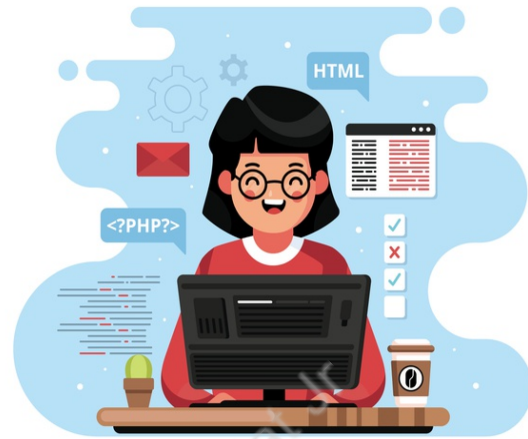


Working with Router



What is our GOAL for this MODULE?

The goal of this module is to learn about the working of the router and how to connect multiple local area networks using router.

What did we ACHIEVE in the class TODAY?

We connected multiple local area networks using a router.

Which CONCEPTS/CODING BLOCKS did we cover today?

- We learned about the working of router
- We learned about the default gateway.
- We also created a Wide area network.

How did we DO the activities?

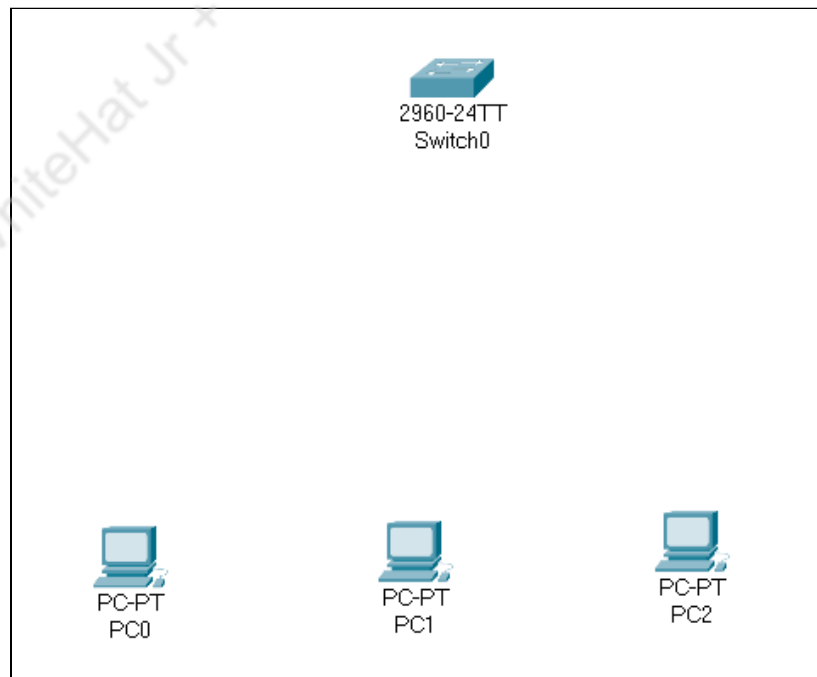
1. What is a router?

Router is a device which connects Multiple Local Area Networks. It helps us to connect with a server which is present in a different country

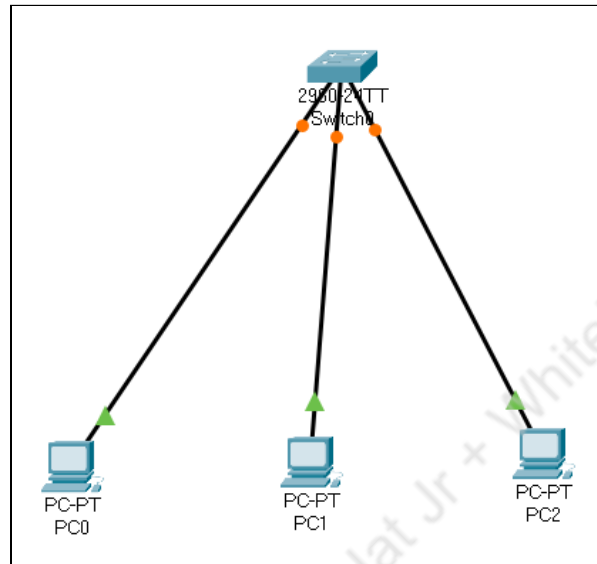


2. Open Cisco packet tracer software and create the Local Area Network

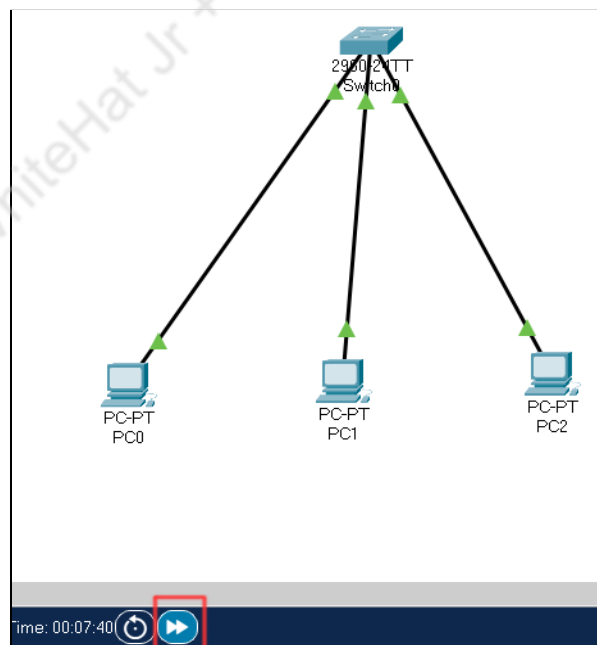
- Drag and drop 3 computers and a switch on the canvas



