0

 default-router 192.168.10.1

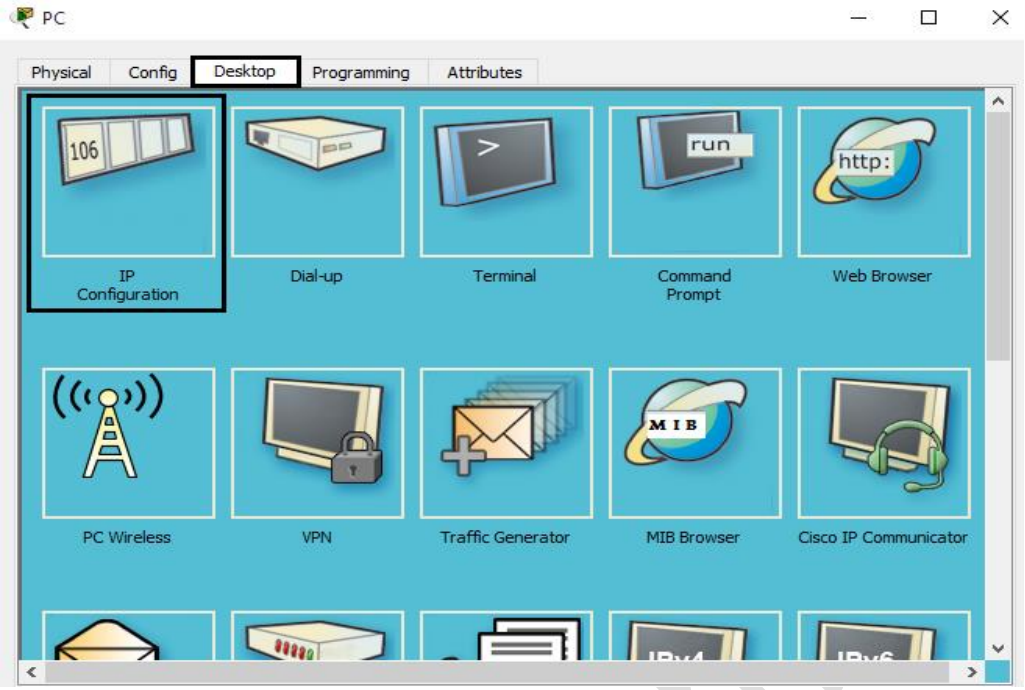
!

!

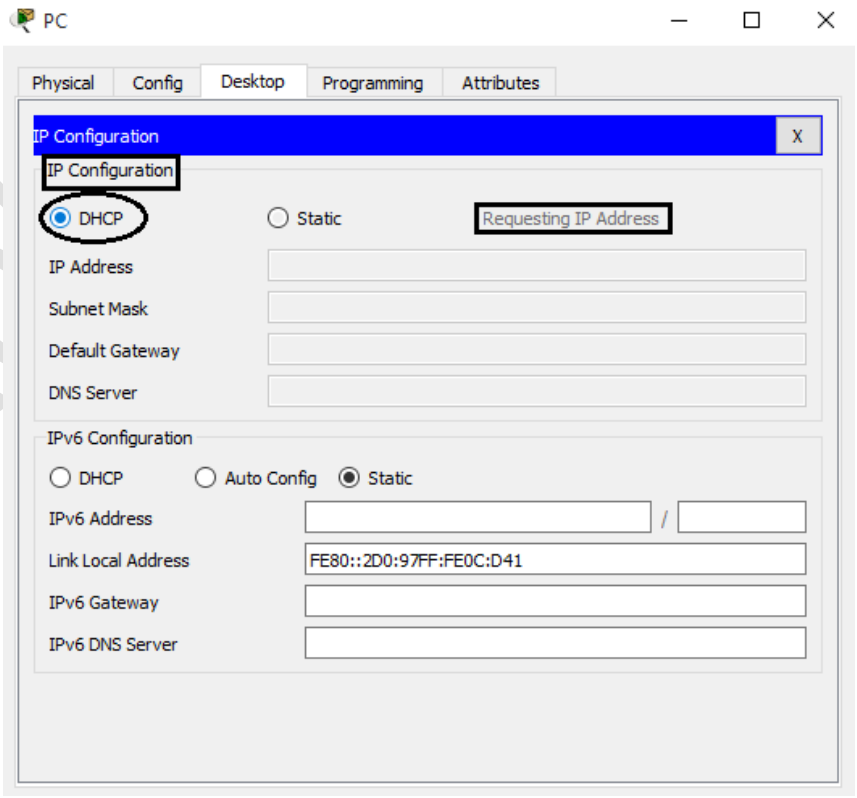
!

