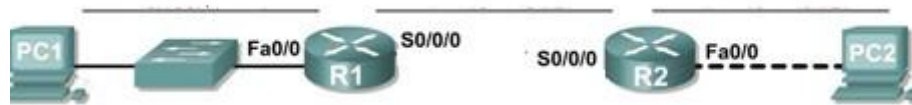


Topology Diagram



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 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? 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.

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.

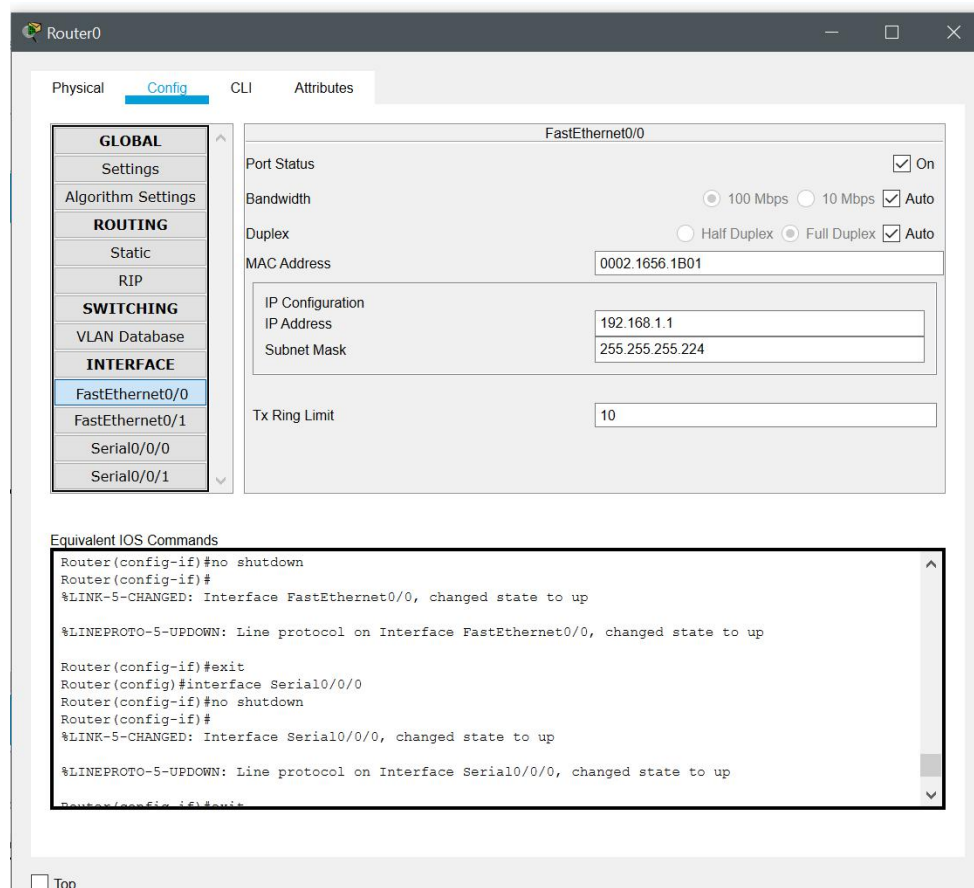


Fig 1: Fa0/0 config of R1

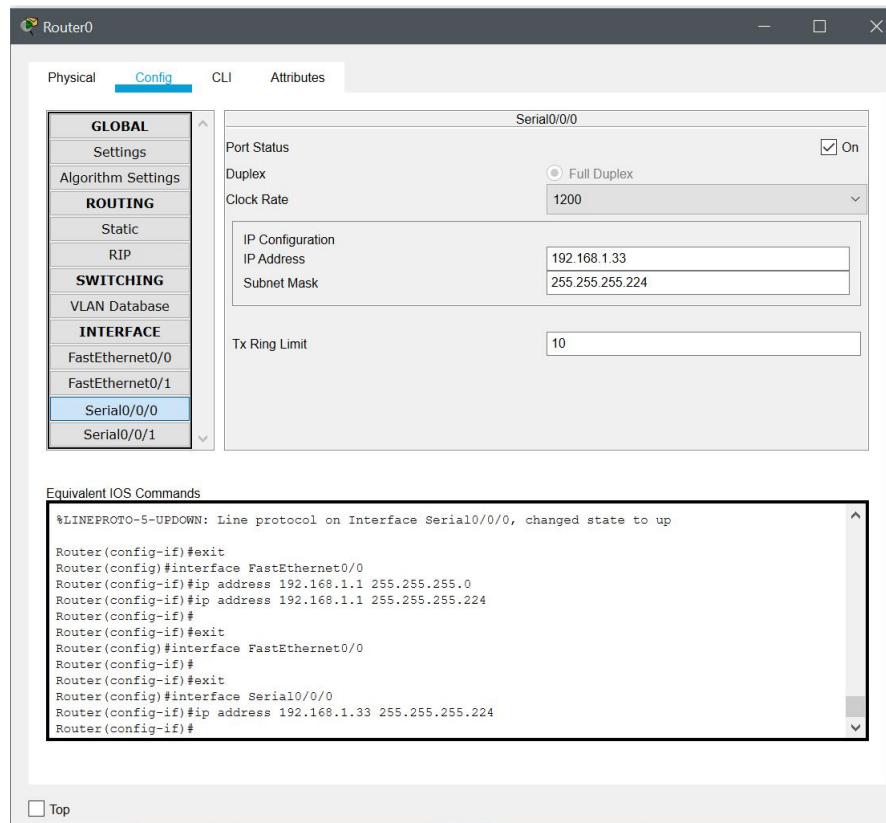


Fig 2: S0/0 config of R1

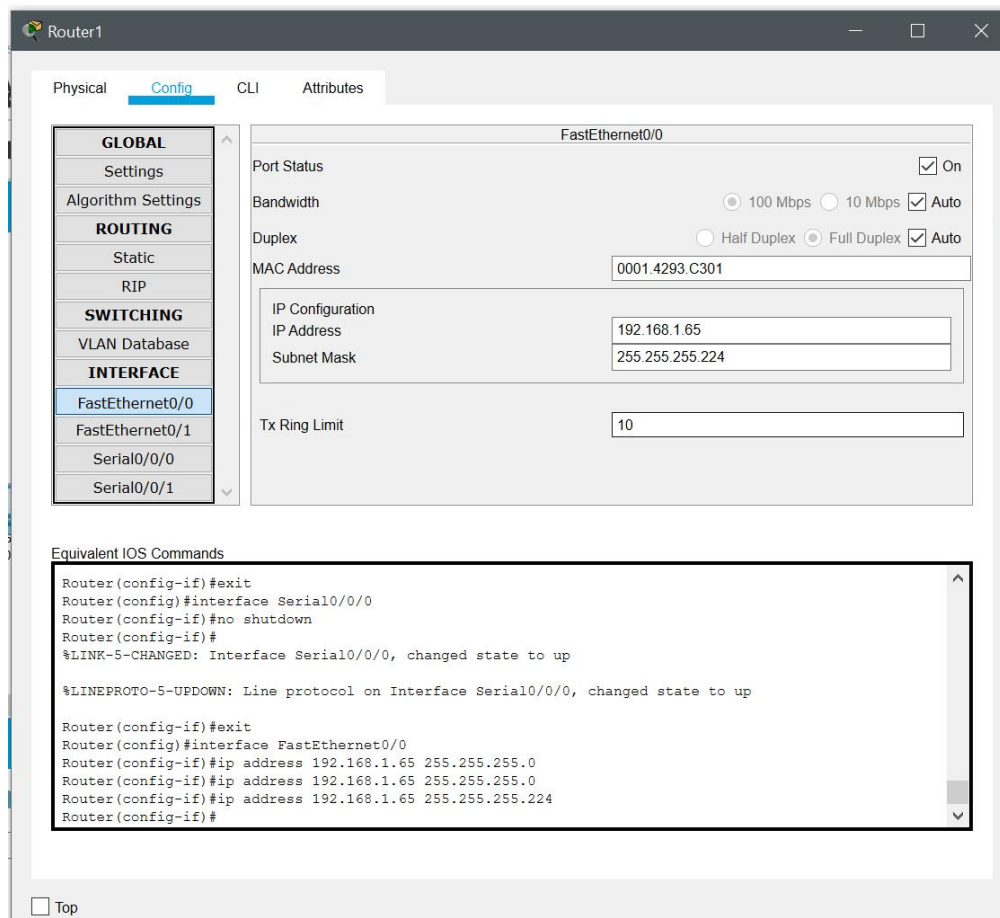


Fig 3: Fa0/0 config of R2

R2

Physical **Config** CLI Attributes

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 ☐ On

Duplex ☒ Full Duplex

Clock Rate 2000000

IP Configuration

IPv4 Address 192.168.1.62

Subnet Mask 255.255.255.224

Tx Ring Limit 10

Equivalent IOS Commands

```
Router(config-if)#ip address 192.168.1.65 255.255.255.224
Router(config-if)#ip address 192.168.1.65 255.255.255.224
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/0/0
Router(config-if)#ip address 192.168.1.62 255.255.255.224
Router(config-if)#
```

☐ Top

Fig 4: S0/0 config of R2

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.