- Connect them with each other through automatic selection. This will choose the best cable according to the device and connect it to the appropriate port. (fast Ethernet port)



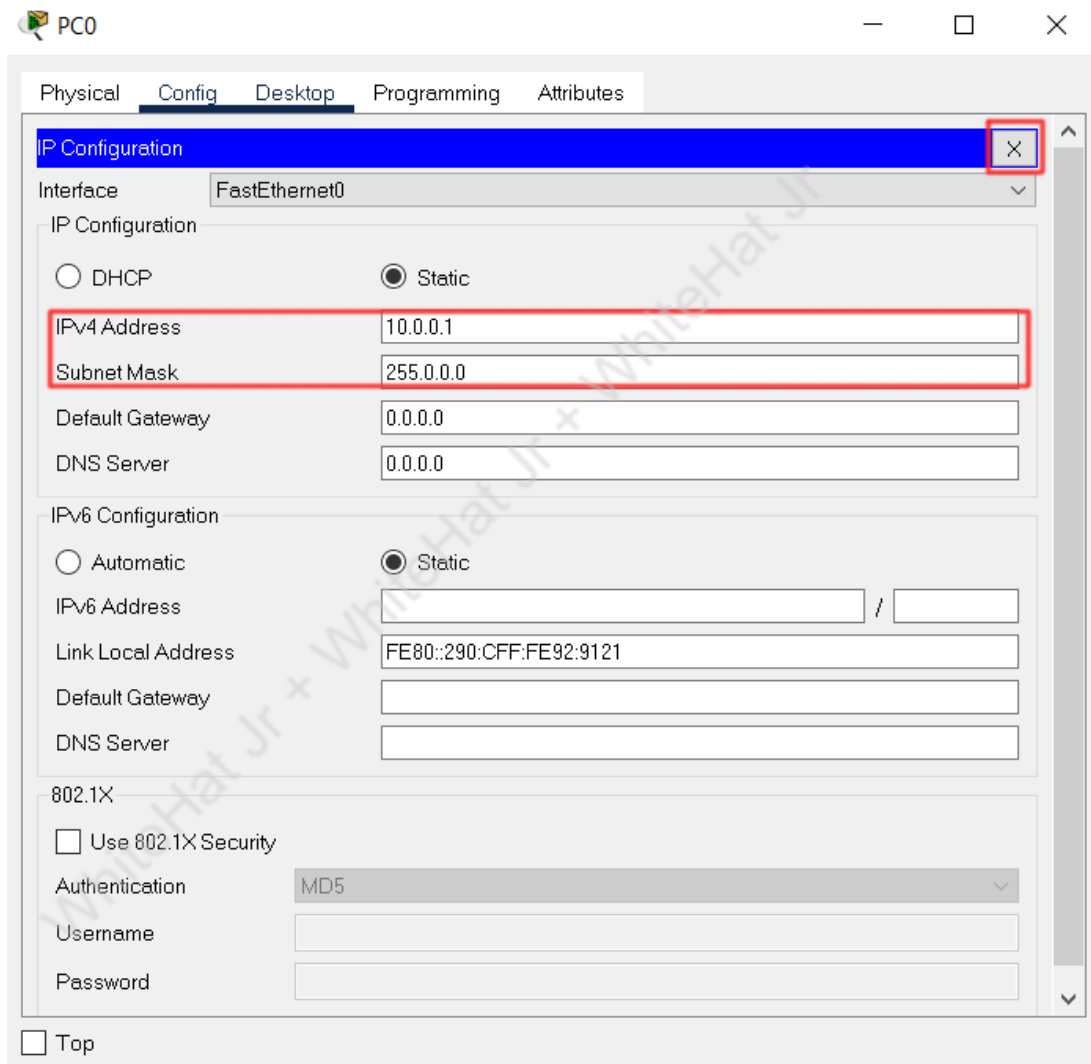
- Switch takes some time to set up. Skip that waiting time by clicking on the fast forward button



We have established a successful connection here

- Assign IP addresses to all the 3 computers.

IP address for the computers on this network are going to be in order of 10.0.0.1 upto 10.0.0.3



