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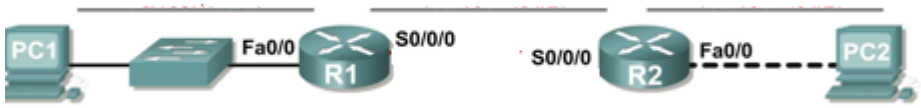
CEL 51, DCCN, Monsoon 2020
Lab 6: Subnet and Router Configuration

Topology Diagram



Addressing Table

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

Learning Objectives

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

- Subnet an address space given requirement.
- Assign appropriate addresses to interfaces and document.
- Configure and activate Serial and Fast Ethernet 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. Total number of address required = 15+1(Networking)+1(Broadcast Address) = 17 (So we consider total 32 hosts with /27)
- The network connected to router R2 will require enough IP addresses to support 30 hosts. Total number of address required = 30+1(Networking)+1(Broadcast Address) = 32 (So we consider total 32 hosts with /27)
- The link between router R1 and router R2 will require IP addresses at each end of the link. Total number of address required = 2+1(Networking)+1(Broadcast Address) = 4 (So we consider total 4 hosts with /30)

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

How many subnets are needed for this network? **3**

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

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

How many usable hosts are there per subnet? **2^5-2 = 30**

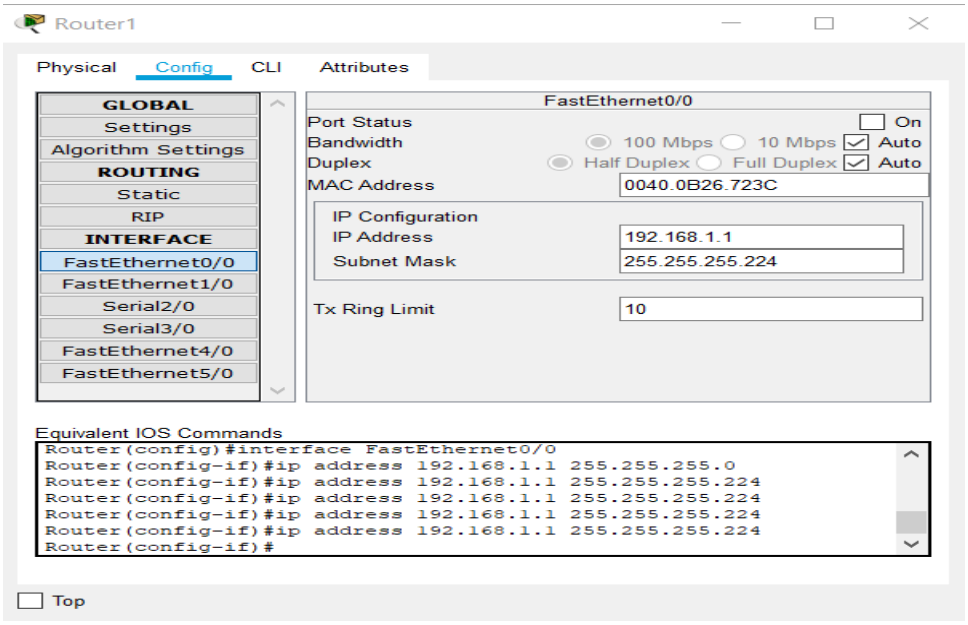
Step 3: Assign sub-network addresses to the Topology Diagram.

1. Assign subnet 1 to the network attached to R1.
2. Assign subnet 2 to the link between R1 and R2.
3. Assign subnet 3 to the network attached to R2.

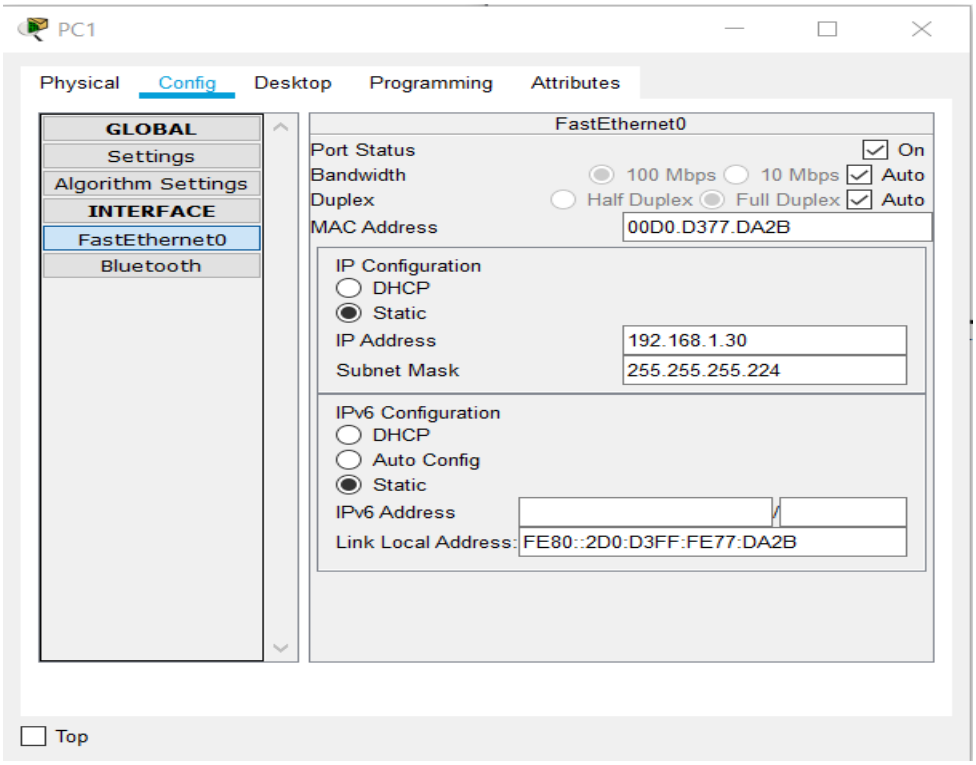
Task 2: Determine Interface Addresses.

Step 1: Assign appropriate addresses to the device interfaces.

