

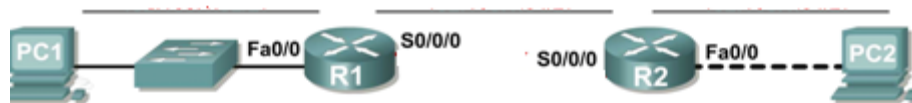
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TE COMPS

CEL 51, DCCN, Monsoon 2020

Lab 6: Subnet and Router Configuration

Aim: Configure and activate Serial and FastEthernet interfaces and to aTest , verify configurations.

Topology Diagram



Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	Fa0/0			N/A
	S0/0/0			N/A
R2	Fa0/0			N/A
	S0/0/0			N/A
PC1	NIC			
PC2	NIC			

Learning Objectives

Upon completion of this lab, you will be able to:

- Subnet an address space given requirements.
- Assign appropriate addresses to interfaces and document.
- Configure and activate Serial and FastEthernet interfaces.
- Test and verify configurations.
- Reflect upon and document the network implementation.

Scenario

In this lab activity, you will design and apply an IP addressing scheme for the topology shown in the Topology Diagram. You will be given one address block that you must subnet to provide a logical addressing scheme for the network. The routers will then be ready for interface address configuration according to your IP addressing scheme. When the configuration is complete, verify that the network is working properly.

Task 1: Subnet the Address Space.

Step 1: Examine the network requirements.

You have been given the 192.168.1.0/24 address space to use in your network design. The network consists of the following segments:

- The network connected to router R1 will require enough IP addresses to support 15 hosts.
- The network connected to router R2 will require enough IP addresses to support 30 hosts.
- The link between router R1 and router R2 will require IP addresses at each end of the link.

Step 2: Consider the following questions when creating your network design.

How many subnets are needed for this network?

Ans: 3 Subnets are required for this network, for network connected to router R1, for network connected to router R2 and link between router R1 and router R2.

What is the subnet mask for this network in dotted decimal format?

Ans: The address block is 192.168.1.0/24

Network: 11000000.10101000.00000001.00000000

Subnet Mask: 11111111.11111111.11111111.00000000

Number of usable host $2^8 - 2 = 254$

The network connected to R2 requires maximum number of host i.e 30.

So now,

Subnet Mask: 11111111.11111111.11111111.11100000

i.e 255.255.255.224

What is the subnet mask for the network in slash format?

Ans: Number of one's i.e $8*3+3 = 27$ hence subnet mask for network in slash format is /27

How many usable hosts are there per subnet?

Ans: In any host there are two IPs that cannot be assigned to any devices i.e Network ID and Broadcast IP address. Therefore $2^5 - 2 = 30$ usable host per subnet.

Step 3: Assign sub-network addresses to the Topology Diagram.

1. Assign subnet 1 to the network attached to R1.

Subnet 1: 11000000.10101000.00000001.00000000 = 192.168.1.0

Network ID: 11000000.10101000.00000001.00000000 = 192.168.1.0/27

1 st usable IP: 11000000.10101000.00000001.00000001 = 192.168.1.1/27

Last usable IP: 11000000.10101000.00000001.00011110 = 192.168.1.30/27

Broadcast IP: 11000000.10101000.00000001.00011111 = 192.168.1.31/27

2. Assign subnet 2 to the link between R1 and R2.

Subnet 2: 11000000.10101000.00000001.00100000 = 192.168.1.32

Network ID: 11000000.10101000.00000001.00100000 = 192.168.1.32/27

1 st usable IP: 11000000.10101000.00000001.00100001 = 192.168.1.33/27

Last usable IP: 11000000.10101000.00000001.00111110 = 192.168.1.62/27

Broadcast IP: 11000000.10101000.00000001.00111111 = 192.168.1.63/27

3. Assign subnet 3 to the network attached to R2.

Subnet 3: 11000000.10101000.00000001.01000000 = 192.168.1.64

Network ID: 11000000.10101000.00000001.01000000 = 192.168.1.64/27

1 st usable IP: 11000000.10101000.00000001.01000001 = 192.168.1.65/27

Last usable IP: 11000000.10101000.00000001.01011110 = 192.168.1.94/27

Broadcast IP: 11000000.10101000.00000001.01011111 = 192.168.1.95/27

Task 2: Determine Interface Addresses.

Step 1: Assign appropriate addresses to the device interfaces.

1. Assign the first valid host address in subnet 1 to the LAN interface on R1 - 192.168.1.1
2. Assign the last valid host address in subnet 1 to PC1 - 192.168.1.30
3. Assign the first valid host address in subnet 2 to the WAN interface on R1 - 192.168.1.33
4. Assign the last valid host address in subnet 2 to the WAN interface on R2 - 192.168.1.62
5. Assign the first valid host address in subnet 3 to the LAN interface of R2 - 192.168.1.65
6. Assign the last valid host address in subnet 3 to PC2 - 192.168.1.94

Step 2: Document the addresses to be used in the table provide under the Topology Diagram.

Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	Fa0/0	192.168.1.1	255.255.255.224	N/A
	S0/0/0	192.168.1.33	255.255.255.224	N/A
R2	Fa0/0	192.168.1.65	255.255.255.224	N/A
	S0/0/0	192.168.1.62	255.255.255.224	N/A
PC1	NIC	192.168.1.30	255.255.255.224	192.168.1.1
PC2	NIC	192.168.1.94	255.255.255.224	192.168.1.65

