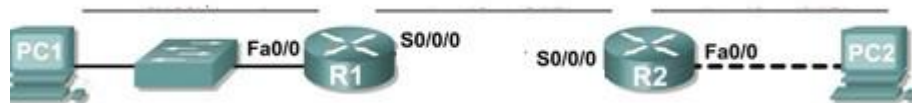


### Topology Diagram



### 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 | 255.255.255.192 | N/A             |
| R2     | Fa0/0     | 192.168.1.193 | 255.255.255.192 | N/A             |
|        | S0/0/0    | 192.168.1.190 | 255.255.255.192 | N/A             |
| PC1    | NIC       | 192.168.1.126 | 255.255.255.192 | 192.168.1.65    |
| PC2    | NIC       | 192.168.1.254 | 255.255.255.192 | 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? **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? **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.  
**192.168.1.65**
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.  
**192.168.1.129**
4. Assign the last valid host address in subnet 2 to the WAN interface on R2.  
**192.168.1.190**
5. Assign the first valid host address in subnet 3 to the LAN interface of R2.  
**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 provided 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.

Network devices

The screenshot shows the 'Config' tab for the 'FastEthernet0/0' interface. The left sidebar has a tree view with 'INTERFACE' selected, and 'FastEthernet0/0' is highlighted. The main panel shows the following settings:

- Port Status: ☒ On
- Bandwidth: ☒ 100 Mbps, ☐ 10 Mbps, ☒ Auto
- Duplex: ☒ Half Duplex, ☐ Full Duplex, ☒ Auto
- MAC Address: 0001.63C2.7501
- IP Configuration:
  - IPv4 Address: 192.168.1.65
  - Subnet Mask: 255.255.255.192
- Tx Ring Limit: 10

Below the configuration fields is a text box titled 'Equivalent IOS Commands' containing the following commands:

```
Router(config)#interface FastEthernet0/0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
```

Fig 1: Fa0/0 config of R1

The screenshot shows the 'Config' tab for the 'Serial0/0/0' interface. The left sidebar has a tree view with 'INTERFACE' selected, and 'Serial0/0/0' is highlighted. The main panel shows the following settings:

- Port Status: ☒ On
- Duplex: ☒ Full Duplex
- Clock Rate: 2000000
- IP Configuration:
  - IPv4 Address: 192.168.1.129
  - Subnet Mask: 255.255.255.192
- Tx Ring Limit: 10

Below the configuration fields is a text box titled 'Equivalent IOS Commands' containing the following commands:

```
Router(config)#ip address 192.168.1.129 255.255.255.192
Bad mask /26 for address 192.168.1.129
Router(config-if)#no ip address
Router(config-if)#ip address 192.168.1.129 255.255.255.192
Router(config-if)#ip address 192.168.1.129 255.255.255.192
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/0/0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
```

Fig 2: S0/0 config of R1

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 0001.96DD.D301  

IP Configuration  
IPv4 Address 192.168.1.193  
Subnet Mask 255.255.255.192

Tx Ring Limit 10

Equivalent IOS Commands

```

Router>configure terminal
Router(config-if)#exit
Router(config)#interface Serial0/0/0
Router(config-if)#ip address 192.168.1.190 255.255.255.192
Router(config-if)#ip address 192.168.1.190 255.255.255.192
Router(config-if)#no shutdown
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