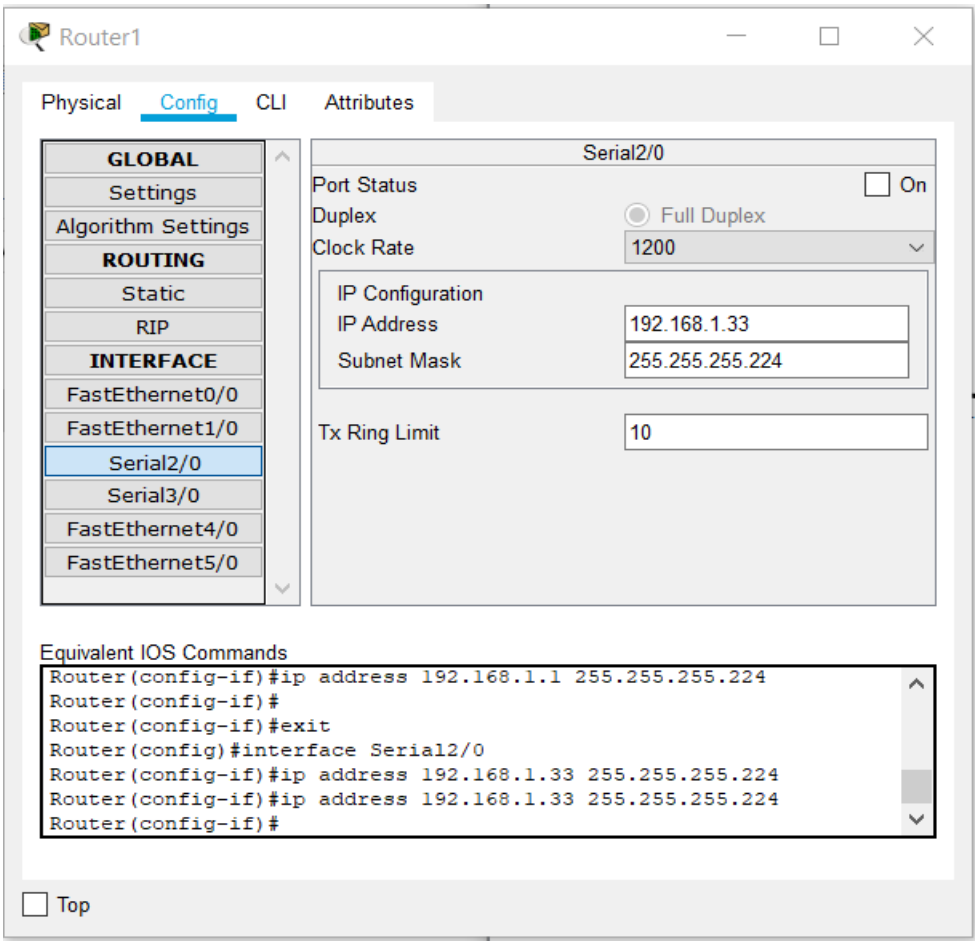
1. Assign the first valid host address in subnet 1 to the LAN interface on R1. **192.168.1.1**



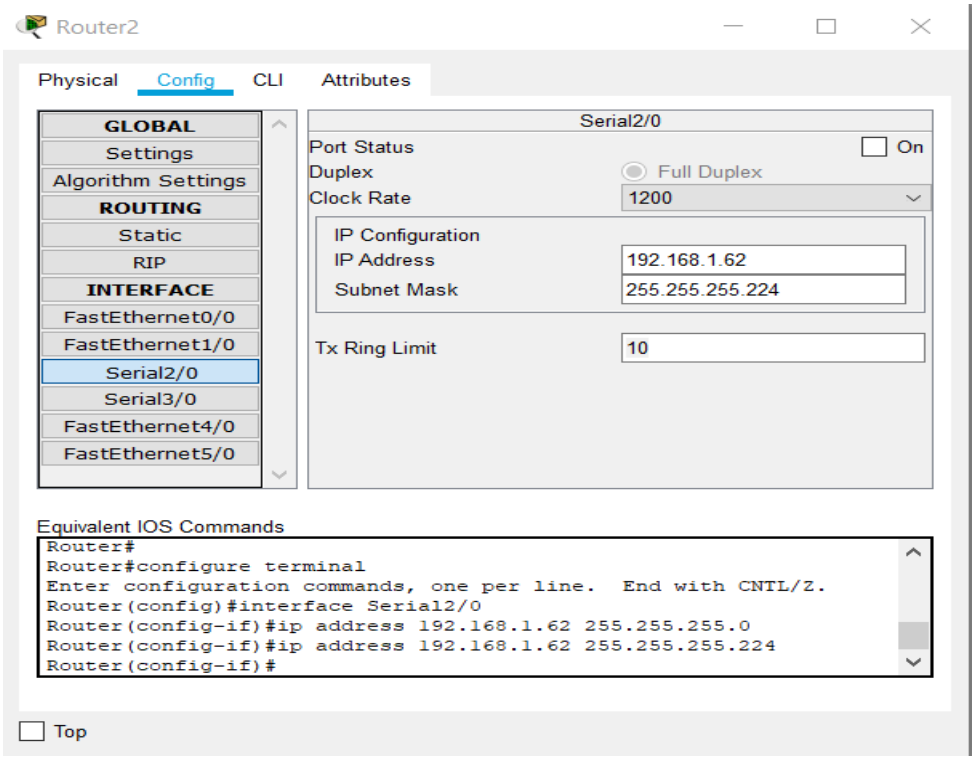
2. Assign the last valid host address in subnet 1 to PC1. **192.168.1.30**



