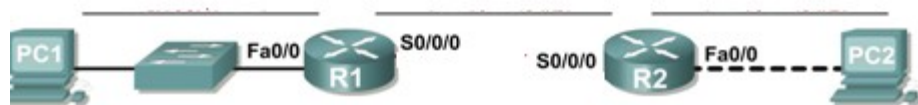


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CEL 51, DCCN, Monsoon 2020

Lab 6: Subnet and Router Configuration

Topology Diagram



Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	Fa0/0	192.168.1.33	255.255.255.224	N/A
	S0/0/0	192.168.1.65	255.255.255.224	N/A
R2	Fa0/0	192.168.1.97	255.255.255.224	N/A
	S0/0/0	192.168.1.94	255.255.255.224	N/A
PC1	NIC	192.168.1.62	255.255.255.224	192.168.1.33
PC2	NIC	192.168.1.126	255.255.255.224	192.168.1.97

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.

We have to design subnet so that they support at the most 30 hosts.

$$2^n - 2 = 30$$
$$n = 5$$

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

How many subnets are needed for this network? 3

Ans : One subnet connected to R1, one connected to R2 and one between R1 and R2.

What is the subnet mask for this network in dotted decimal format? 255.255.255.224

Ans : $32 - 5 = 27$

11111111.11111111.11111111.11100000 in binary is 255.255.255.224 in decimal form.

What is the subnet mask for the network in slash format? /27

Ans : Out of 32 bits, 27 bits have value 1

How many usable hosts are there per subnet? 30

Ans : One id is used for network id and one id is used as broadcast address.

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

1. Assign subnet 1 to the network attached to R1.(192.168.1.32/27)
2. Assign subnet 2 to the link between R1 and R2.(192.168.1.64/27)
3. Assign subnet 3 to the network attached to R2.(192.168.1.96/27)