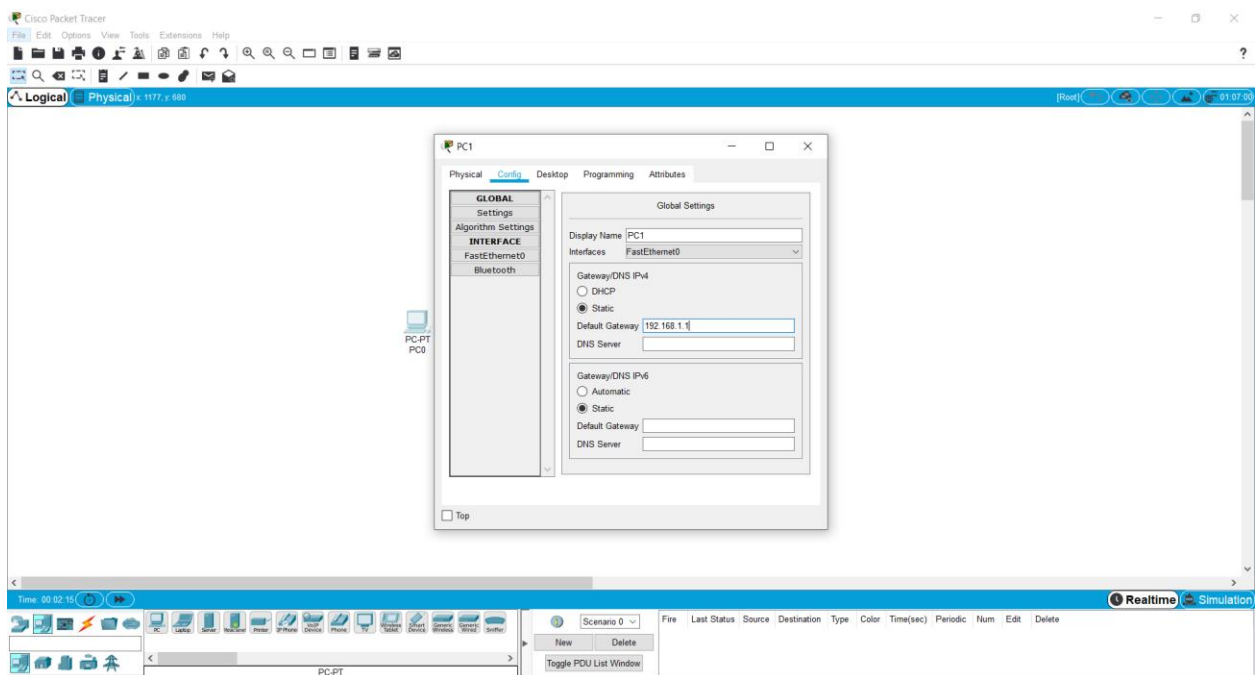
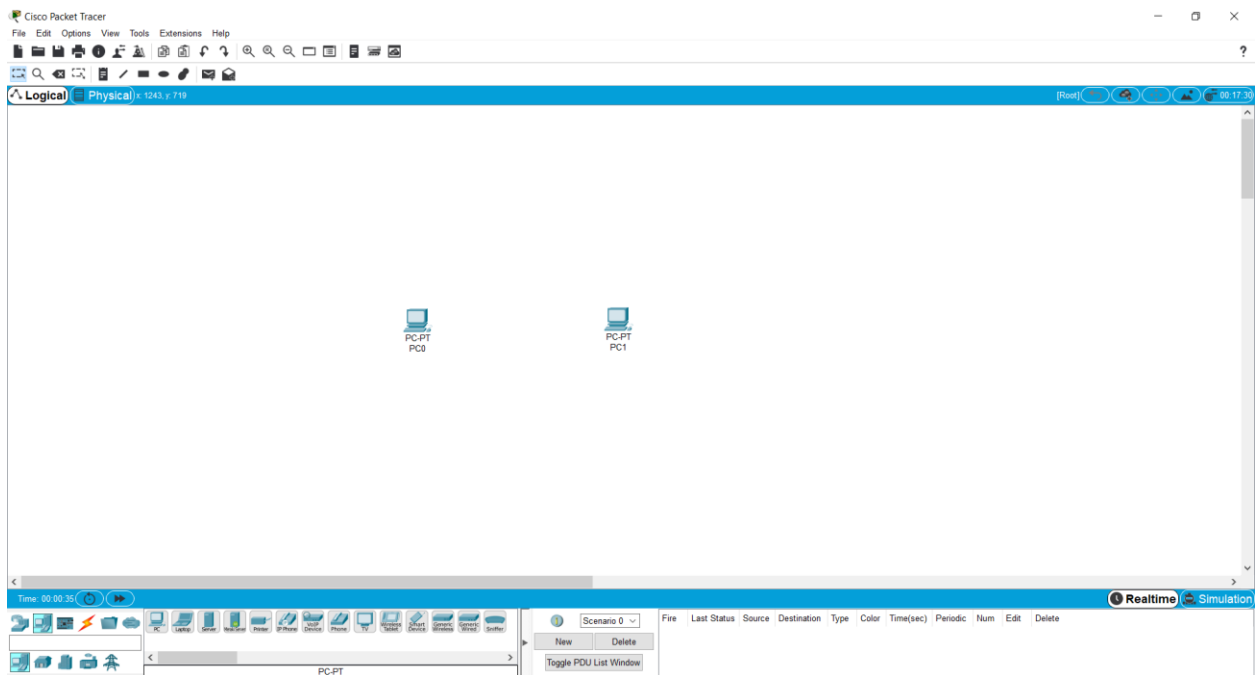
Task 3: Configure the Serial and FastEthernet Addresses.

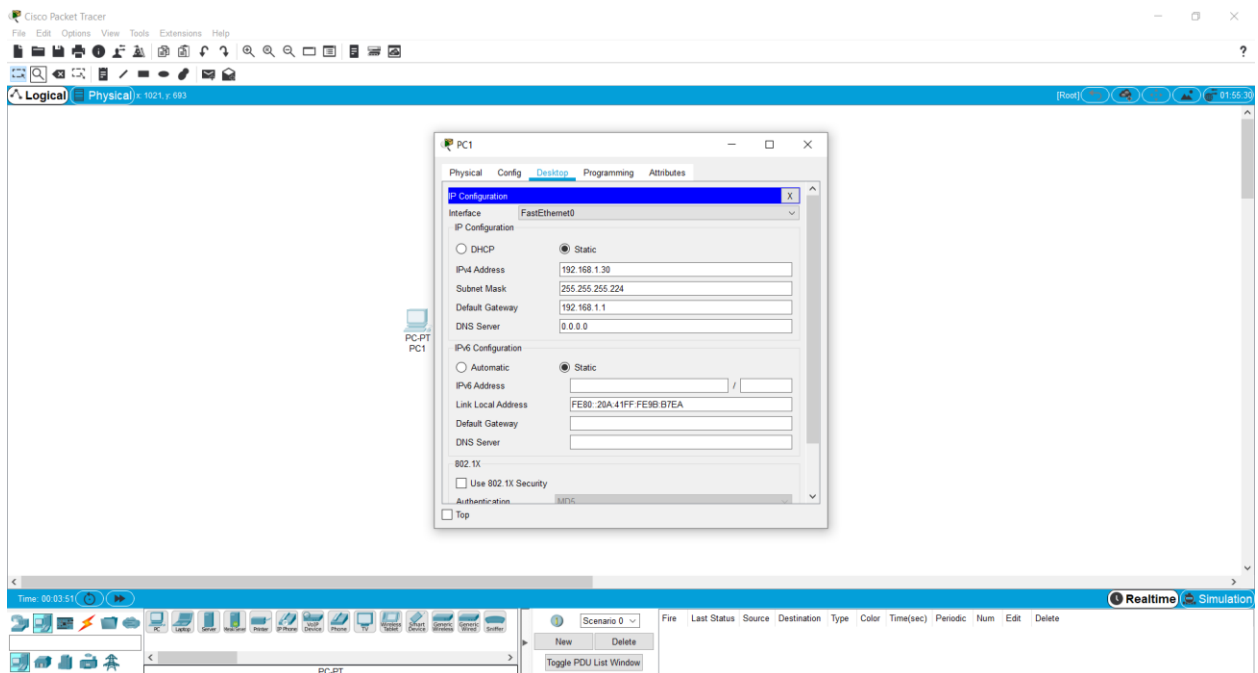
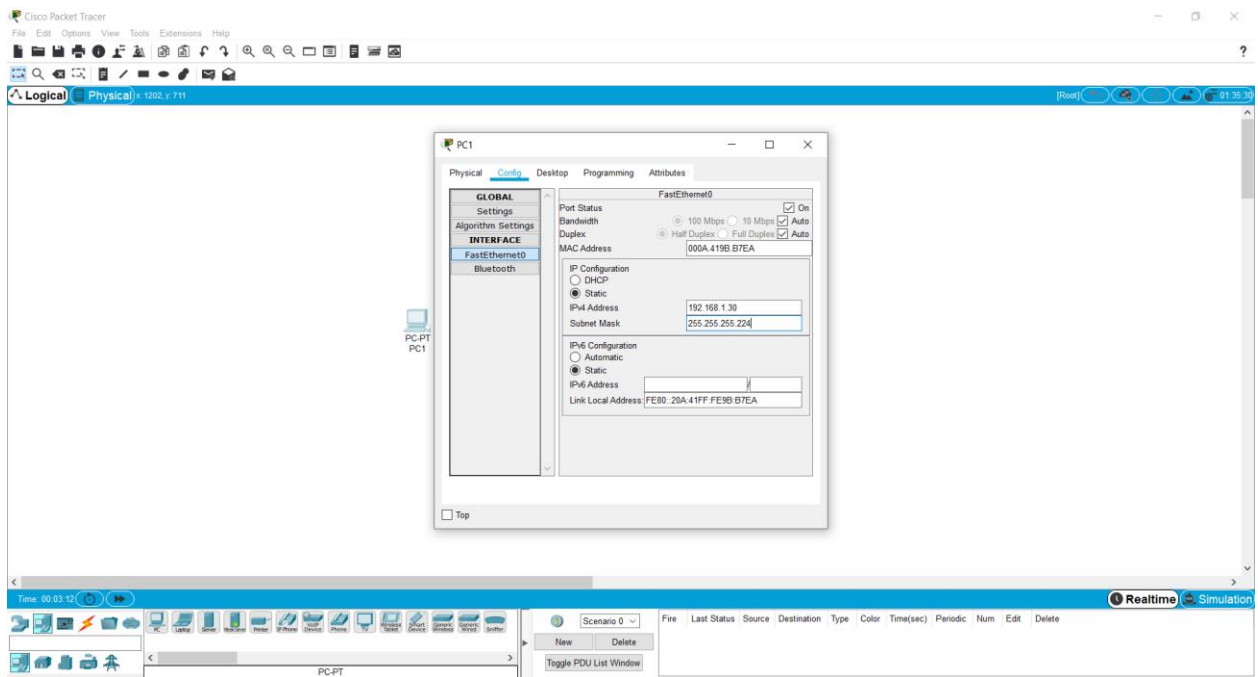
Step 1: Configure the router interfaces.