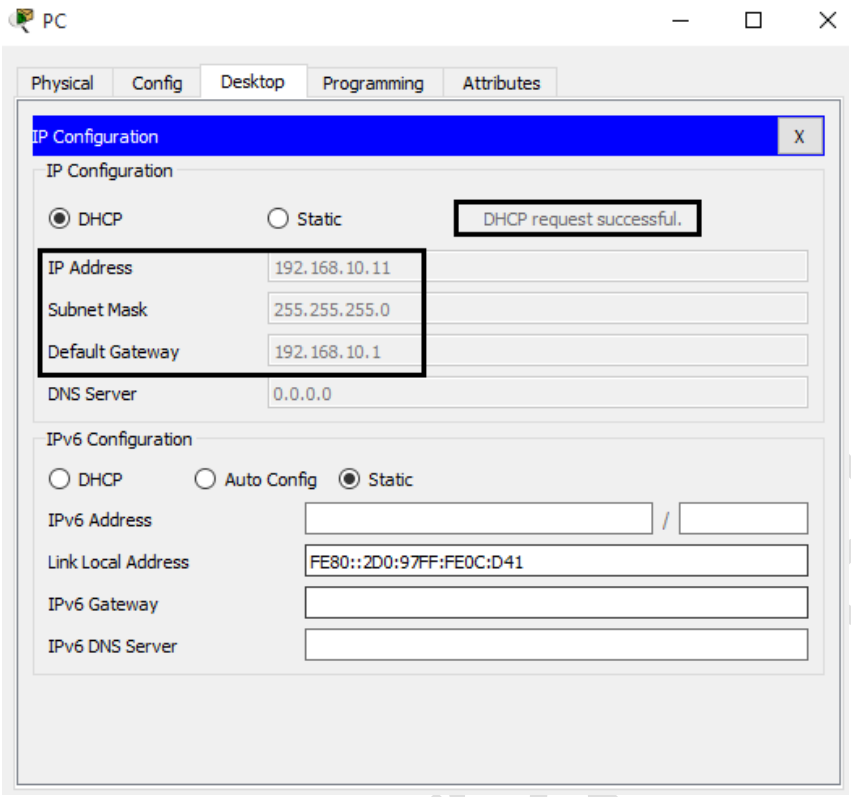


15. Click on the PC and under the Desktop tab select the IP Configuration.

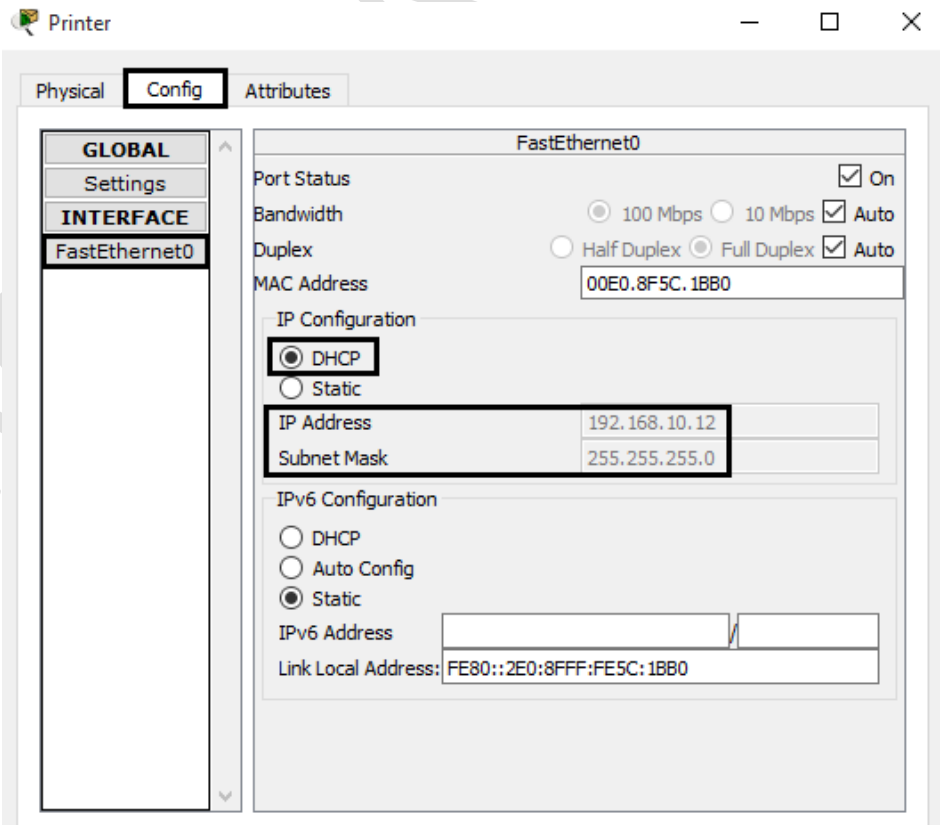


16. In the IP Configuration of the PC, select the DHCP radio button and wait for the PC to complete the request for its IP address from the DHCP Router. Notice that the ip addresses ranging from 192.168.10.1 to 192.168.10.10 are excluded as per the given commands in step 12.

