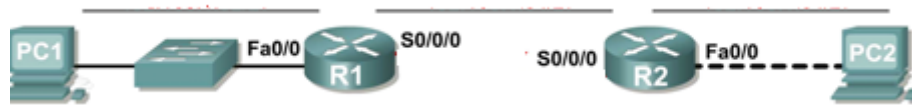


Topology Diagram



Addressing Table

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

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 subnets are needed for this network.

First subnet - the network connected to router R1

Second subnet - the link between R1 and R2

Third subnet - the network connected to router R2

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

Subnet mask in dotted decimal notation is 255.255.255.224

Network 1 needs maximum number of hosts - 30 hosts.

Hence, 30 different host addresses per subnet. $2^5 = 32$.

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

Subnet mask in slash format is /27

How many usable hosts are there per subnet?

Each subnet has 32 addresses.

Usable hosts are $32 - 2 = 30$

First address of the subnet - network identification

Last address of the subnet - broadcast.

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.

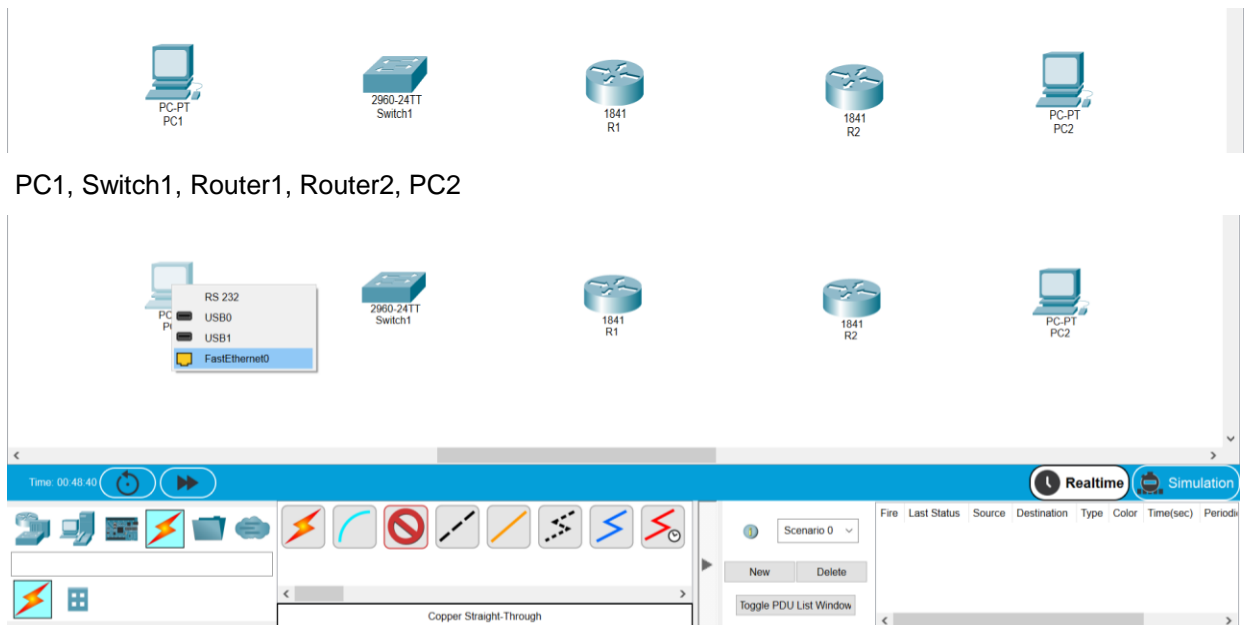
Fa0/0 = 192.168.1.97

- Assign the last valid host address in subnet 3 to PC2.

192.168.1.126

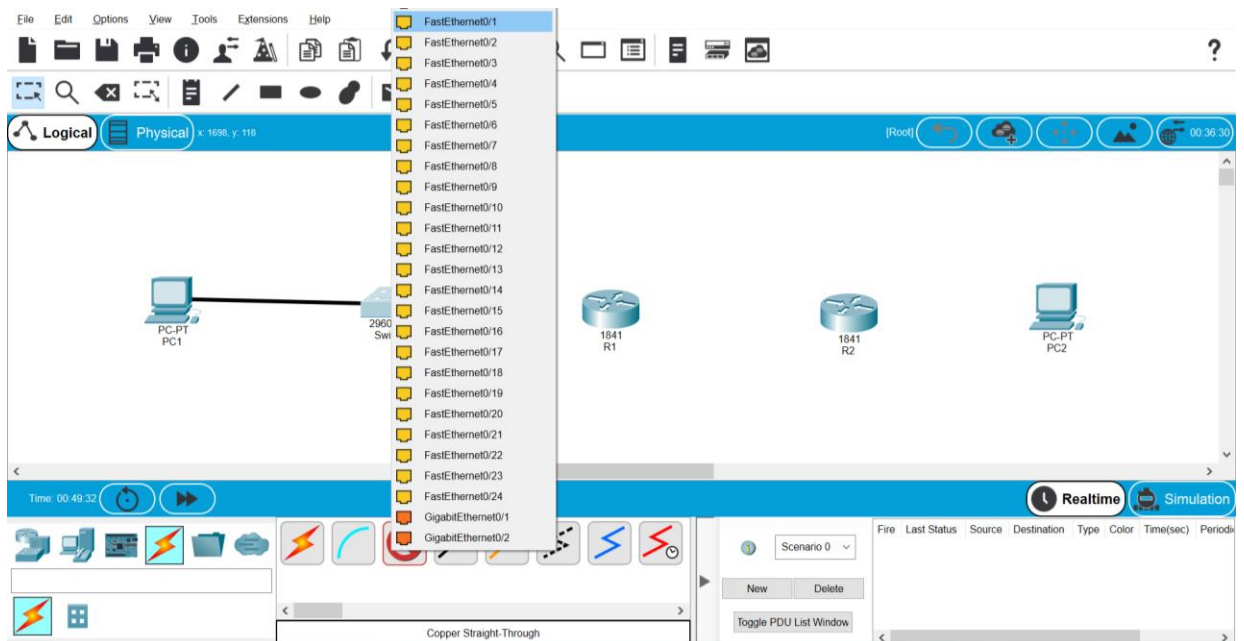
Step 2: Document the addresses to be used in the table provide under the Topology Diagram.

Task 3: Configure the Serial and FastEthernet Addresses.

