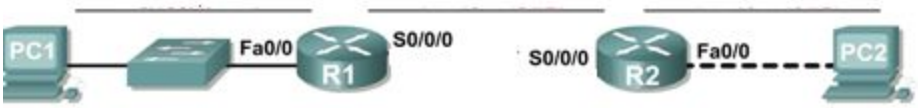
Afaan Ansari
2019230064
CEL 51, DCCN, Monsoon 2020
Lab 6: Subnet and Router Configuration

Topology Diagram



Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	Fa0/0	192.168.1.65	255.255.255.192	N/A
	S0/0/0	192.168.1.129		N/A
R2	Fa0/0	192.168.1.193		N/A
	S0/0/0	192.168.1.190		N/A
PC1	NIC	192.168.1.126		192.168.1.65
PC2	NIC	192.168.1.254		192.168.1.193

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?

Ans : 3 subnets are needed. :

First subnet - the network connected to router R1 to 15 hosts

Second subnet - the link between R1 and R2

Third subnet - the network connected to router R2 to 30 hosts

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

Ans : 192.168.1.0/24 belongs to Class C ,192 is in the range of class C

Subnet mask: 255.255.255.0 is the default.

We need 3 subnets for this network

11111111.11111111.11111111.1100000

255.255.255.192

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

Ans : Subnet mask in slash format is /26 , the number of ones in the binary form of subnet mask.

How many usable hosts are there per subnet?

Ans : Each subnet : 62 addresses.

Usable hosts : $2^6 - 2 = 64-2 = 62$

First address of subnet - network identification

Last address of subnet - broadcast.

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

1. Assign subnet 1 to the network attached to R1. **192.168.1.64/26**
2. Assign subnet 2 to the link between R1 and R2. **192.168.1.128/26**
3. Assign subnet 3 to the network attached to R2. **192.168.1.192/26**

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 = 192.168.1.65

2. Assign the last valid host address in subnet 1 to PC1.
   192.168.1.126

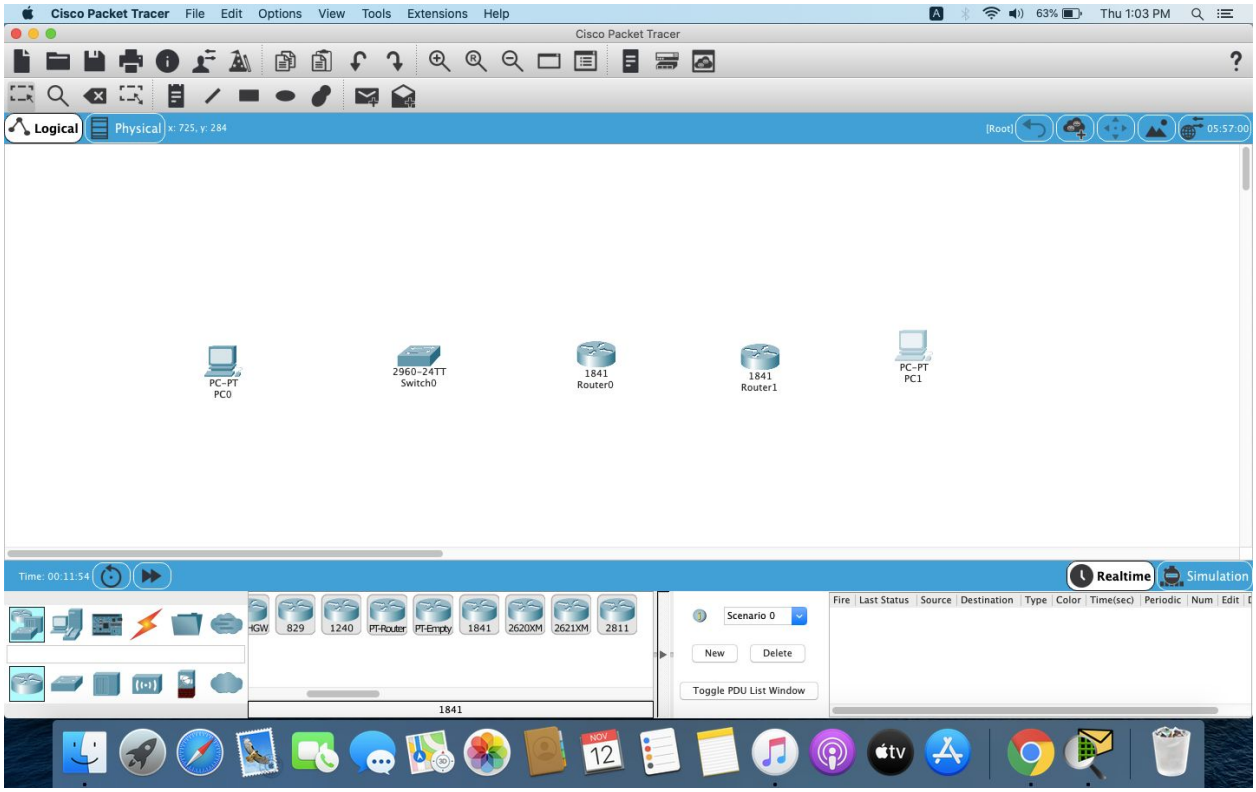
3. Assign the first valid host address in subnet 2 to the WAN interface on R1.
   S0/0/0 = 192.168.1.129