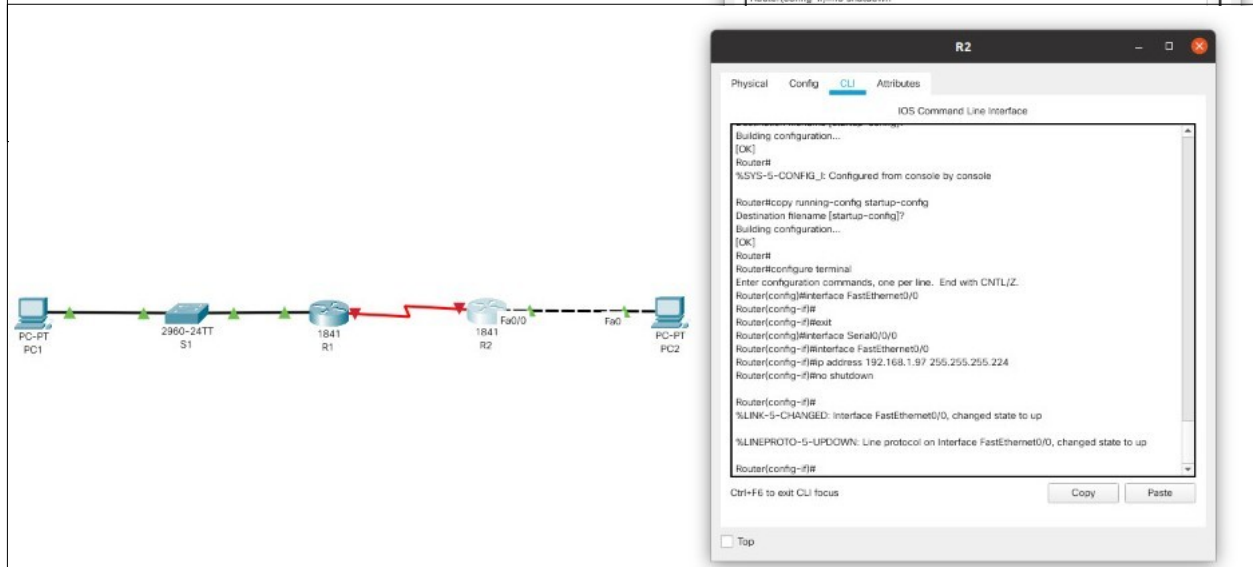
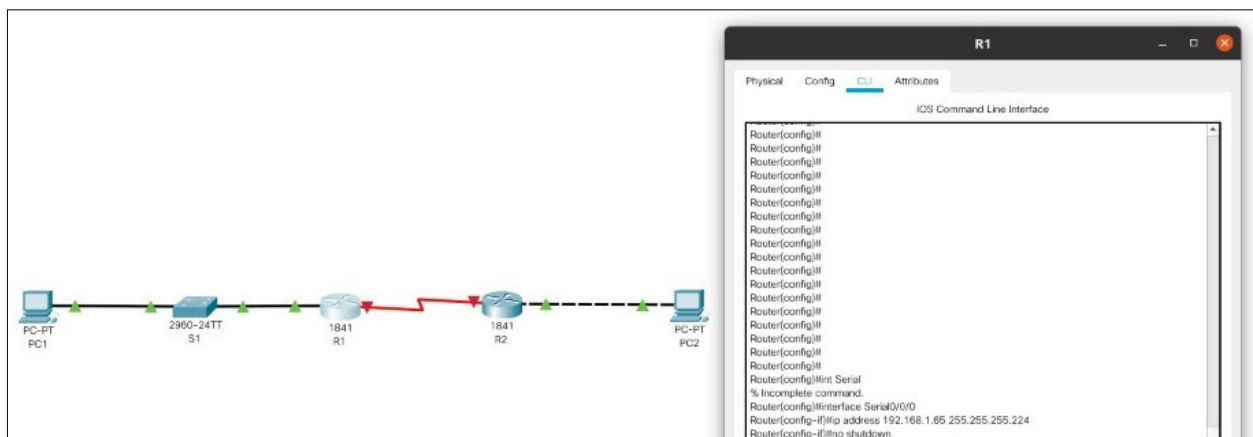
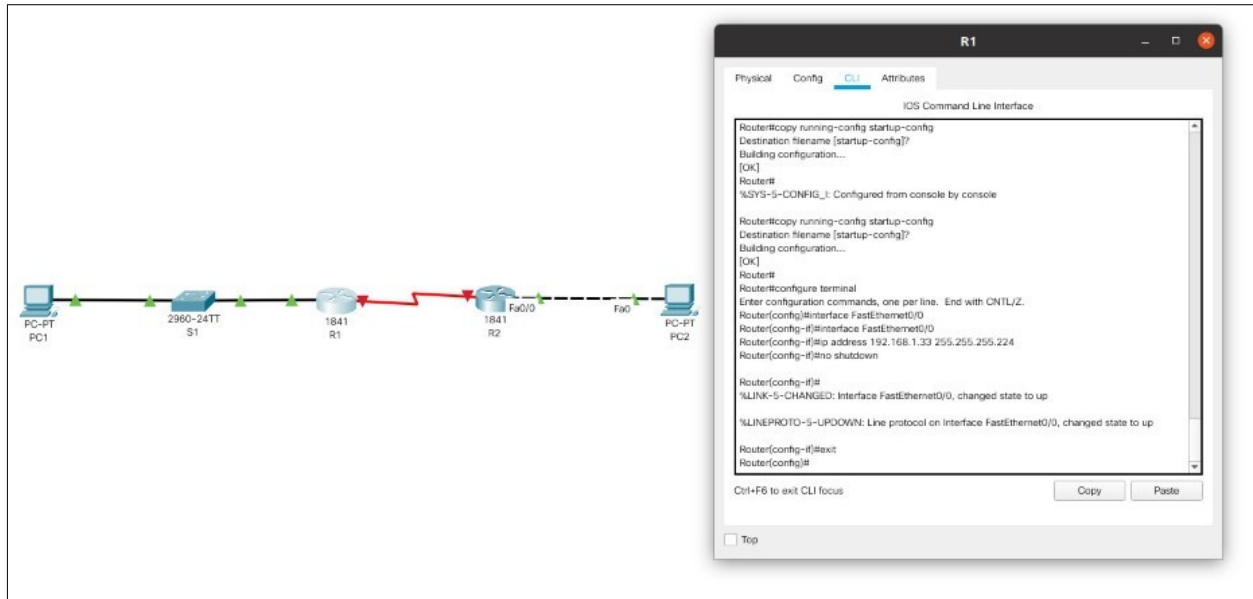
Task 2: Determine Interface Addresses.