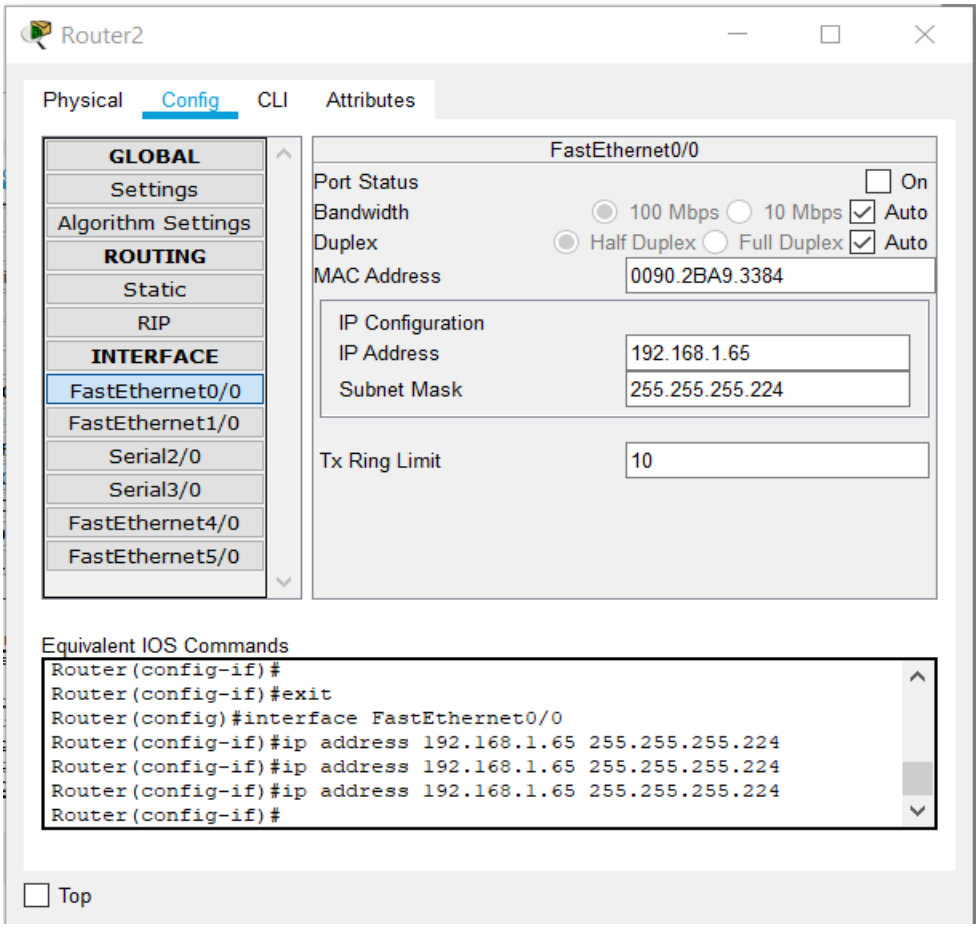
3. Assign the first valid host address in subnet 2 to the WAN interface on R1. **192.168.1.33**



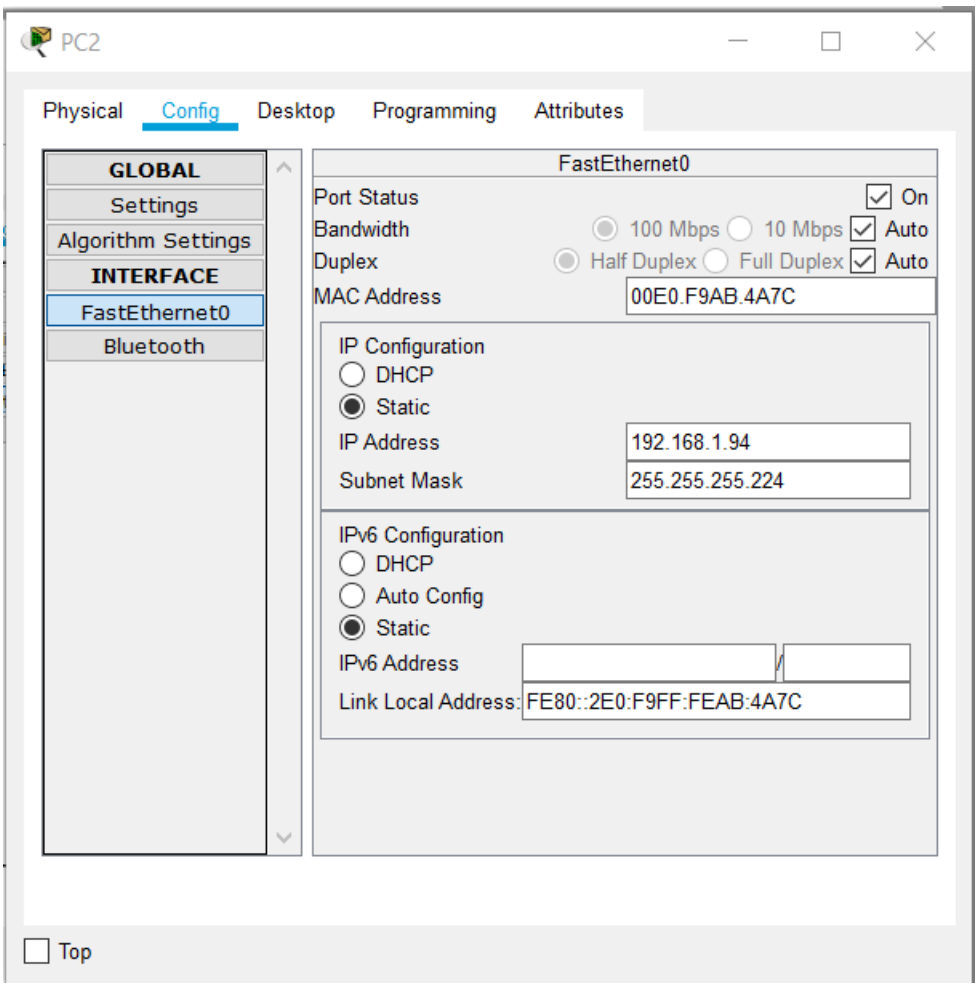
4. Assign the last valid host address in subnet 2 to the WAN interface on R2. **192.168.1.62**



5. Assign the first valid host address in subnet 3 to the LAN interface of R2. **192.168.1.65**

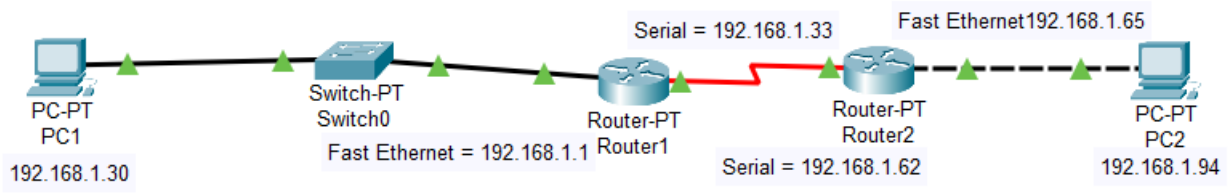


6. Assign the last valid host address in subnet 3 to PC2. **192.168.1.94**



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

Below is the arrangement that we get after doing the required configurations regarding the address.