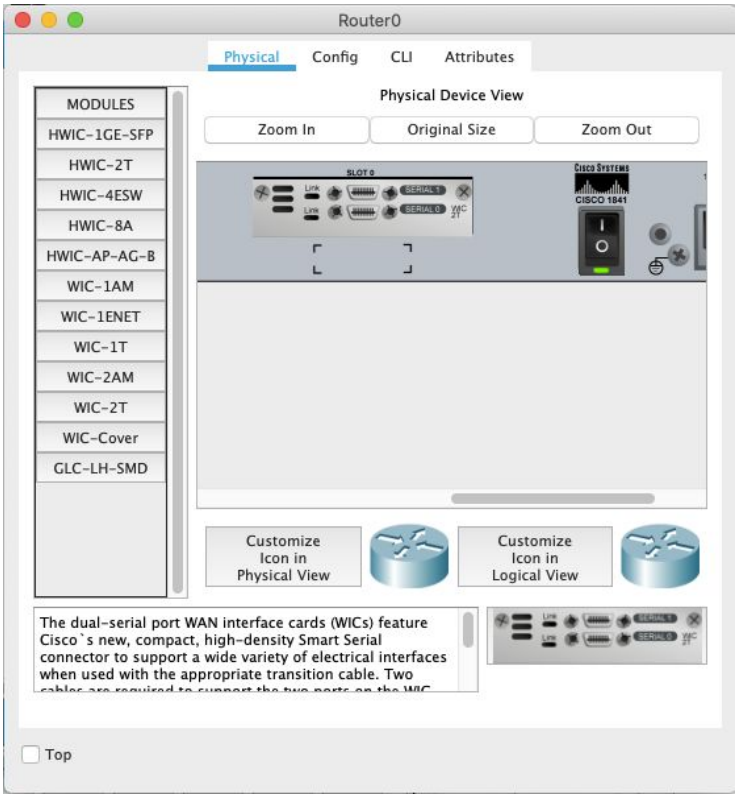
4. Assign the last valid host address in subnet 2 to the WAN interface on R2.
   S0/0/0 = 192.168.1.190