PC0

Physical Config Desktop Programming Attributes

IP Configuration

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 10.0.0.1

Subnet Mask 255.0.0.0

Default Gateway 0.0.0.0

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::290:CFF:FE92:9121

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

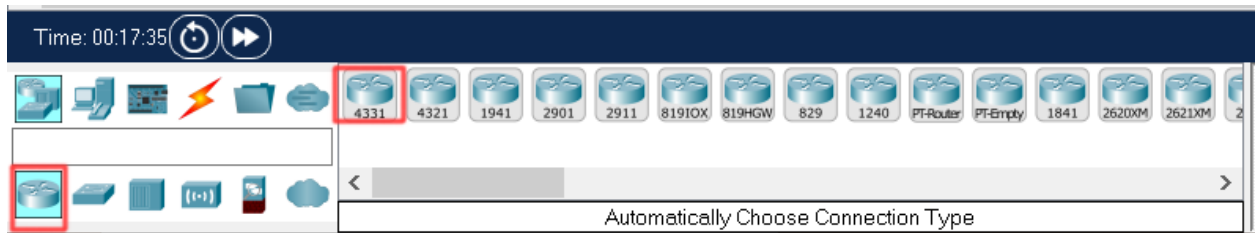
Authentication MD5

Username

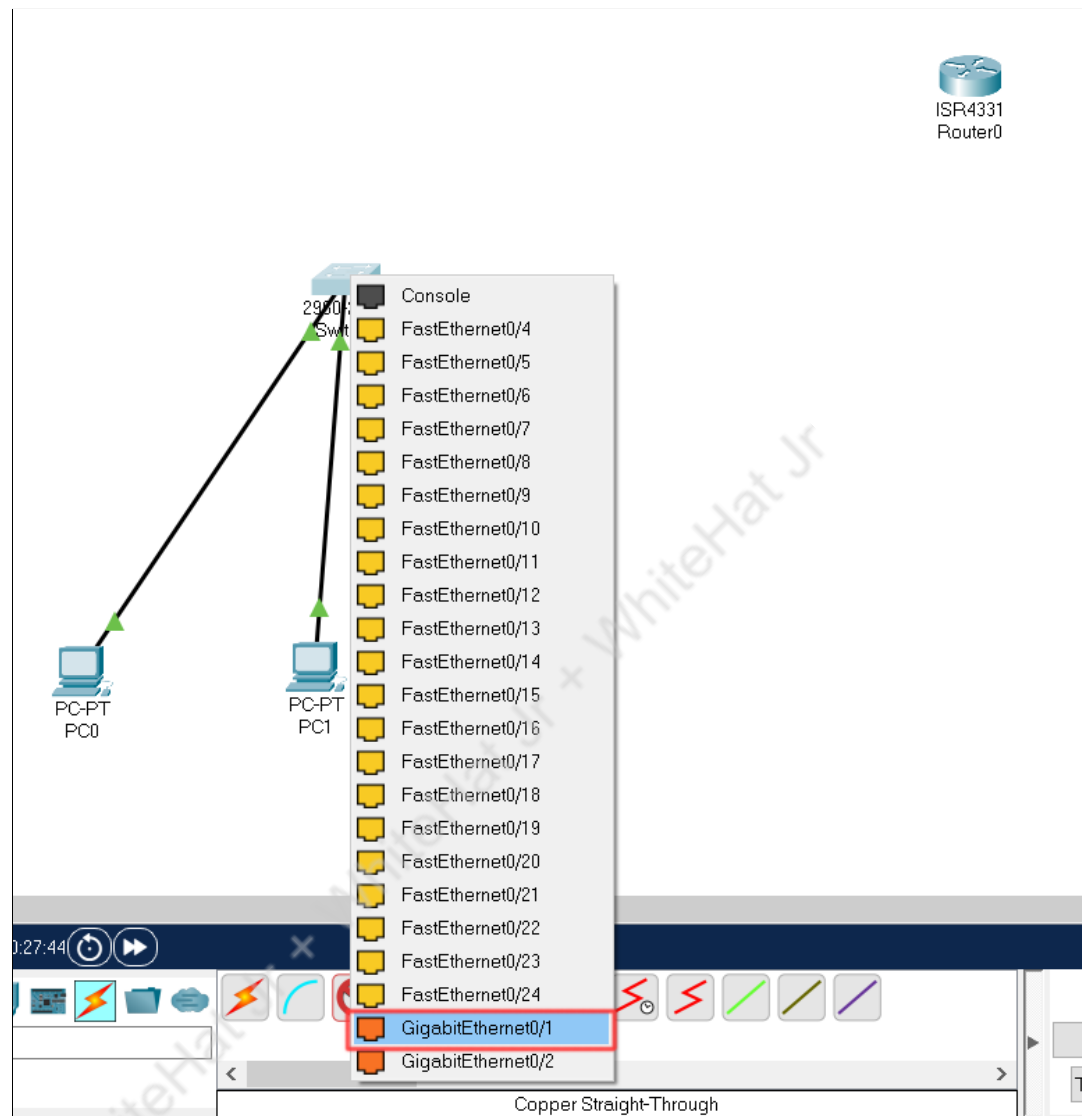
Password

Top

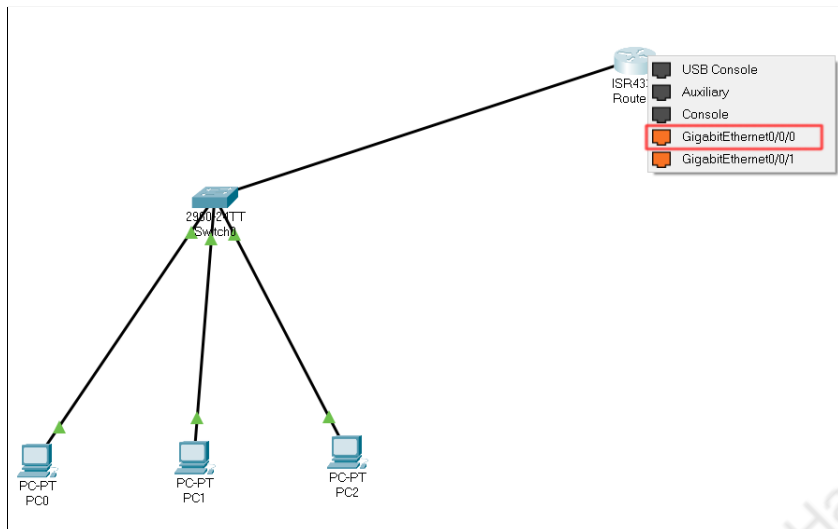
4. Then drag and drop the router. Select the first one from the list of routers available.