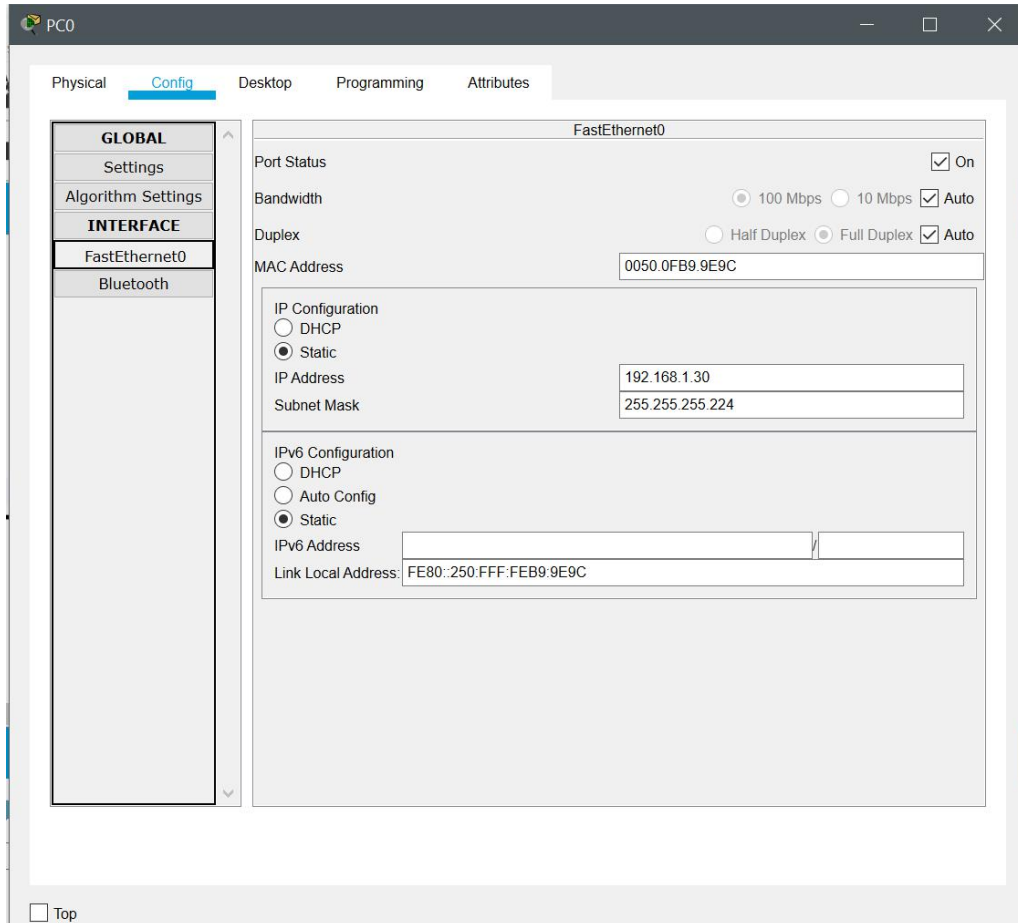


Fig 5: Fa0 interface for PC1

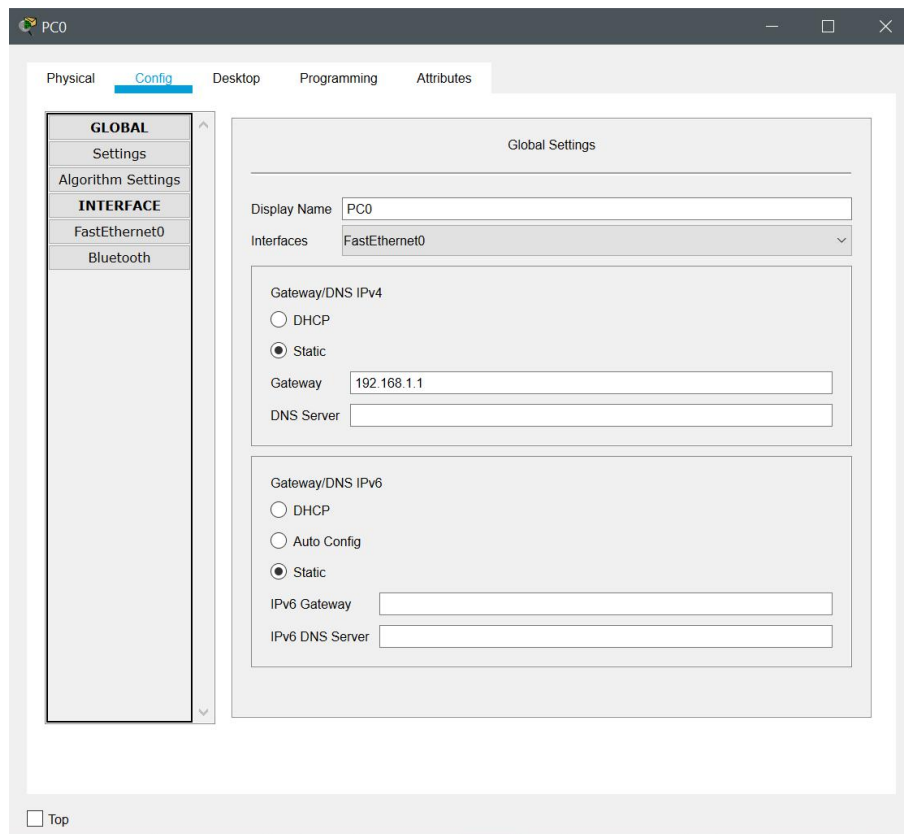