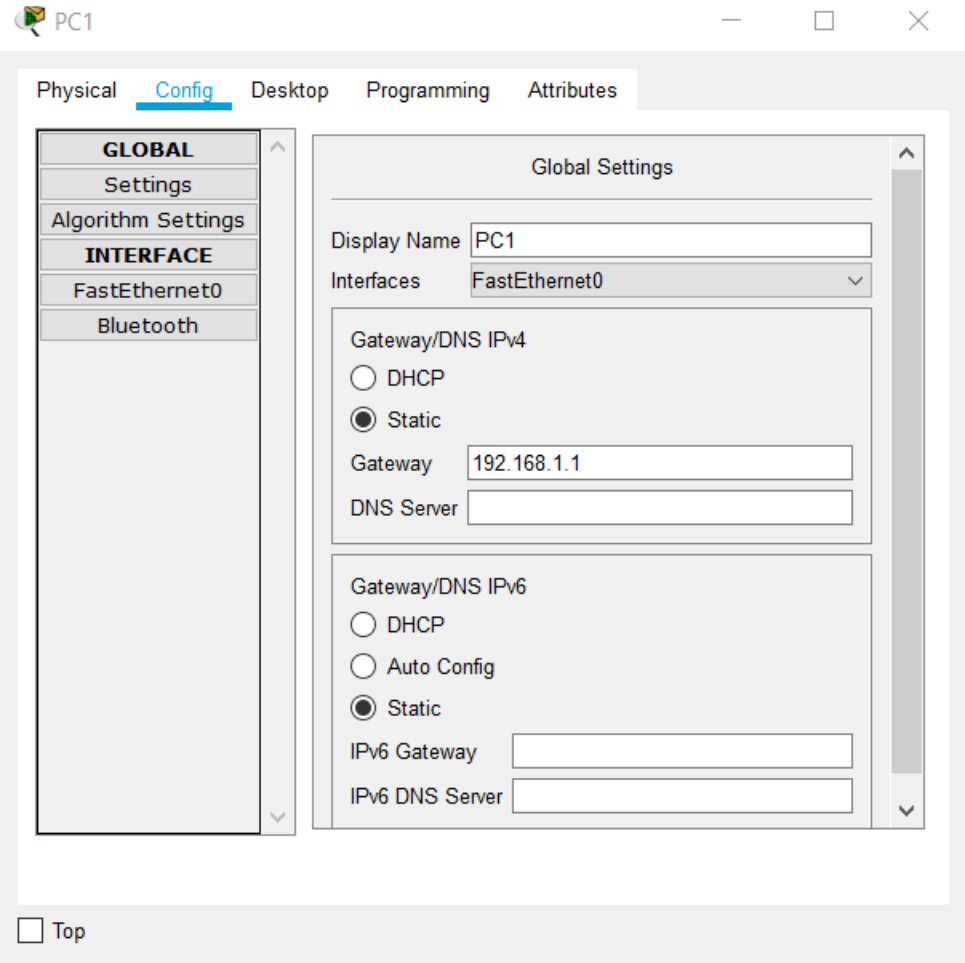


Task 3: Configure the Serial and Fast Ethernet Addresses.

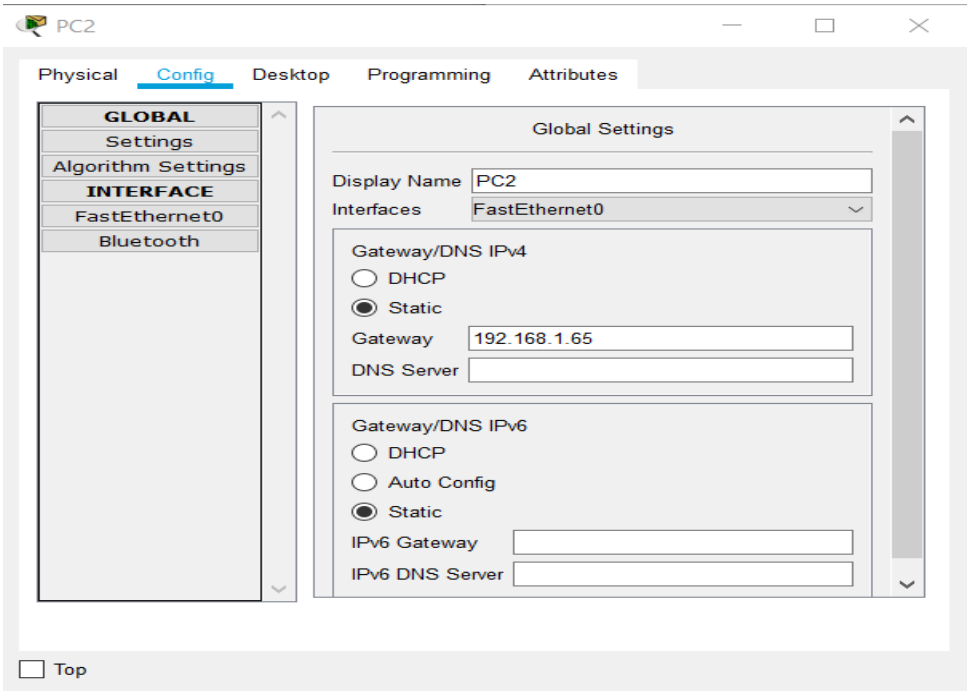
Step 1: Configure the router interfaces.

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.