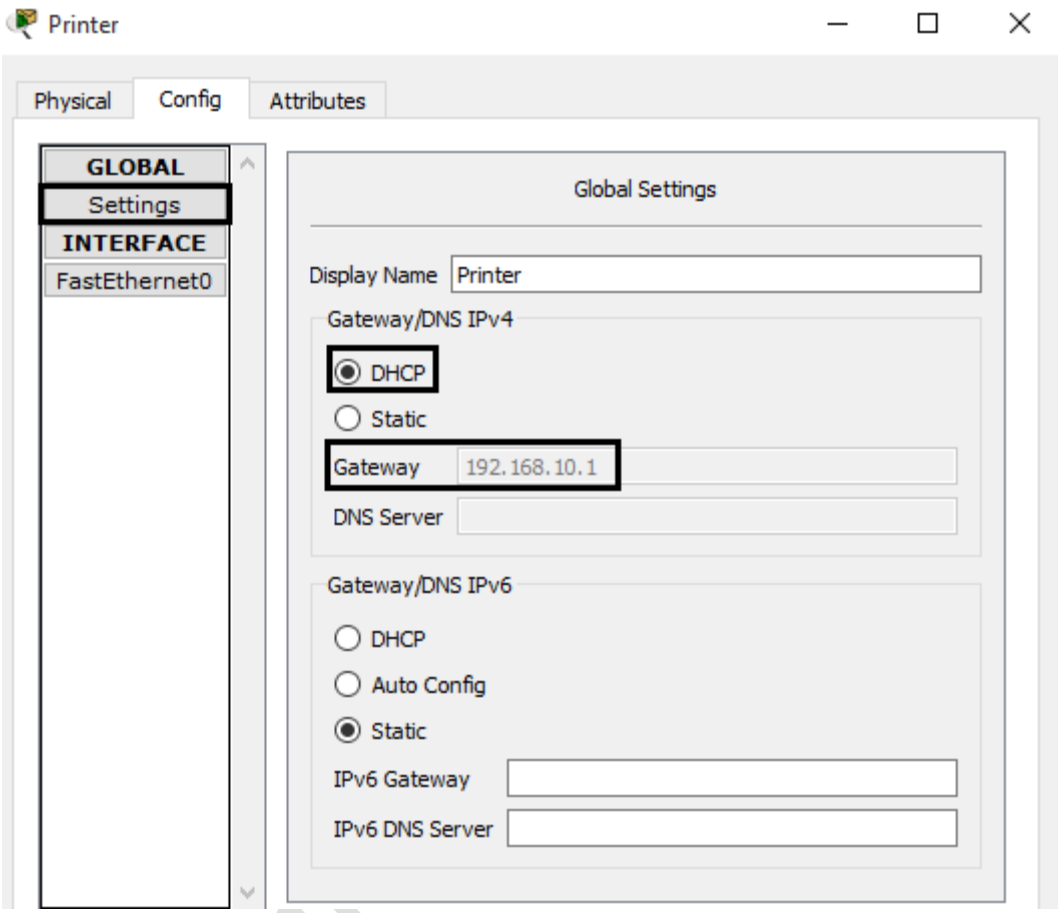




17. Click on the Printer and under the Config tab, select the FastEthernet0 Interface Settings. Click on the DHCP Radio Button and wait for the IP Address to be assigned.



18. Under the Printer's Global Settings verify the Gateway that is the IP Address of the Router.



19. Click on the Router and in the Command Line Interface ping