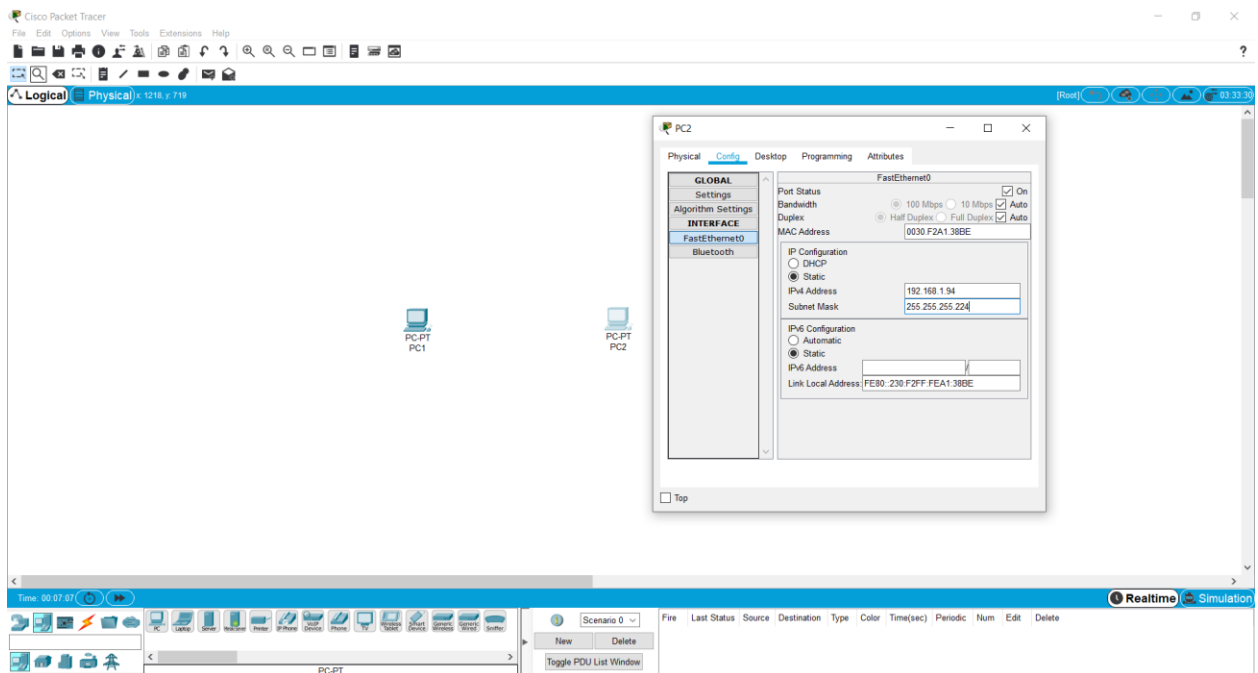
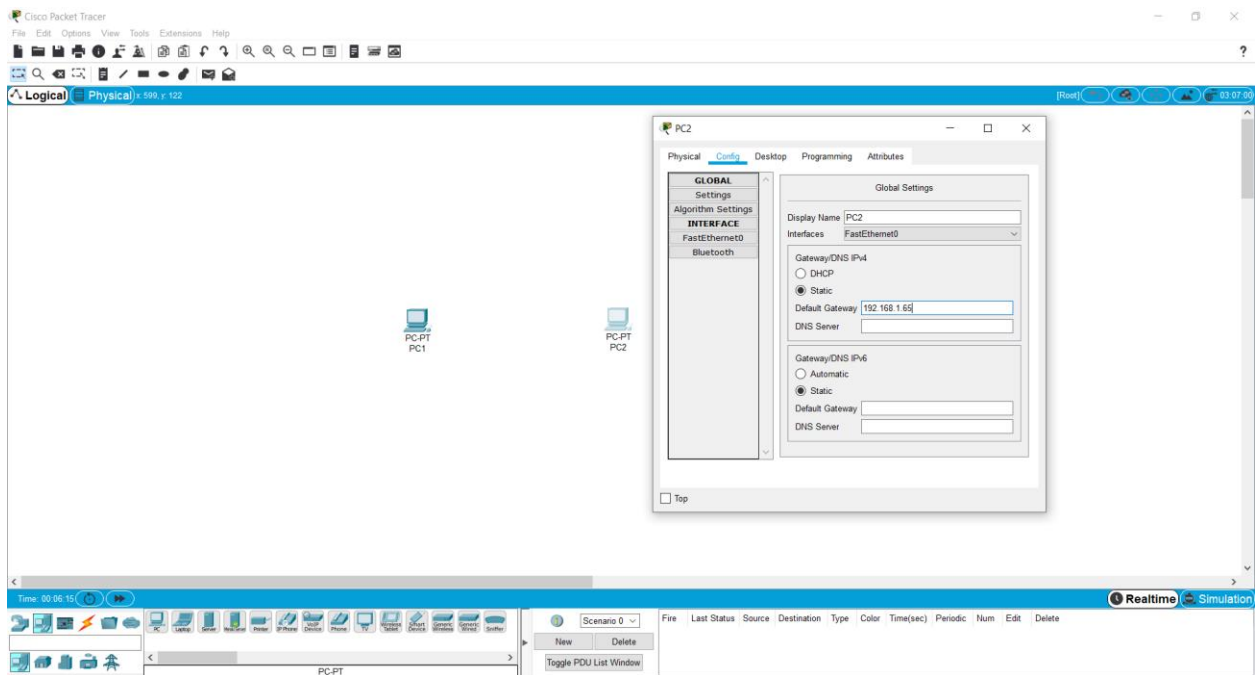
Configure the interfaces on the R1 and R2 routers with the IP addresses from your network design. Please note, to complete the activity in Packet Tracer you will be using the Config Tab. When you have finished, be sure to save the running configuration to the NVRAM of the router.