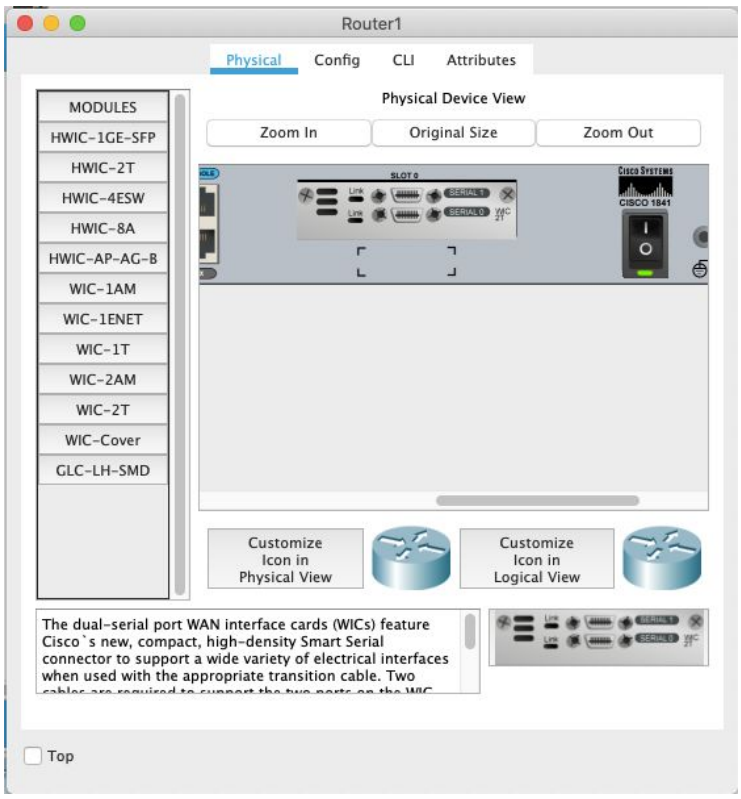
5. Assign the first valid host address in subnet 3 to the LAN interface of R2.
   Fa0/0 = 192.168.1.193

6. Assign the last valid host address in subnet 3 to PC2.
   192.168.1.254

Step 2: Document the addresses to be used in the table provide under the Topology Diagram.Task 3: Configure the Serial and FastEthernet Addresses.

