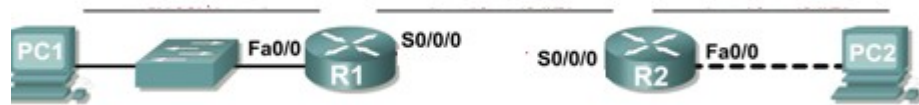


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Lab 6: Subnet and Router Configuration

Topology Diagram



Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	Fa0/0	192.168.1.1	255.255.255.192	N/A
	S0/0/0	192.168.1.65	255.255.255.192	N/A
R2	Fa0/0	192.168.1.129	255.255.255.192	N/A
	S0/0/0	192.168.1.126	255.255.255.192	N/A
PC1	NIC	192.168.1.62	255.255.255.192	192.168.1.1
PC2	NIC	192.168.1.190	255.255.255.192	192.168.1.129

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 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.
- 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? 255.255.255.192

What is the subnet mask for the network in slash format? /26

How many usable hosts are there per subnet? $2^6 - 2 = 62$

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.
192.168.1.62
3. Assign the first valid host address in subnet 2 to the WAN interface on R1.
192.168.1.65
4. Assign the last valid host address in subnet 2 to the WAN interface on R2.
192.168.1.126
5. Assign the first valid host address in subnet 3 to the LAN interface of R2.
192.168.1.129
6. Assign the last valid host address in subnet 3 to PC2.
192.168.1.190

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: The devices have been connected

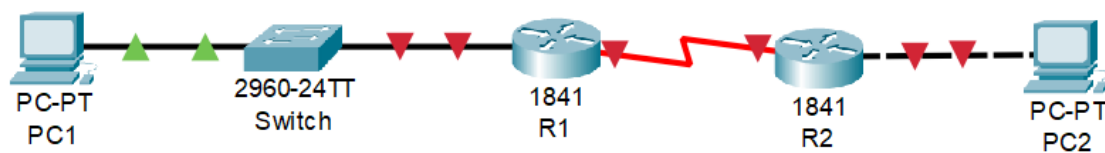


Fig 2 : Fa0/0 config of R1

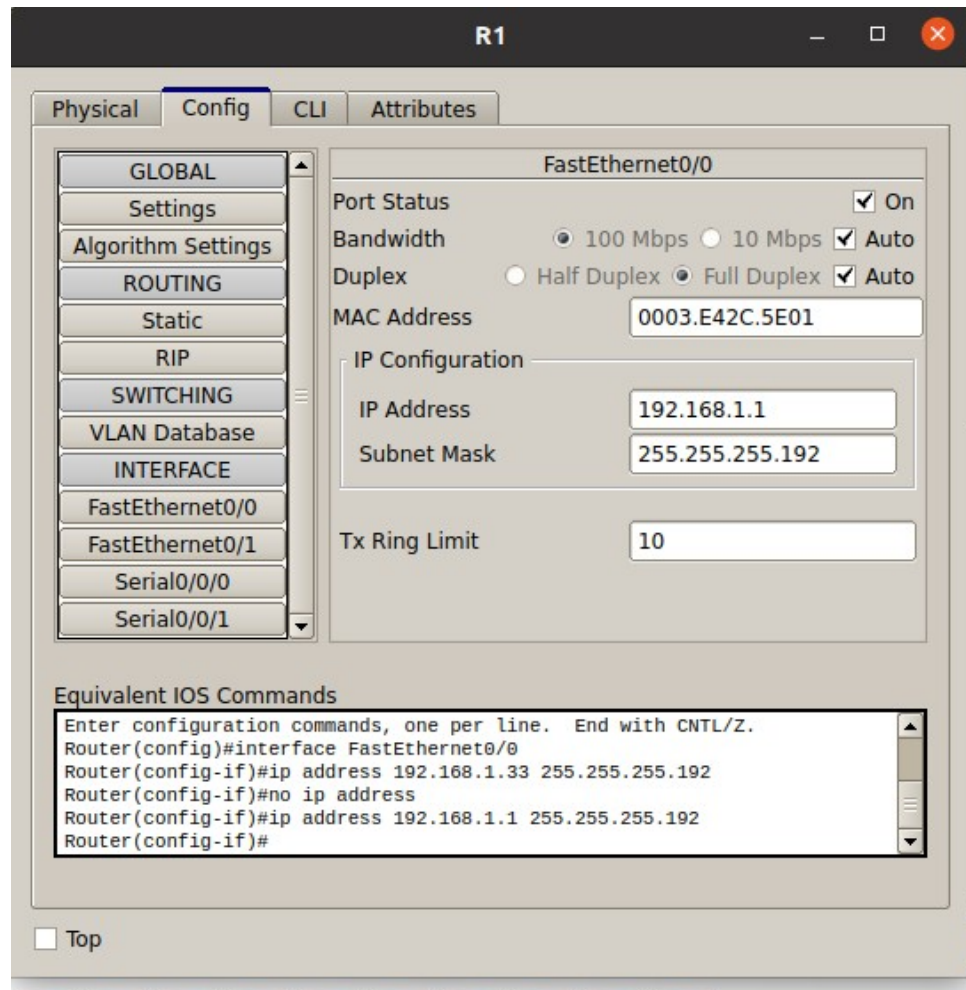


Fig 3: S0/0 config of R1

The screenshot shows a configuration window for a router named R1. The window has four tabs: Physical, Config (selected), CLI, and Attributes. On the left, there is a tree view with categories: GLOBAL (Settings, Algorithm Settings), ROUTING (Static, RIP), SWITCHING (VLAN Database), and INTERFACE (FastEthernet0/0, FastEthernet0/1, Serial0/0/0, Serial0/0/1). The Serial0/0/0 interface is selected. The main area shows the configuration for Serial0/0/0 with the following settings: Port Status is checked and set to On; Duplex is set to Full Duplex; Clock Rate is set to 2000000; IP Configuration shows IP Address 192.168.1.65 and Subnet Mask 255.255.255.192; and Tx Ring Limit is set to 10. At the bottom, there is a section for Equivalent IOS Commands with a text area containing the following commands: Router(config-if)#no ip address, Router(config-if)#ip address 192.168.1.1 255.255.255.192, Router(config-if)#, Router(config-if)#exit, Router(config)#interface Serial0/0/0, and Router(config-if)#. A Top button is located at the bottom left.