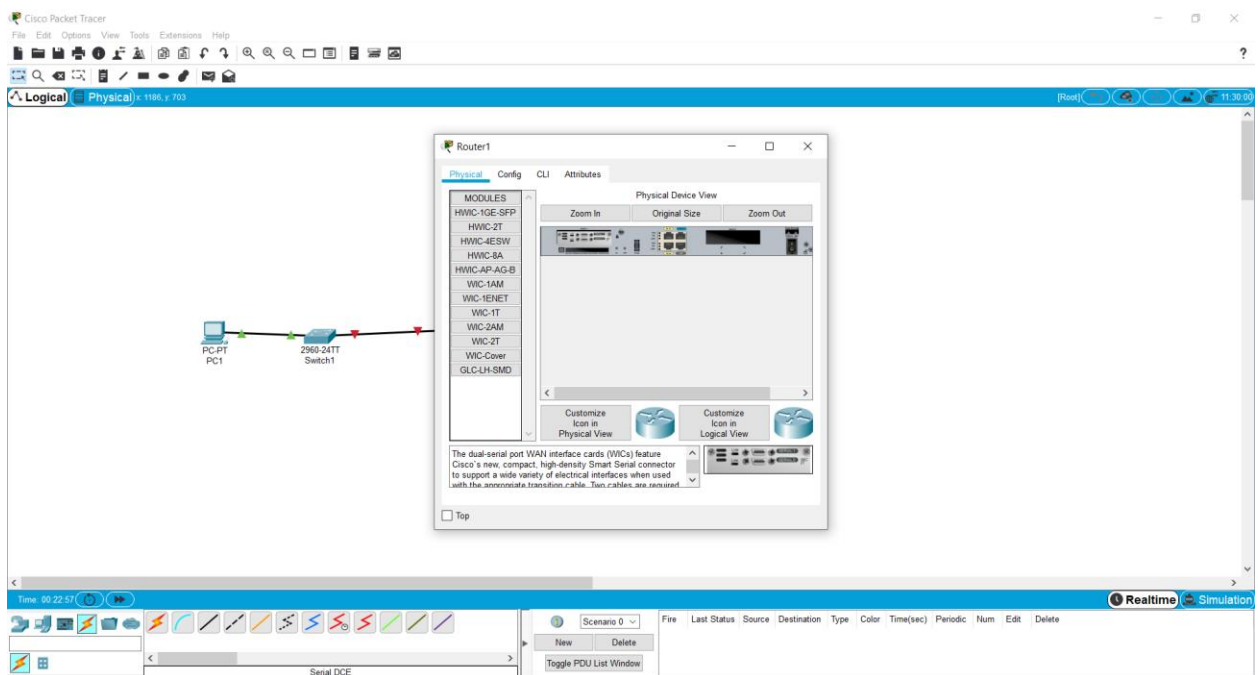
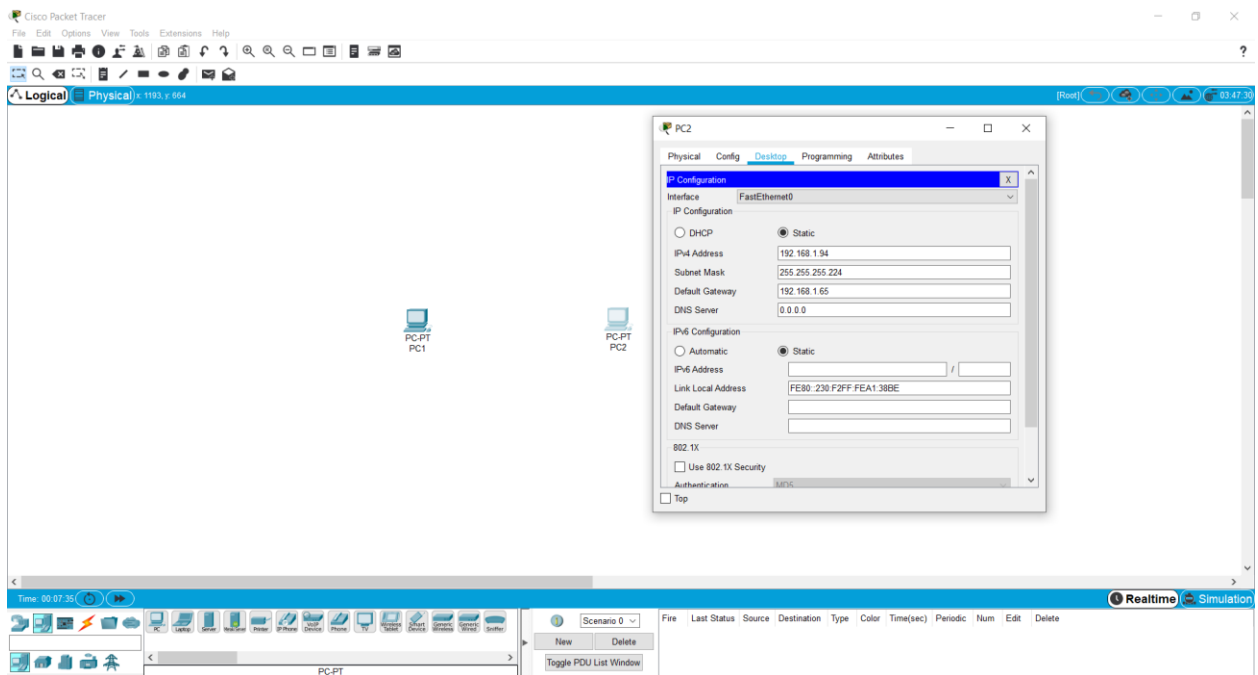
Step 2: Configure the PC interfaces.

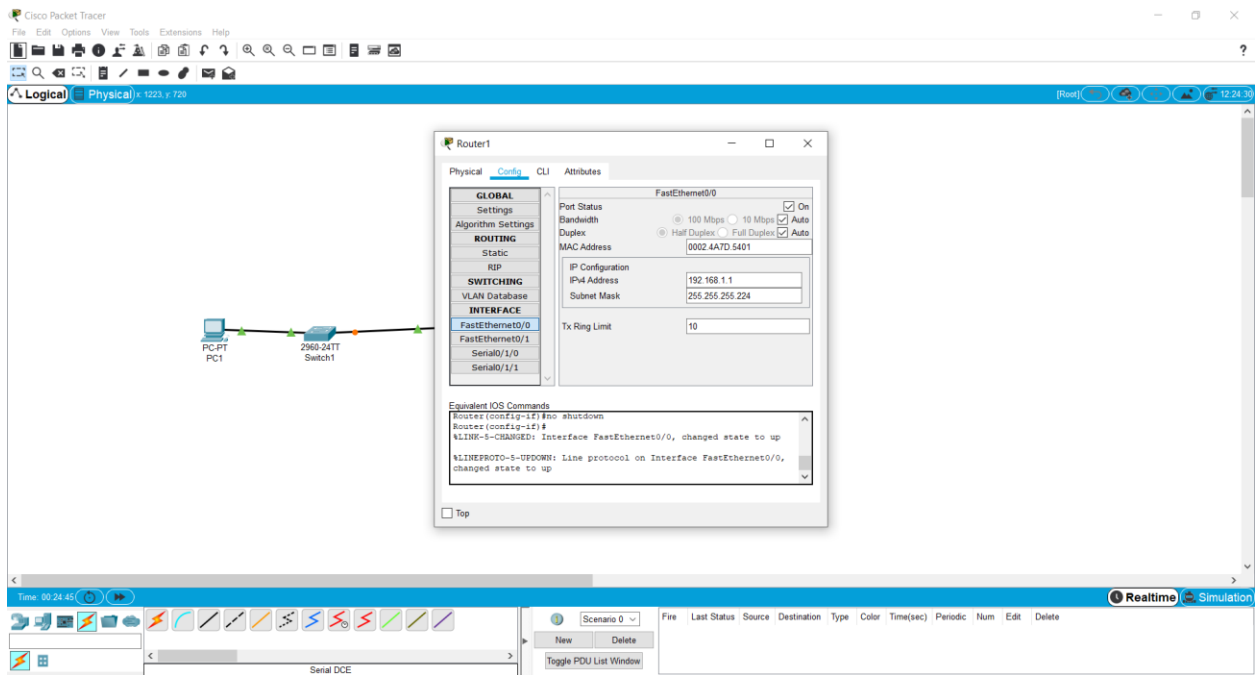
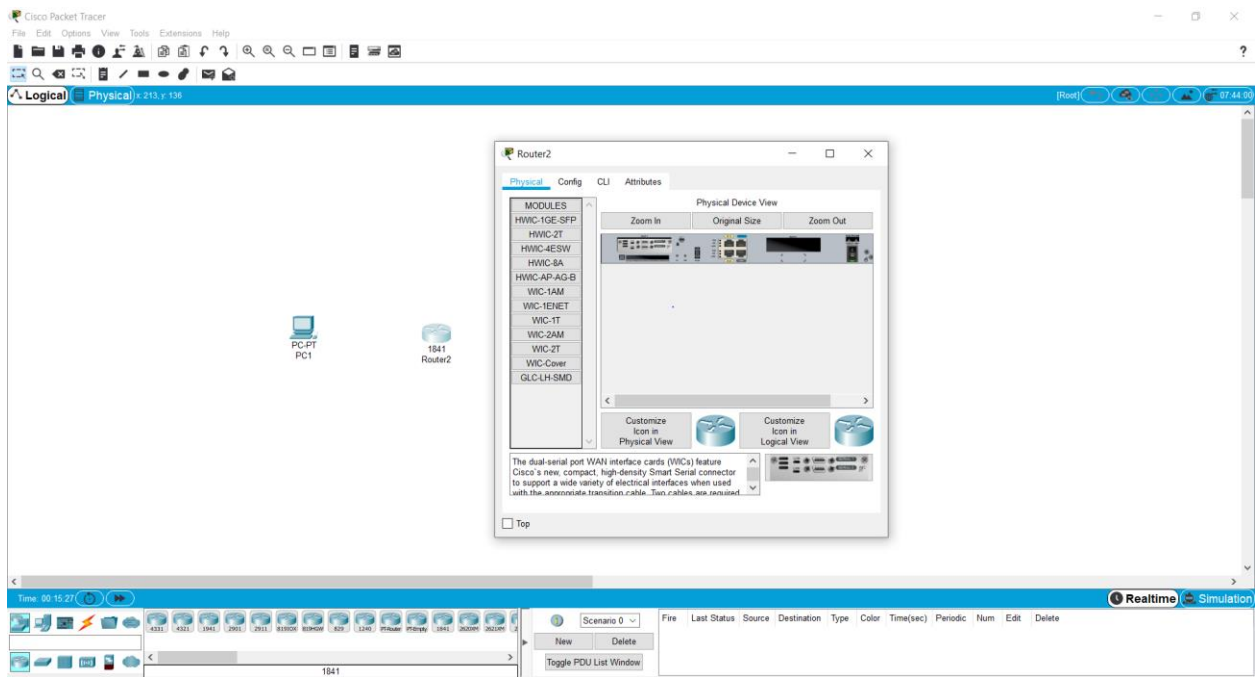
Configure the Ethernet interfaces of PC1 and PC2 with the IP addresses and default gateways from your network design.