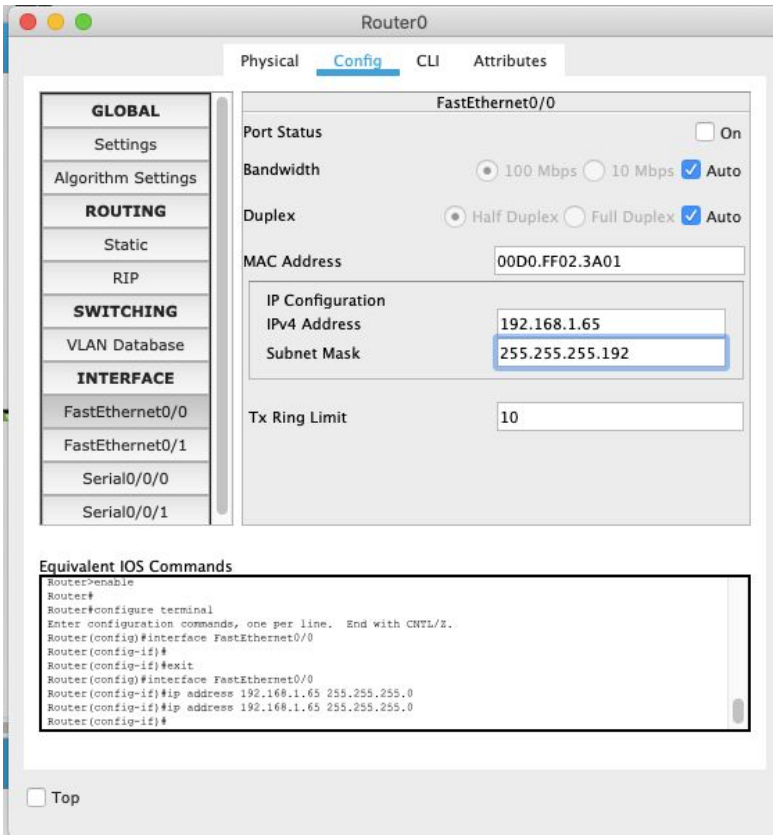


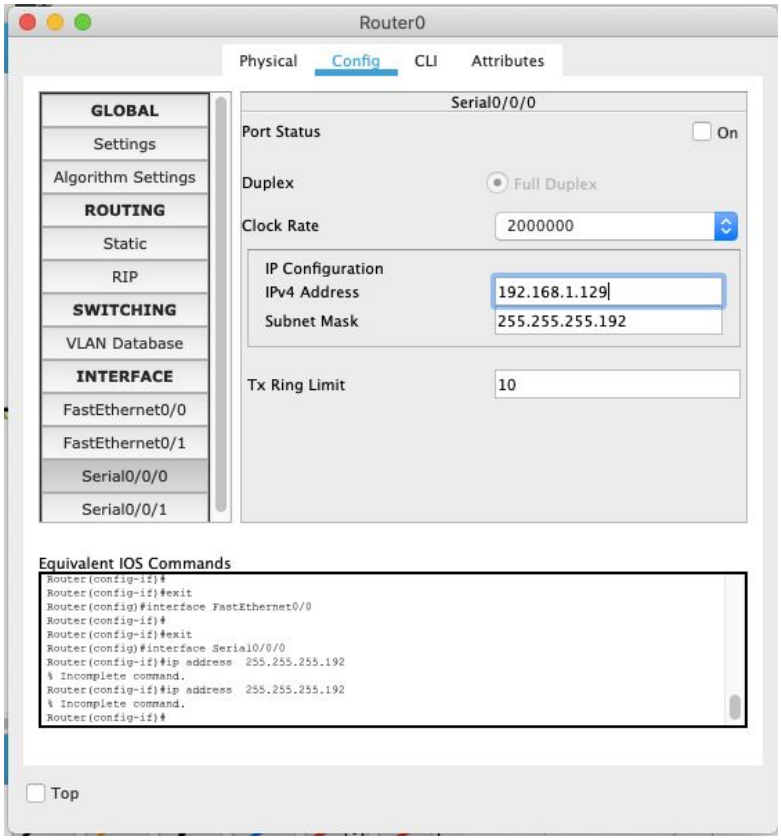


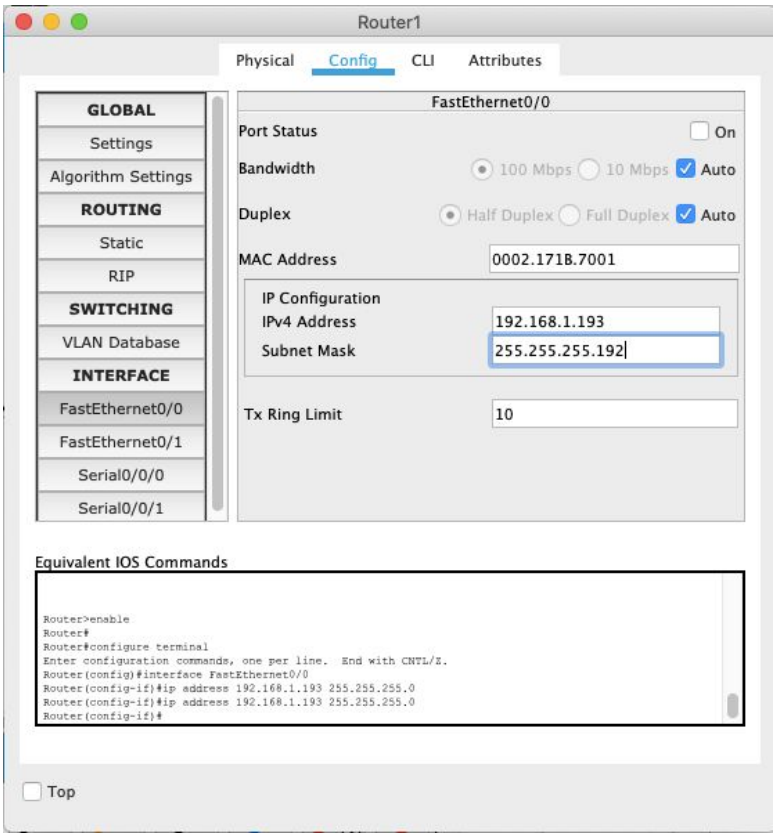


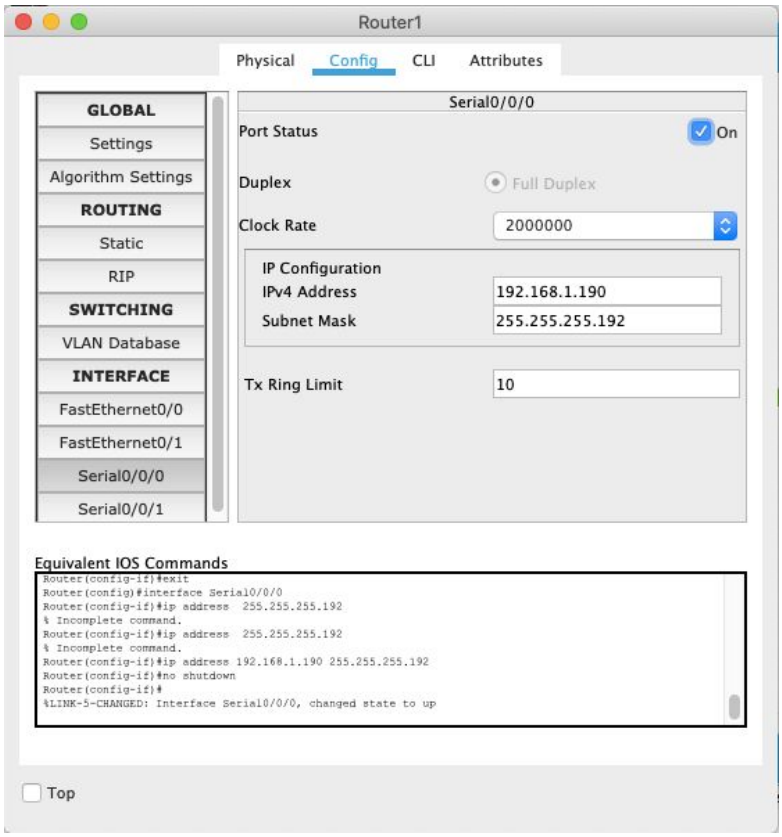
Step 1: Configure the router interfaces.

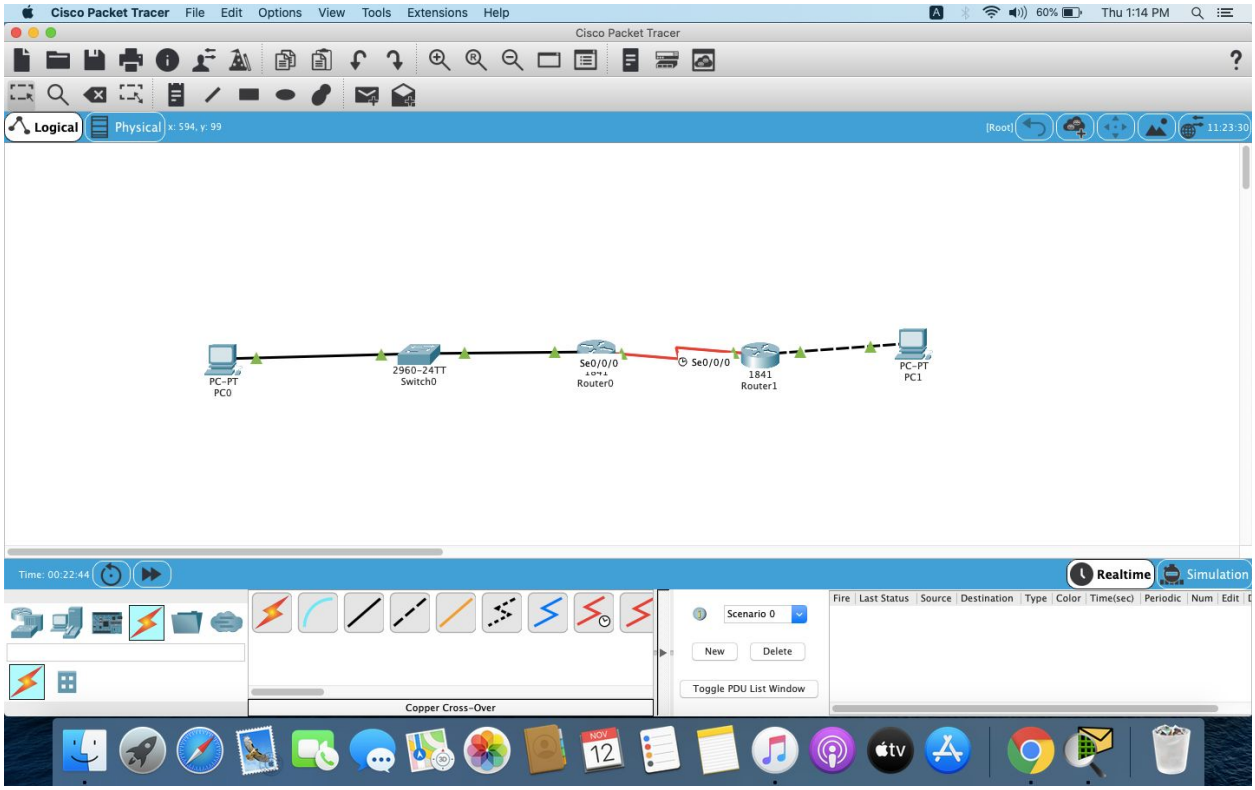
Configure the interfaces on the R1 and R2 routers with the IP addresses from your network design. Please note, to complete the activity in Packet Tracer you will be using the Config Tab. When you have finished, be sure to save the running configuration to the NVRAM of the router