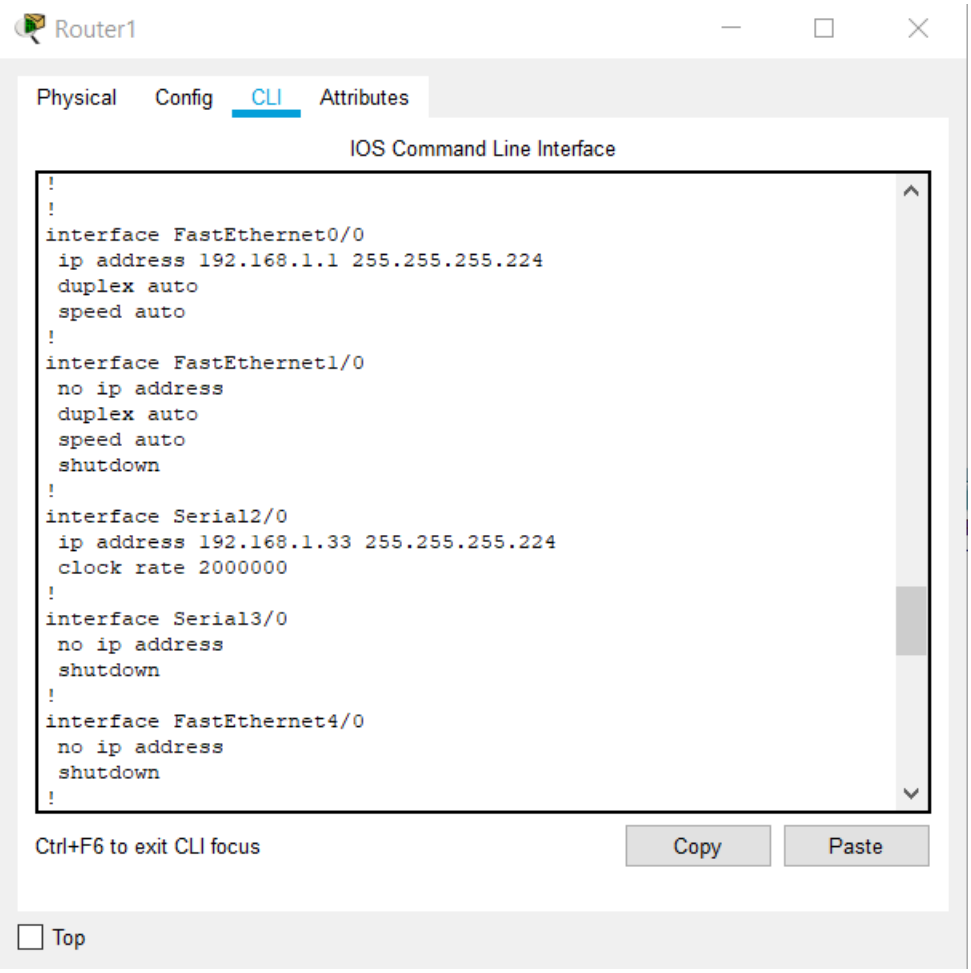
Configuring the Default Gateway for PC1 **192.168.1.1**



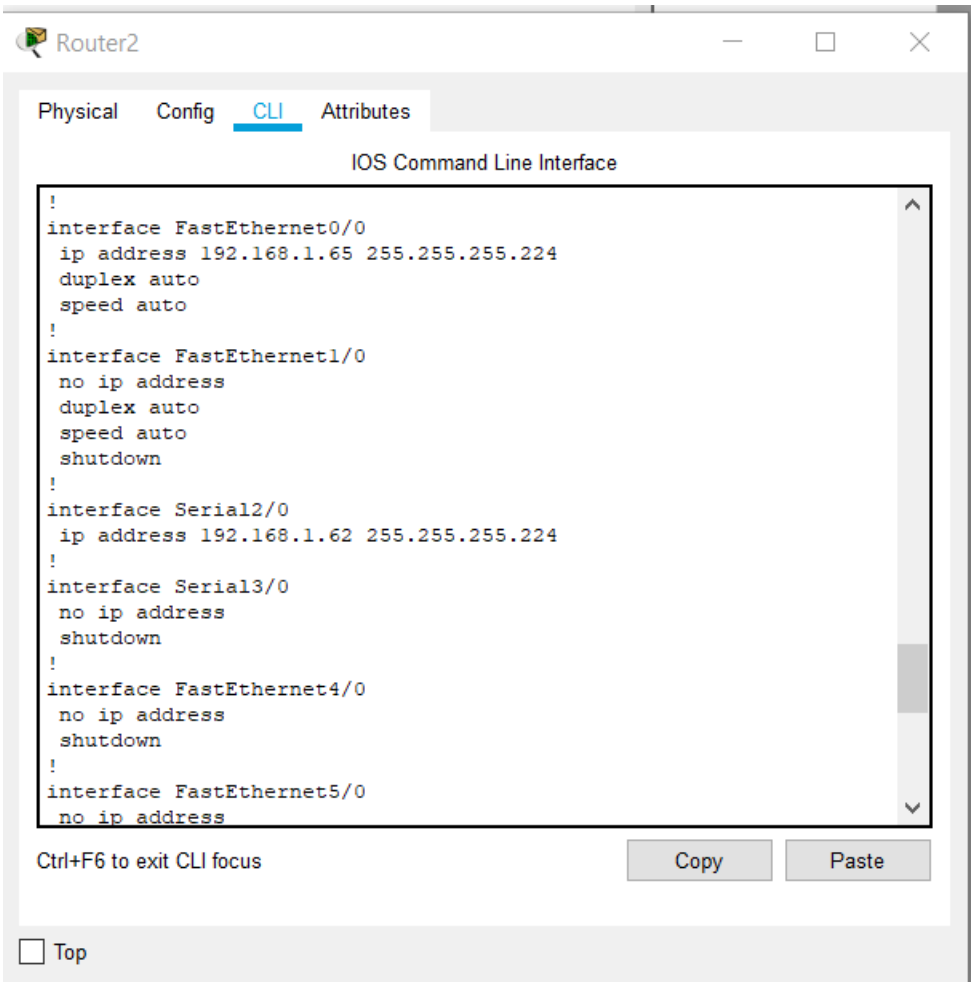
Configuring the default gateway for PC2 **192.168.1.65**