the Router with the IP Address of the PC (192.168.10.11) and the Printer (192.168.10.12) to test the connectivity.

Router>enable

Router#ping 192.168.10.11

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 192.168.10.11, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

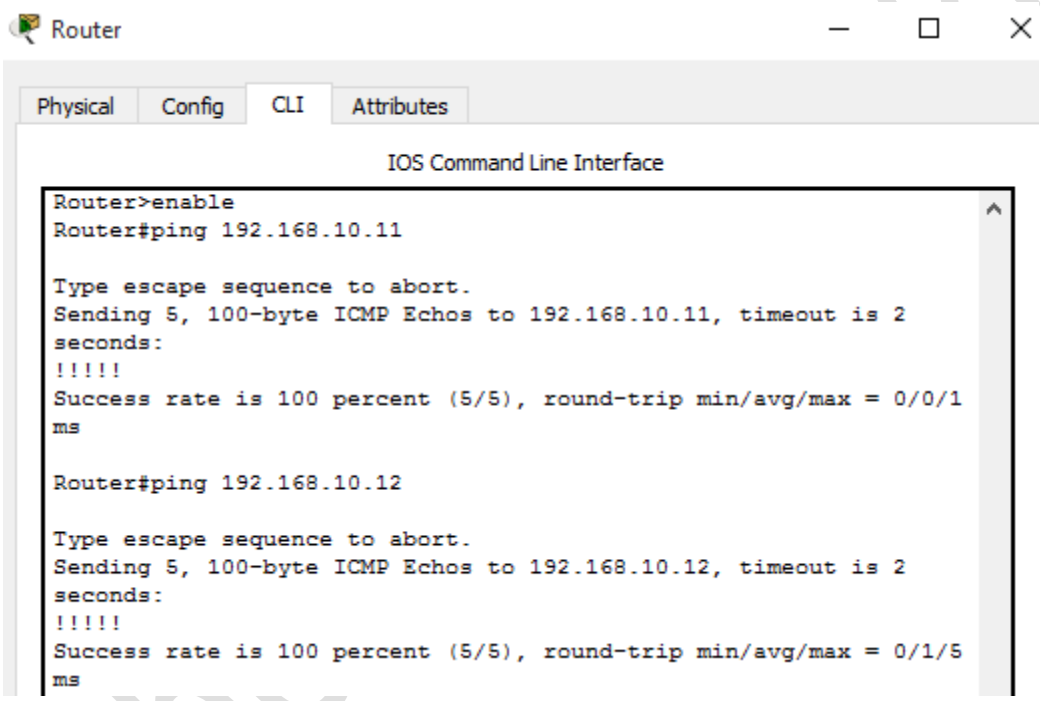
Router#ping 192.168.10.12

Type escape sequence to abort.