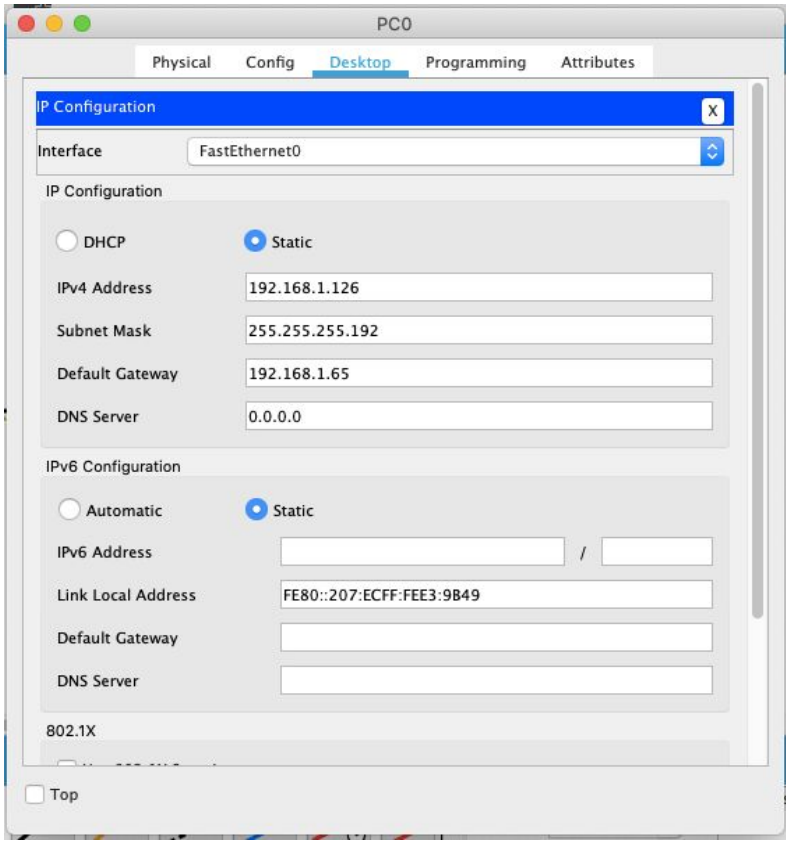

Router1
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
FastEthernet0/0
FastEthernet0/1
Serial0/0/0
Serial0/0/1
FastEthernet0/0
Port Status
On
Bandwidth
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
0002.171B.7001
IP Configuration
IPv4 Address
192.168.1.193
Subnet Mask
255.255.255.192
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 192.168.1.193 255.255.255.0
Router(config-if)#ip address 192.168.1.193 255.255.255.0
Router(config-if)#
Top

