

CEL 51, DCCN, Monsoon 2020

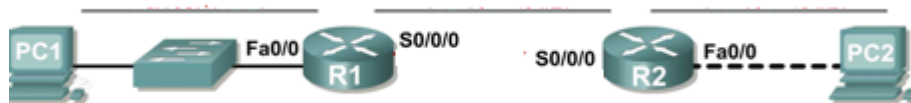
Lab 6: Subnet and Router Configuration

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C-batch TE COMPS

Topology Diagram



Addressing Table

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

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? 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.
2. Assign the last valid host address in subnet 1 to PC1.
3. Assign the first valid host address in subnet 2 to the WAN interface on R1.
4. Assign the last valid host address in subnet 2 to the WAN interface on R2.
5. Assign the first valid host address in subnet 3 to the LAN interface of R2.
6. Assign the last valid host address in subnet 3 to PC2.

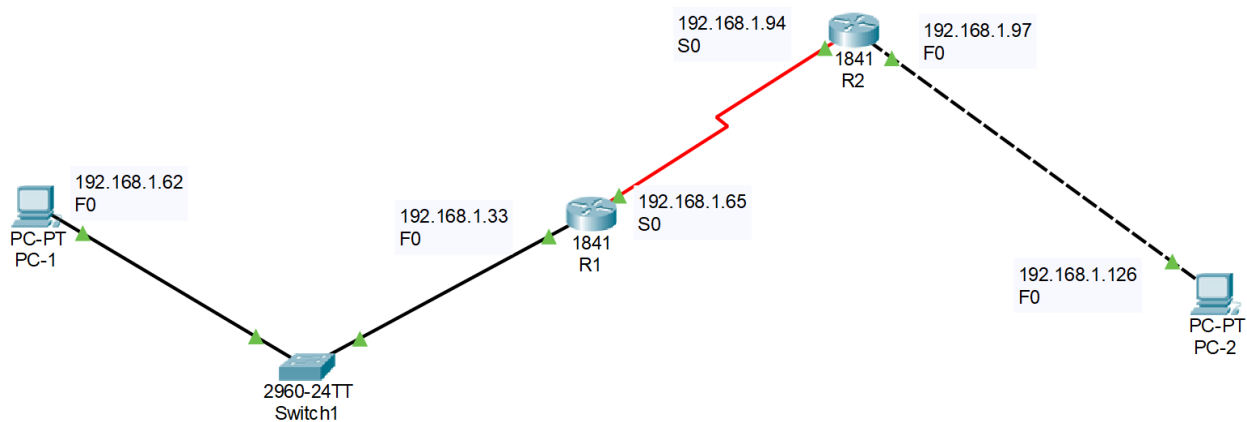


Fig-1 Topology

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.

The screenshot shows the configuration window for router R1 in Packet Tracer. The window has tabs for Physical, Config, CLI, and Attributes. The Config tab is active, showing a tree view on the left with categories: GLOBAL, Settings, Algorithm Settings, ROUTING, Static, RIP, and INTERFACE. Under the INTERFACE category, FastEthernet0/0 is selected. The main area displays the configuration for FastEthernet0/0. The Port Status is set to On. Bandwidth is set to 100 Mbps. Duplex is set to Full Duplex. The MAC Address is 0090.2191.5B18. The IP Configuration section shows the IPv4 Address as 192.168.1.33 and the Subnet Mask as 255.255.255.224. The Tx Ring Limit is set to 10. Below the configuration fields, there is a section for Equivalent IOS Commands, which shows the following commands: Router>enable, Router#, Router#configure terminal, Enter configuration commands, one per line. End with CNTL/Z., Router(config)#interface FastEthernet0/0, and Router(config-if)#. At the bottom left, there is a checkbox labeled Top.

R1

Physical Config CLI Attributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

INTERFACE

FastEthernet0/0

FastEthernet1/0

Serial2/0

Serial3/0

FastEthernet4/0

FastEthernet5/0

FastEthernet0/0

Port Status ☒ On

Bandwidth ☒ 100 Mbps ☐ 10 Mbps ☒ Auto

Duplex ☐ Half Duplex ☒ Full Duplex ☒ Auto

MAC Address 0090.2191.5B18

IP Configuration

IPv4 Address 192.168.1.33

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)#
```

☐ Top

Configuring the router R1 interface

R1

Physical **Config** CLI Attributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

INTERFACE

FastEthernet0/0

FastEthernet1/0

Serial2/0

Serial3/0

FastEthernet4/0

FastEthernet5/0

Serial2/0

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

Equivalent IOS Commands

```
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial2/0
Router(config-if)#
```

☐ Top

Configuring the router R1 interface

R2

Physical **Config** CLI Attributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

INTERFACE

FastEthernet0/0

FastEthernet1/0

Serial2/0

Serial3/0

FastEthernet4/0

FastEthernet5/0

FastEthernet0/0

Port Status ☒ On

Bandwidth ☒ 100 Mbps ☐ 10 Mbps ☒ Auto

Duplex ☐ Half Duplex ☒ Full Duplex ☒ Auto

MAC Address 000C.CFCB.2552

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)#
```

☐ Top

Configuring the router R2 interface

R2

Physical **Config** CLI Attributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

INTERFACE

FastEthernet0/0

FastEthernet1/0

Serial2/0

Serial3/0

FastEthernet4/0

FastEthernet5/0

Serial2/0

Port Status ☒ On

Duplex ☐ Full Duplex

Clock Rate 1200

IP Configuration

IPv4 Address 192.168.1.94

Subnet Mask 255.255.255.224

Tx Ring Limit 10

Equivalent IOS Commands

```
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial2/0
Router(config-if)#
```

☐ Top

Configuring the router R2 interface

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.