Running the **copy run start** command for **R1**



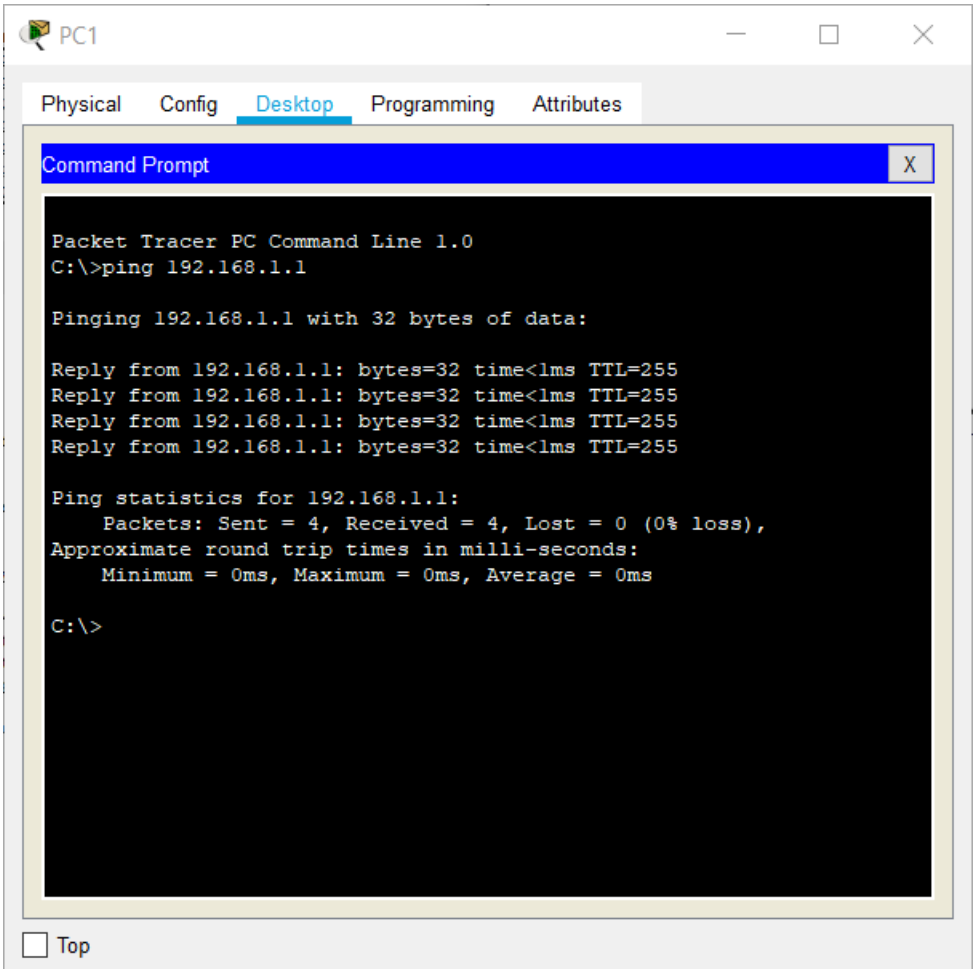
Running the **copy run start** command for **R2**



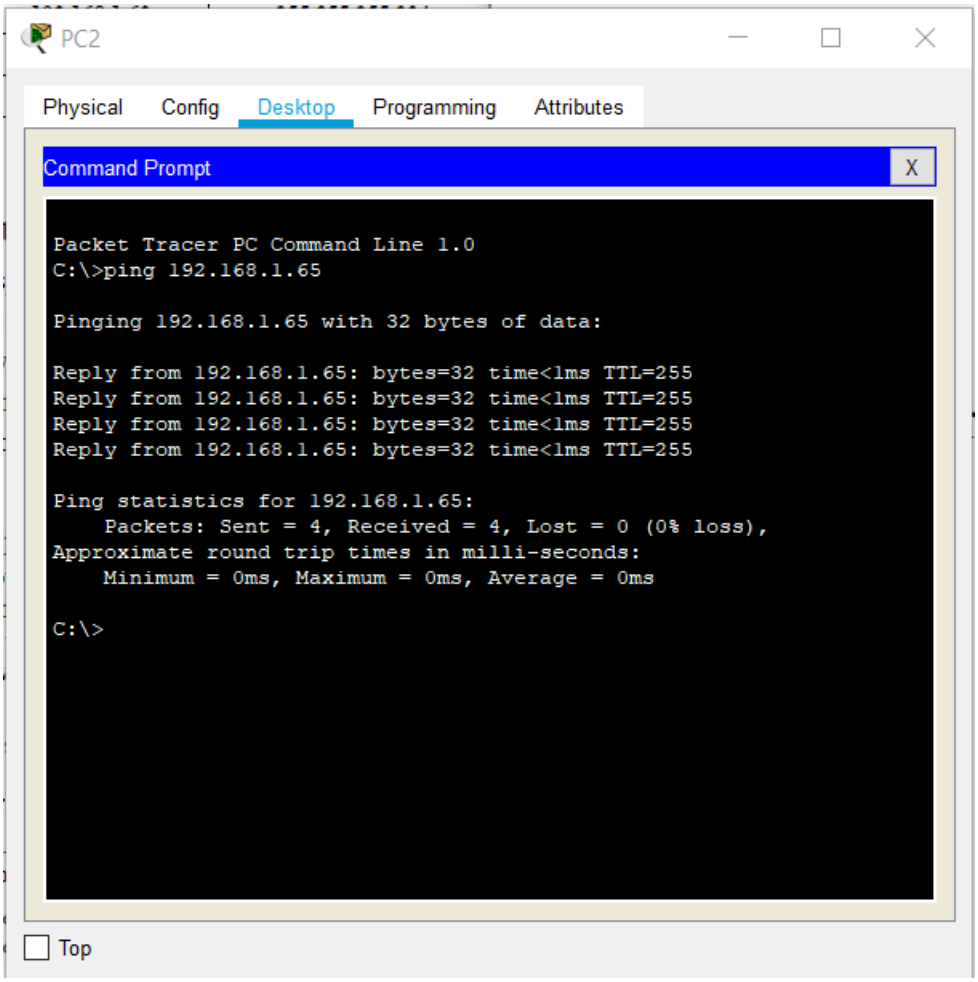
Task 4: Verify the Configurations.