Fig 6: PC1 default gateway

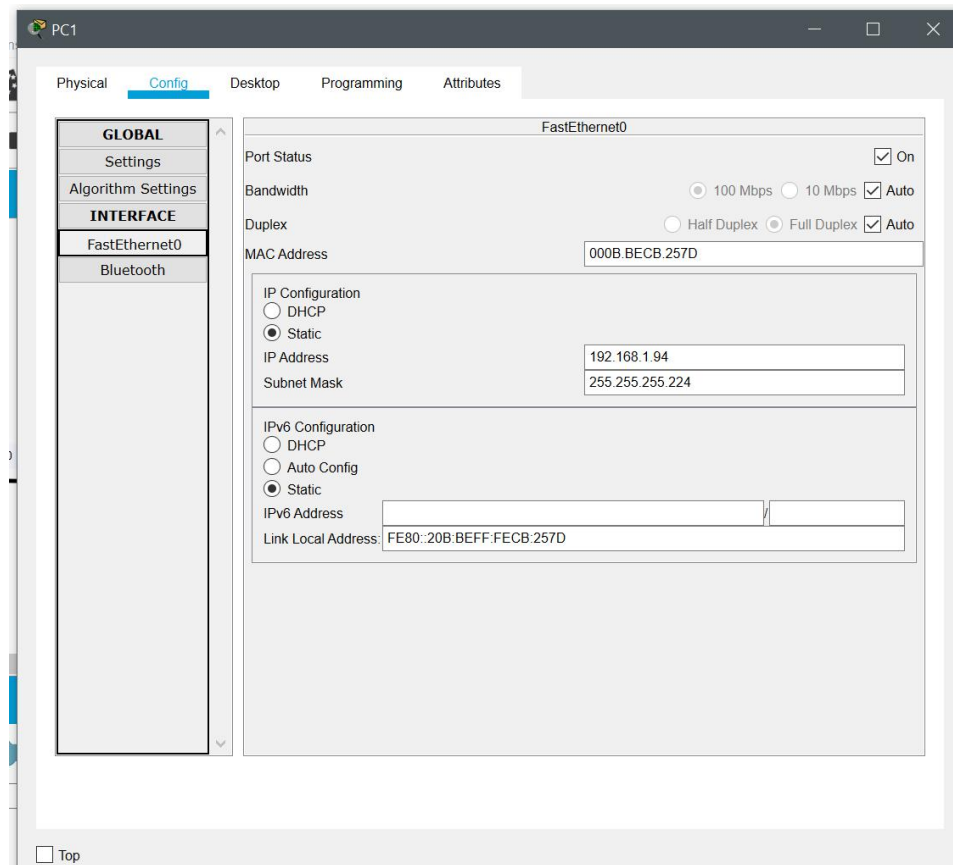


Fig 7: Fa0 interface for PC2

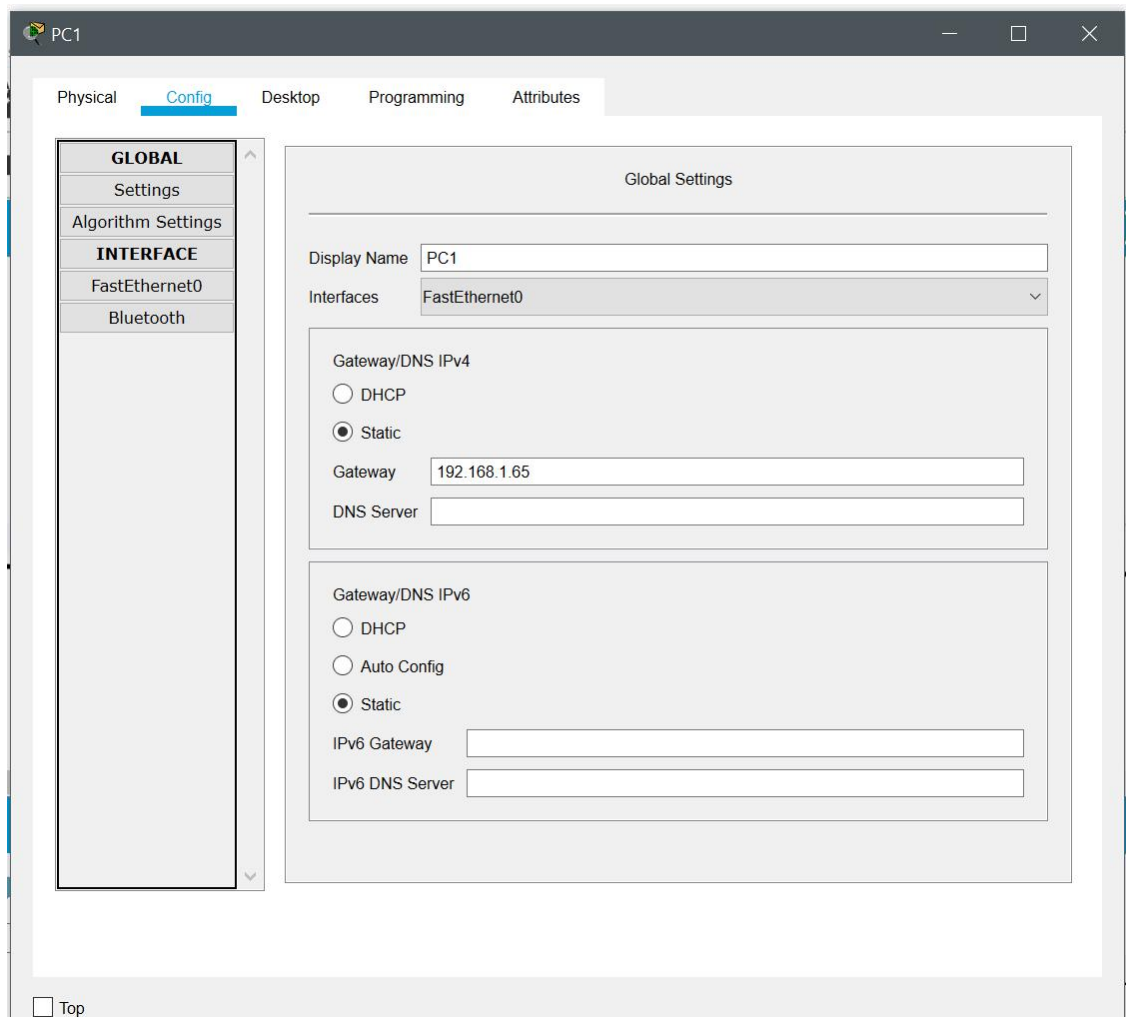