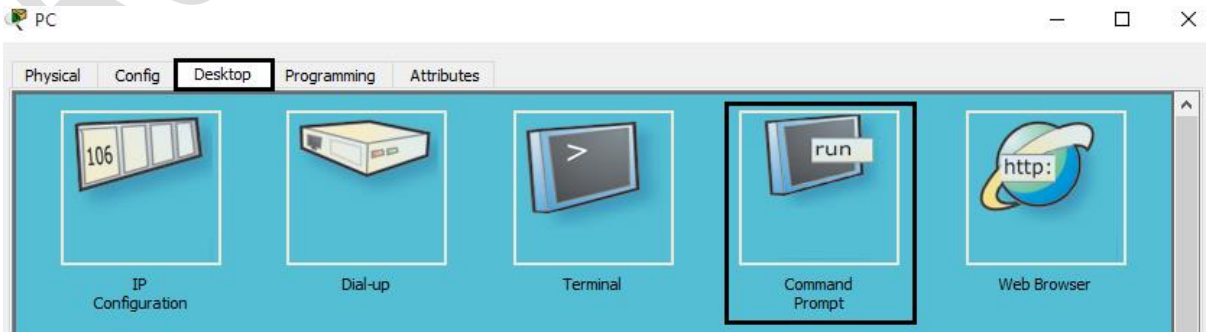
Sending 5, 100-byte ICMP Echos to 192.168.10.12, timeout is 2 seconds:

!!!!!

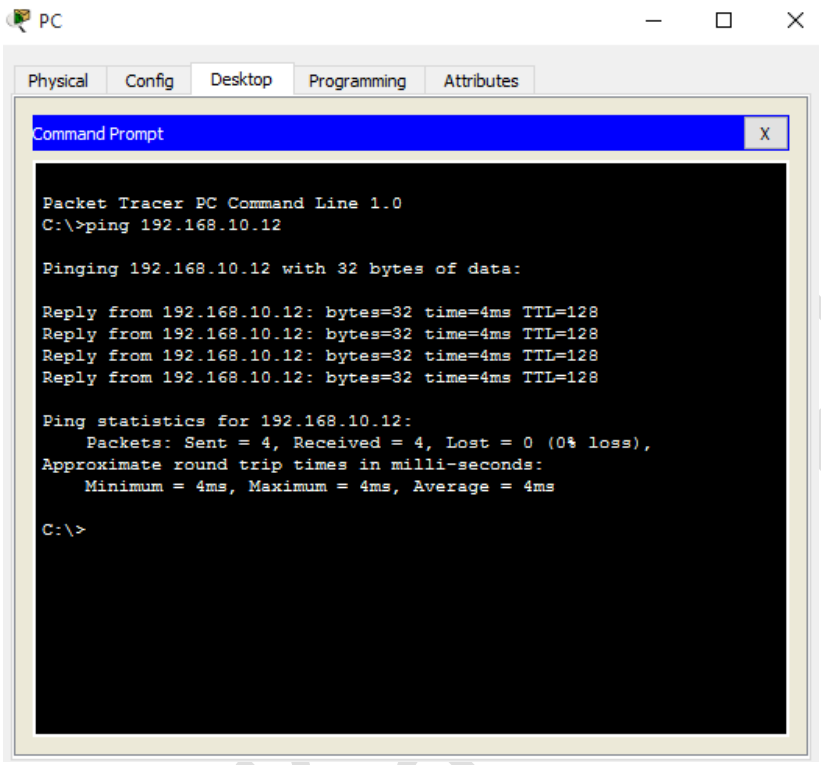
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/1/5 ms