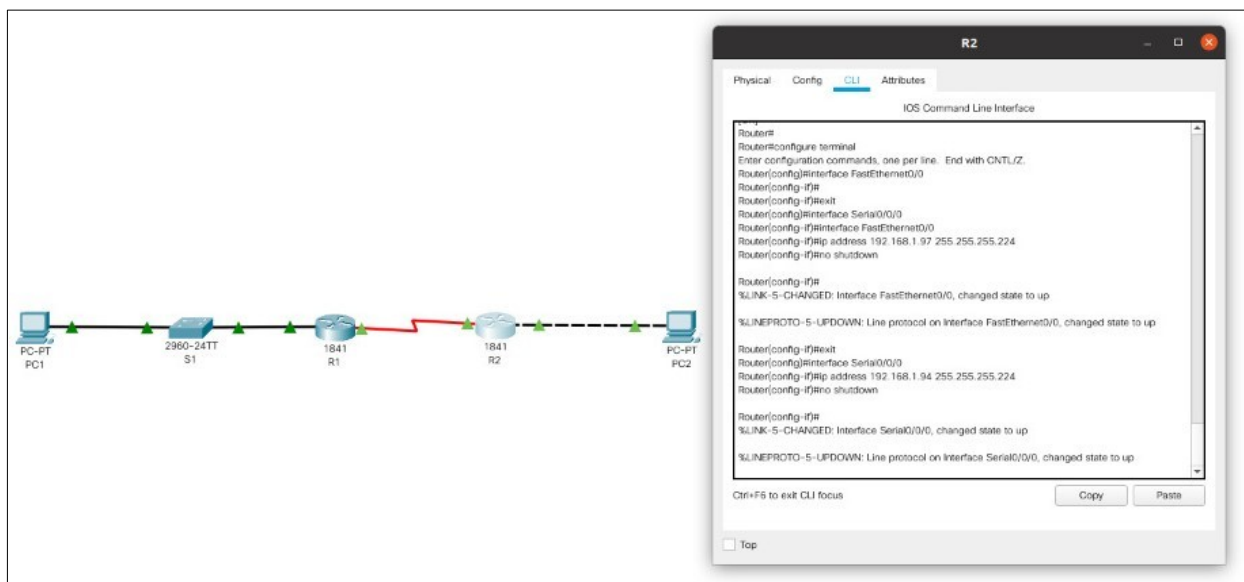
Step 1: Assign appropriate addresses to the device interfaces.

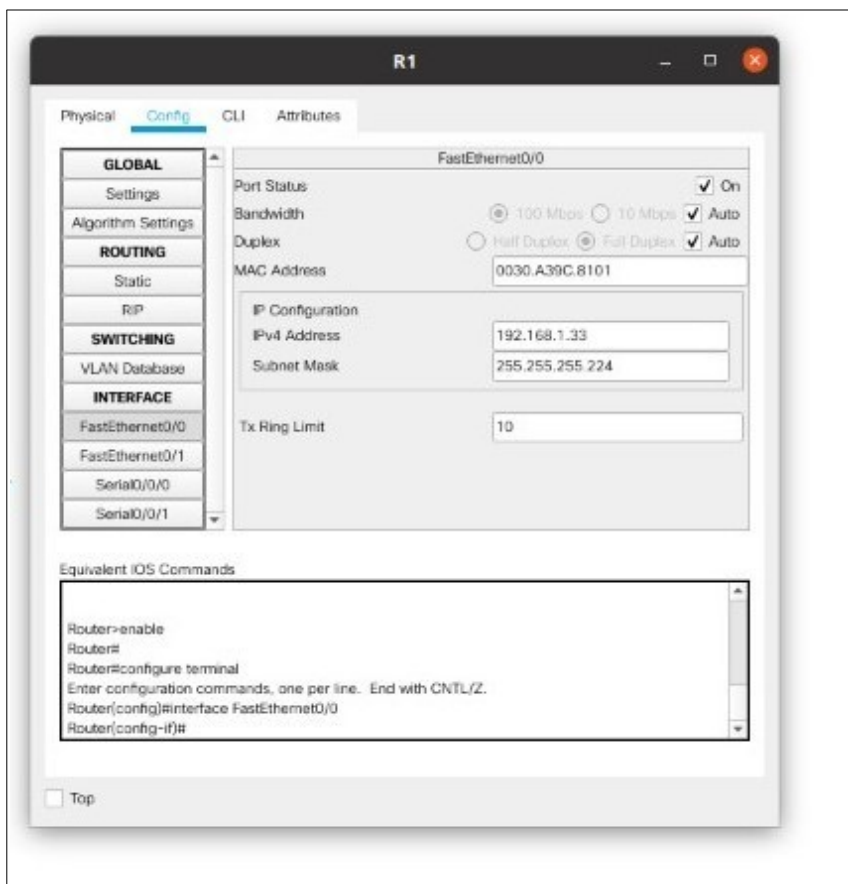
1. Assign the first valid host address in subnet 1 to the LAN interface on R1.(Fa0/0 = 192.168.1.33)
2. Assign the last valid host address in subnet 1 to PC1.(192.168.1.62)
3. Assign the first valid host address in subnet 2 to the WAN interface on R1.(S0/0/0=192.168.1.65)
4. Assign the last valid host address in subnet 2 to the WAN interface on R2.(S0/0/0=192.168.1.94)
5. Assign the first valid host address in subnet 3 to the LAN interface of R2.(Fa0/0=192.168.1.97)
6. Assign the last valid host address in subnet 3 to PC2.(192.168.1.126)

Task 3: Configure the Serial and FastEthernet Addresses.

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.