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

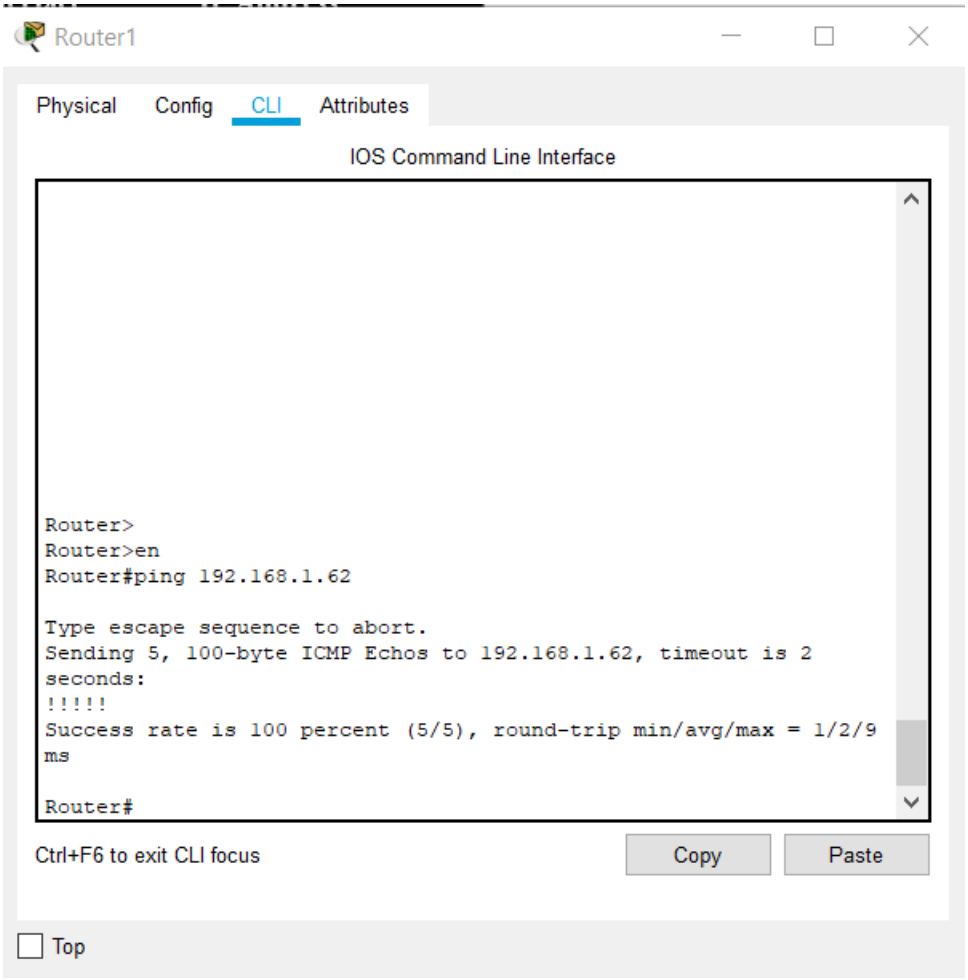
From the host attached to R1, is it possible to ping the default gateway? **Yes**



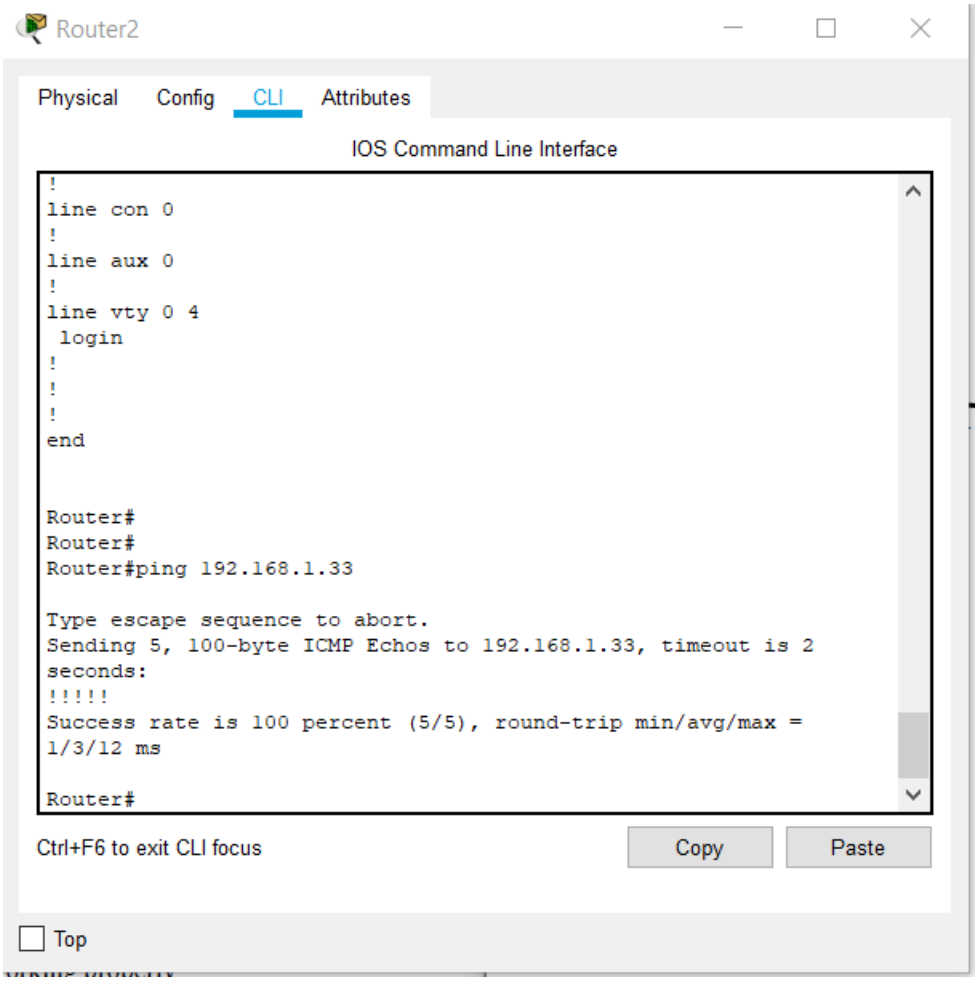
From the host attached to R2, is it possible to ping the default gateway? **Yes**