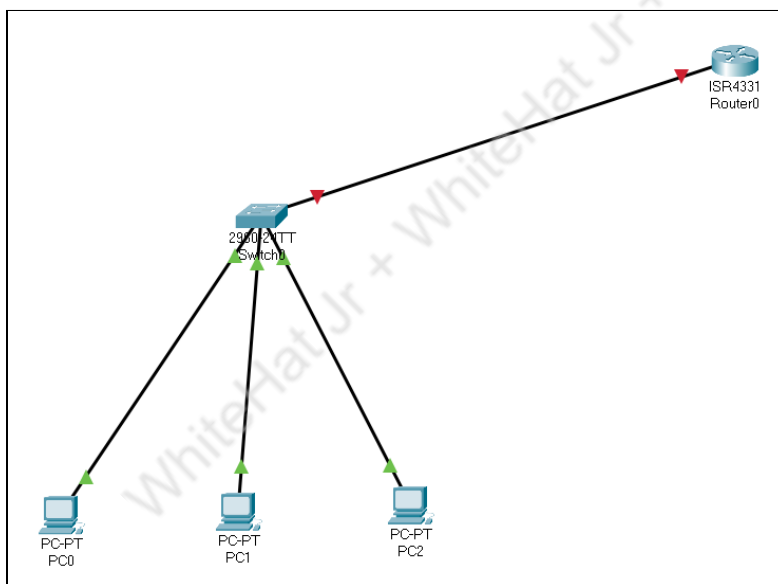
5. Connect the 2 devices using the copper straight through cable and click on the switch. Select the Gigabit port.



Port/Parameters	Fast Ethernet Port	Gigabit Ethernet port.
Speed of data transmission	100MBPS	1000MBPS
Range	Transmits data over long range(upto 70 km).	Transmits data over short distances(upto 10 Km)

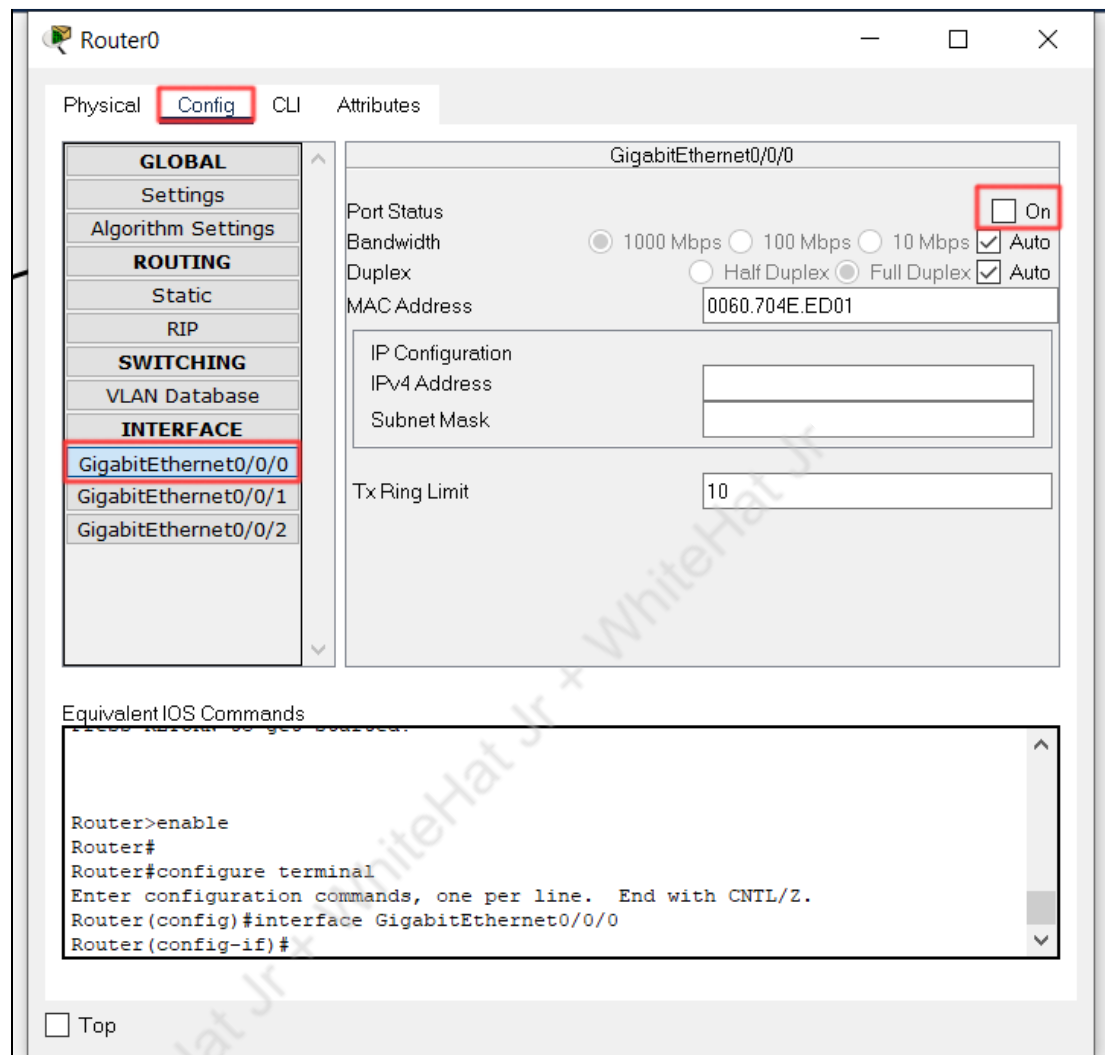


6. Connection is established but there are red lines indicating improper connection.



7. Steps to bring the router online

- Turn the router ON
 - Double click on the router and go to the config tab and then in the bottom left select the gigabit 0 port. Here you have the option to turn it on.