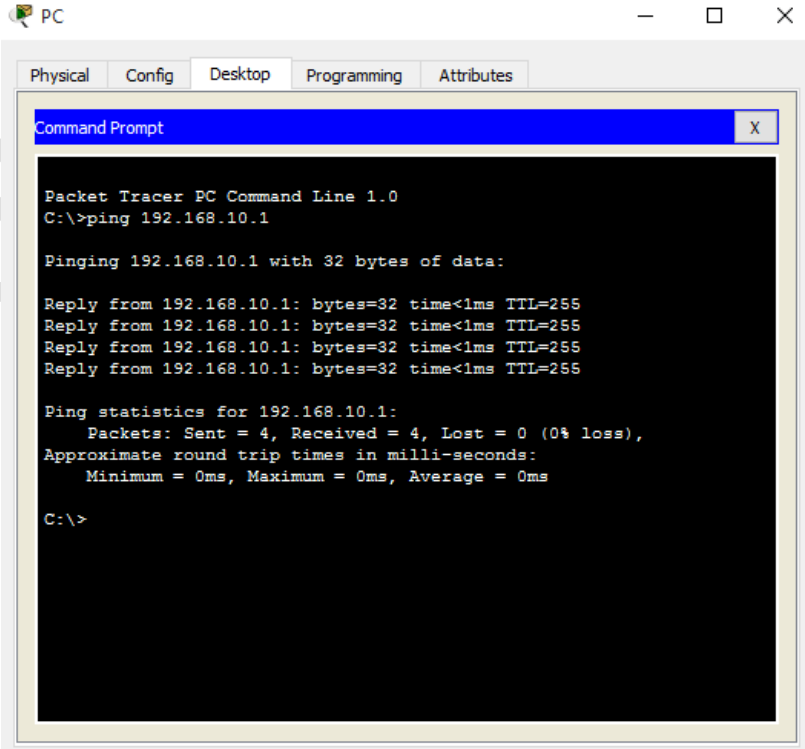
20. Click on the PC and under the Desktop tab select the Command Prompt



21. Perform a ping command to check the connection between the PC and printer by pinging the PC with the DHCP given address of the Printer (192.168.10.12).



22. Perform a ping command to check the connection between the PC and Router by pinging it with the Router's IP Address (192.168.10.1).



23. Send a Protocol Data Unit(PDU) from a selected device to the other to test the connection by clicking on “Add Simple PDU” or pressing “P” then clicking on the first device followed by clicking on the next device. Press Ctrl+Shift+O to toggle the PDU list window and view the Fire Status.

PDU List Window

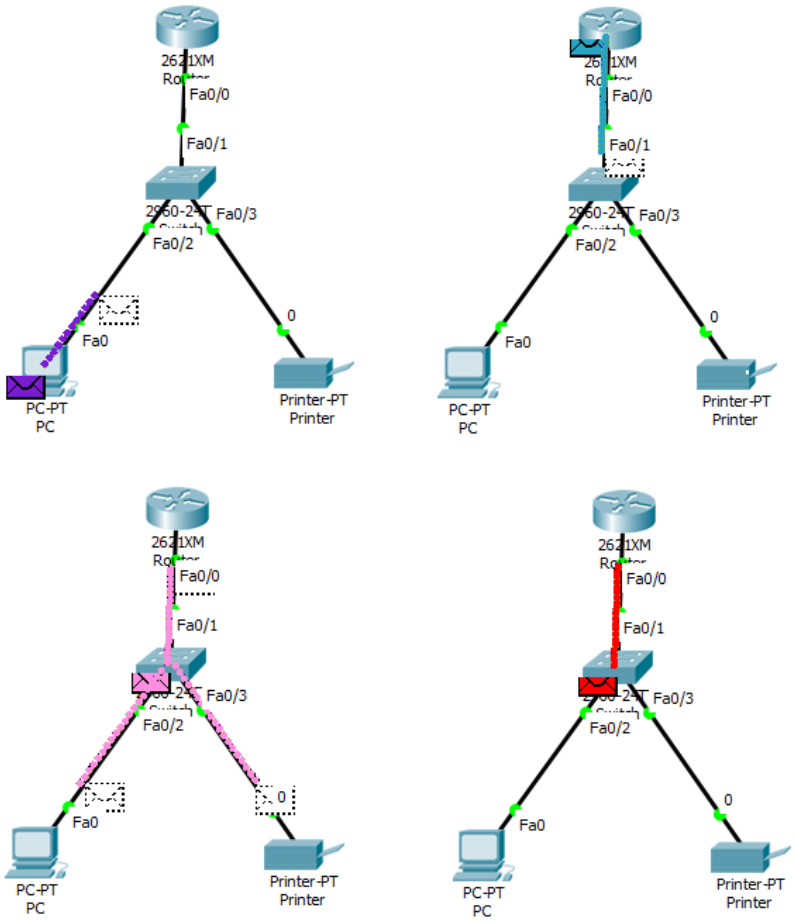
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC	Printer	ICMP		0.000	N	0	(edit)	(delete)
	Successful	Printer	PC	ICMP		0.000	N	1	(edit)	(delete)
	Successful	PC	Router	ICMP		0.000	N	2	(edit)	(delete)
	Successful	Printer	Router	ICMP		0.000	N	3	(edit)	(delete)
	Successful	Router	PC	ICMP		0.000	N	4	(edit)	(delete)
	Successful	Router	Printer	ICMP		0.000	N	5	(edit)	(delete)