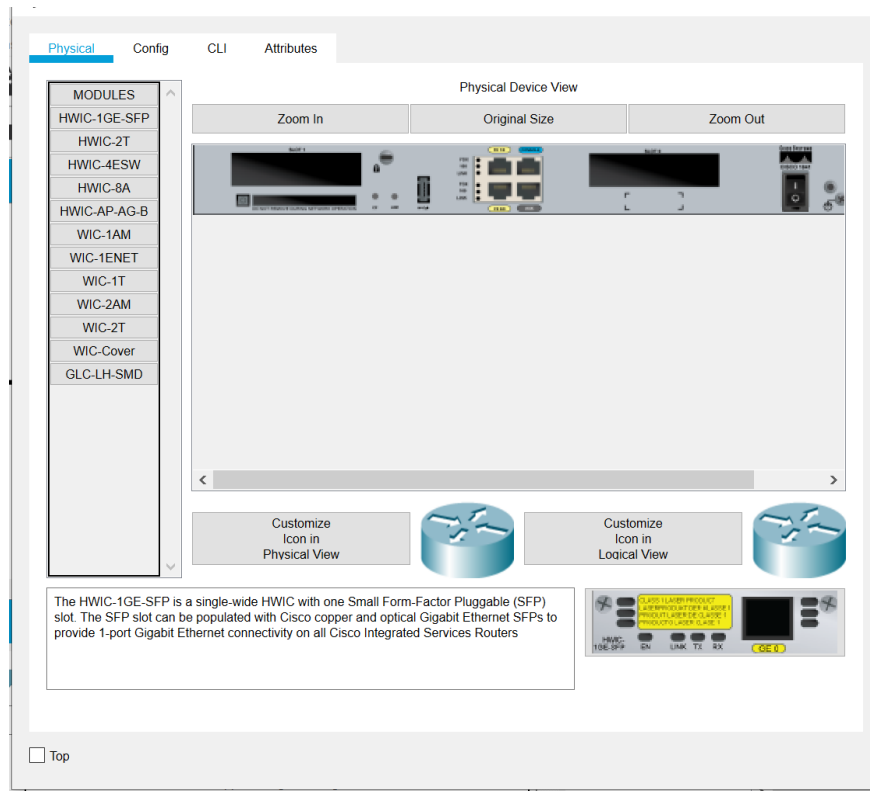


PC1, Switch1, Router1, Router2, PC2

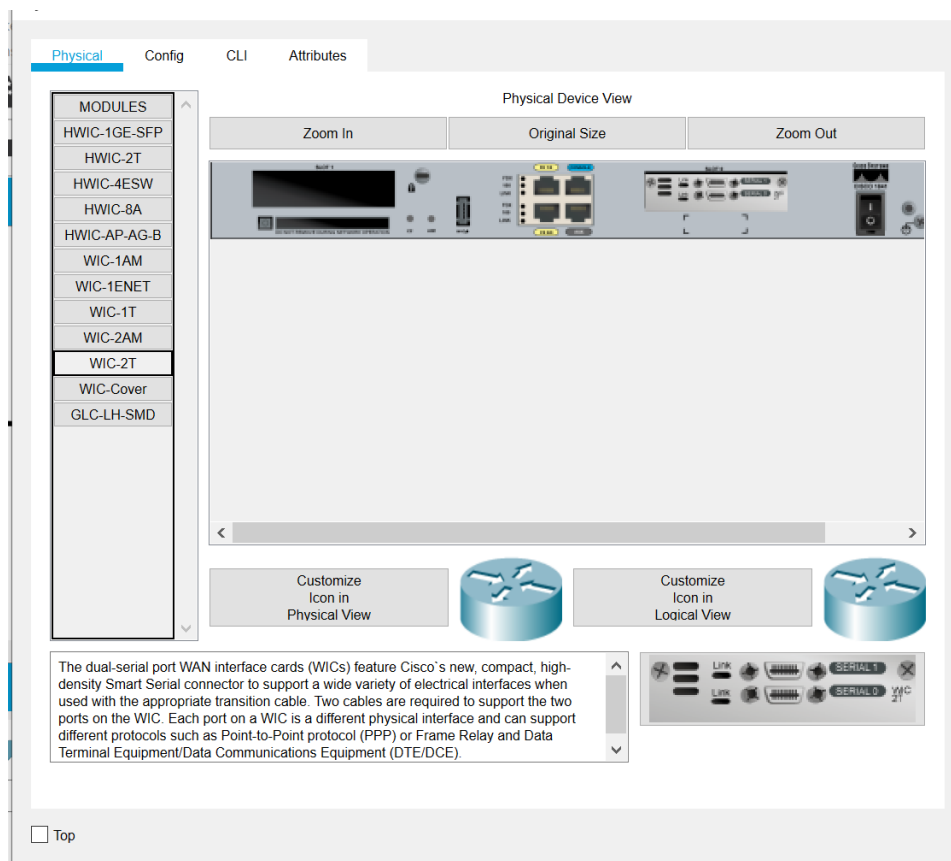
Click on pc1 and select fast ethernet0



Click on switch and select FastEthernet0/1



Click on router1 and then select physical



Select WIC-2T

Physical
Config
CLI
Attributes

MODULES

HWIC-1GE-SFP

HWIC-2T

HWIC-4ESW

HWIC-8A

HWIC-AP-AG-B

WIC-1AM

WIC-1ENET

WIC-1T

WIC-2AM

WIC-2T

WIC-Cover

GLC-LH-SMD

Zoom In

Original Size

Zoom Out

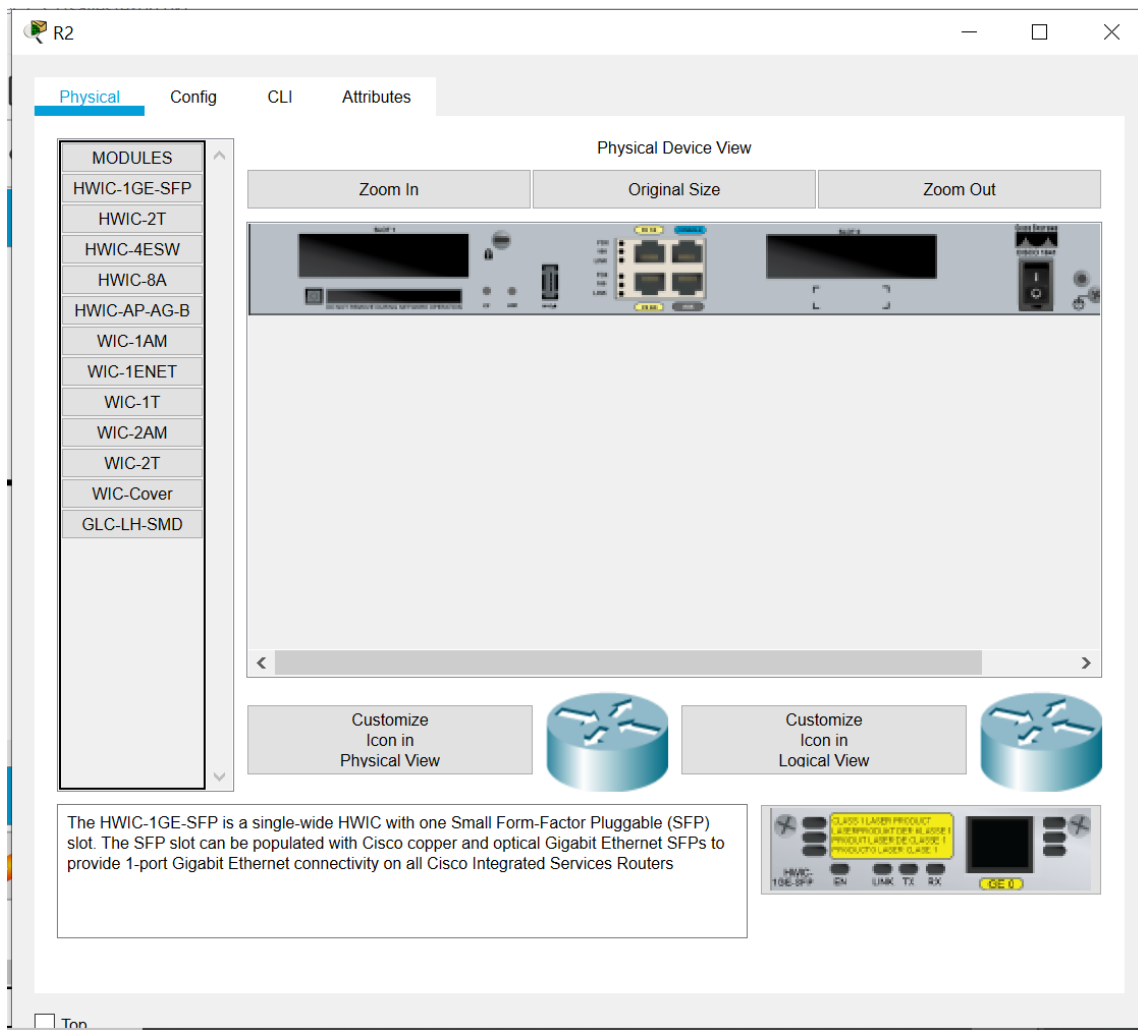
Customize Icon in Physical View

Customize Icon in Logical View

The dual-serial port WAN interface cards (WICs) feature Cisco's new, compact, high-density Smart Serial connector to support a wide variety of electrical interfaces when used with the appropriate transition cable. Two cables are required to support the two ports on the WIC. Each port on a WIC is a different physical interface and can support different protocols such as Point-to-Point protocol (PPP) or Frame Relay and Data Terminal Equipment/Data Communications Equipment (DTE/DCE).

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Select router r2 and click physical