R2

PhysicalConfigCLIAttributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

FastEthernet0/0

FastEthernet0/1

Serial0/0/0

Serial0/0/1

FastEthernet0/0

Port Status

Bandwidth

Duplex

MAC Address

IP Configuration

IPv4 Address

Subnet Mask

Tx Ring Limit

Equivalent IOS Commands

Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#

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R2

PhysicalConfigCLIAttributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

FastEthernet0/0

FastEthernet0/1

Serial0/0/0

Serial0/0/1

Serial0/0/0

Port Status

Duplex

Clock Rate

IP Configuration

IPv4 Address

Subnet Mask

Tx Ring Limit

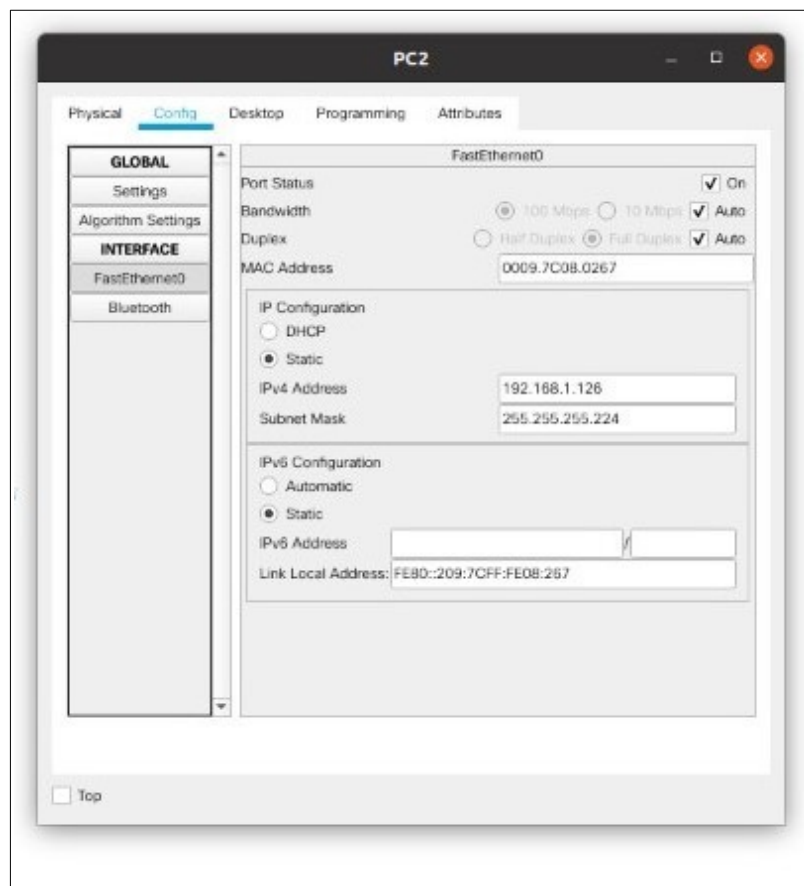
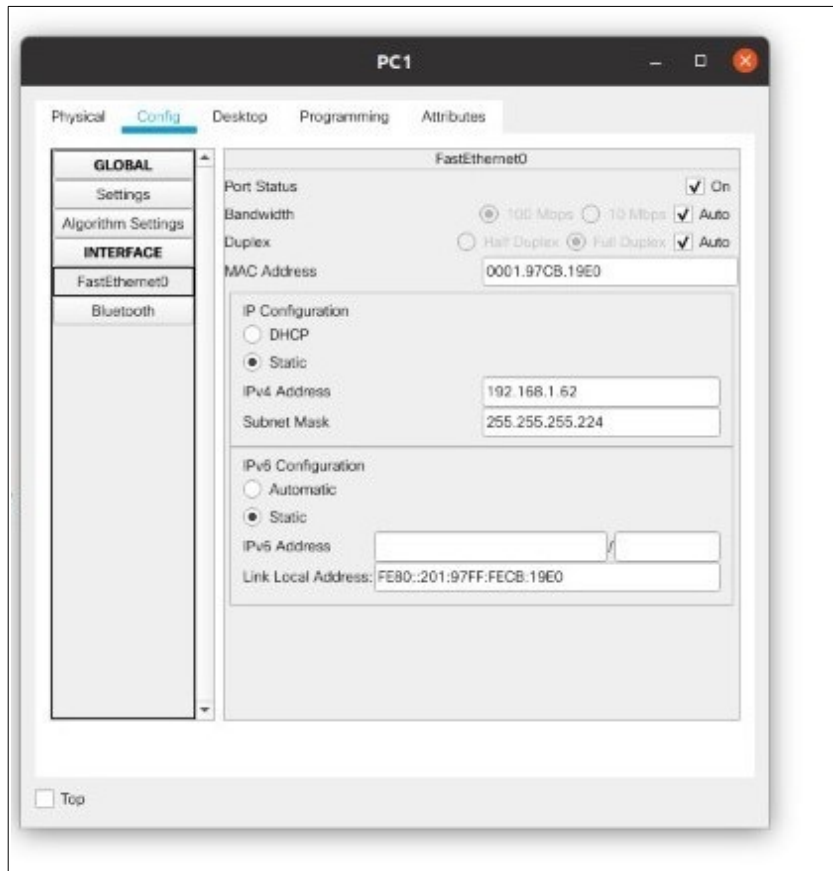
Equivalent IOS Commands