Fig 8: Default gateway of PC2

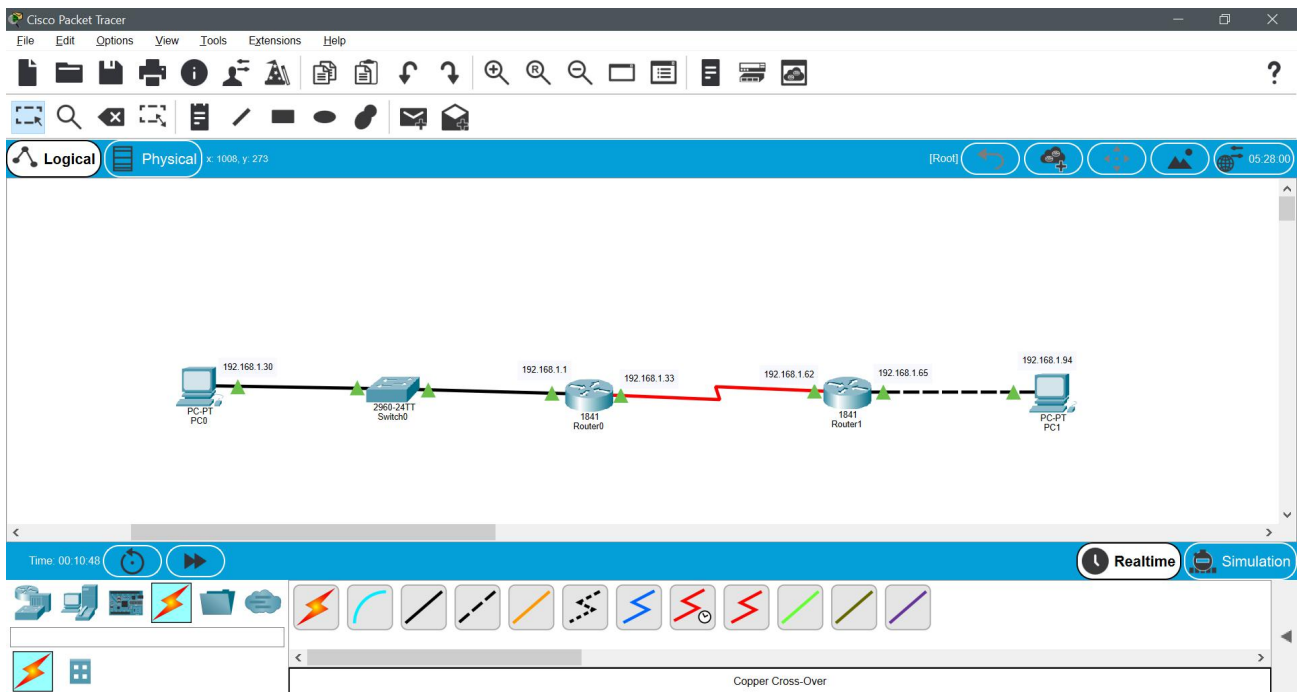
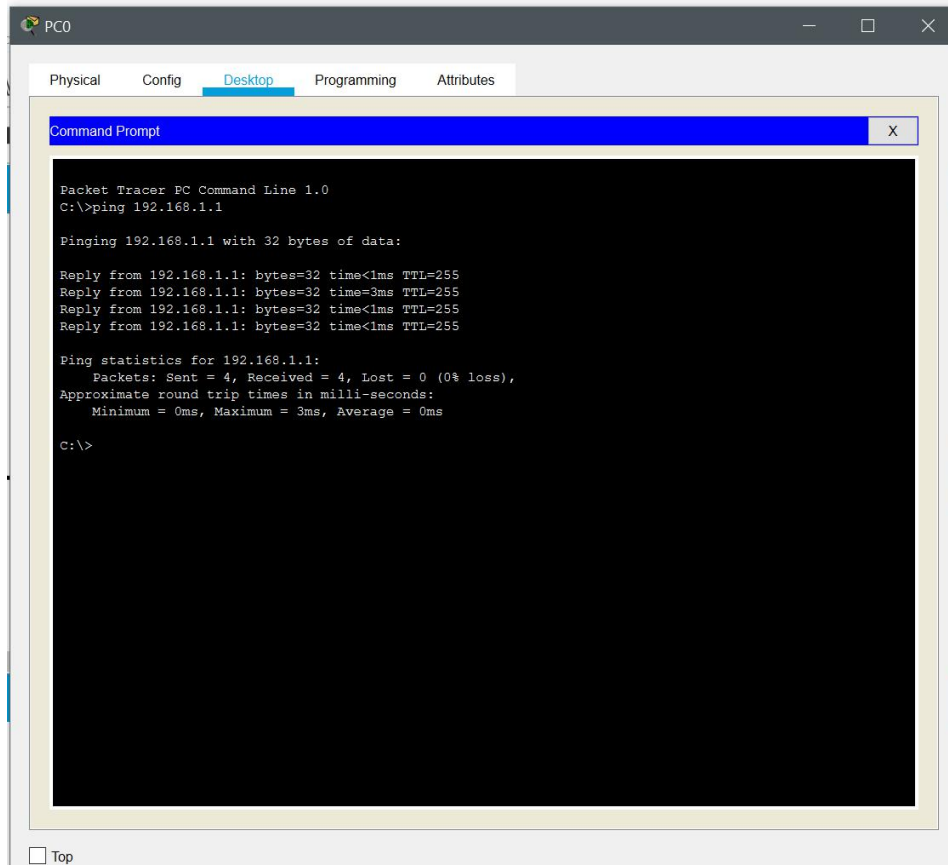