R2

Physical

Config

CLI

Attributes

MODULES

HWIC-1GE-SFP

HWIC-2T

HWIC-4ESW

HWIC-8A

HWIC-AP-AG-B

WIC-1AM

WIC-1ENET

WIC-1T

WIC-2AM

WIC-2T

WIC-Cover


GLC-LH-SMD

Physical Device View

Zoom In

Original Size


Zoom Out



Customize Icon in Physical View

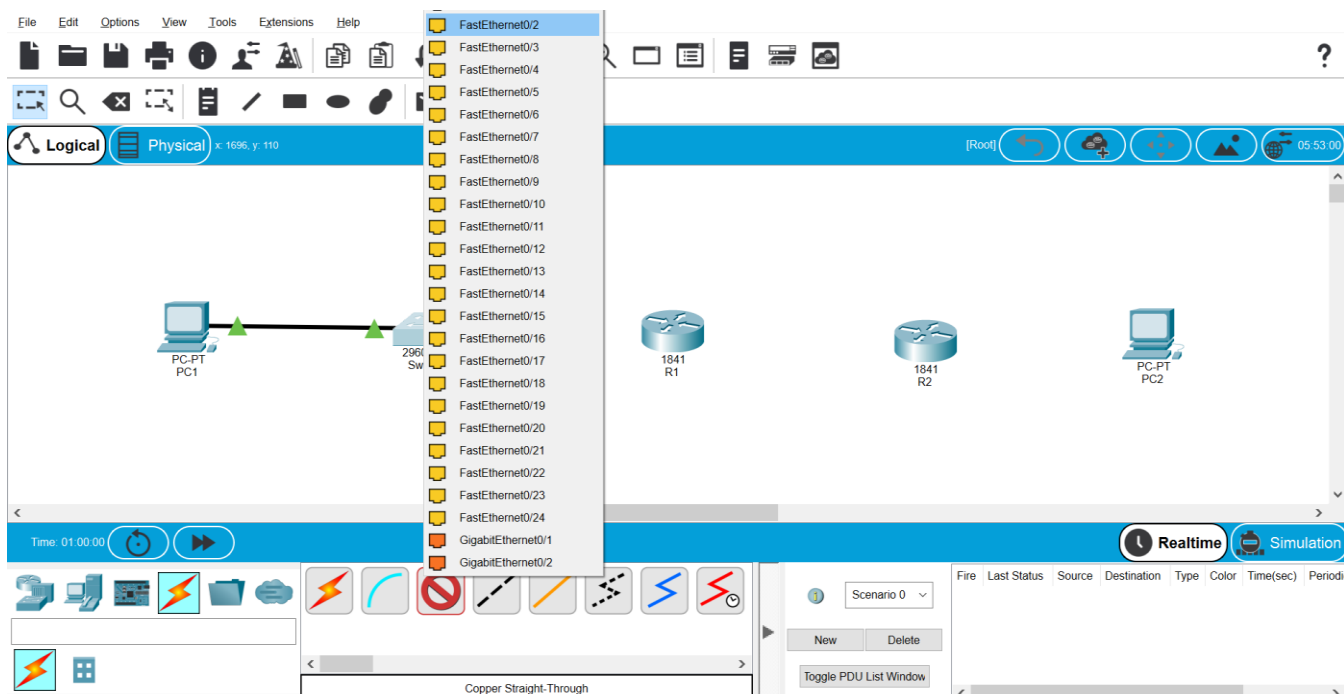
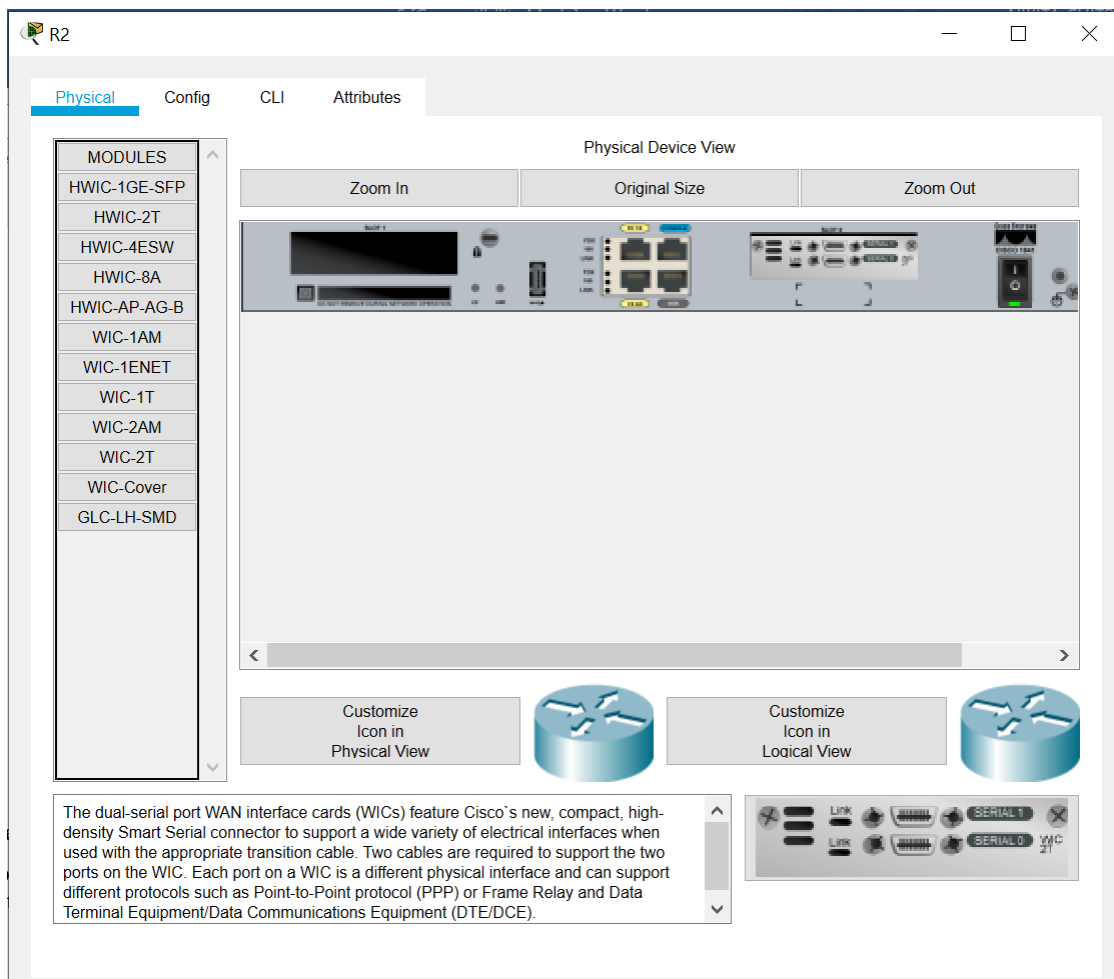
Customize Icon in Logical View

The dual-serial port WAN interface cards (WICs) feature Cisco's new, compact, high-density Smart Serial connector to support a wide variety of electrical interfaces when used with the appropriate transition cable. Two cables are required to support the two ports on the WIC. Each port on a WIC is a different physical interface and can support different protocols such as Point-to-Point protocol (PPP) or Frame Relay and Data Terminal Equipment/Data Communications Equipment (DTE/DCE).