R1

Physical Config CLI Attributes

Serial0/0/0

Port Status ☒ On

Duplex ☒ Full Duplex

Clock Rate 2000000

IP Configuration

IP Address 192.168.1.65

Subnet Mask 255.255.255.192

Tx Ring Limit 10

Equivalent IOS Commands

```
Router(config-if)#no ip address
Router(config-if)#ip address 192.168.1.1 255.255.255.192
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/0/0
Router(config-if)#
```

☐ Top

Fig 4: Fa0/0 config of R2

The screenshot shows a configuration window for a router named R2. The window has four tabs: Physical, Config, CLI, and Attributes. The Config tab is selected. On the left, there is a tree view with categories: GLOBAL, Settings, Algorithm Settings, ROUTING, Static, RIP, SWITCHING, VLAN Database, INTERFACE, and a list of interfaces: FastEthernet0/0, FastEthernet0/1, Serial0/0/0, and Serial0/0/1. The FastEthernet0/0 interface is selected. The main area shows the configuration for this interface. It includes fields for Port Status (checked On), Bandwidth (100 Mbps selected, 10 Mbps unselected, Auto checked), Duplex (Half Duplex unselected, Full Duplex selected, Auto checked), MAC Address (0060.2F6D.1101), IP Configuration (IP Address 192.168.1.129, Subnet Mask 255.255.255.192), and Tx Ring Limit (10). At the bottom, there is a section for Equivalent IOS Commands with a text area containing the following commands: Router(config-if)#exit, Router(config)#interface FastEthernet0/0, Router(config-if)#, Router(config-if)#exit, Router(config)#interface FastEthernet0/0, and Router(config-if)#. A 'Top' button is located at the bottom left.

R2

Physical Config CLI Attributes

FastEthernet0/0

Port Status ☒ On

Bandwidth ☒ 100 Mbps ☐ 10 Mbps ☒ Auto

Duplex ☐ Half Duplex ☒ Full Duplex ☒ Auto

MAC Address

IP Configuration

IP Address

Subnet Mask

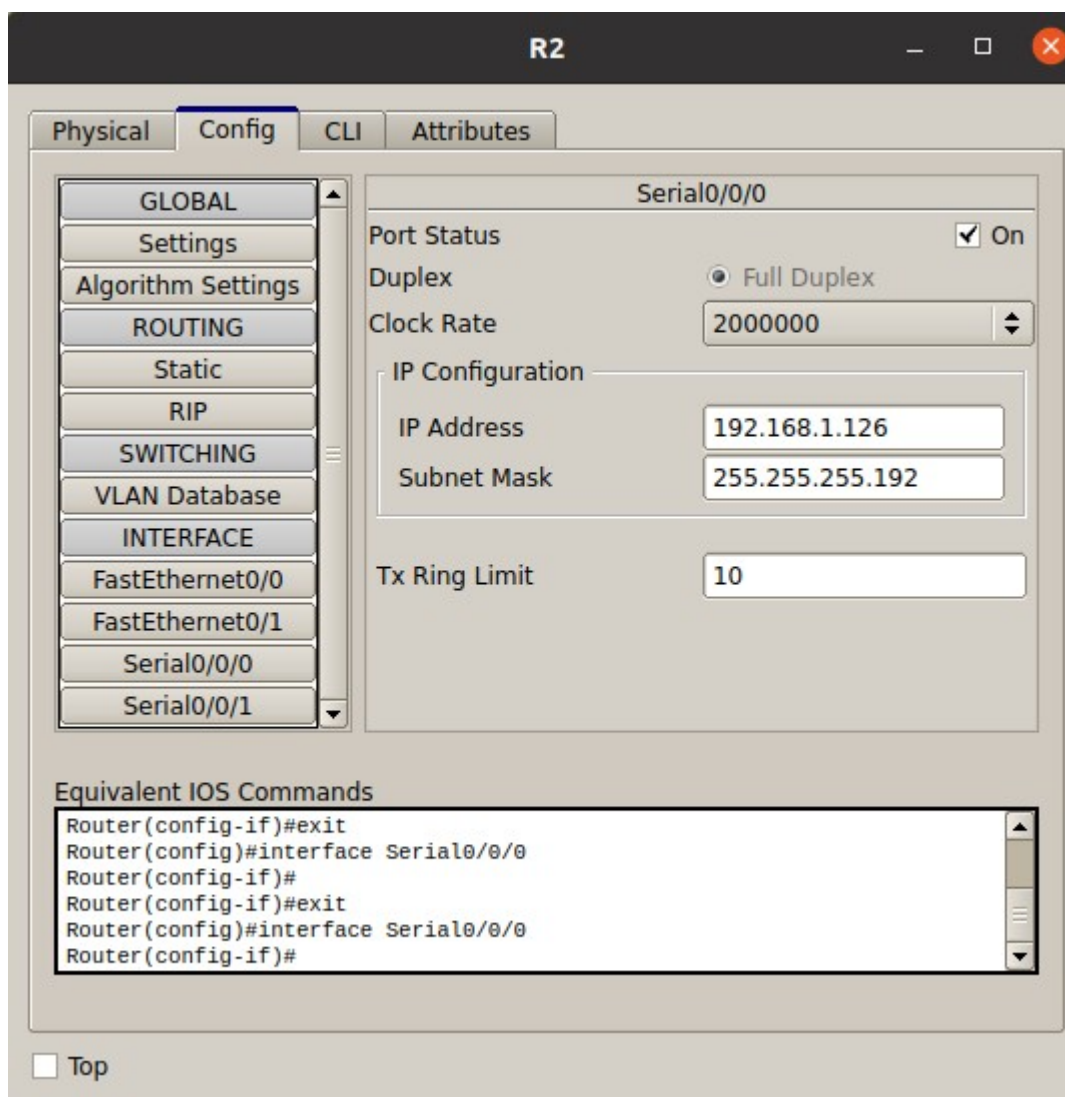
Tx Ring Limit

Equivalent IOS Commands

```
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#
```