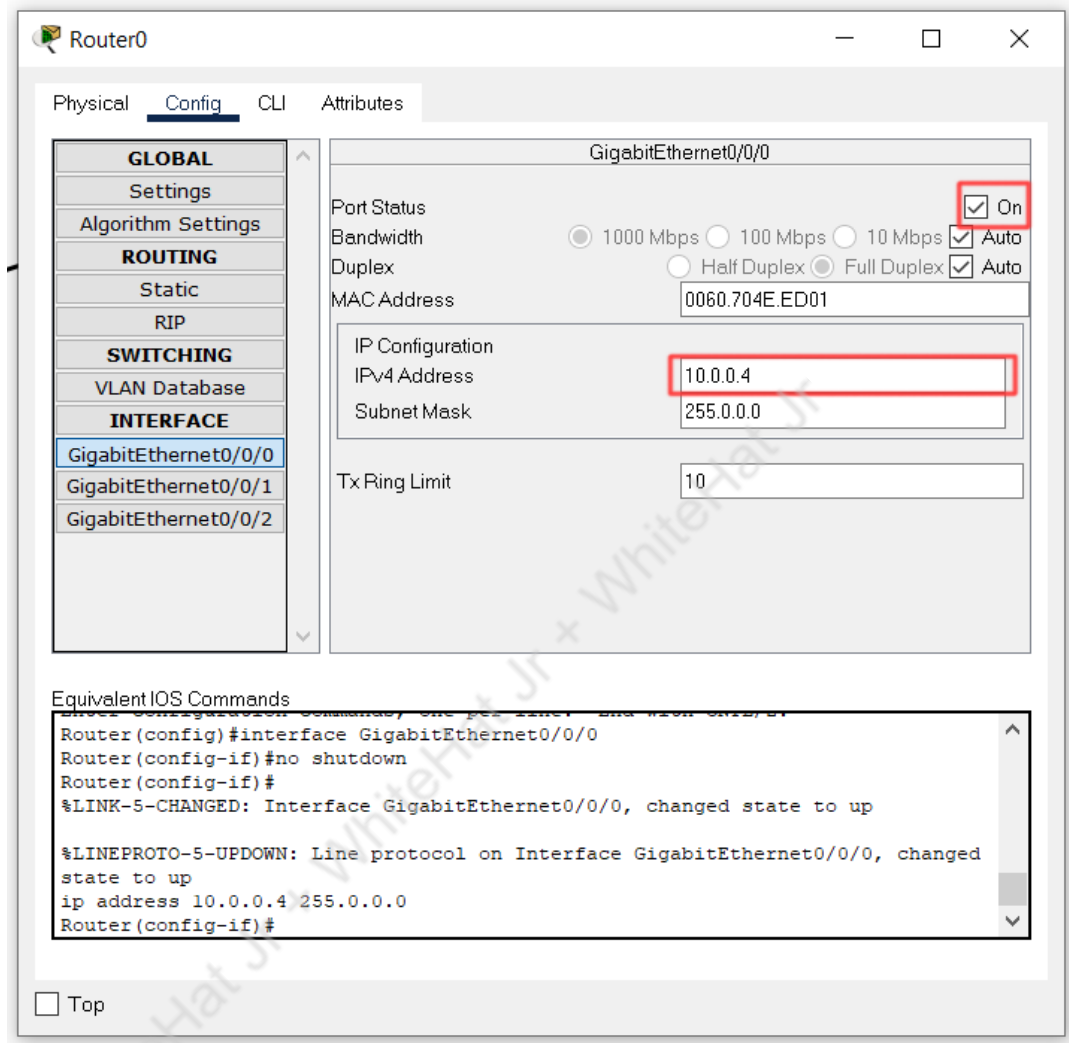


The screenshot shows the configuration window for Router0. The 'Config' tab is selected. On the left, the 'INTERFACE' section is expanded, and 'GigabitEthernet0/0/0' is selected. The main area shows the configuration for this interface. The 'Port Status' checkbox is checked and labeled 'On'. The 'Bandwidth' is set to '1000 Mbps'. The 'Duplex' is set to 'Full Duplex'. The 'MAC Address' is '0060.704E.ED01'. The 'IP Configuration' section has empty fields for 'IPv4 Address' and 'Subnet Mask'. The 'Tx Ring Limit' is set to '10'. At the bottom, the 'Equivalent IOS Commands' section shows the following commands:

```
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0/0
Router(config-if)#
```

A 'Top' button is located at the bottom left of the window.

- Assign the IP address to this port as well.
 - Important note is that this IP address should be in range of the IP of our LAN. For example the IP address for the computers are 10.0.0.1 to 10.0.0.3. So the IP should be something like 10.0.0.4 We can choose the last number of our own.



The screenshot shows the configuration window for Router0, specifically the 'Config' tab for the GigabitEthernet0/0/0 interface. The interface is currently configured with the following settings:

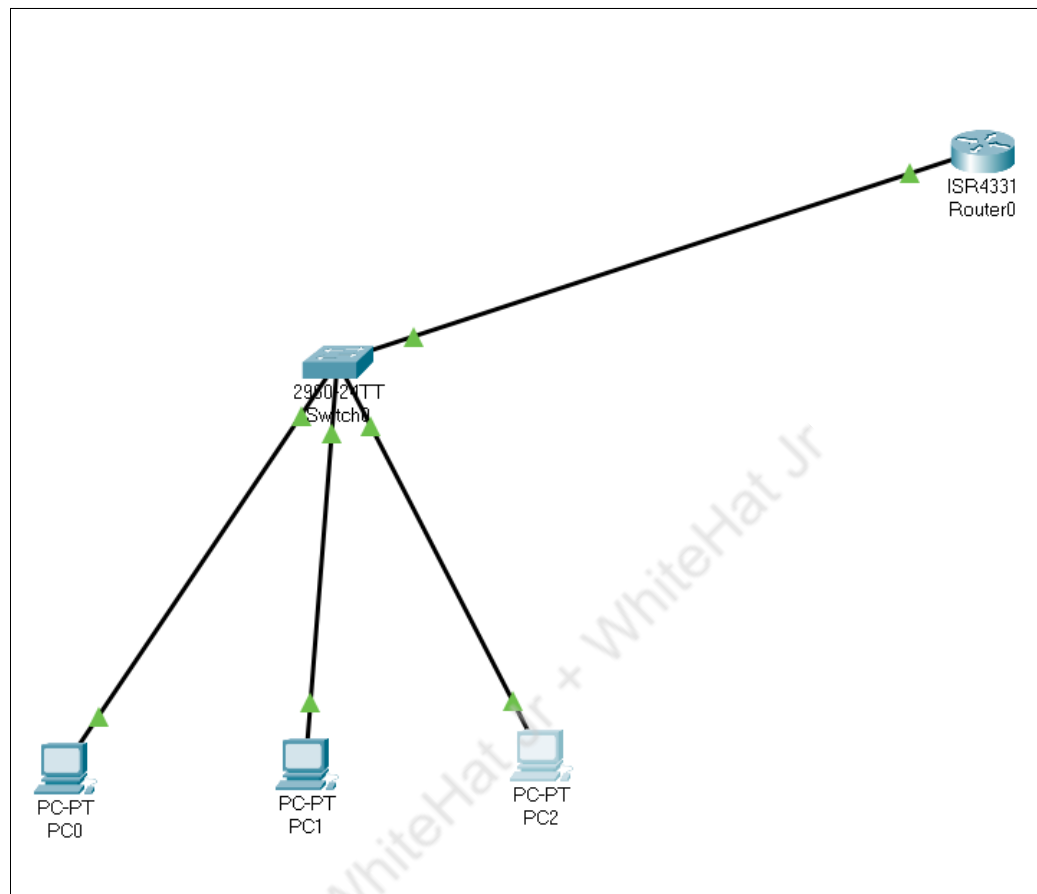
- Port Status:** ☒ On
- Bandwidth:** ☒ 1000 Mbps
- Duplex:** ☒ Full Duplex
- MAC Address:** 0060.704E.ED01
- IP Configuration:**
 - IPv4 Address: 10.0.0.4
 - Subnet Mask: 255.0.0.0
- Tx Ring Limit:** 10

The 'Equivalent IOS Commands' section shows the following commands:

```
Router(config)#interface GigabitEthernet0/0/0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0, changed state to up
ip address 10.0.0.4 255.0.0.0
Router(config-if)#
```

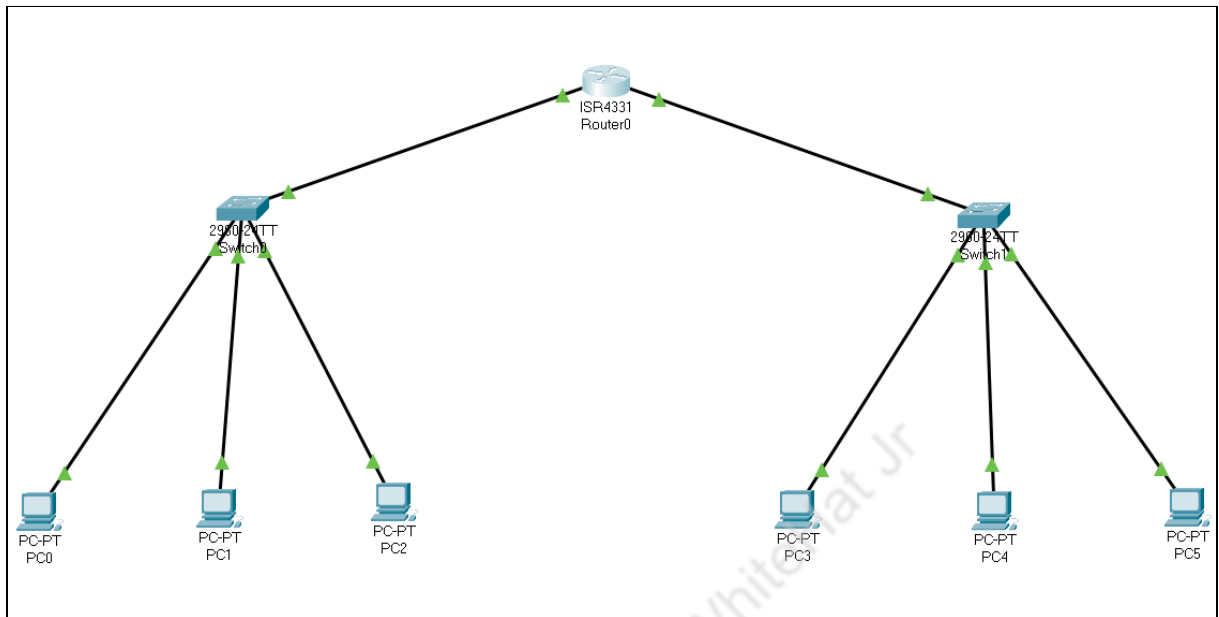
A 'Top' button is located at the bottom left of the window.