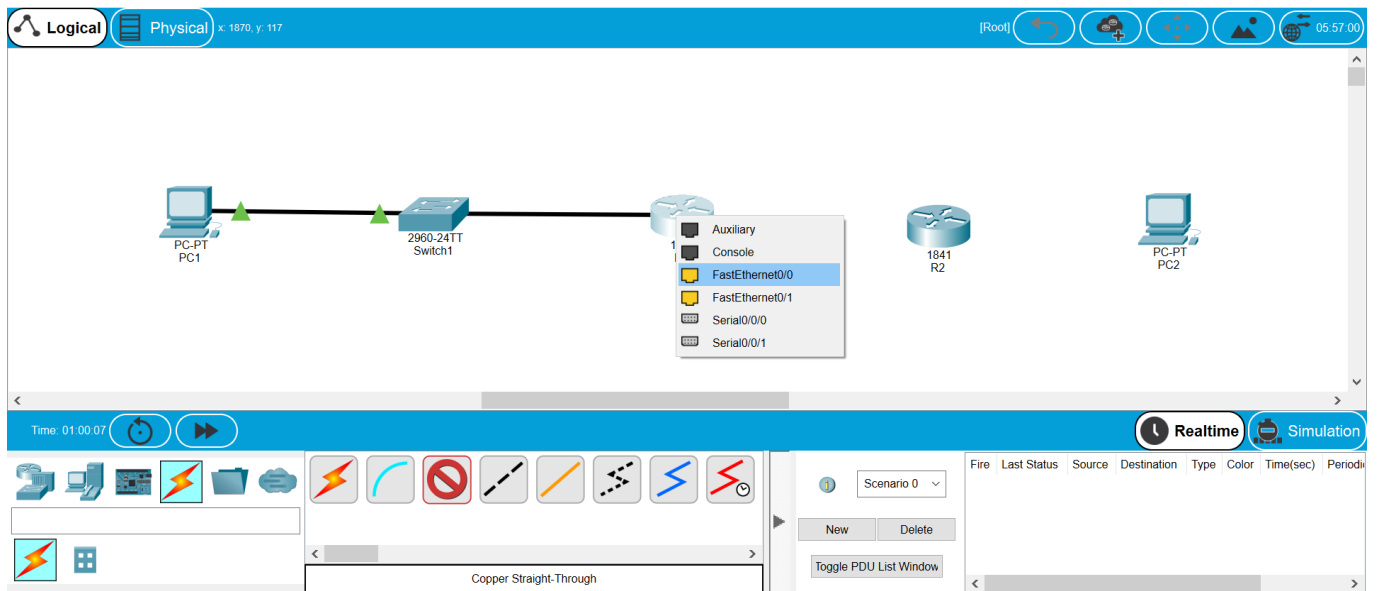


Select WIC-2T

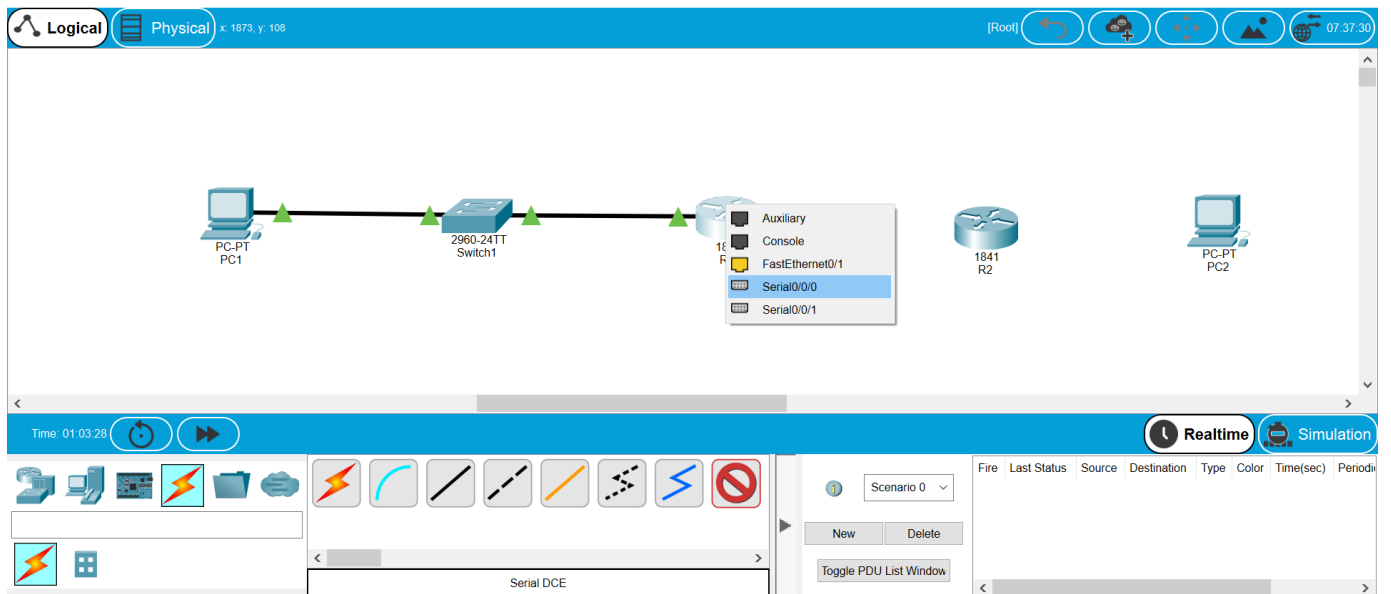
7 of 22



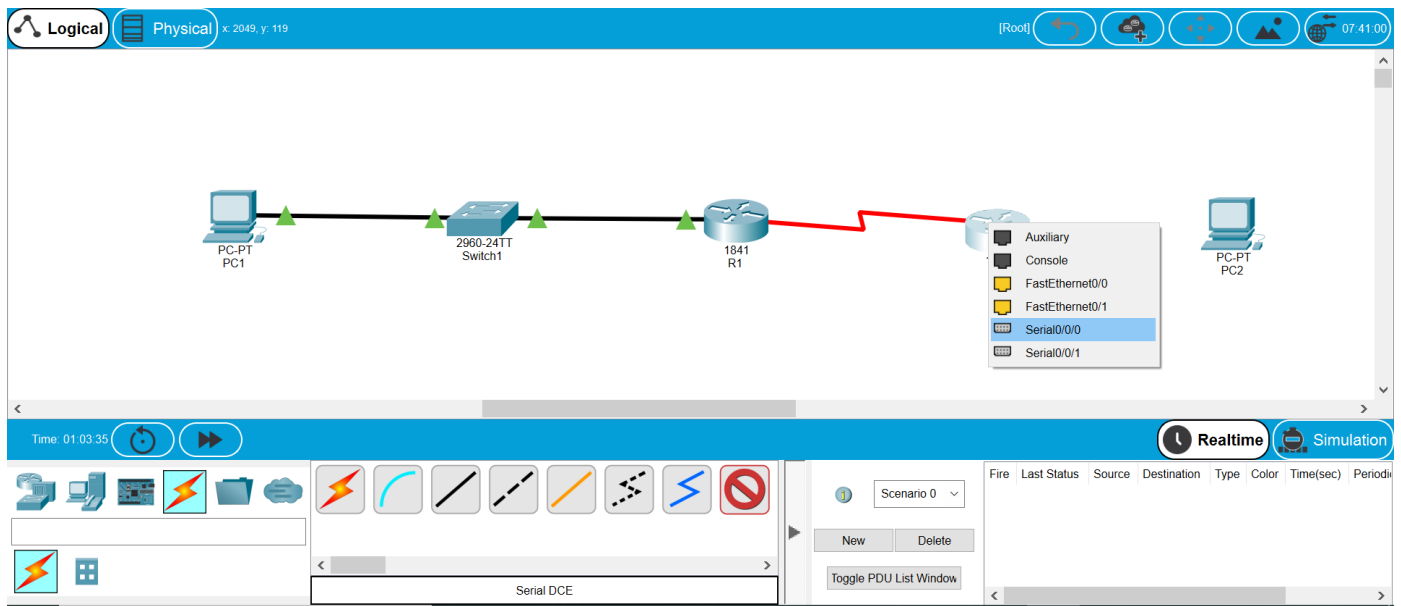
Click on Switch1 and select Fast Ethernet 0/2



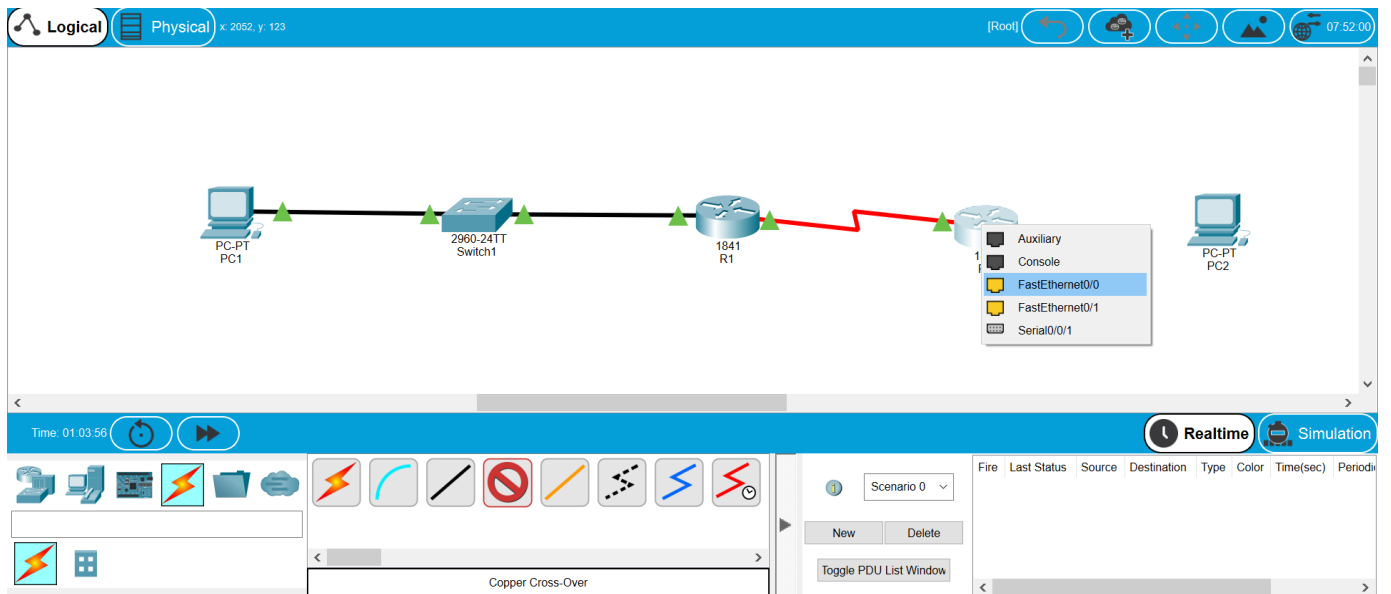
Click on Router and select FastEthernet0\0



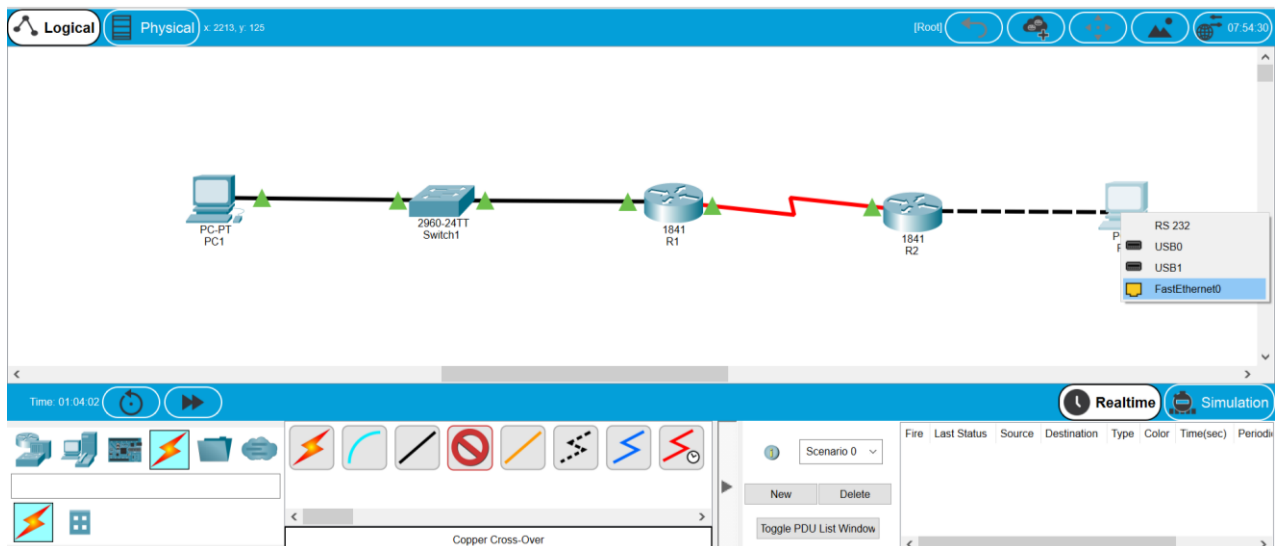
Select Serial0/0/0



Select Serial 0/0/0



Click on router2 and select FastEthernet0/0



Click on PC2 and select FastEthernet0

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.

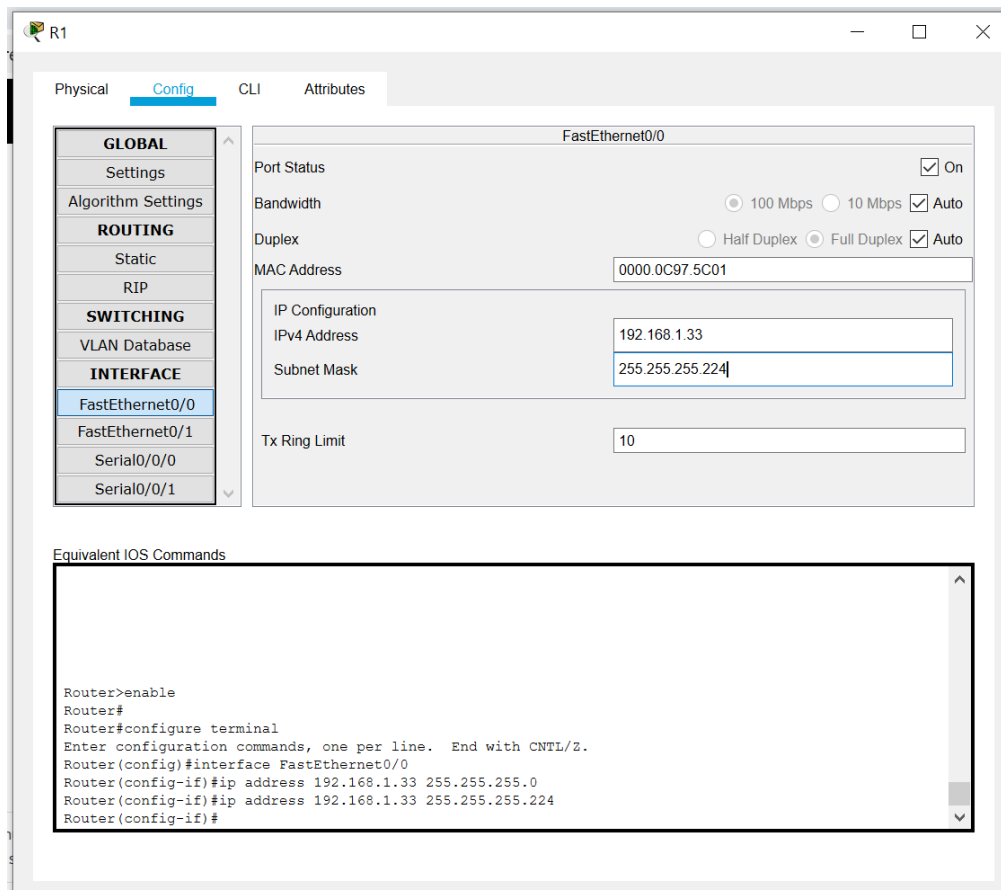


Fig shows the IPv4 address as 192.168.1.33 and Subnet mask as 255.255.255.224 and port status is ON