☐ Top

Fig 5: 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 6: Fa0 interface for PC1

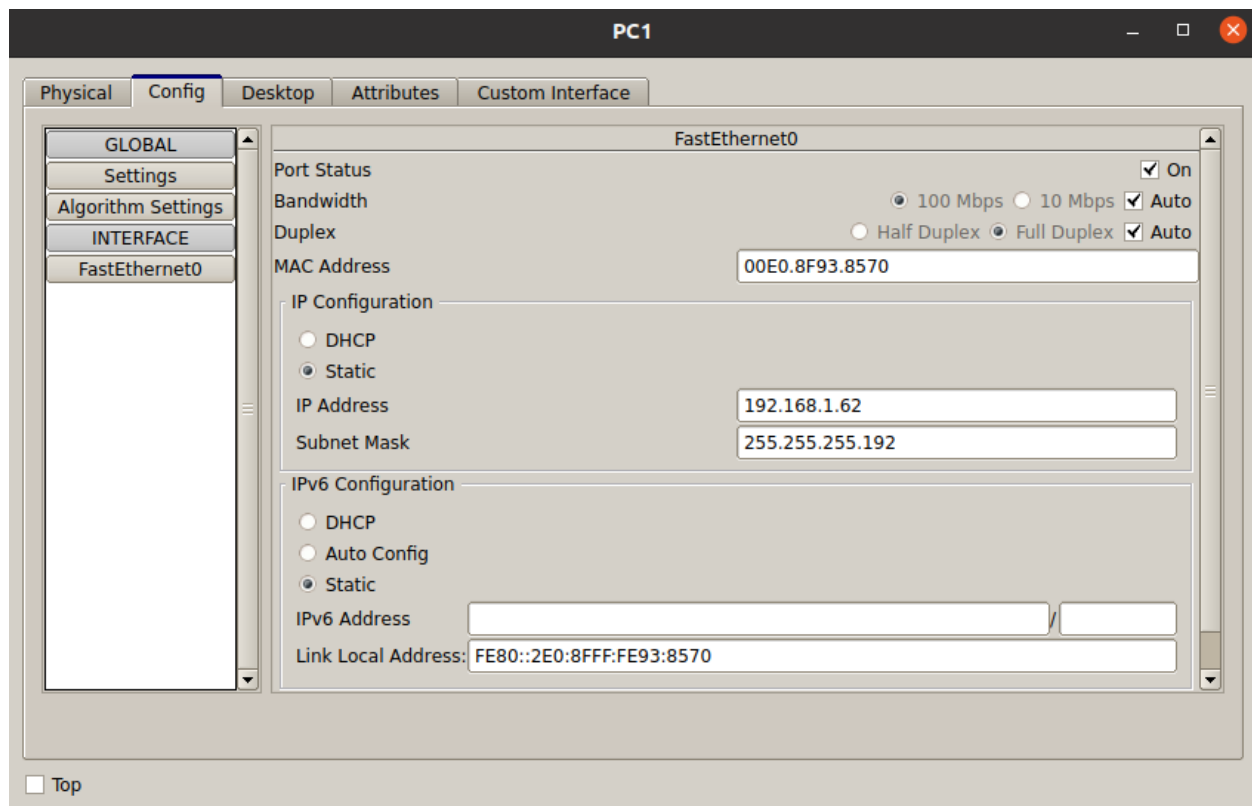