After we assign the IP address here this port turns on

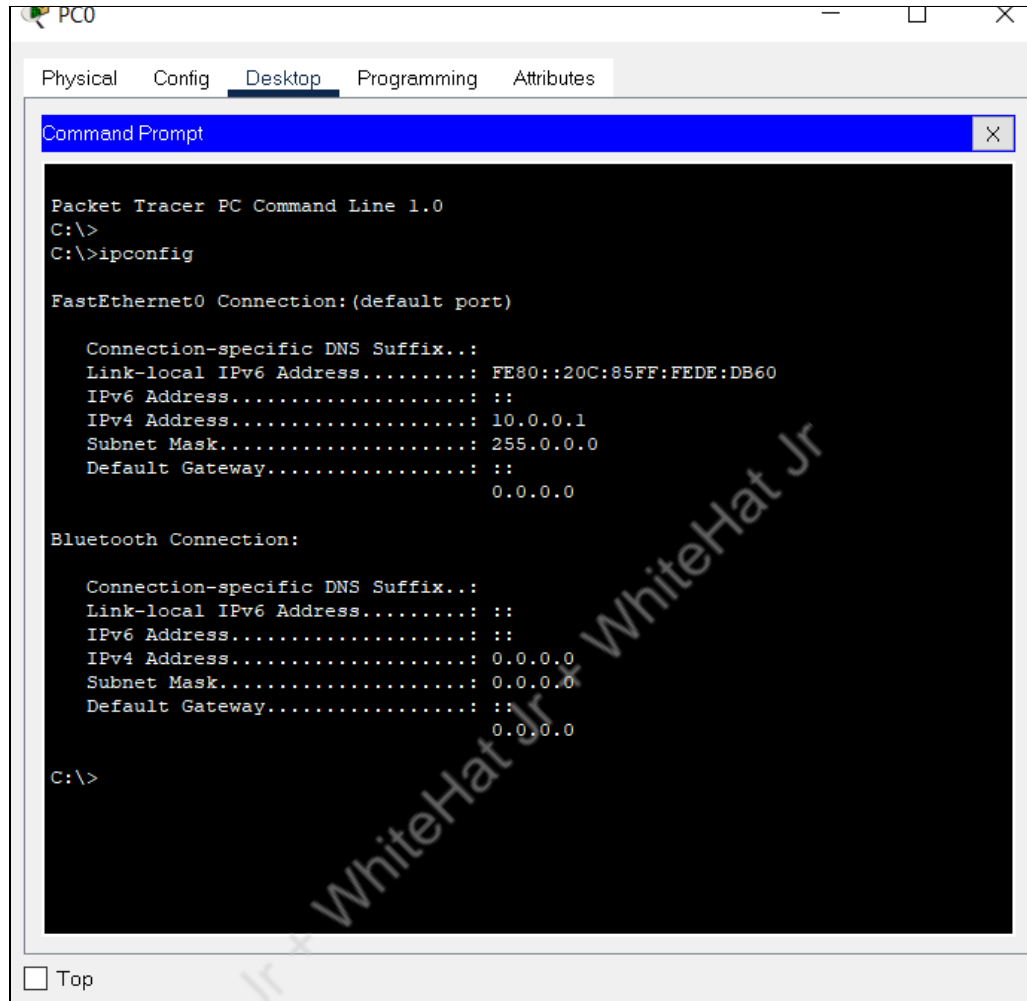


We have created the LAN and connected it with the router.

8. Create one more LAN first and then connect that with the router, so that both of these networks can share information with each other.



9. Double click on any computer on the left LAN and then open the command prompt.
 - First we will check the IP address of this computer. Type ipconfig and press enter. This will show us the IP address of this computer.



```
PC0
Physical Config Desktop Programming Attributes
Command Prompt
Packet Tracer PC Command Line 1.0
C:\>
C:\>ipconfig

FastEthernet0 Connection:(default port)

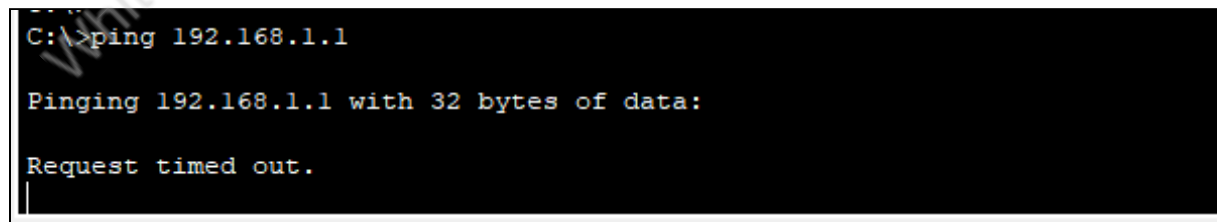
Connection-specific DNS Suffix...:
Link-local IPv6 Address.....: FE80::20C:85FF:FEDE:DB60
IPv6 Address.....: ::
IPv4 Address.....: 10.0.0.1
Subnet Mask.....: 255.0.0.0
Default Gateway.....: ::
                                0.0.0.0

Bluetooth Connection:

Connection-specific DNS Suffix...:
Link-local IPv6 Address.....: ::
IPv6 Address.....: ::
IPv4 Address.....: 0.0.0.0
Subnet Mask.....: 0.0.0.0
Default Gateway.....: ::
                                0.0.0.0

C:\>
```