The screenshot shows the configuration window for router R1. The 'Config' tab is selected, and the 'Serial0/0/0' interface is chosen from the left-hand menu. The configuration details for Serial0/0/0 are as follows:

- Port Status:** ☒ On
- Duplex:** ☐ Full Duplex
- Clock Rate:** 2000000
- IP Configuration:**
 - IPv4 Address:** 192.168.1.65
 - Subnet Mask:** 255.255.255.224
- Tx Ring Limit:** 10

Below the configuration fields, the 'Equivalent IOS Commands' section displays the following commands:

```
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)#ip address 192.168.1.33 255.255.255.224
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/0/0
Router(config-if)#ip address 192.168.1.65 255.255.255.224
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)#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)#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)#ip address 192.168.1.65 255.255.255.224
Router(config-if)#
```

Select Serial 0/0/0 , Fig shows the IPv4 address as 192.168.1.65 and Subnet mask as 255.255.255.224 and port status is ON

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

FastEthernet0/0

Port Status ☒ On

Bandwidth ☒ 100 Mbps ☐ 10 Mbps ☒ Auto

Duplex ☐ Half Duplex ☒ Full Duplex ☒ Auto

MAC Address 0001.6493.8201

IP Configuration

IPv4 Address 192.168.1.97

Subnet Mask 255.255.255.224

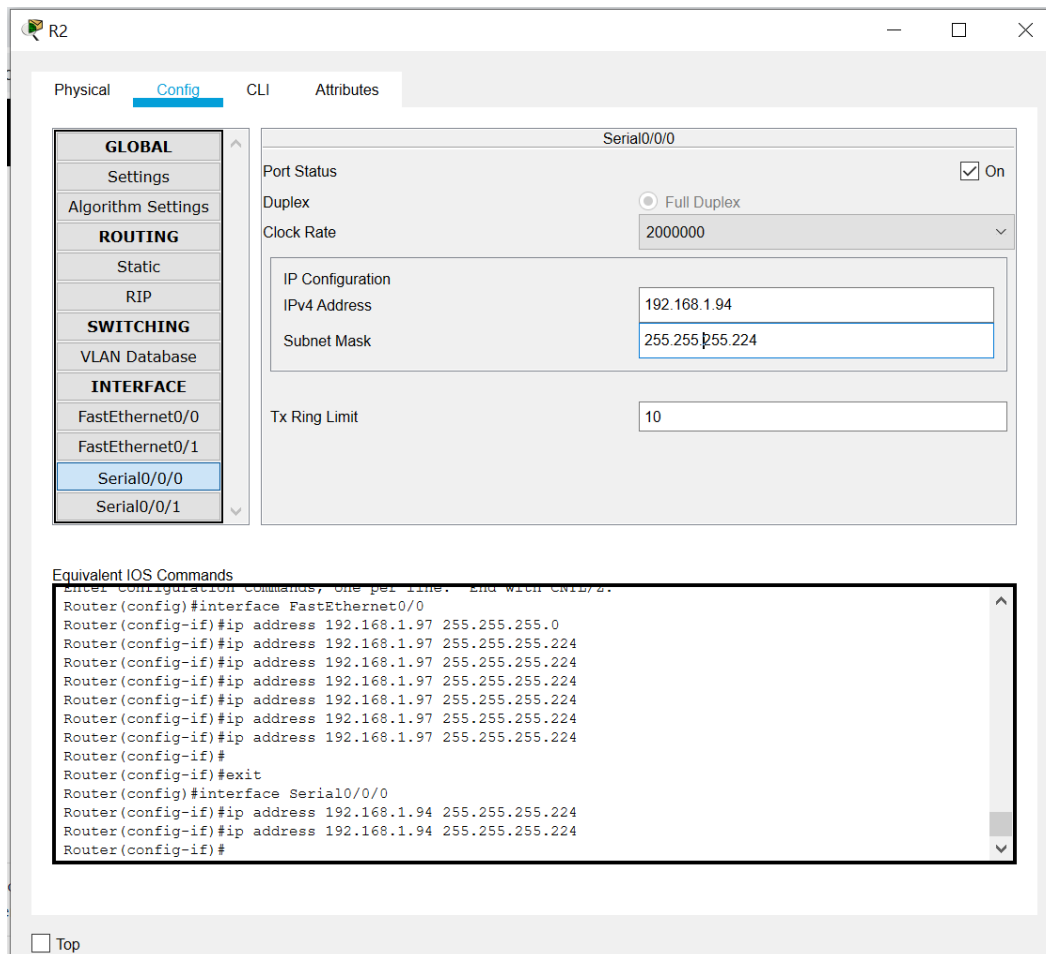
Tx Ring Limit 10

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)#ip address 192.168.1.97 255.255.255.0
Router(config-if)#ip address 192.168.1.97 255.255.255.224
Router(config-if)#
```

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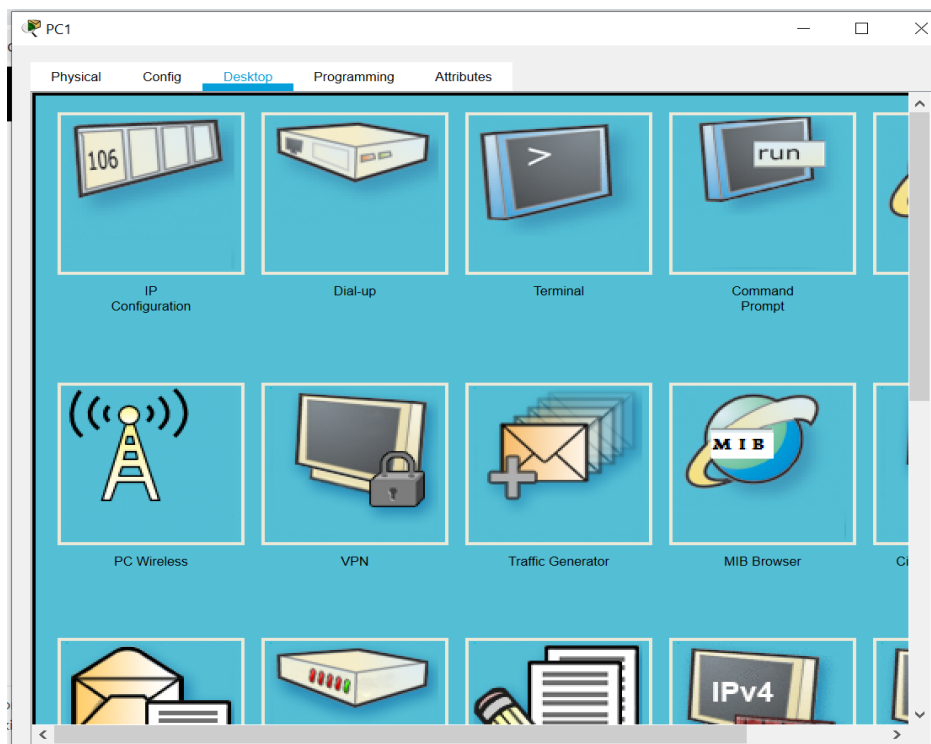
Click on router2 ,Fig shows the IPv4 address as 192.168.1.97 and Subnet mask as 255.255.255.224 and port status is ON



Select Serial 0/0/0 , Fig shows the IPv4 address as 192.168.1.94 and Subnet mask as 255.255.255.224 and port status is ON