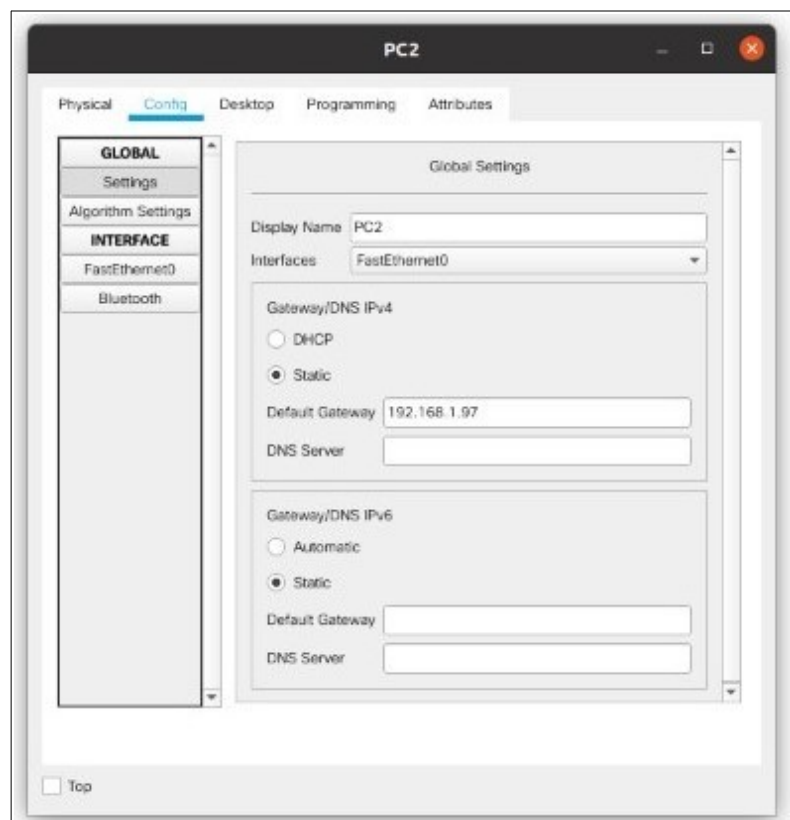
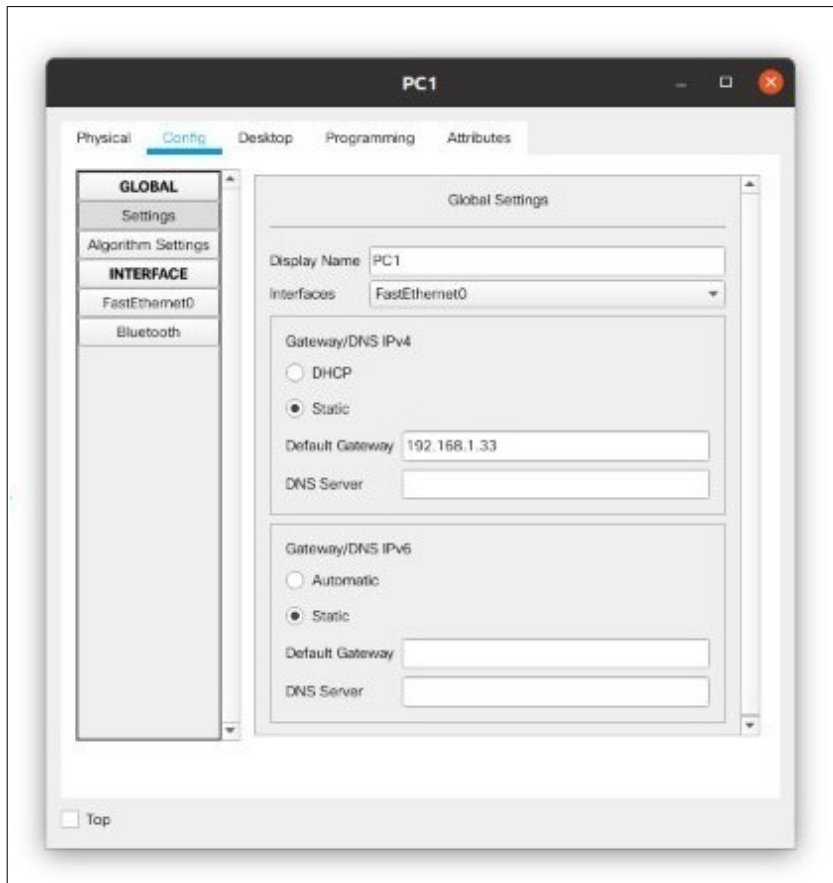
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/0/0
Router(config-if)#

Top

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.