- Ping the first computer from the other network. Write ping 192.168.1.1



```
C:\>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:

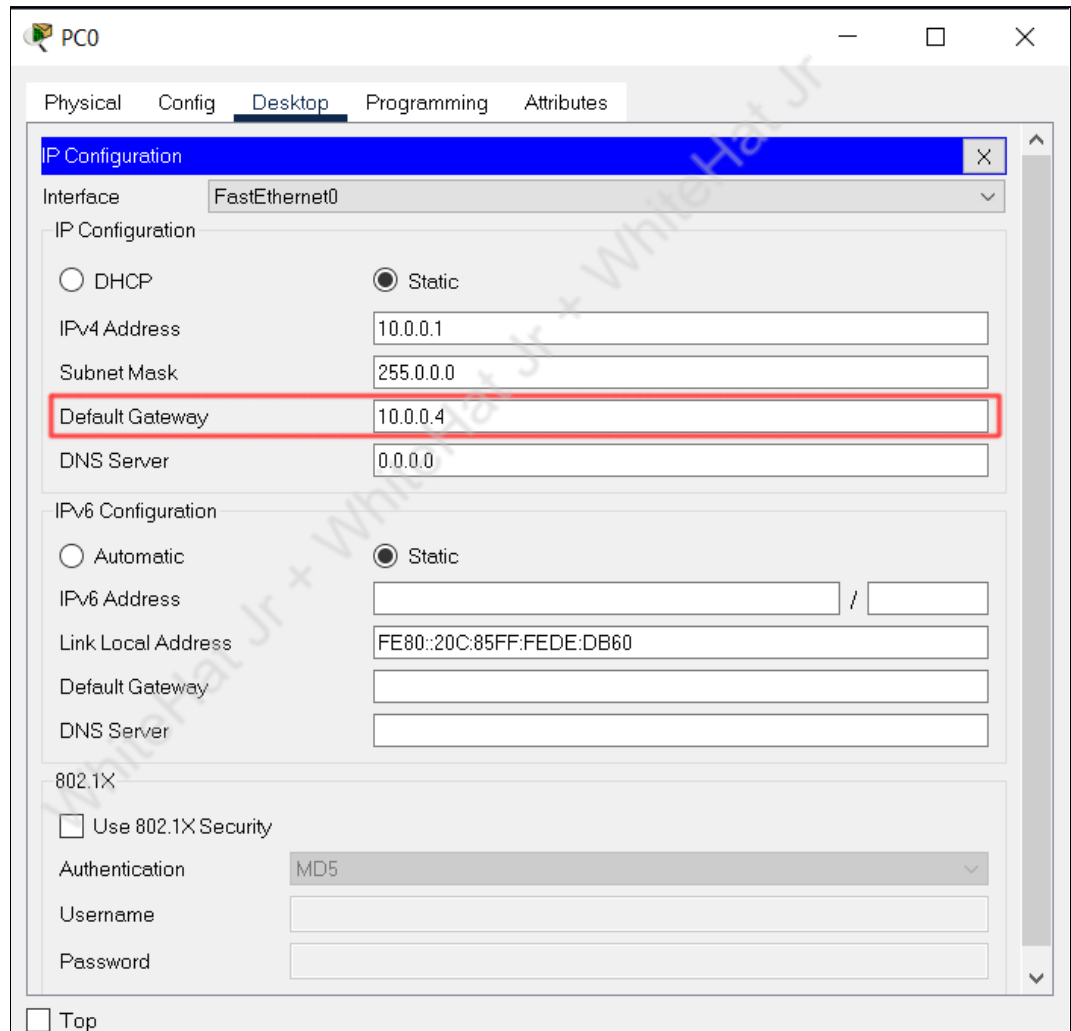
Request timed out.
```

Our computer doesn't know about this IP address of the router, so we should assign it manually.

10. Assign default gateway to all the computers on the network as it is a simulated environment.

Double click on the first computer on the left network and go to the IP configuration window. There is a tab named default gateway. In this write the IP address we assigned in the router. Which is 10.0.0.4

Note: Default Gateway should be the same as the IP address assigned to the router. Repeat with the other computers on the network.



The screenshot shows the configuration window for PC0, specifically the 'Desktop' tab. The 'IP Configuration' section is expanded, showing settings for the 'FastEthernet0' interface. The 'Static' radio button is selected under 'IP Configuration'. The 'Default Gateway' field is highlighted with a red rectangle and contains the value '10.0.0.4'. Other fields include 'IPv4 Address' (10.0.0.1), 'Subnet Mask' (255.0.0.0), and 'DNS Server' (0.0.0.0). The 'IPv6 Configuration' section is also visible, with 'Static' selected and 'Link Local Address' set to 'FE80::20C:85FF:FEDE:DB60'. The '802.1X' section shows 'Use 802.1X Security' unchecked, 'Authentication' set to 'MD5', and empty fields for 'Username' and 'Password'.

11. Now after getting the ipconfig of the computer test with ping

First ping :

```
C:\>ping 10.0.0.1

Pinging 10.0.0.1 with 32 bytes of data:

Request timed out.
Reply from 10.0.0.1: bytes=32 time<1ms TTL=127
Reply from 10.0.0.1: bytes=32 time<1ms TTL=127
Reply from 10.0.0.1: bytes=32 time<1ms TTL=127

Ping statistics for 10.0.0.1:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

When we set up the network. We lose the data packet on our first ping.

Second ping:

```
C:\>ping 10.0.0.1

Pinging 10.0.0.1 with 32 bytes of data:

Reply from 10.0.0.1: bytes=32 time<1ms TTL=127
Reply from 10.0.0.1: bytes=32 time<1ms TTL=127
Reply from 10.0.0.1: bytes=32 time=11ms TTL=127
Reply from 10.0.0.1: bytes=32 time<1ms TTL=127

Ping statistics for 10.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 11ms, Average = 2ms

C:\>
```

On our second ping we can see that all the packets are sent and received.

We have successfully built a Wide Area Network. If we connect a lot of networks like this we will have something called an INTERNET. We have learned how to set up a router and connect multiple LAN's with it. We also learned about the default gateway and how it plays an important role in connecting the computer to the internet.

What's NEXT?

In the next class, we will learn more about _____.

EXTEND YOUR KNOWLEDGE

You can create an account in CPT using this [link](#).

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