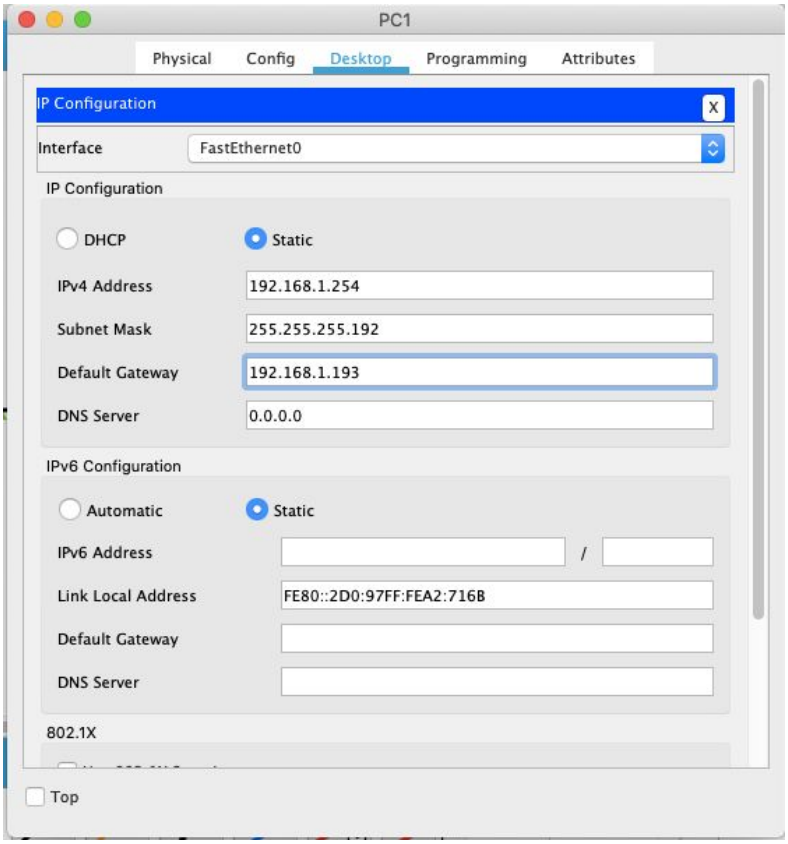

Router1
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
FastEthernet0/0
FastEthernet0/1
Serial0/0/0
Serial0/0/1
Serial0/0/0
Port Status
On
Duplex
Full Duplex
Clock Rate
2000000
IP Configuration
IPv4 Address
192.168.1.190
Subnet Mask
255.255.255.192
Tx Ring Limit
10
Equivalent IOS Commands
Router(config-if)#exit
Router(config)#interface Serial0/0/0
Router(config-if)#ip address 255.255.255.192
% Incomplete command.
Router(config-if)#ip address 255.255.255.192
% Incomplete command.
Router(config-if)#ip address 192.168.1.190 255.255.255.192
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
Top


Cisco Packet Tracer
File
Edit
Options
View
Tools
Extensions
Help
Thu 1:14 PM
Logical
Physical
PC-PT
PC0
2960-24TT
Switch0
Se0/0/0
Router0
Se0/0/0
1841
Router1
PC-PT
PC1
Realtime
Simulation
Scenario 0
New
Delete
Toggle PDU List Window
Copper Cross-Over

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.