Fig 9: Final network after setup

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



The screenshot shows a Packet Tracer interface for PC0. The 'Desktop' tab is selected, displaying a 'Command Prompt' window. The command prompt shows the execution of a ping command to 192.168.1.1, which is successful. The output includes details about the data size (32 bytes), time (less than 1ms), and TTL (255) for each of the four packets sent. The statistics show 4 packets sent, 4 received, and 0% loss.

```
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.1

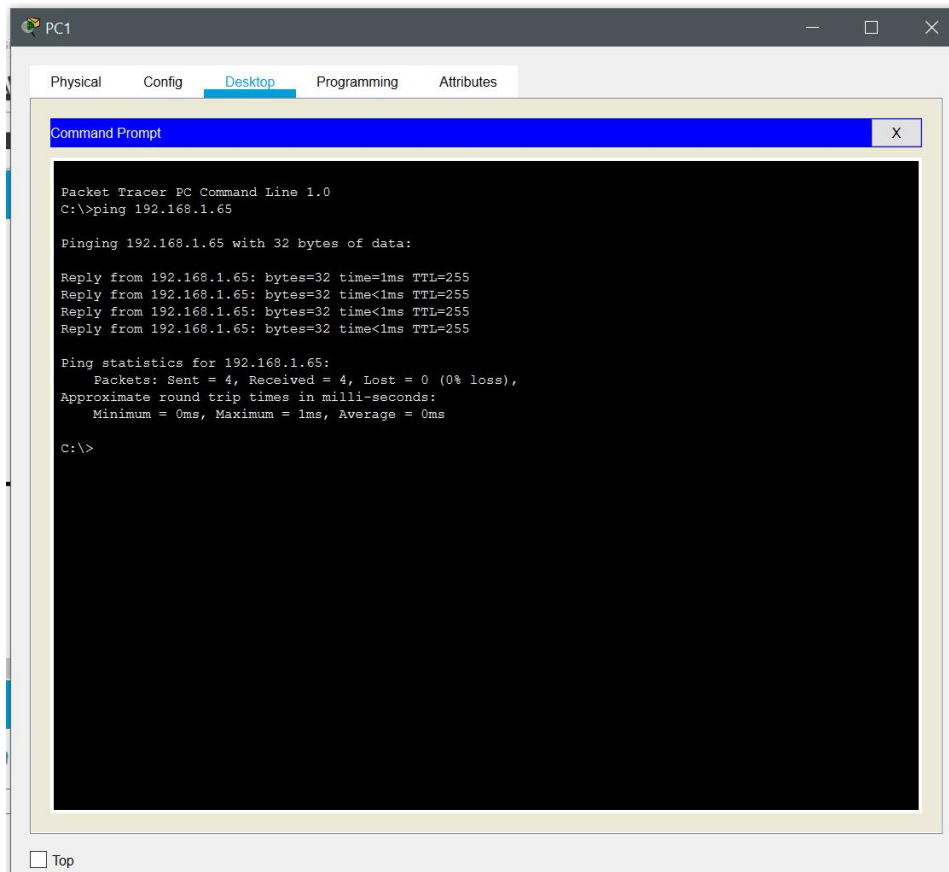
Pinging 192.168.1.1 with 32 bytes of data:

Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time=3ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 3ms, Average = 0ms

C:\>
```