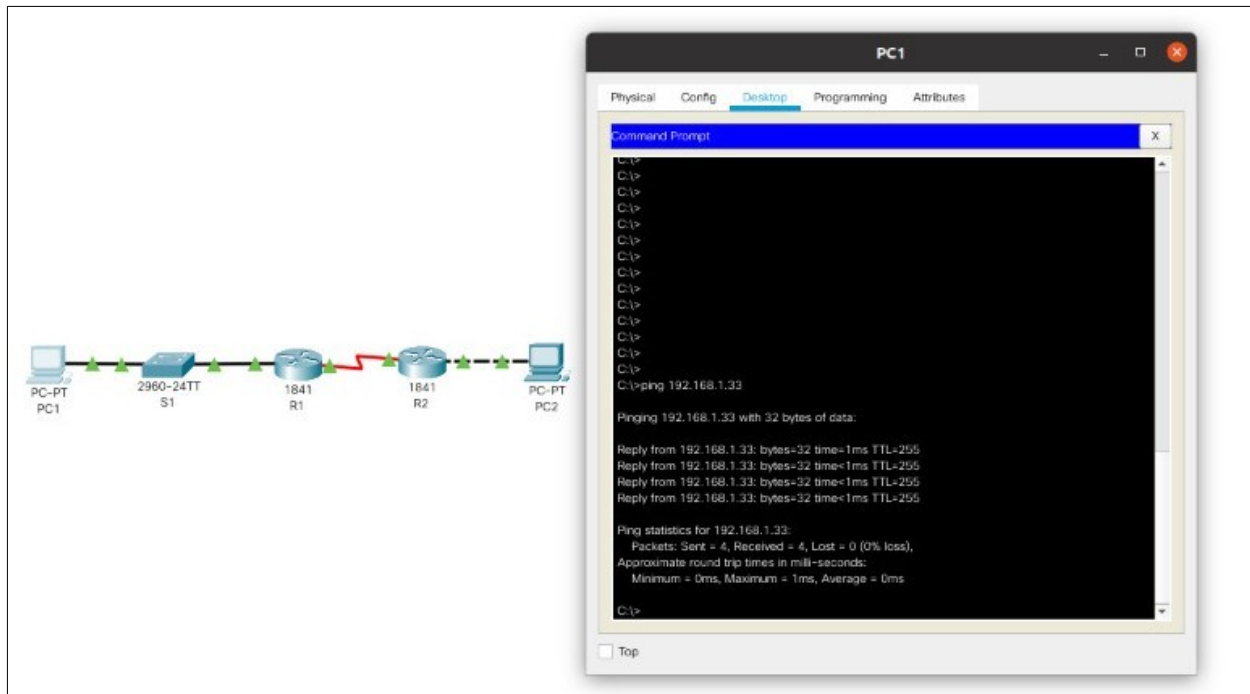




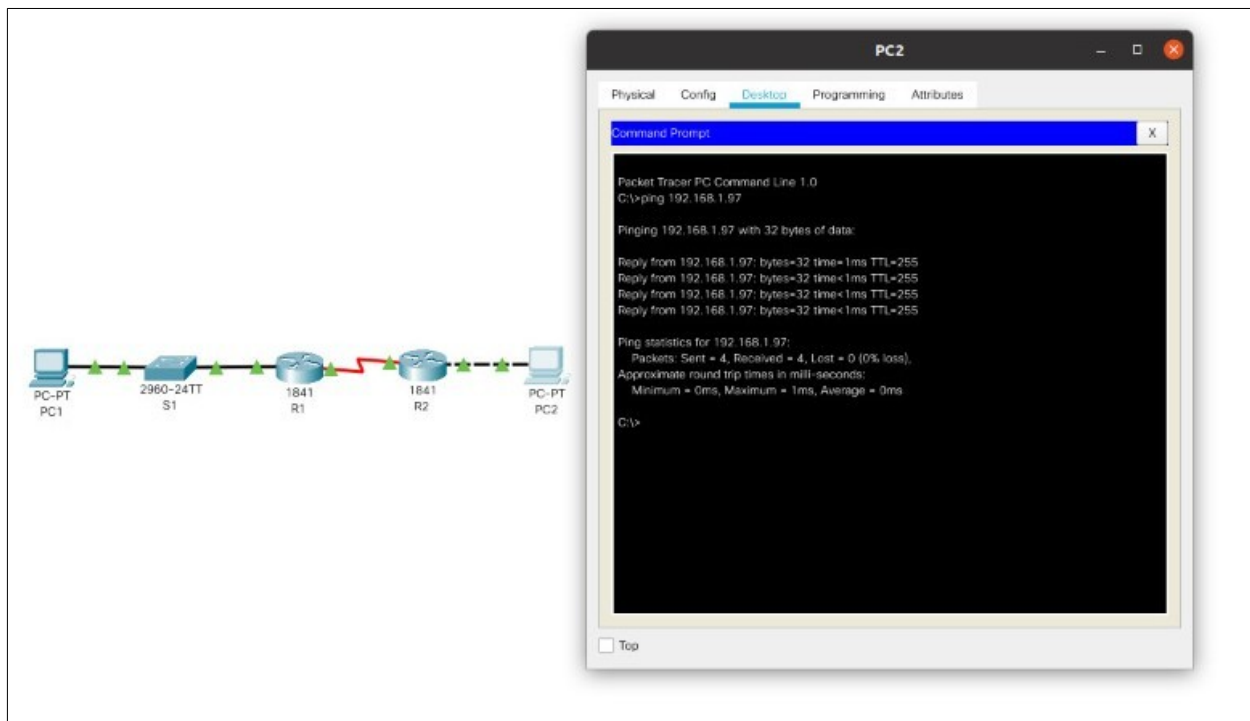
Task 4: Verify the Configurations.