24. Press Ctrl+Shift+D to Delete the Scenario and all PDUs. Press Shift+S to enter into the Simulation Mode. Press “P” to Add a Simple PDU. Click on the PC then click on the Printer. Press Alt+C or on the Simulation Panel under the Play Controls click on the Capture/Forward button multiple times and observe successful implementation of different network protocols such as ICMP (Internet Control Message Protocol), STP (Spanning Tree Protocol), DTP (Dynamic Trunking Protocol), CDP (Cisco) etc. under the Event List on the Type Column.

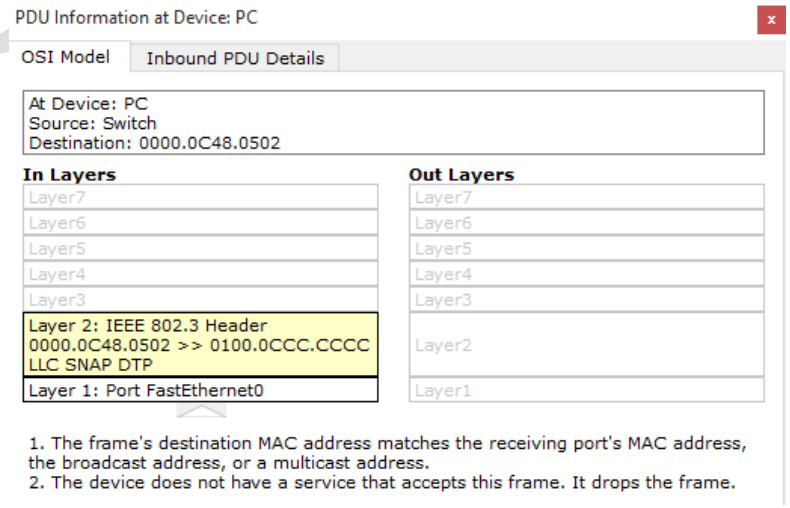
Simulation Panel

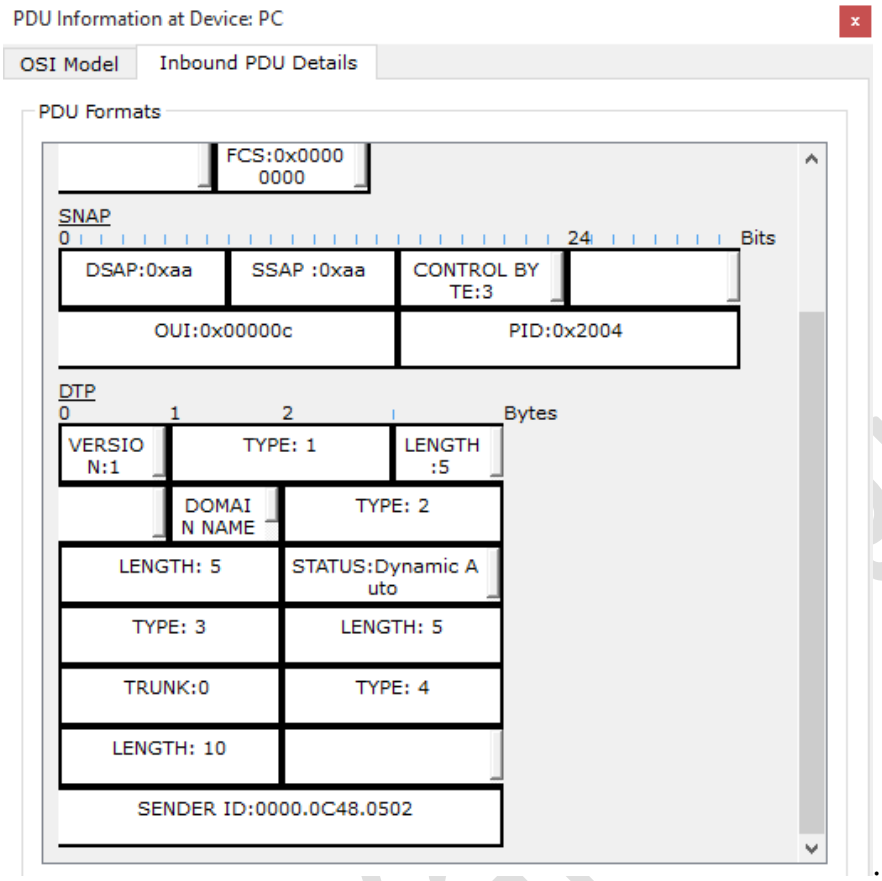
Event List

Vis.	Time(sec)	Last Device	At Device	Type	Info
	25.191	Switch	Router	CDP	