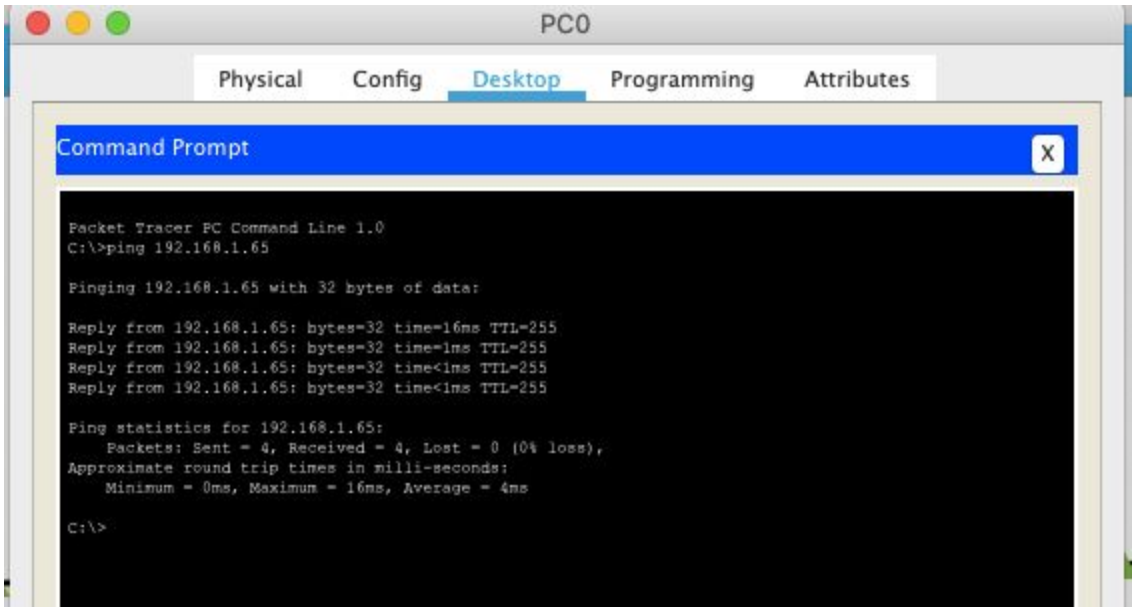




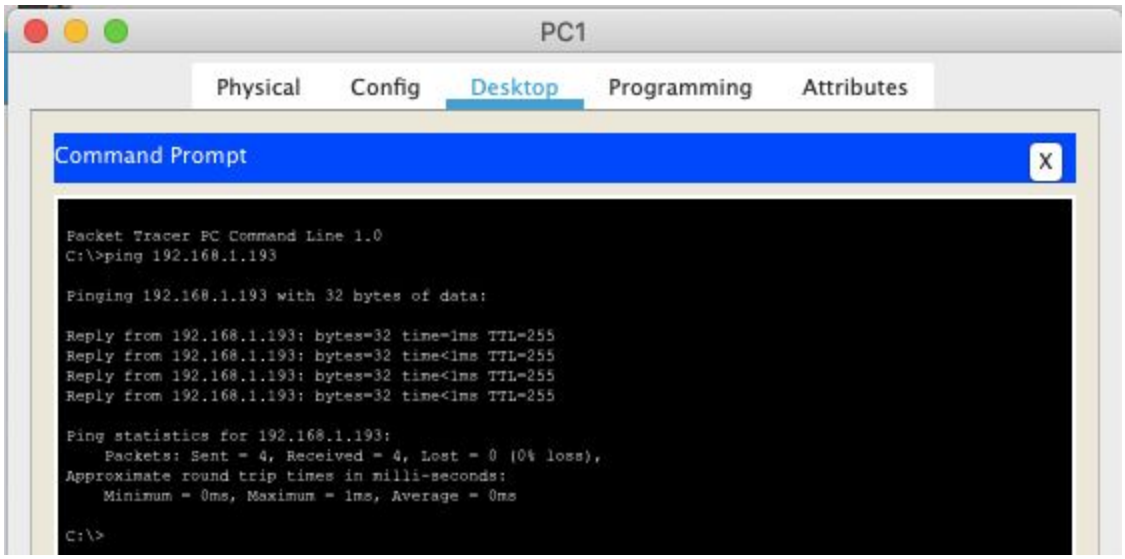
Task 4: Verify the Configurations.

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**

```
Router#^Z
Router#^Z
Router#ping 192.168.1.190

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.190, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 2/22/46 ms

Router#
```

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

```
Router#pin
Router#ping 192.168.1.129

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.129, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 2/21/41 ms

Router#
```

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: YES, The devices on the two different LANs cannot be pinged. Therefore PC1 cannot ping PC2 and vice versa.

```
C:\>ping 192.168.1.254

Pinging 192.168.1.254 with 32 bytes of data:

Reply from 192.168.1.65: Destination host unreachable.
Reply from 192.168.1.65: Destination host unreachable.
Reply from 192.168.1.65: Destination host unreachable.
Reply from 192.168.1.65: Destination host unreachable.

Ping statistics for 192.168.1.254:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

```
C:\>ping 192.168.1.126

Pinging 192.168.1.126 with 32 bytes of data:

Reply from 192.168.1.193: Destination host unreachable.
Reply from 192.168.1.193: Destination host unreachable.
Reply from 192.168.1.193: Destination host unreachable.
Reply from 192.168.1.193: Destination host unreachable.

Ping statistics for 192.168.1.126:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

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

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