Cisco Packet Tracer

File Edit Options View Tools Extensions Help

Logical Physical x 1342, y 149 [Row] 13.16.00

PC-PT PC1 2960-24TT Switch1 1841 Router1 1841 Router2 PC-PT PC2

Router1

Physical Config CLI Attributes

GLOBAL Settings Algorithm Settings ROUTING Static RIP SWITCHING VLAN Database INTERFACE FastEthernet0/0 FastEthernet0/1 Serial0/1/0 Serial0/1/1

Serial0/1/0

Port Status ☒ On

Duplex ☒ Full Duplex

Clock Rate 2000000

IP Configuration

IPv4 Address 192.168.1.33

Subnet Mask 255.255.255.224

Tx Ring Limit 10

Equivalent IOS Commands

```
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#ip address 192.168.1.33 255.255.255.224
Router(config-if)#ip address 192.168.1.33 255.255.255.224
Router(config-if)#no shutdown
Router(config-if)#
```

Time: 00:26:29

Scenario 0

Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete

New Delete

Toggle PDU List Window

Serial DCE

Cisco Packet Tracer

File Edit Options View Tools Extensions Help

Logical Physical x 1234, y 719 [Row] 14.01.00

PC-PT PC1 2960-24TT Switch1 1841 Router1 1841 Router2 PC-PT PC2

Router2

Physical Config CLI Attributes

GLOBAL Settings Algorithm Settings ROUTING Static RIP SWITCHING VLAN Database INTERFACE FastEthernet0/0 FastEthernet0/1 Serial0/1/0 Serial0/1/1

FastEthernet0/0

Port Status ☒ On

Bandwidth ☒ 100 Mbps ☐ 10 Mbps ☒ Auto

Duplex ☒ Half Duplex ☒ Full Duplex ☒ Auto

MAC Address 0010.1136.6C01

IP Configuration

IPv4 Address 192.168.1.65

Subnet Mask 255.255.255.224

Tx Ring Limit 10

Equivalent IOS Commands

```
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CTRL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 192.168.1.65 255.255.255.0
Router(config-if)#ip address 192.168.1.65 255.255.255.224
Router(config-if)#
```

Time: 00:27:58

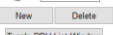
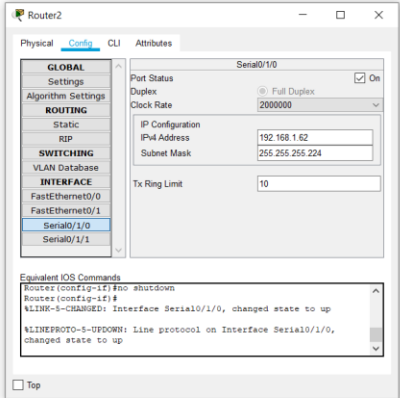
Scenario 0

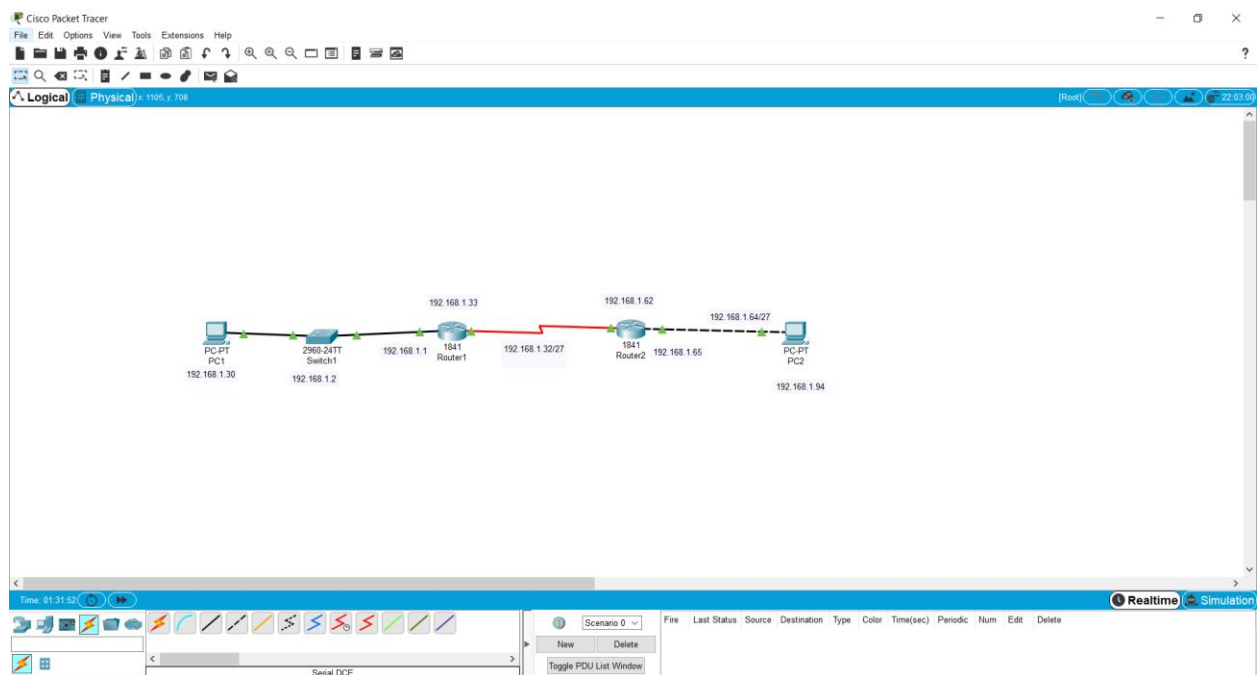
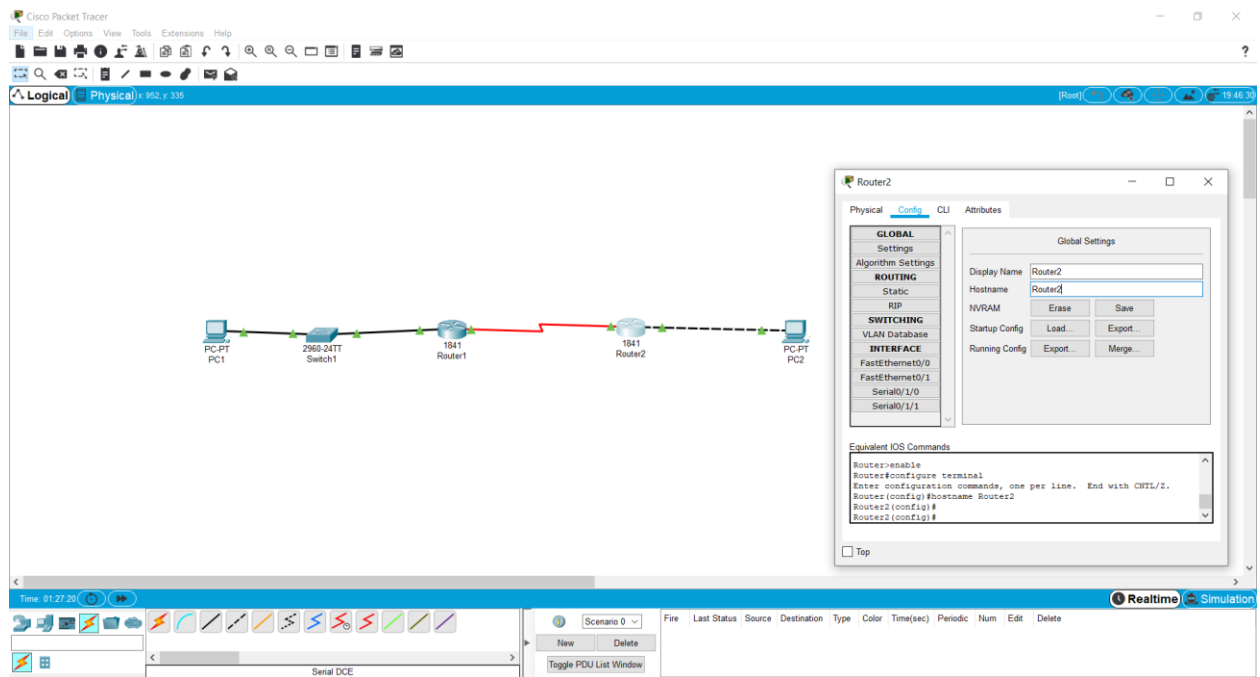
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete

New Delete

Toggle PDU List Window

Serial DCE



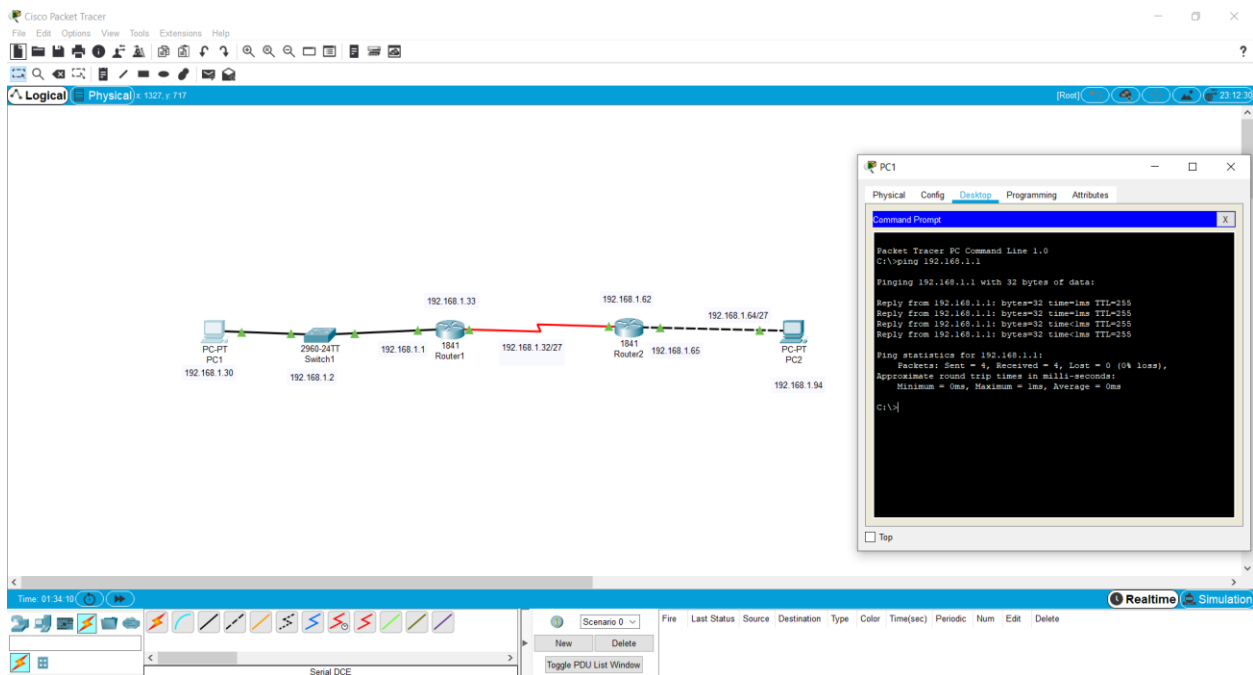


Task 4: Verify the Configurations.

Answer the following questions to verify that the network is operating as expected.

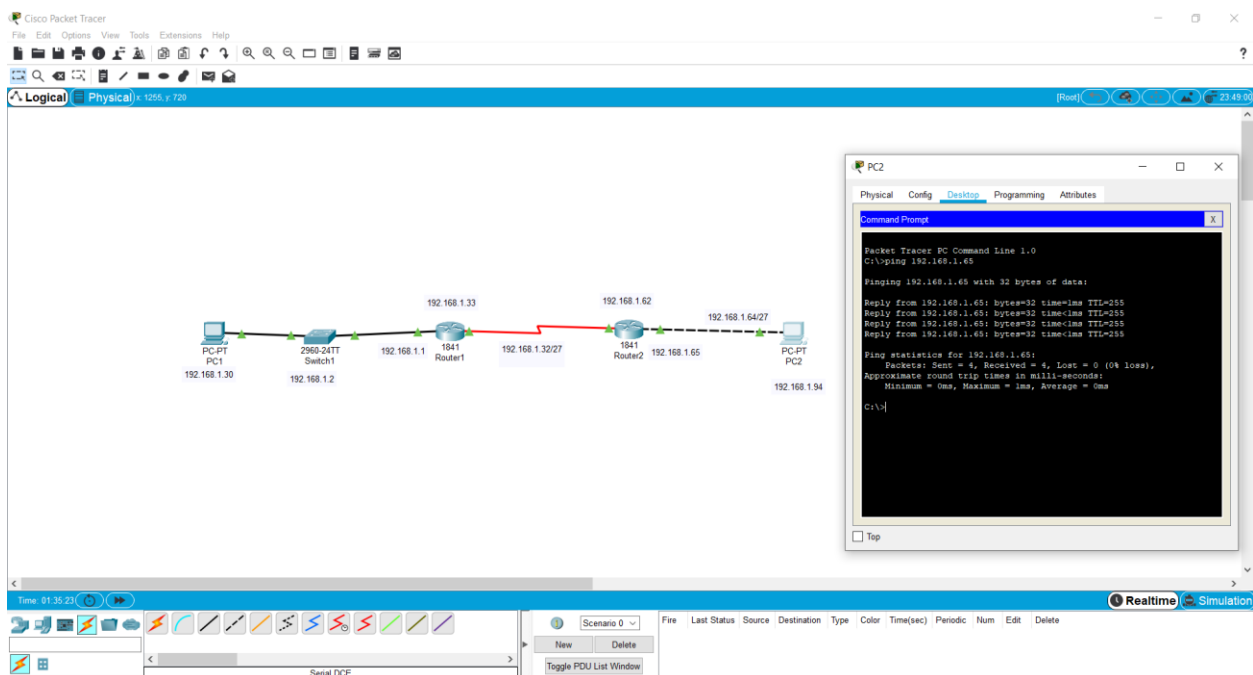
From the host attached to R1, is it possible to ping the default gateway?