Fig 7: PC1 default gateway

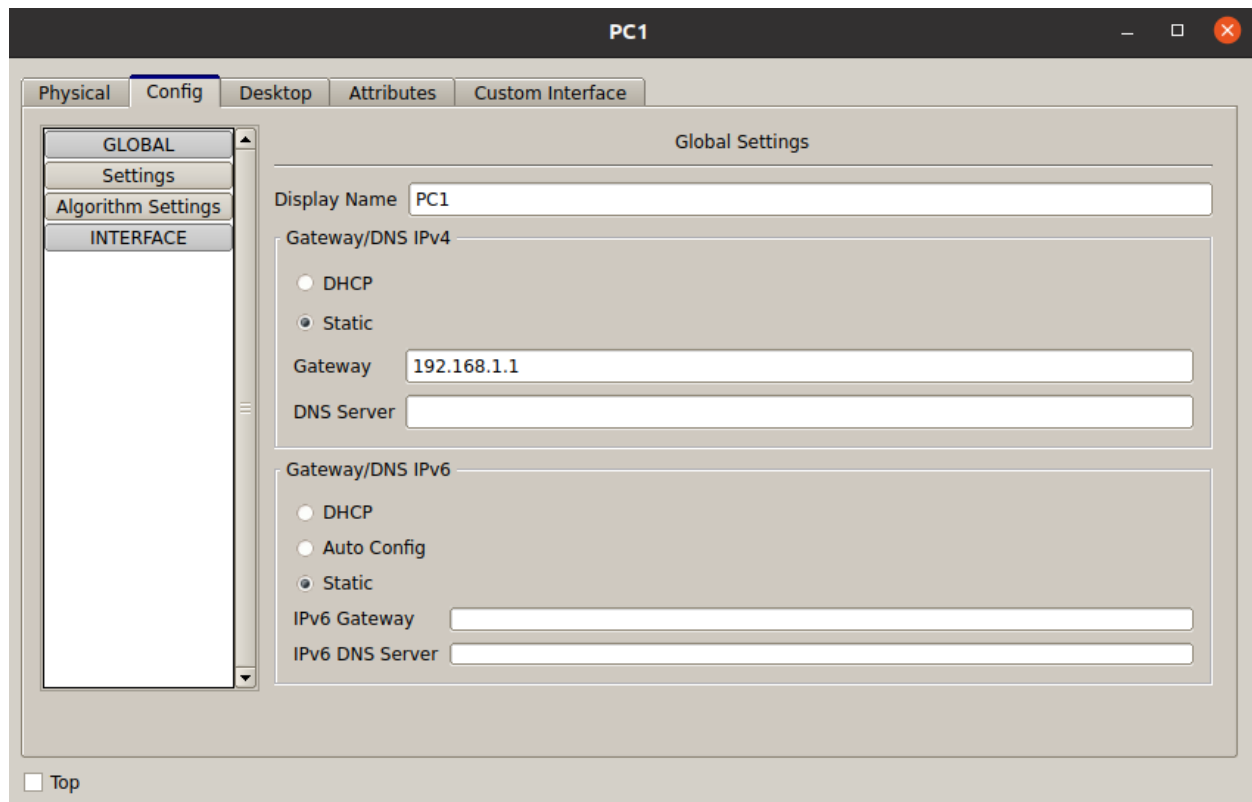


Fig 8: Fa0 interface for PC2

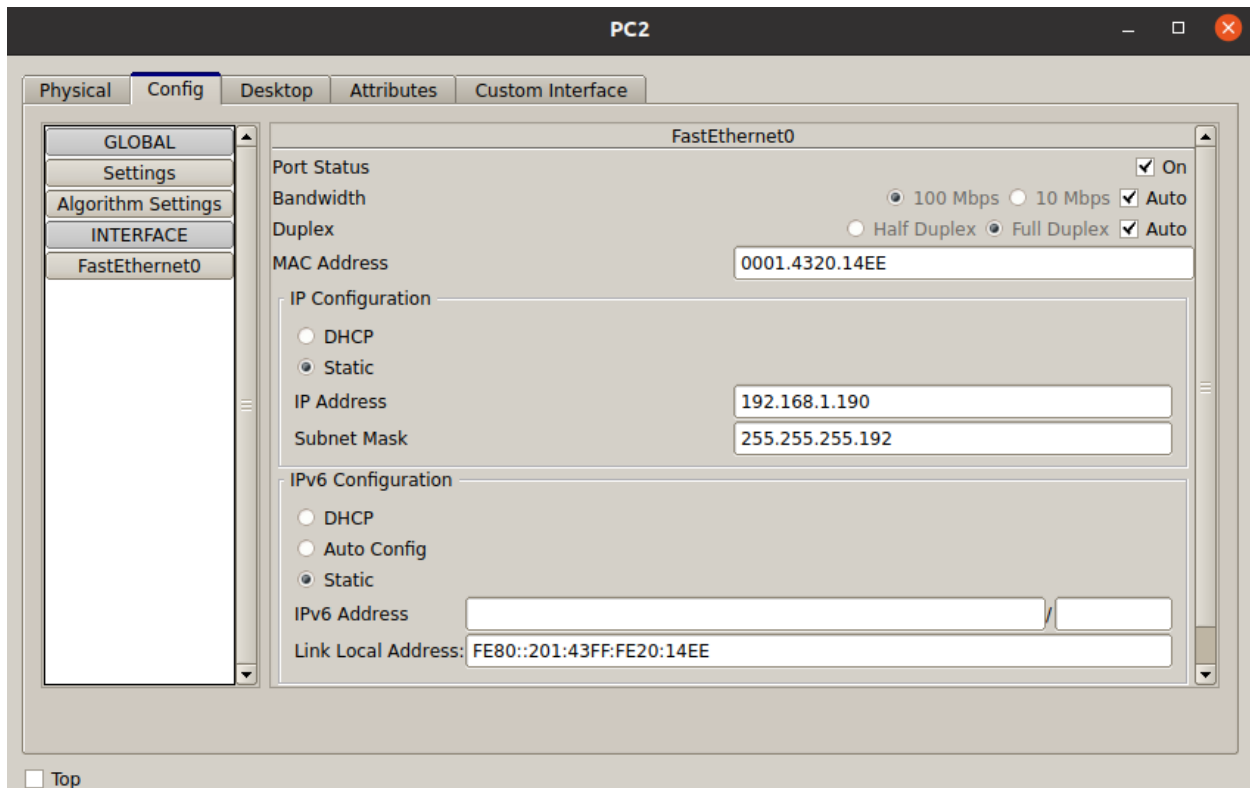