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**



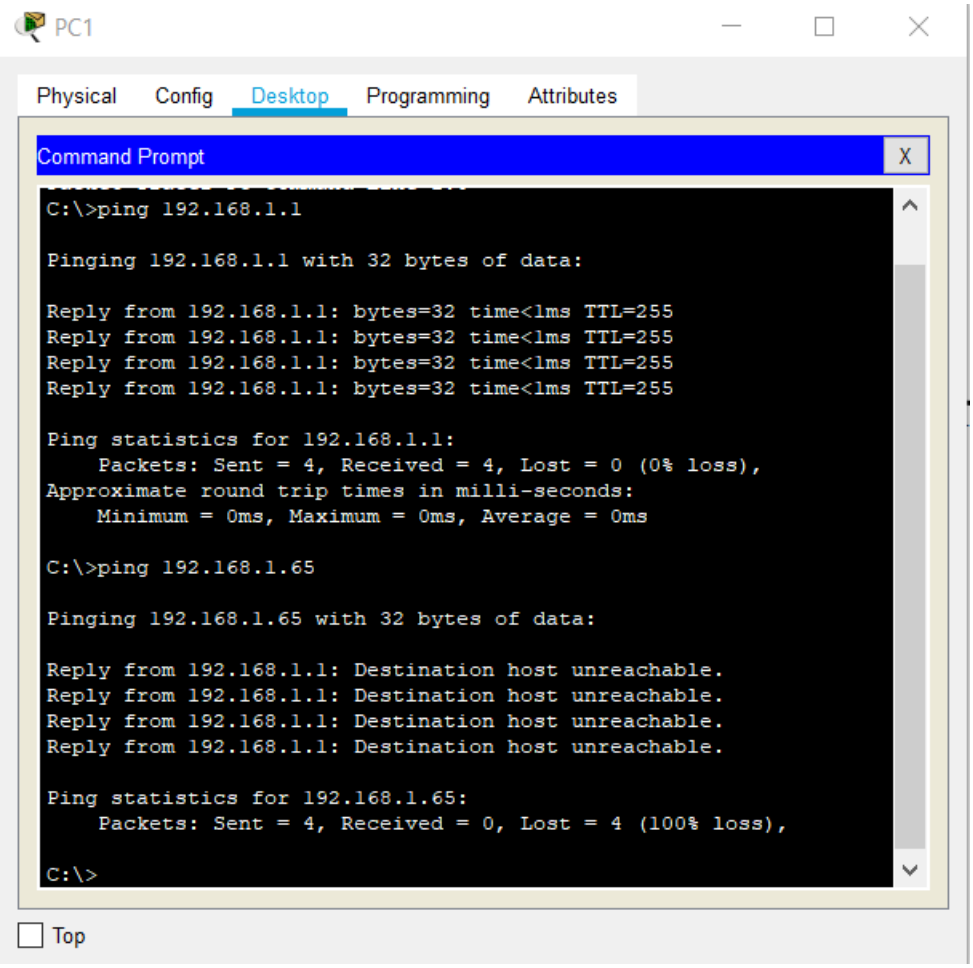
The answer to the above questions should be **yes**. If any of the above pings failed, check your physical connections and configurations.

Task 5: Reflection

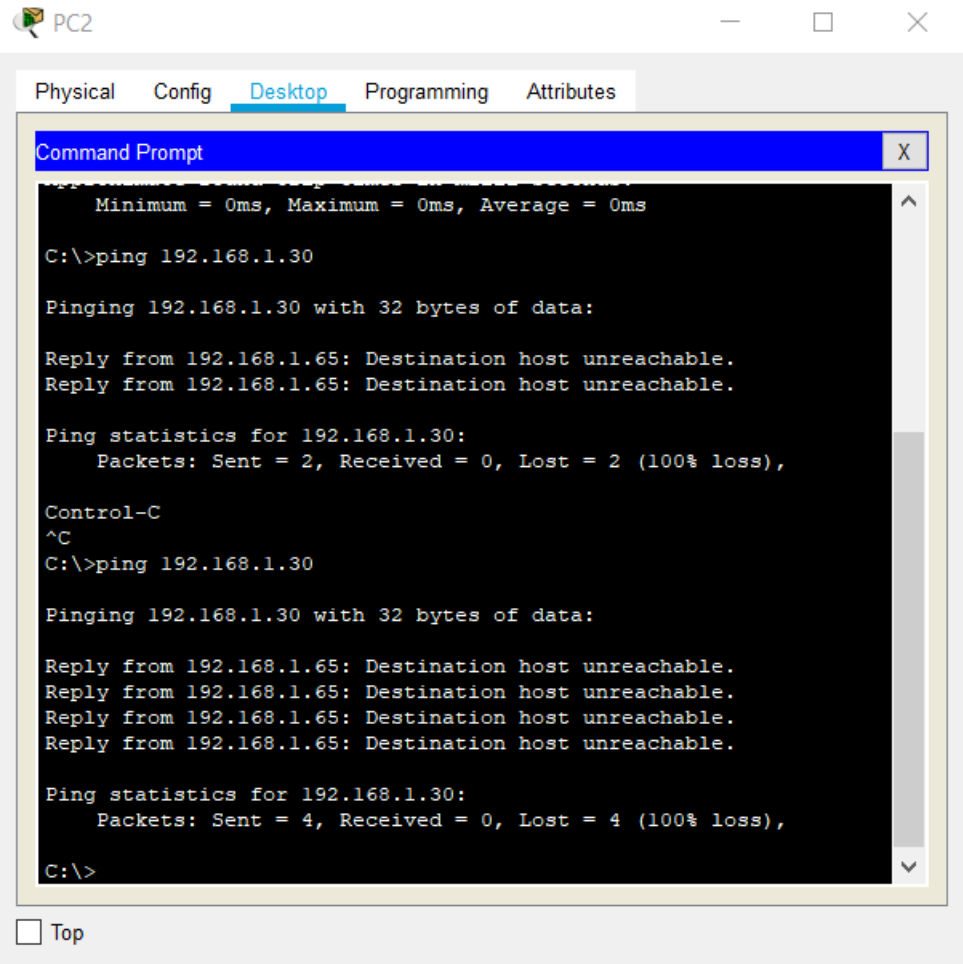
Are there any devices on the network that cannot ping each other?

Devices that are not the part of the same network cannot ping each other.

We cannot ping the PC1 [192.168.1.65] from the PC0 [192.168.1.30]



We cannot ping the PC0[192.168.1.30] from the PC1[192.168.1.65]



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

The thing that is missing is the routing protocol that would help to ping between those devices. This routing protocol must be set-up on the routers to mask the PC's on either side. So, like for example if PC0 [192.168.1.33] wants to ping the PC1 [192.168.1.65] then it must first transfer its packet to Router1 which translates it to Router2 and then its translated to PC1.