Ans: Yes



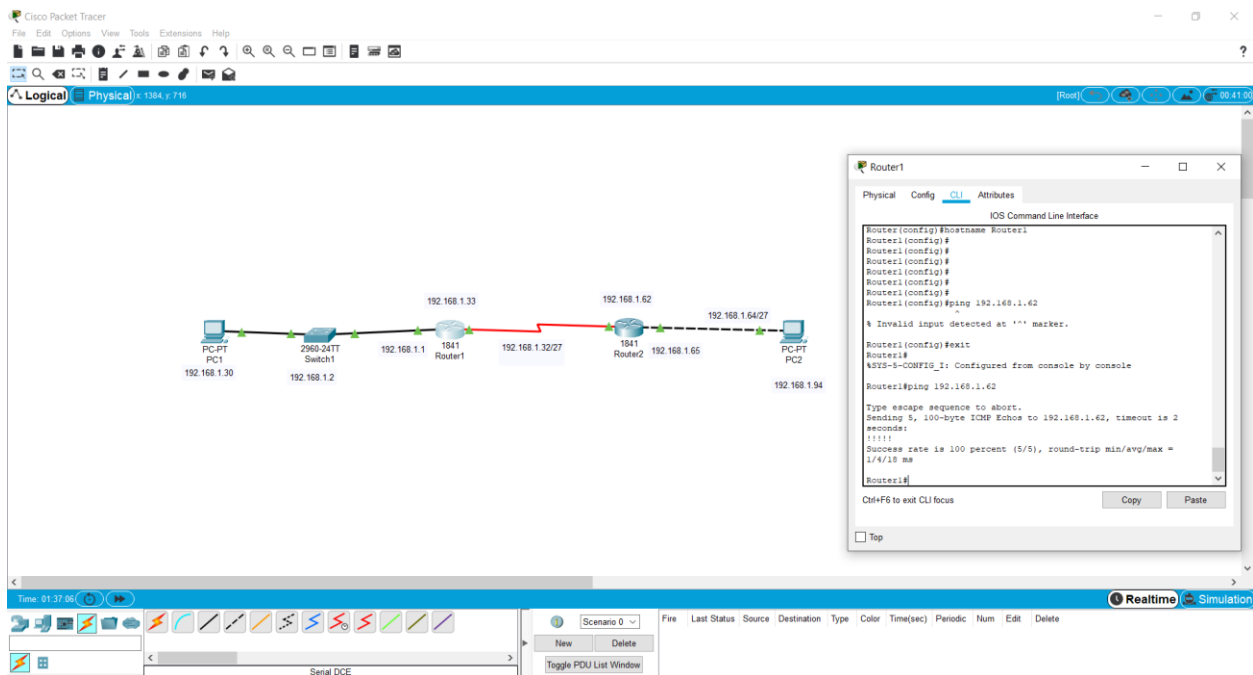
From the host attached to R2, is it possible to ping the default gateway?

Ans: Yes



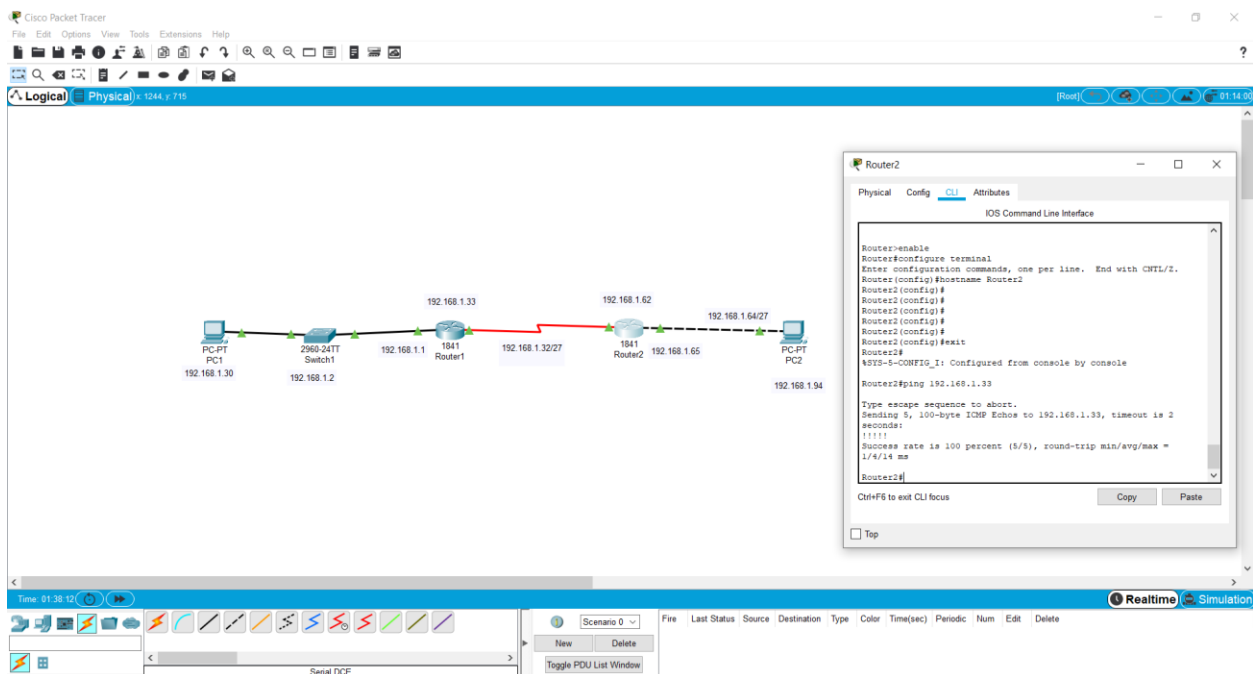
From the router R1, is it possible to ping the Serial 0/0/0 interface of R2?

Ans: Yes



From the router R2, is it possible to ping the Serial 0/0/0 interface of R1?

Ans: Yes



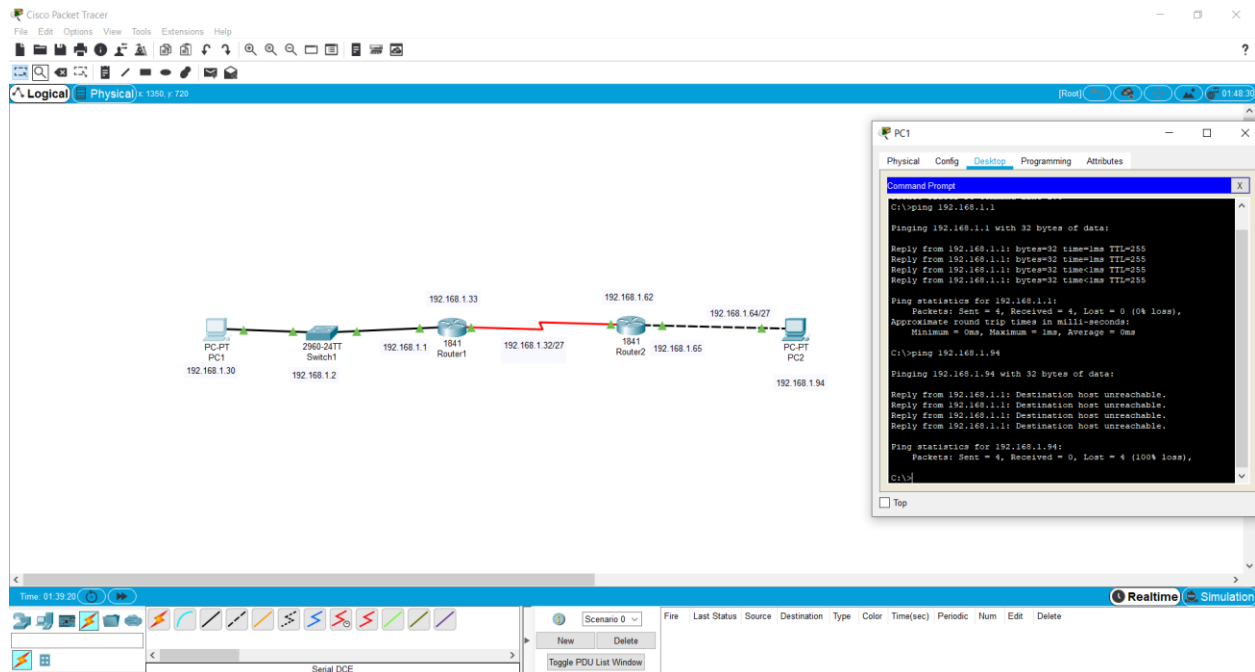
The answer to the above questions should be **yes**. If any of the above pings failed, check your physical connections and configurations.