Fig 9: Default gateway of PC2

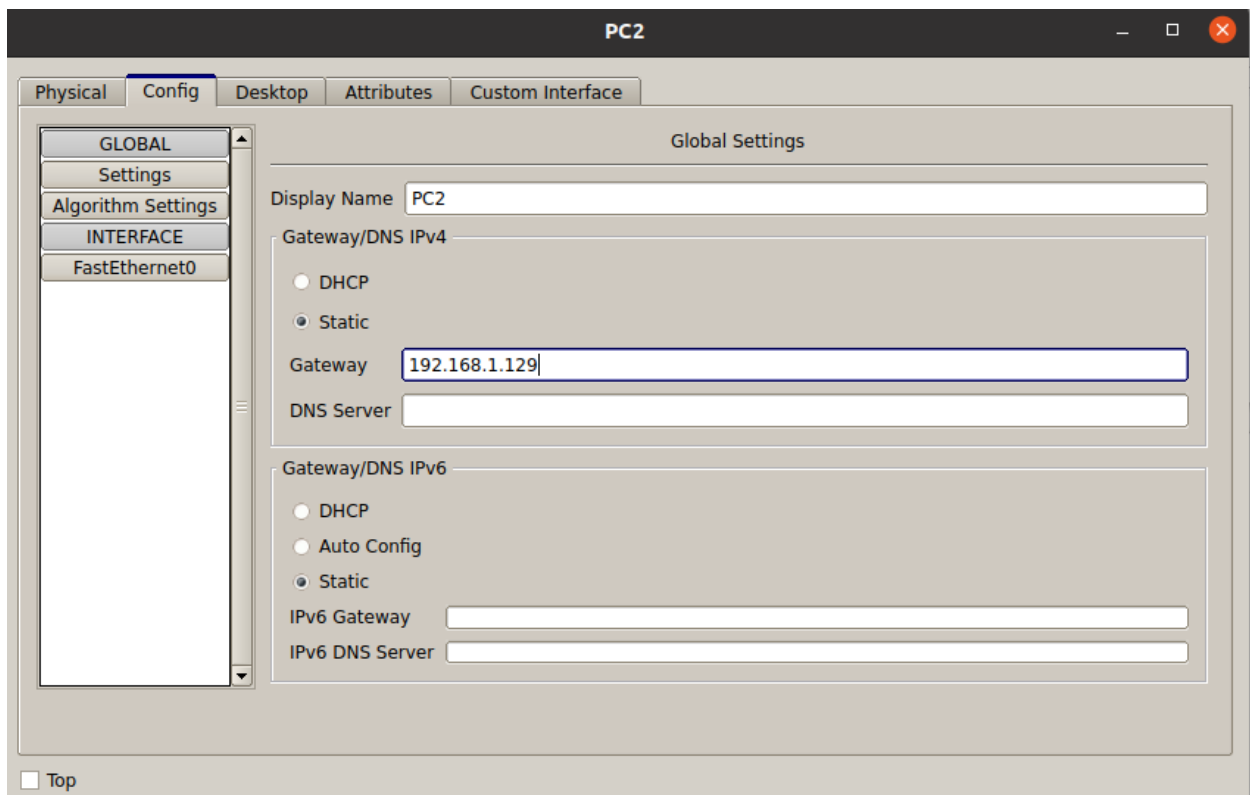
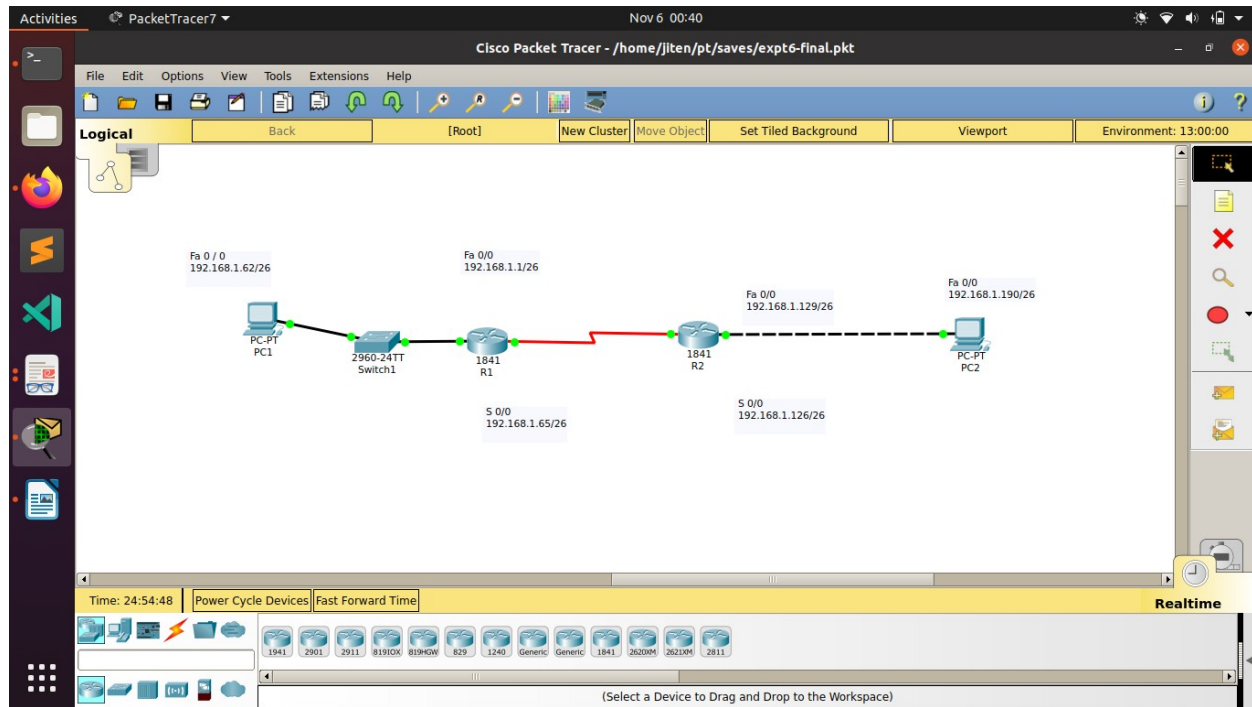