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



The screenshot shows a Packet Tracer interface for PC1. The 'Desktop' tab is active, displaying a 'Command Prompt' window. The command prompt shows the execution of a ping command to 192.168.1.65, which is successful. The output includes the command, the data being pinged, four successful replies with 1ms response times, and ping statistics showing 0% loss.

```
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.65

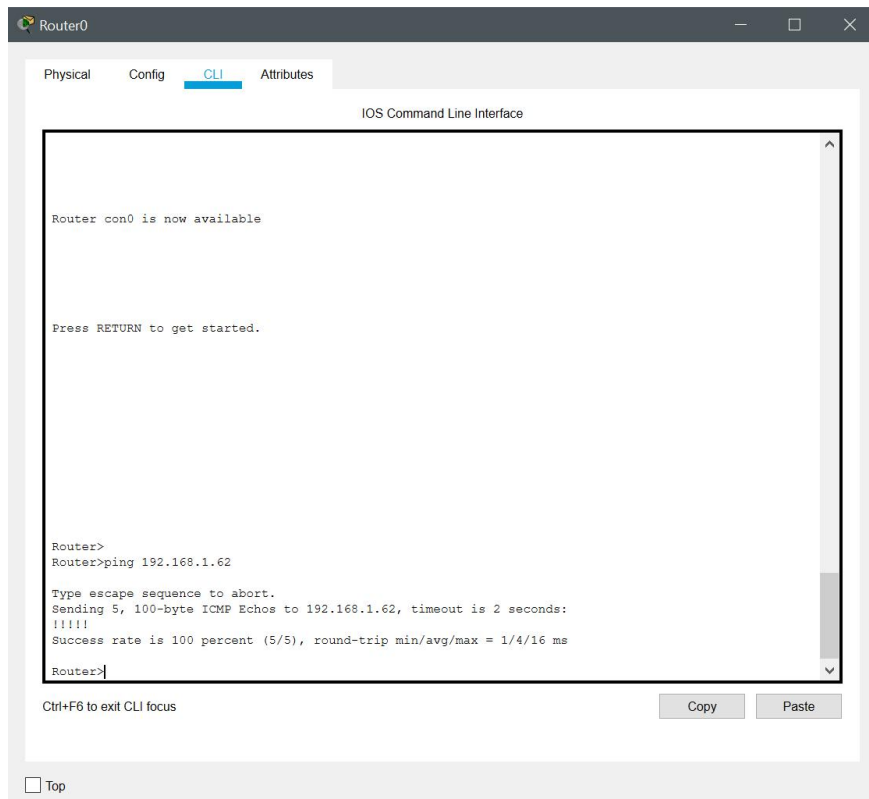
Pinging 192.168.1.65 with 32 bytes of data:

Reply from 192.168.1.65: bytes=32 time=1ms TTL=255
Reply from 192.168.1.65: bytes=32 time<1ms TTL=255
Reply from 192.168.1.65: bytes=32 time<1ms TTL=255
Reply from 192.168.1.65: bytes=32 time<1ms TTL=255

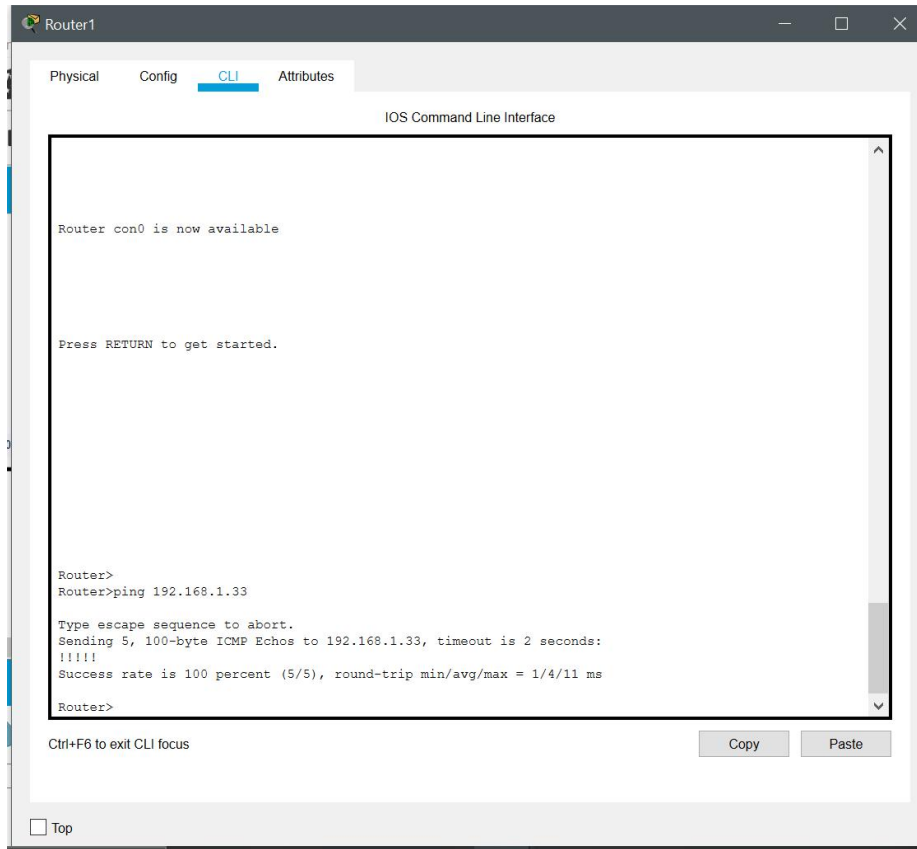
Ping statistics for 192.168.1.65:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>
```