	25.191	Switch	PC	CDP	
	25.191	Switch	Printer	CDP	
	25.448	--	Switch	DTP	
	25.449	Switch	Router	DTP	
	26.588	--	Switch	STP	
	26.589	Switch	PC	STP	
	26.589	Switch	Printer	STP	
	26.589	Switch	Router	STP	

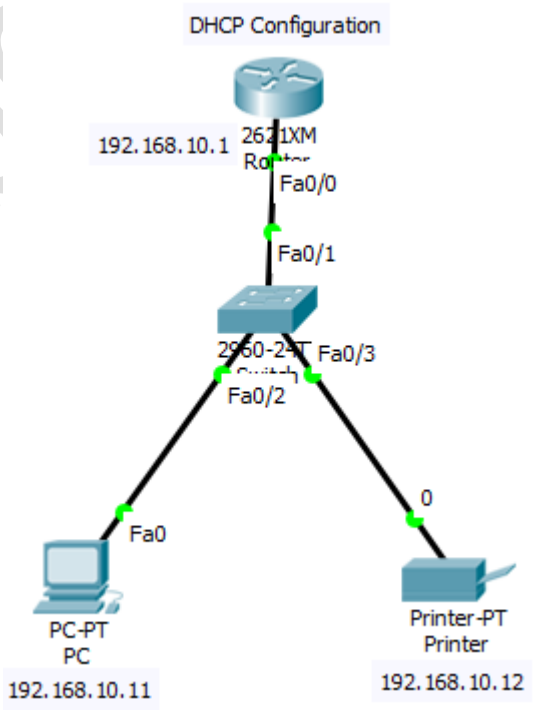


25. Observe the PDU Information at the Device by clicking on the event in the Event List. Under the OSI Model Tab view the “In Layers” model. Click on the Next Layer Button to observe the processes taking place at each layer of an event. Under the Inbound PDU Details tab you may observe the PDU Formats.





SAMPLE OUTPUT



RESULT

Thus, the experiment to implement the Dynamic Host Configuration Protocol (DHCP) was executed successfully and the output is verified.