```

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Fig 3: Fa0/0 config of 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 192.168.1.190  
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 192.168.1.193 255.255.255.192
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/0/0
Router(config-if)#ip address 192.168.1.190 255.255.255.192
Router(config-if)#ip address 192.168.1.190 255.255.255.192
Router(config-if)#no shutdown
Router(config-if)#

```

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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.

The screenshot shows the 'IP Configuration' window for the 'FastEthernet0' interface. The 'Static' radio button is selected under 'IP Configuration'. The fields are filled with the following values:

| Field           | Value           |
|-----------------|-----------------|
| IPv4 Address    | 192.168.1.126   |
| Subnet Mask     | 255.255.255.192 |
| Default Gateway | 192.168.1.65    |
| DNS Server      | 0.0.0.0         |

Under 'IPv6 Configuration', the 'Static' radio button is selected. The fields are empty:

| Field              | Value                    |
|--------------------|--------------------------|
| IPv6 Address       |                          |
| Link Local Address | FE80::2E0:A3FF:FE3B:949A |
| Default Gateway    |                          |
| DNS Server         |                          |

Under '802.1X', the 'Use 802.1X Security' checkbox is unchecked. The 'Authentication' dropdown is set to 'MD5'. The 'Username' and 'Password' fields are empty.

Fig 5: IP Config for PC1

The screenshot shows the 'IP Configuration' window for the 'FastEthernet0' interface. The 'Static' radio button is selected under 'IP Configuration'. The fields are filled with the following values:

| Field           | Value           |
|-----------------|-----------------|
| IPv4 Address    | 192.168.1.254   |
| Subnet Mask     | 255.255.255.192 |
| Default Gateway | 192.168.1.193   |
| DNS Server      | 0.0.0.0         |

Under 'IPv6 Configuration', the 'Static' radio button is selected. The fields are filled with the following values:

| Field              | Value                    |
|--------------------|--------------------------|
| IPv6 Address       |                          |
| Link Local Address | FE80::207:ECFF:FE9E:56EC |
| Default Gateway    |                          |
| DNS Server         |                          |

Under '802.1X', the 'Use 802.1X Security' checkbox is unchecked. The 'Authentication' dropdown is set to 'MD5'. The 'Username' and 'Password' fields are empty.

Fig 6: IP Config for PC2

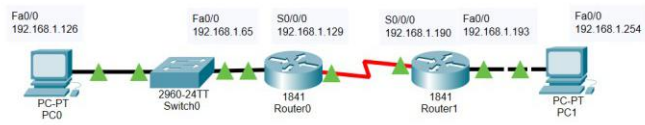
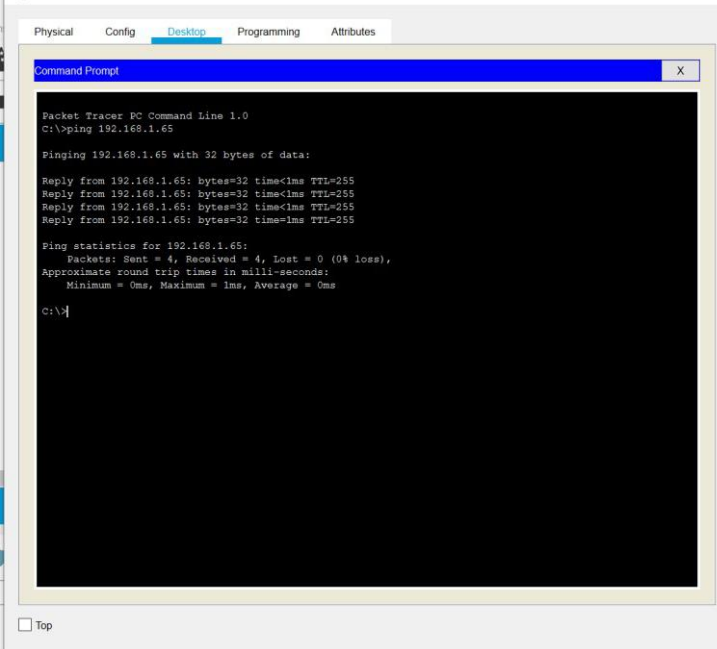


Fig 7: Final network after setup

#### 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**



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

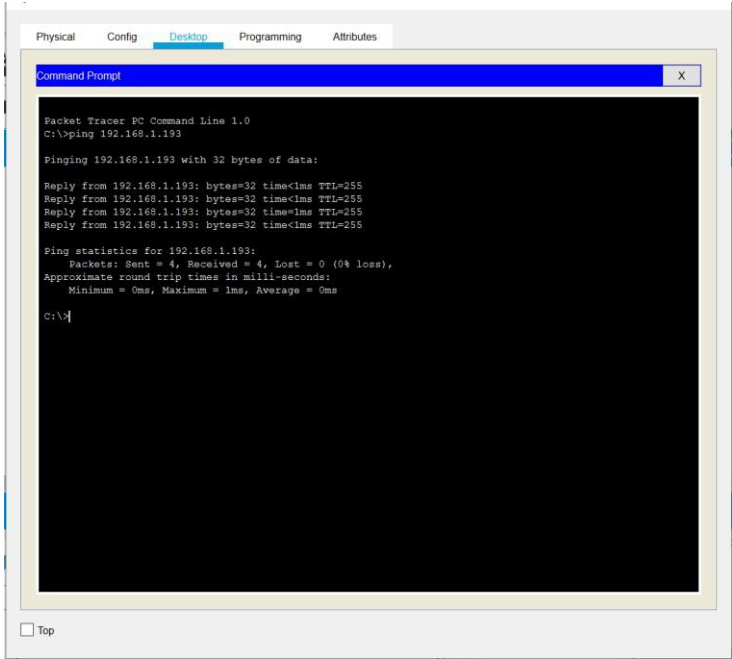
Pinging 192.168.1.65 with 32 bytes of data:

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 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**