Task 5: Reflection

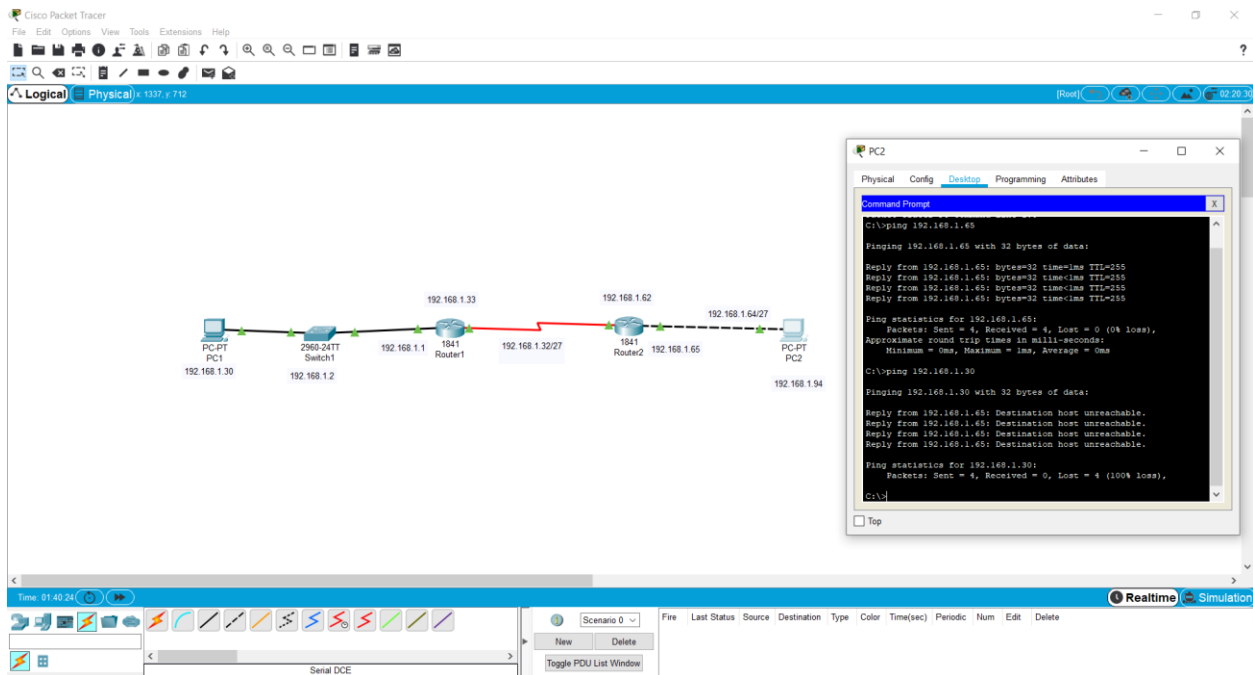
Are there any devices on the network that cannot ping each other?

Ans:

PC1 cannot ping FastEthernet port of Router2 and PC2

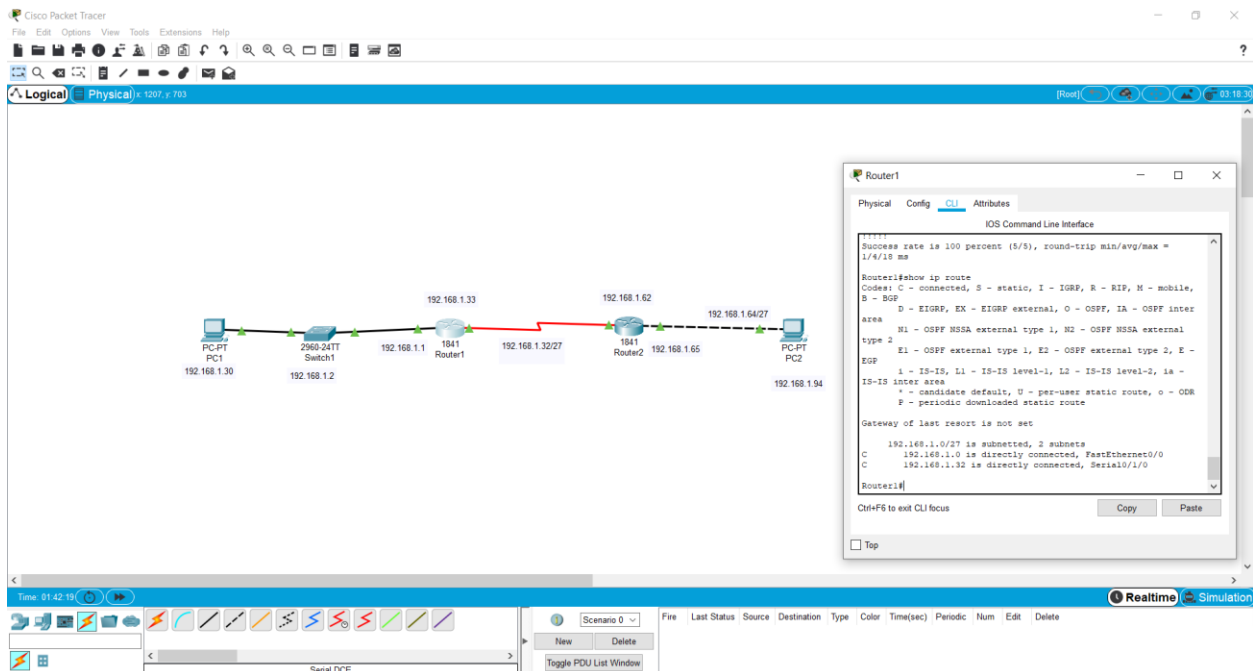


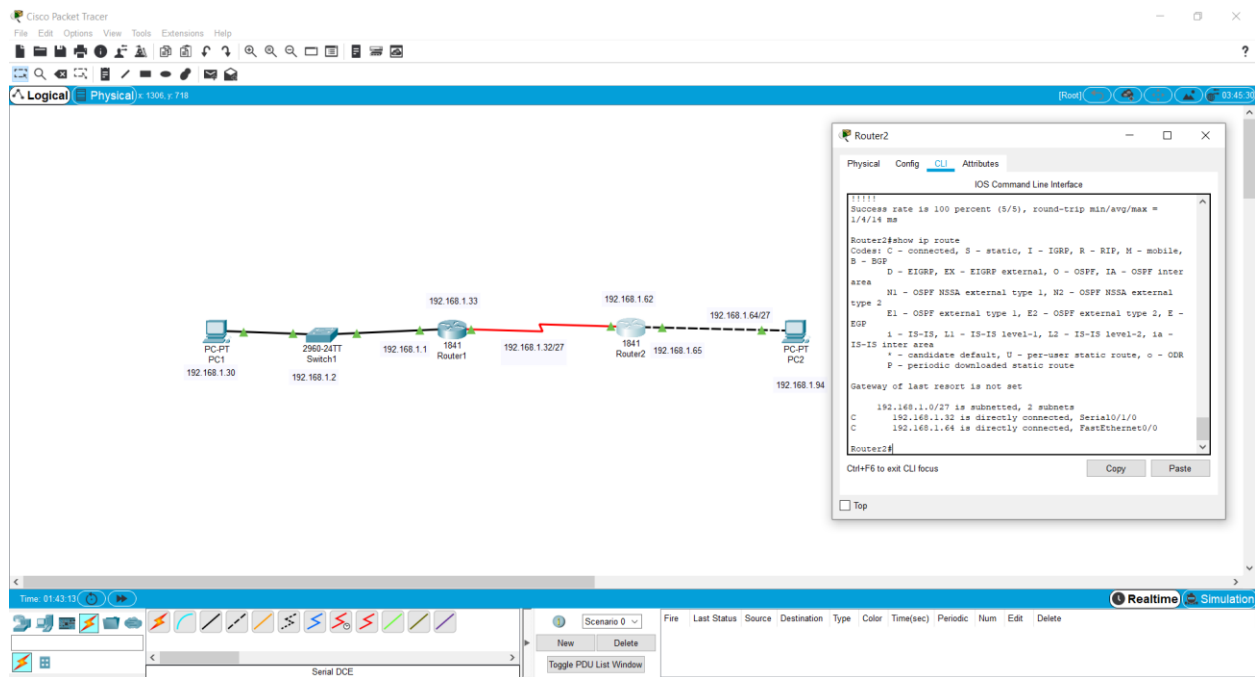
PC2 cannot ping FastEthernet port of Router1 and PC1



What is missing from the network that is preventing communication between these devices?

Ans: Static or Dynamic routing is not present. Therefore, we cannot ping devices on another subnet.





Conclusion:

1. In this experiment, I learned about subnetting a given address space and assigning subnets to various networks according to their mentioned need.
2. I learned to configure serial port on router and established connection between two routers using Serial connection.