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

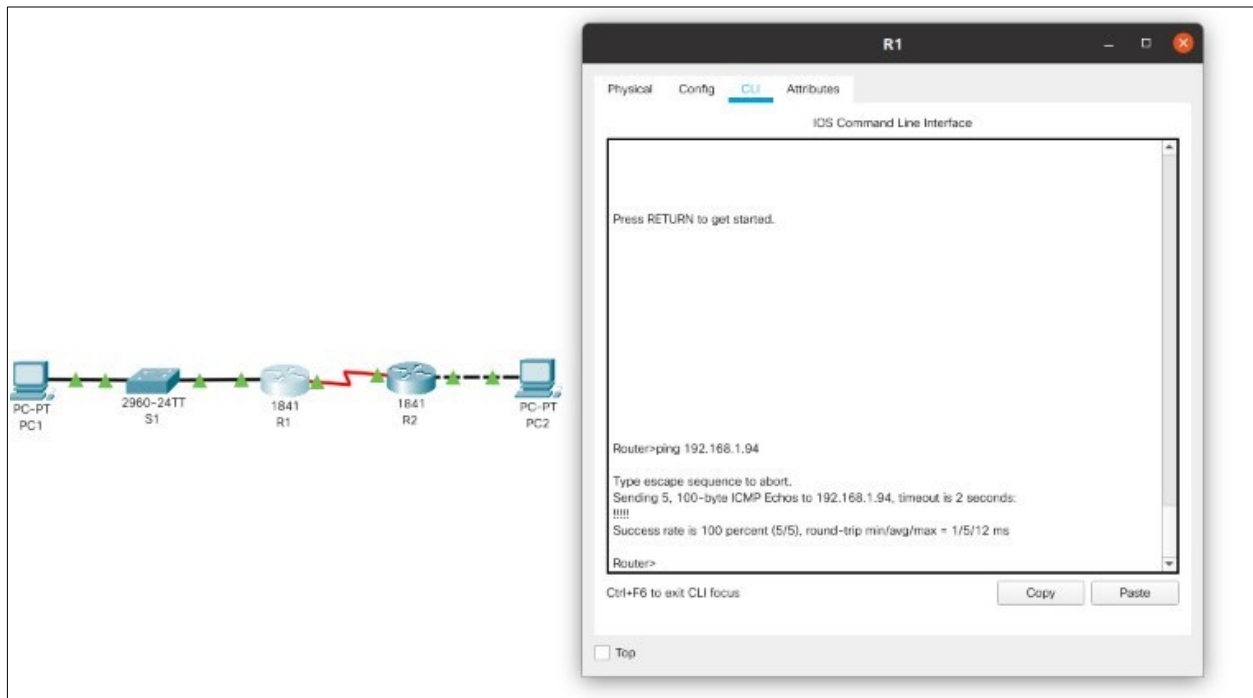
From the host attached to R1, is it possible to ping the default gateway? ___Yes___