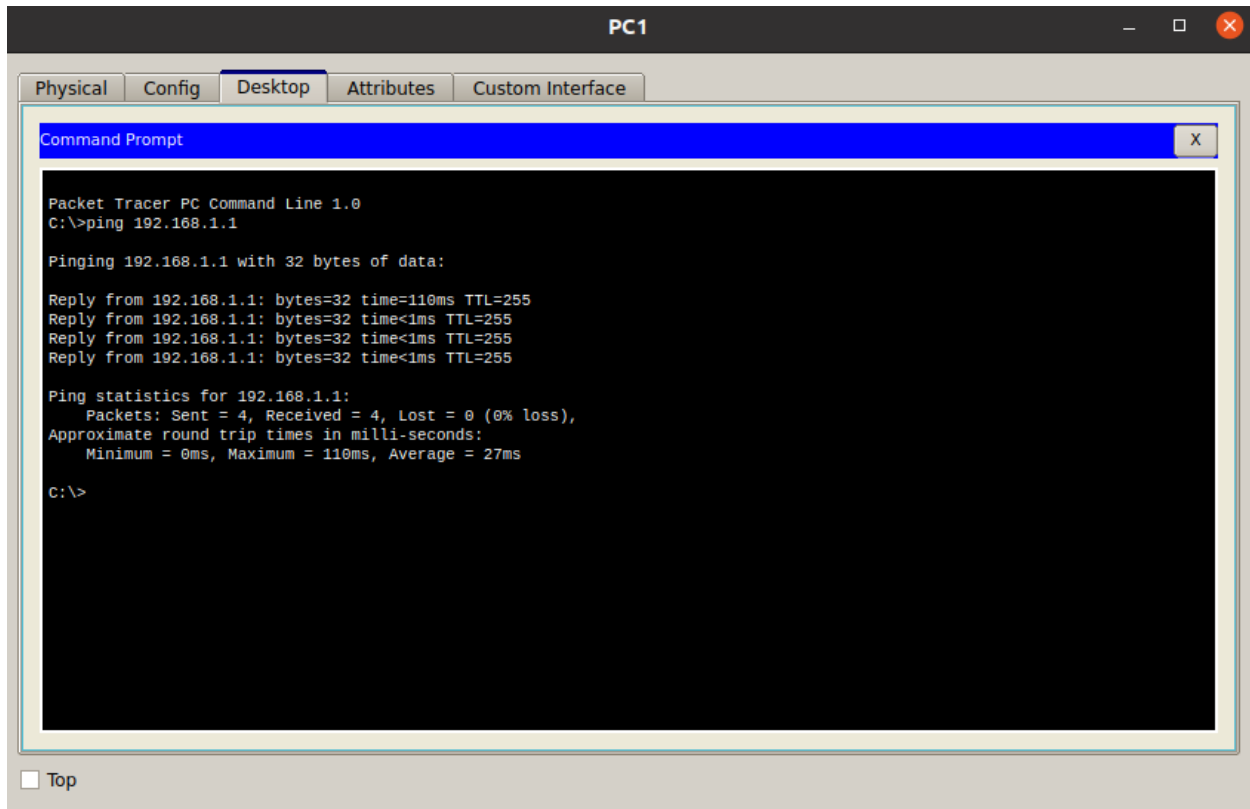
Fig 10: Final network after setup



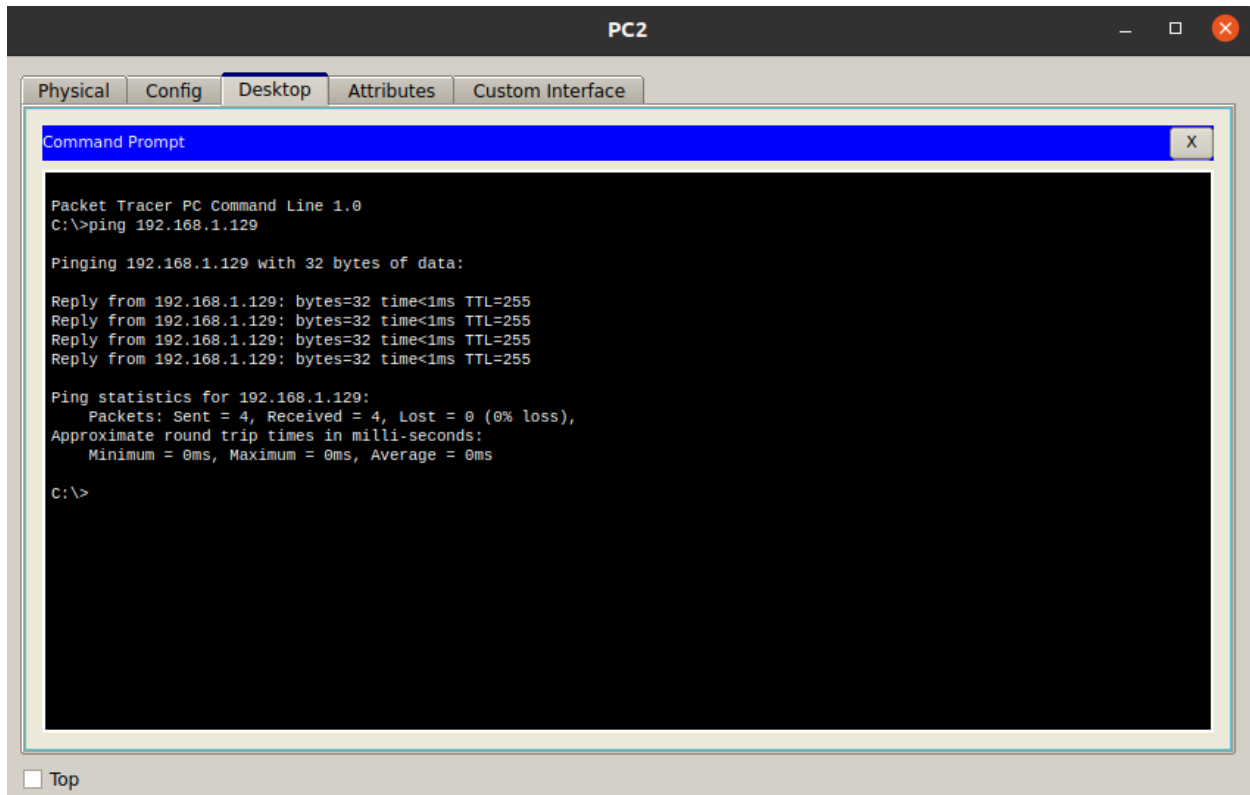
Task 4: Verify the Configurations.