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.



Click on pc1 select desktop select ipconfiguration

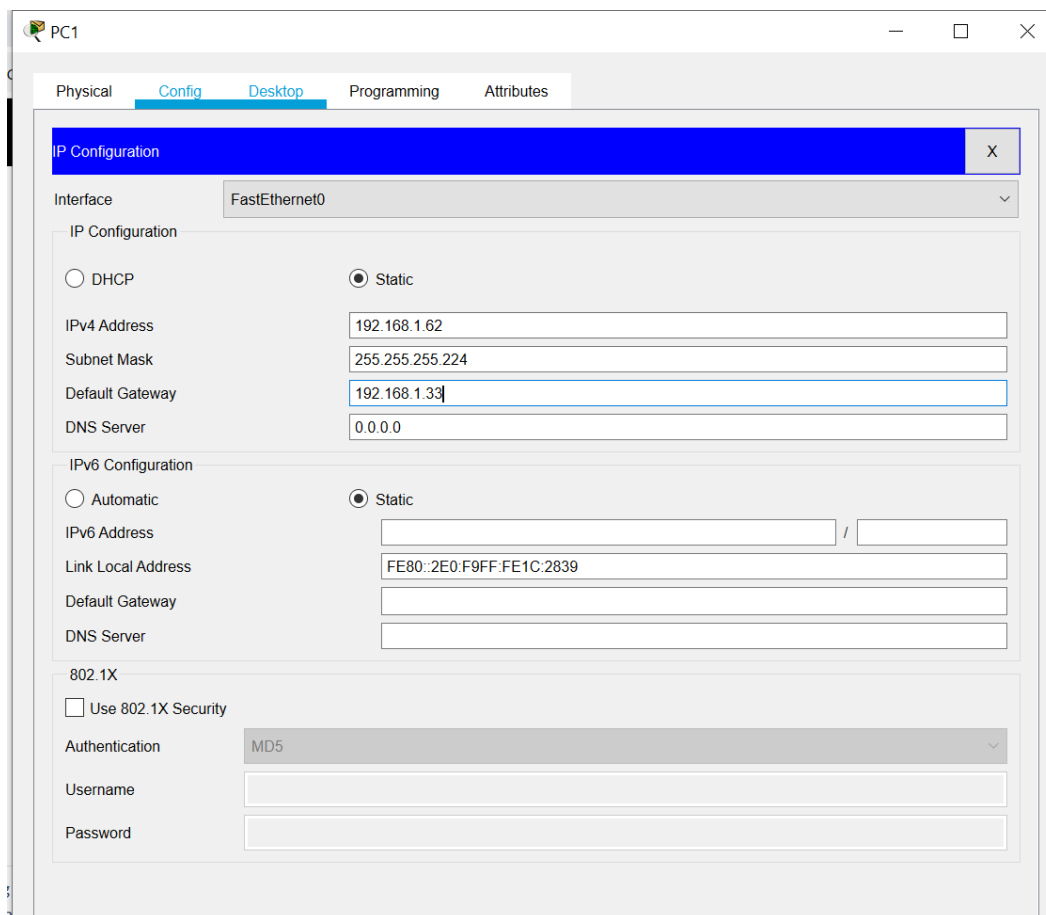
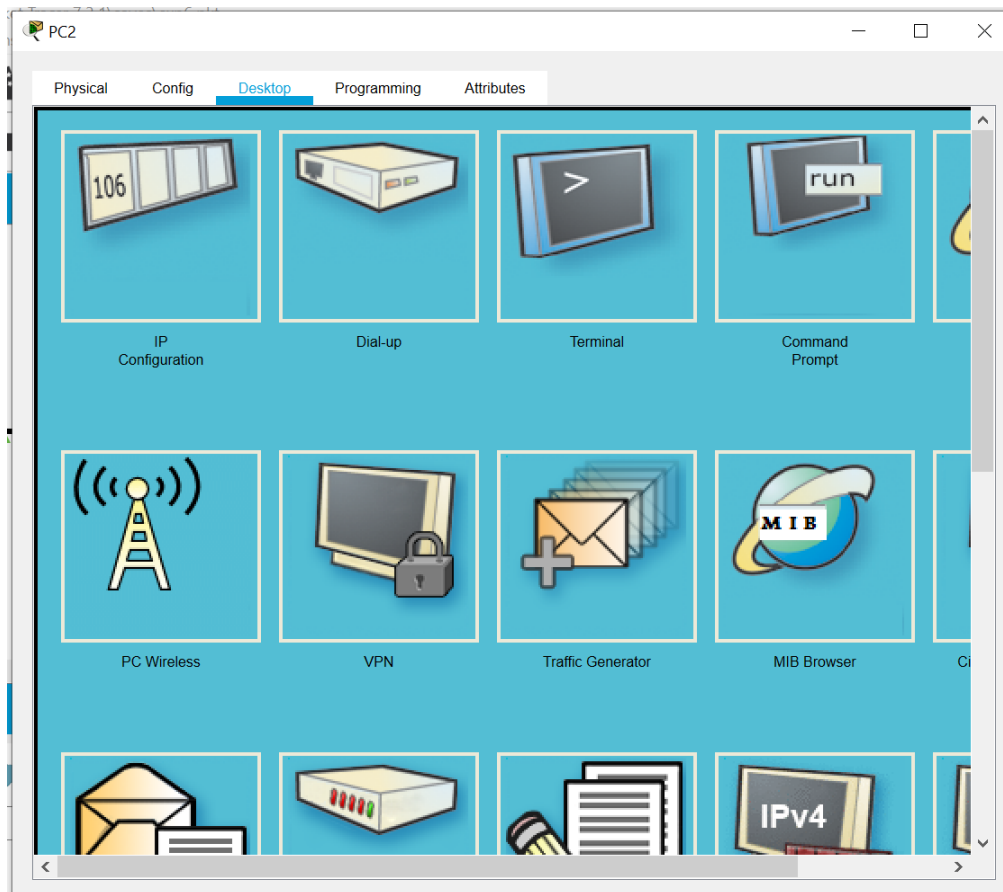


Fig shows the IPv4 address as 192.168.1.62 and Subnet mask as 255.255.255.224 and the default gateway as 192.168.1.33



Click on pc2 select desktop select ipconfiguration

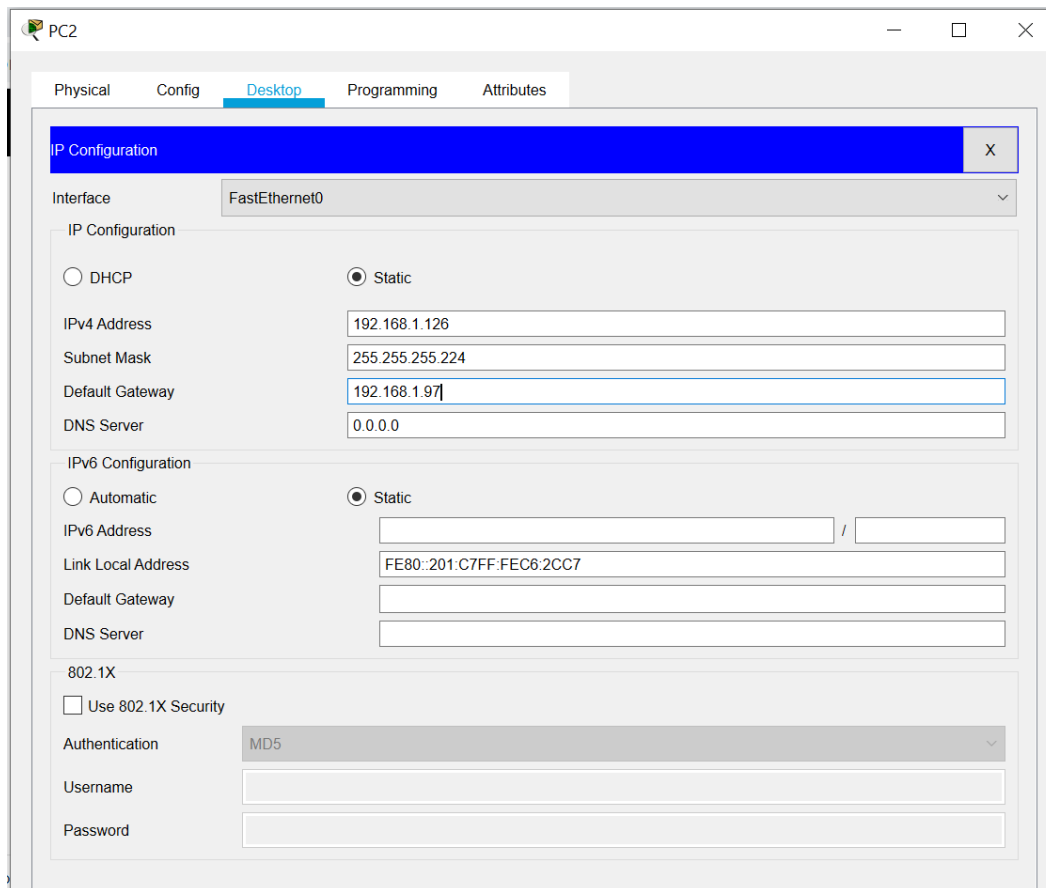
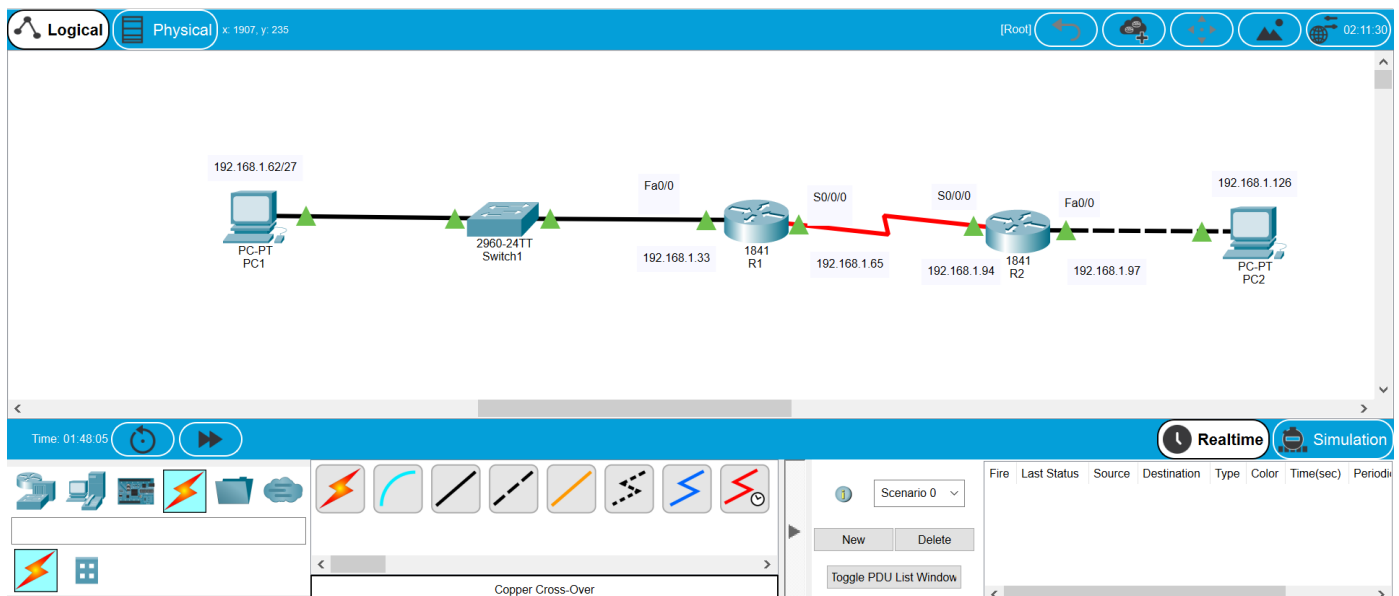


Fig shows the IPv4 address as 192.168.1.126 and Subnet mask as 255.255.255.224 and the default gateway as 192.168.1.97

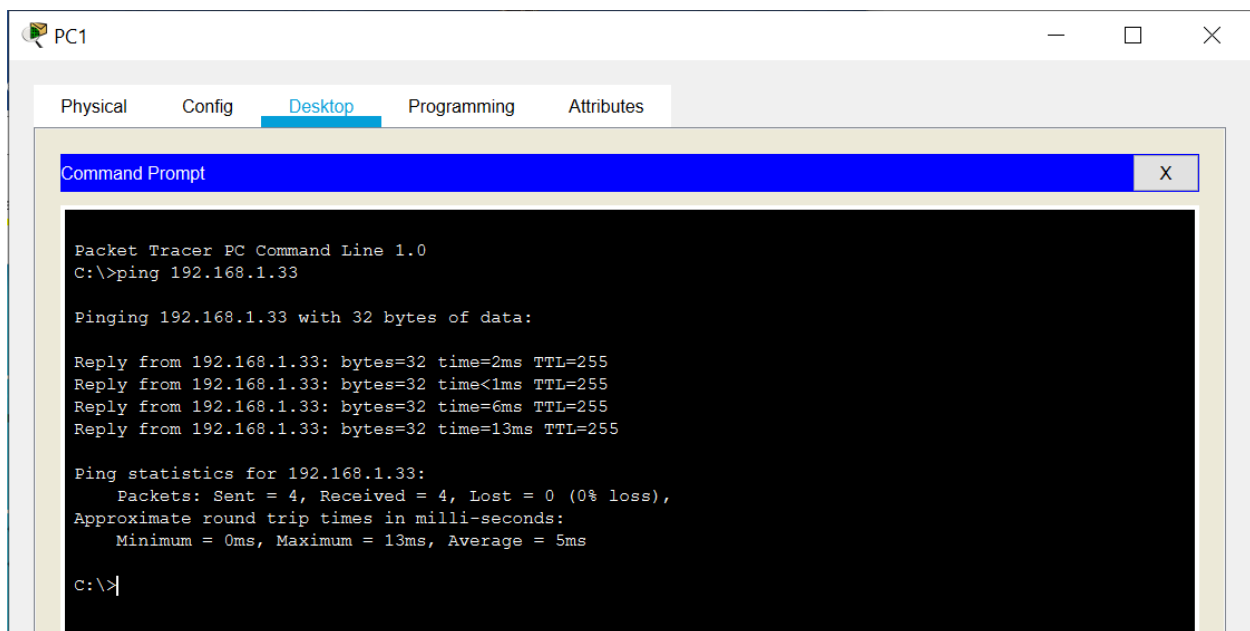
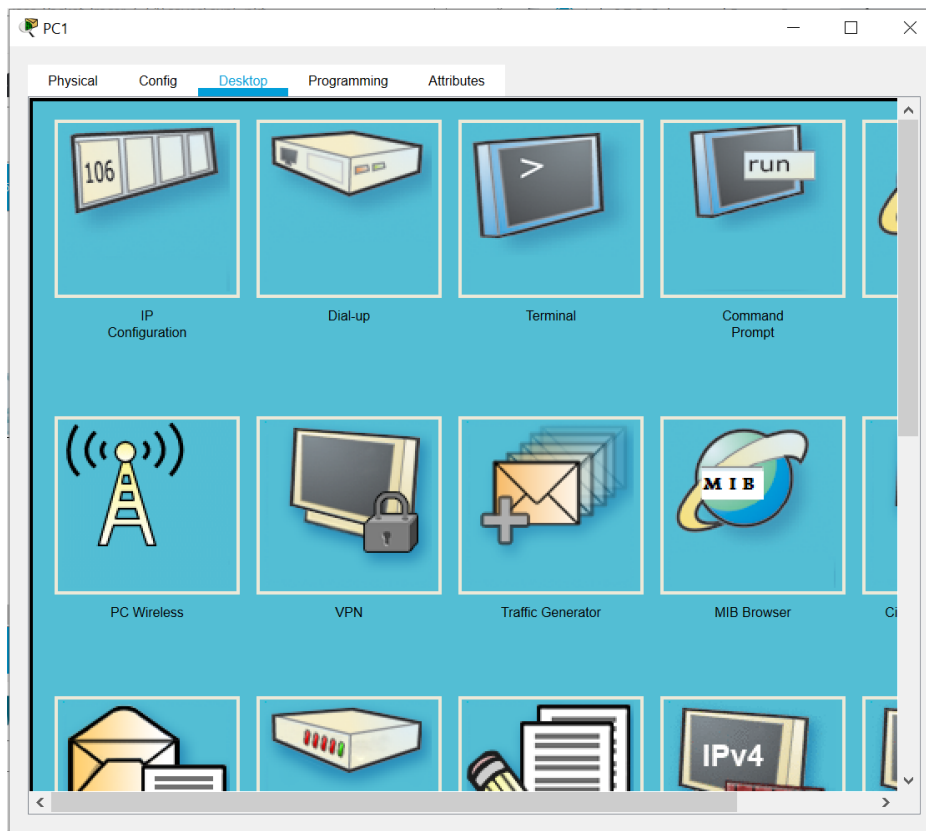


Task 4: Verify the Configurations.

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?

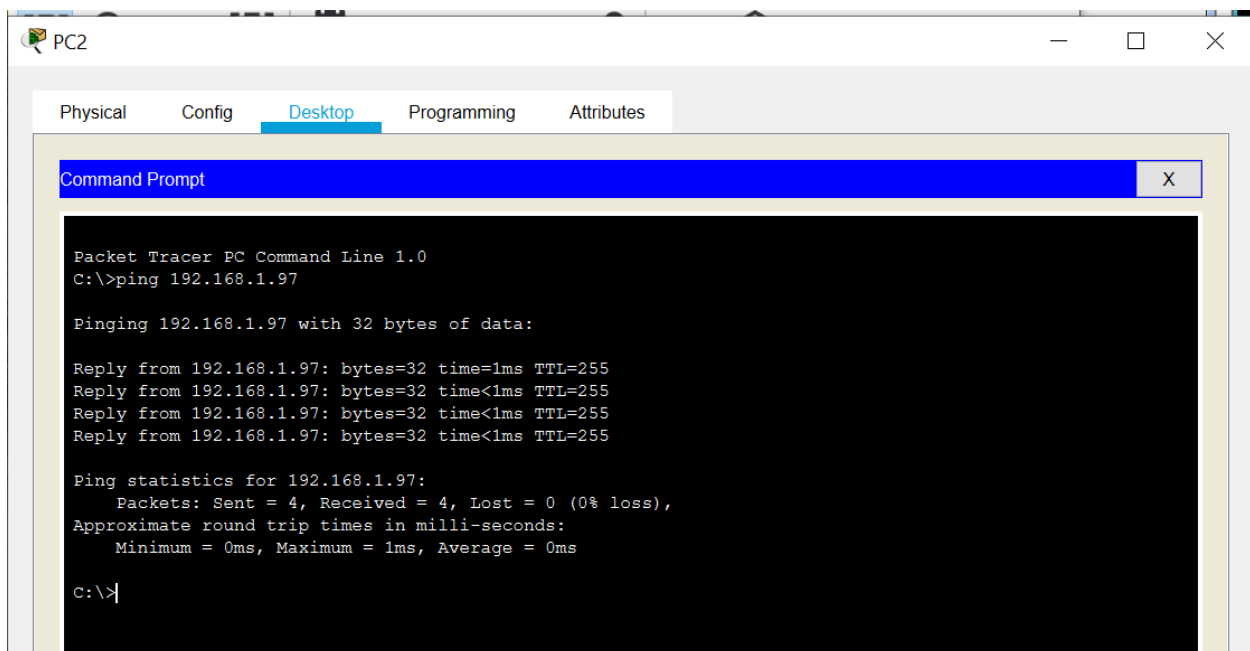
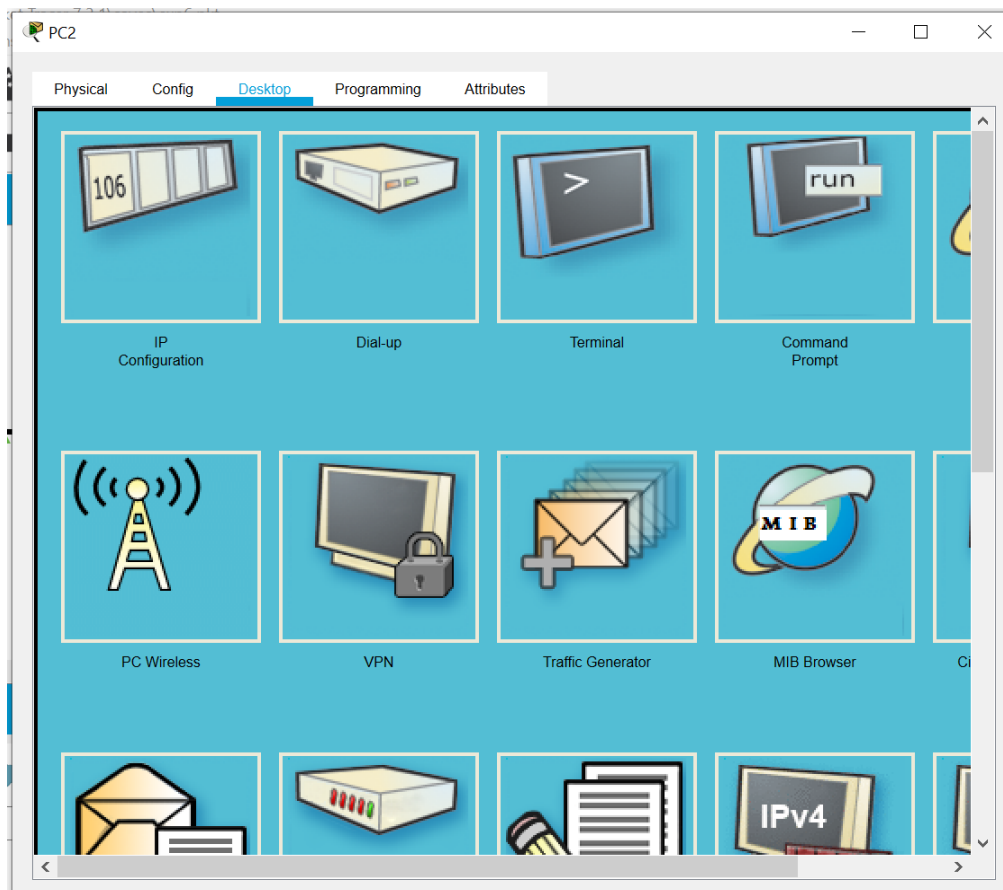
Yes, it's possible



Select pc1 Desktop and ping 192.168.1.33 i.e router1