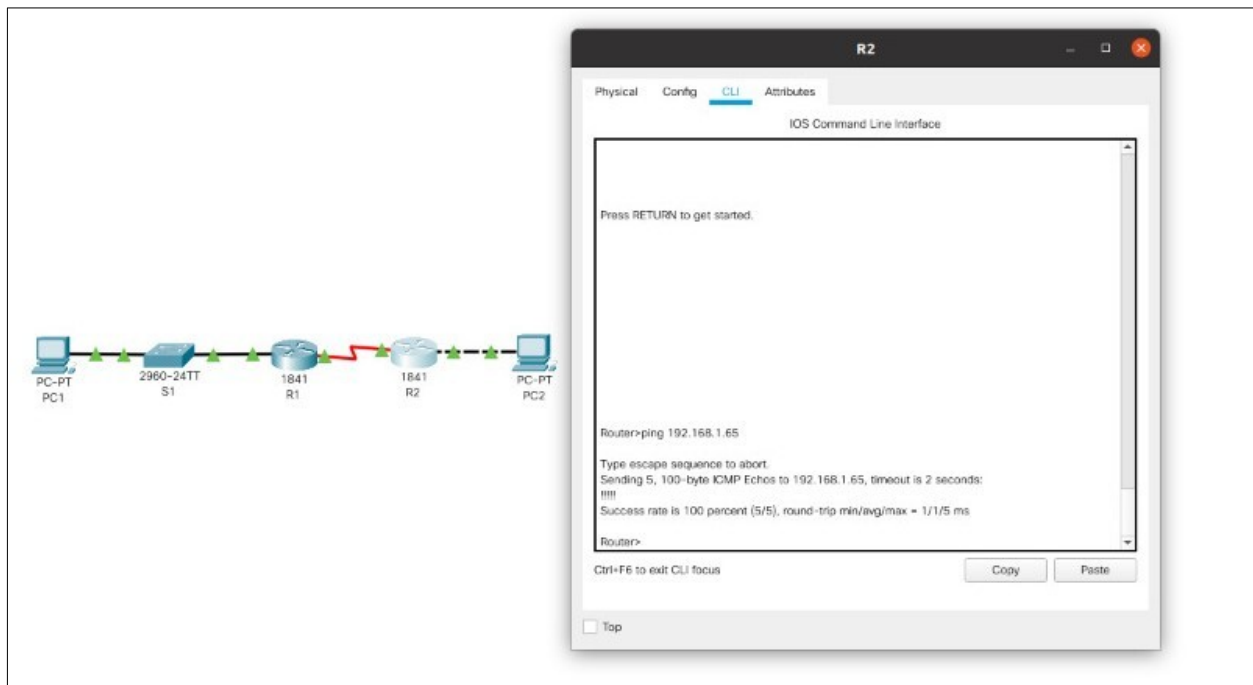
From the host attached to R2, is it possible to ping the default gateway? ___Yes___



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



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

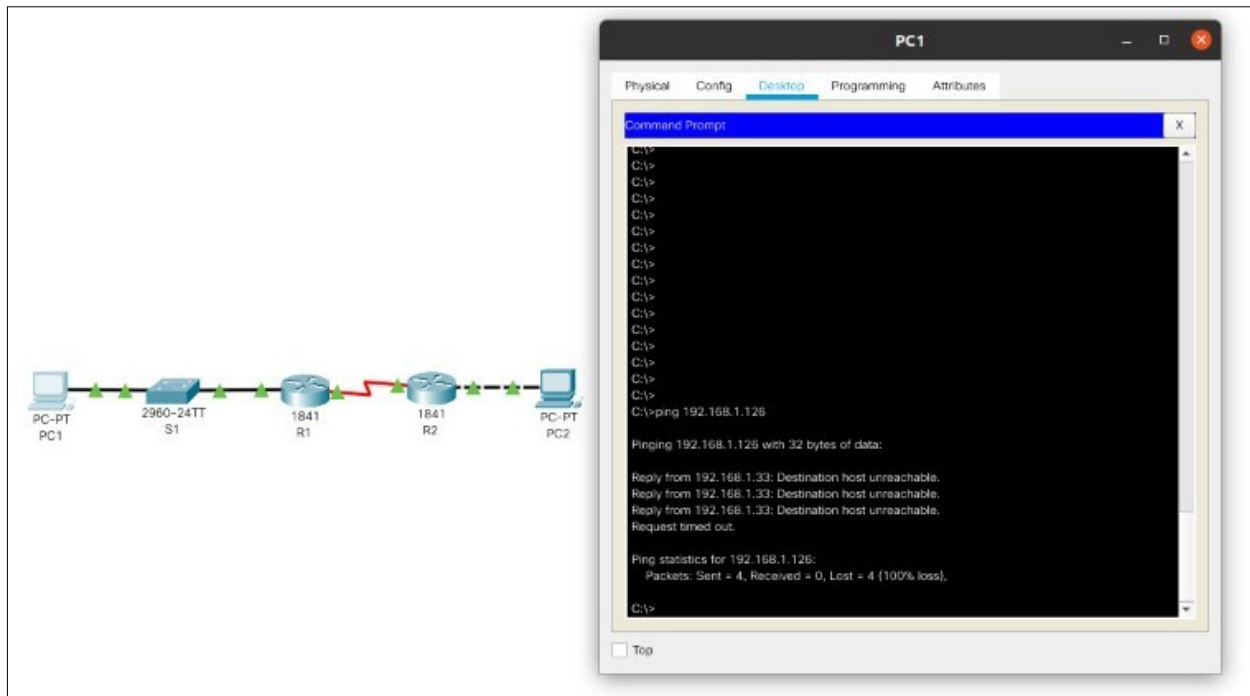


The answer to the above questions should be **yes**. If any of the above pings failed, check your physical connections and configurations.

Task 5: Reflection

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

Ans : We cannot ping PC2 from PC1 or PC1 from PC2



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

Ans : Yes, from different subnet, we can't do ping, we have to configure routing, either static or dynamic