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

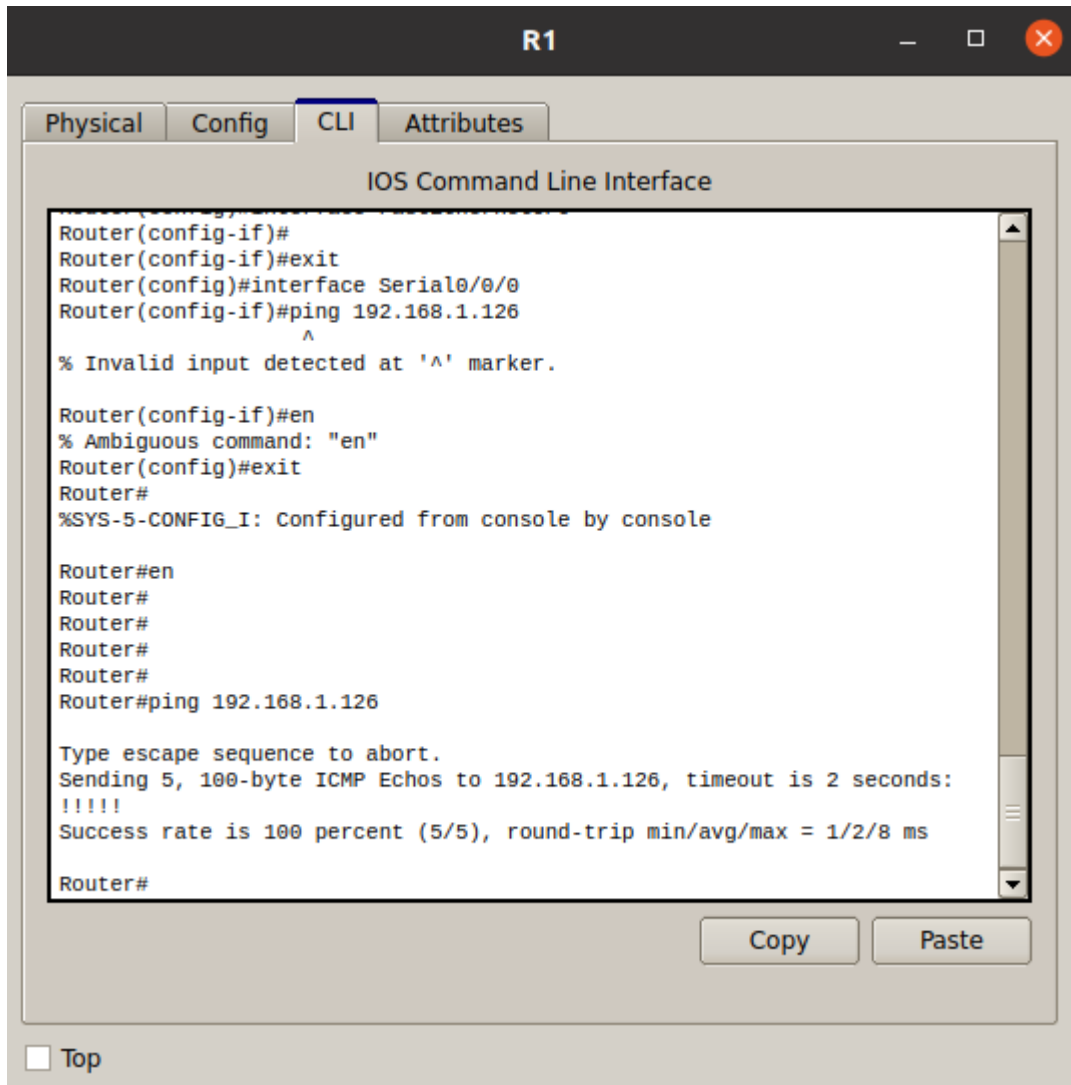
From the host attached to R1, is it possible to ping the default gateway? **Yes**