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

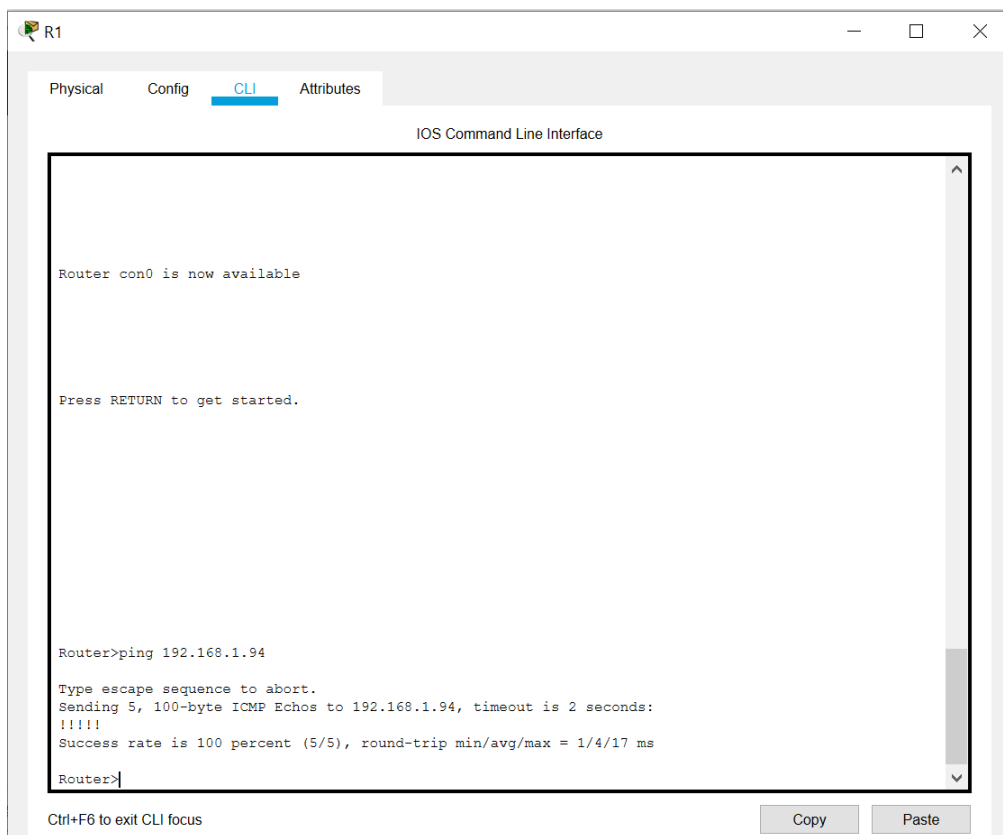
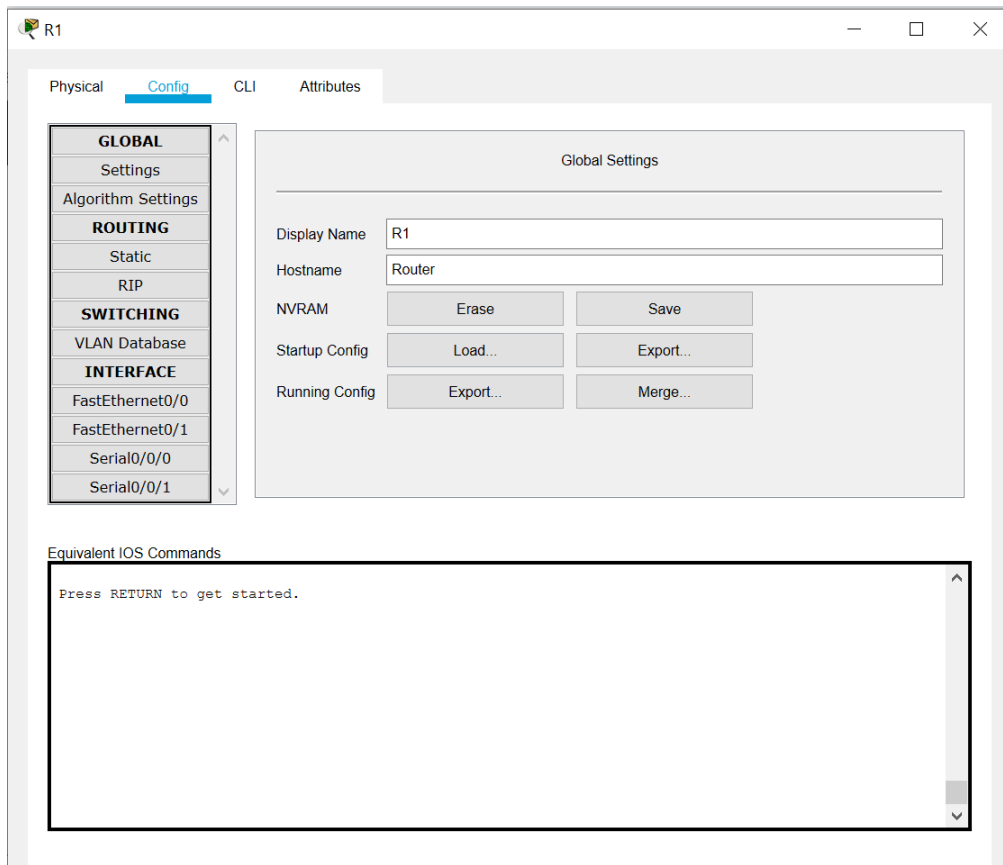
Yes, it's possible



Select pc2 Desktop and ping 192.168.1.97 i.e router2

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

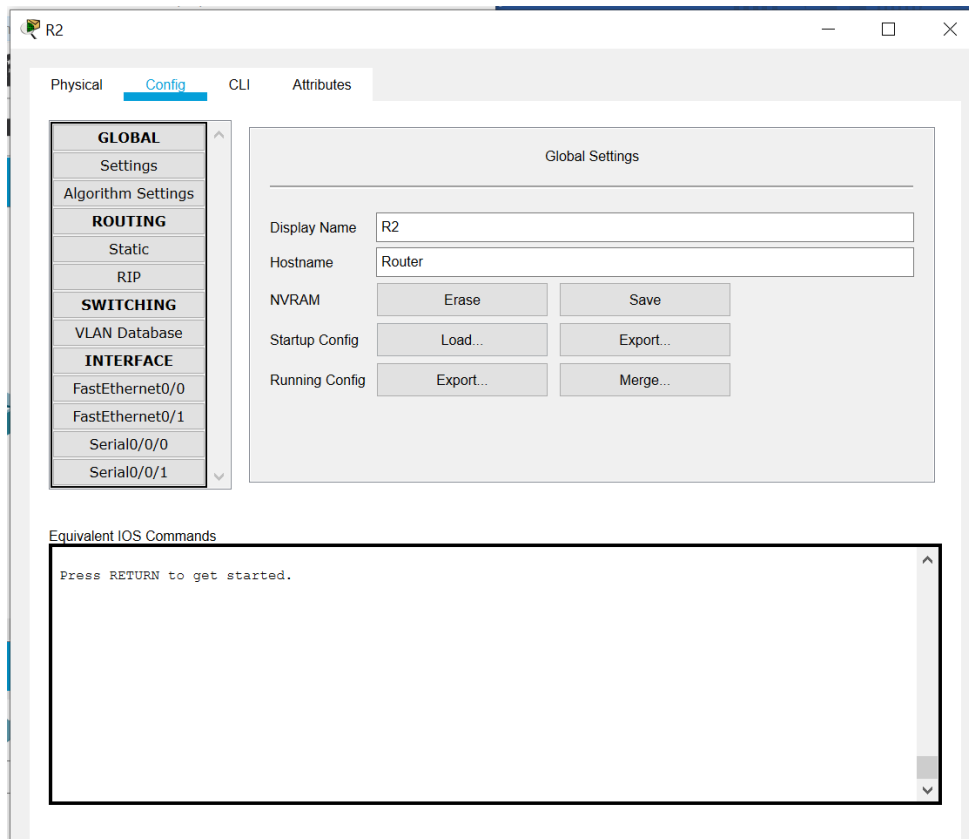
Yes, it is possible



Select router R1 and ping 192.168.1.94

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

Yes, it is possible



Select router R1 and ping 192.168.1.65

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?

R1 cannot ping the FastEthernet interface on R2. Devices from different networks cannot ping each other.

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

Network is preventing communication between these devices because we cannot ping these devices because we have not configured routing, either static or dynamic. This network is missing either static or dynamic routing or both.