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

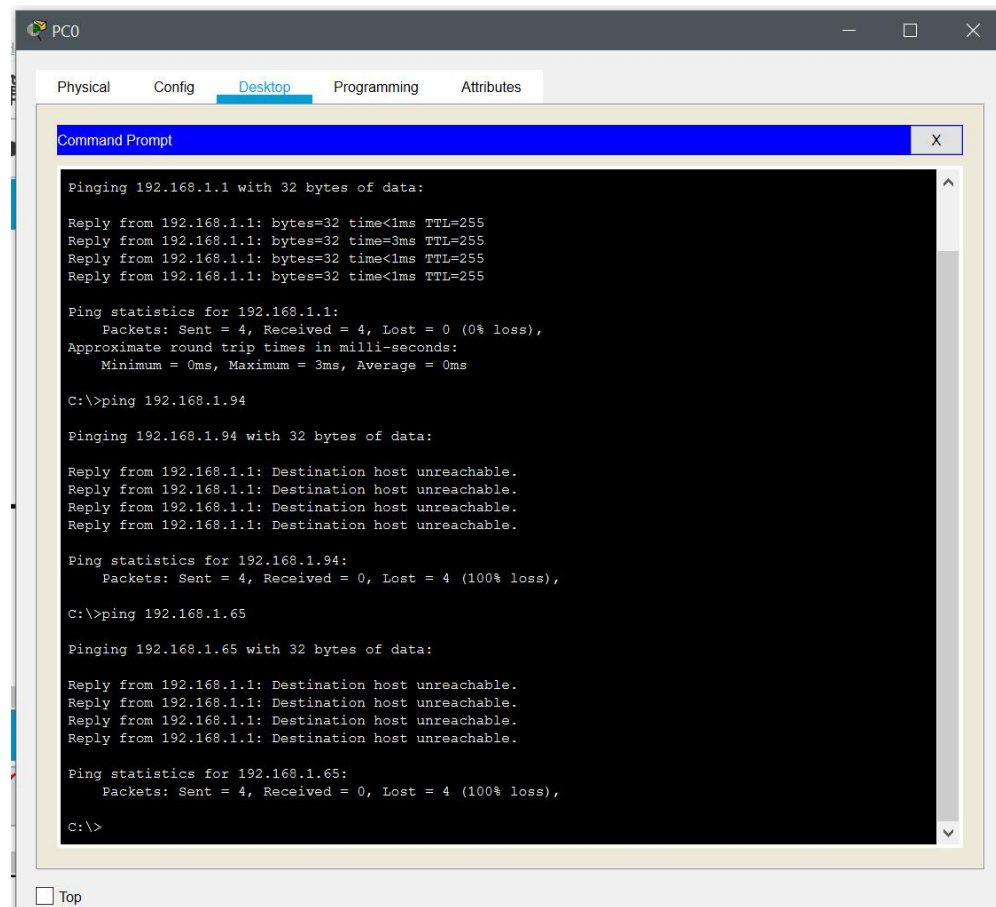


The answer to the above questions should be **yes**. If any of the above pings failed, check your physical connections and configurations.

Task 5: Reflection

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

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



The screenshot shows a PC0 Desktop window with a Command Prompt open. The Command Prompt displays the results of several ping commands. The first ping is to 192.168.1.1, which is successful. The second ping is to 192.168.1.94, which fails with 'Destination host unreachable'. The third ping is to 192.168.1.65, which also fails with 'Destination host unreachable'.

```
PC0
Physical Config Desktop Programming Attributes
Command Prompt
Pinging 192.168.1.1 with 32 bytes of data:
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time=3ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 3ms, Average = 0ms

C:\>ping 192.168.1.94

Pinging 192.168.1.94 with 32 bytes of data:
Reply from 192.168.1.1: Destination host unreachable.
Reply from 192.168.1.1: Destination host unreachable.
Reply from 192.168.1.1: Destination host unreachable.
Reply from 192.168.1.1: Destination host unreachable.

Ping statistics for 192.168.1.94:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 192.168.1.65

Pinging 192.168.1.65 with 32 bytes of data:
Reply from 192.168.1.1: Destination host unreachable.
Reply from 192.168.1.1: Destination host unreachable.
Reply from 192.168.1.1: Destination host unreachable.
Reply from 192.168.1.1: Destination host unreachable.

Ping statistics for 192.168.1.65:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

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

Switch