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**



The screenshot shows a window titled "R1" with tabs for "Physical", "Config", "CLI", and "Attributes". The "CLI" tab is active, displaying the "IOS Command Line Interface". The terminal text is as follows:

```
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/0/0
Router(config-if)#ping 192.168.1.126
                        ^
% Invalid input detected at '^' marker.

Router(config-if)#en
% Ambiguous command: "en"
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

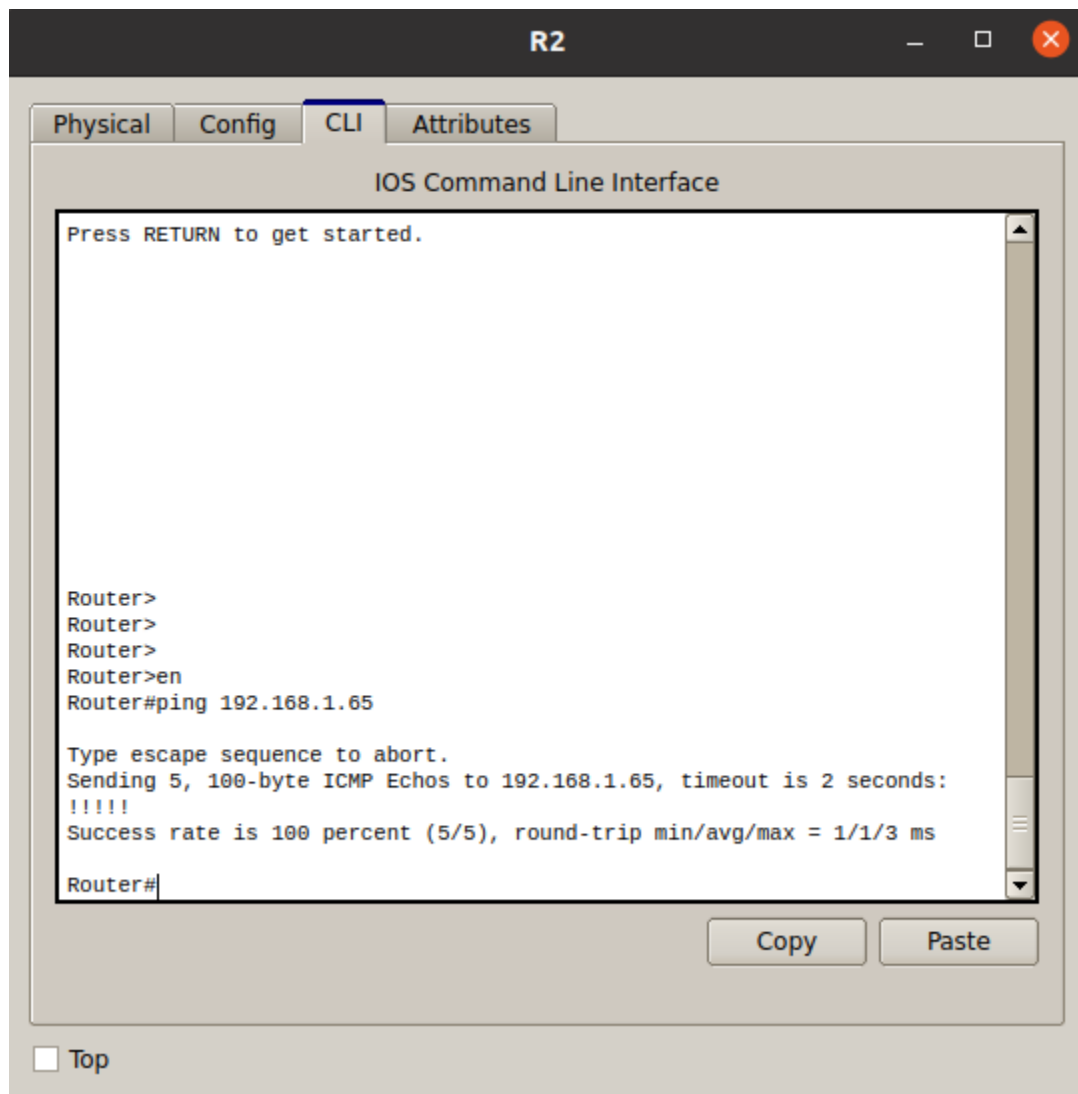
Router#en
Router#
Router#
Router#
Router#
Router#ping 192.168.1.126

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.126, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/8 ms

Router#
```

At the bottom of the CLI window, there are "Copy" and "Paste" buttons. Below the window, there is a checkbox labeled "Top" which is currently unchecked.

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

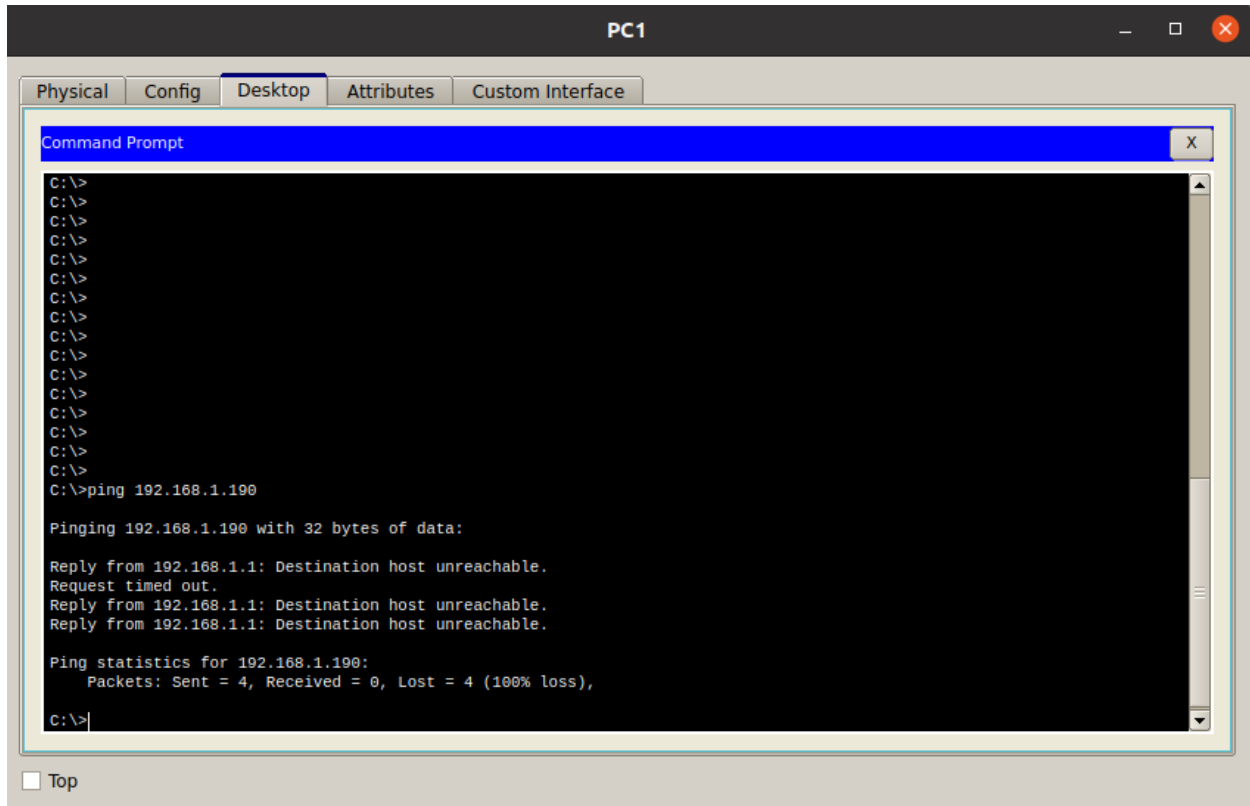


The answer to the above questions should be yes. If any of the above pings failed, check your physical connections and configurations.

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.



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

Switch