PC-1

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IP Address 192.168.1.62

Subnet Mask 255.255.255.224

Default Gateway 192.168.1.33

DNS Server 0.0.0.0

IPv6 Configuration

☐ DHCP ☐ Auto Config ☒ Static

IPv6 Address /

Link Local Address FE80::230:A3FF:FE3B:A841

IPv6 Gateway

IPv6 DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Password

☐ Top

Configuring the PC-1 interface

PC-2

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IP Address 192.168.1.126

Subnet Mask 255.255.255.224

Default Gateway 192.168.1.97

DNS Server 0.0.0.0

IPv6 Configuration

☐ DHCP ☐ Auto Config ☒ Static

IPv6 Address /

Link Local Address FE80::2D0:BAFF:FE79:A3C9

IPv6 Gateway

IPv6 DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Password

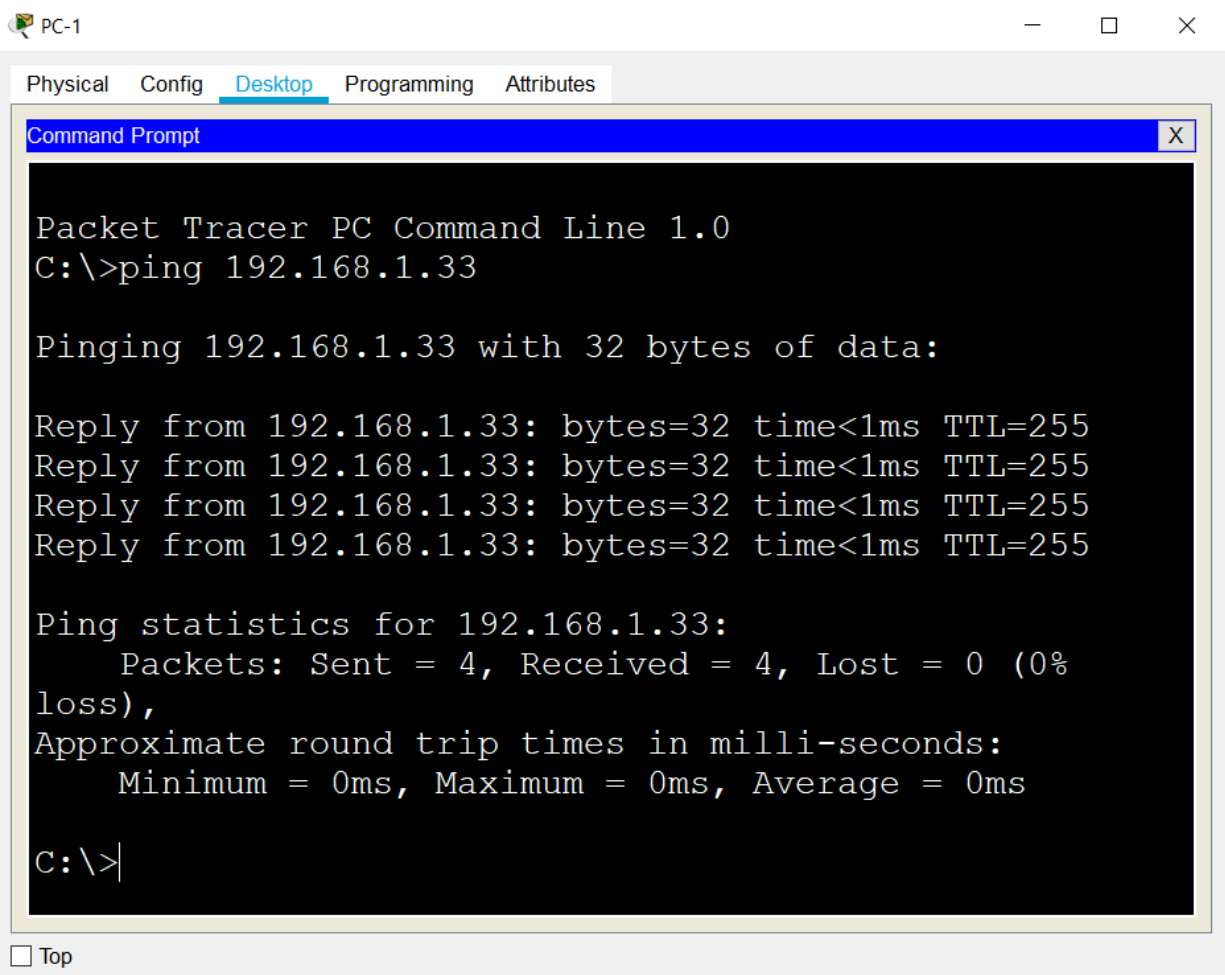
☐ Top

Configuring the PC-2 interface

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 PC Command Line window for PC-1. The window has tabs for Physical, Config, Desktop, Programming, and Attributes, with Desktop selected. The Command Prompt window displays the following text:

```
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.33

Pinging 192.168.1.33 with 32 bytes of data:

Reply from 192.168.1.33: bytes=32 time<1ms TTL=255
Reply from 192.168.1.33: bytes=32 time<1ms TTL=255
Reply from 192.168.1.33: bytes=32 time<1ms TTL=255
Reply from 192.168.1.33: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.1.33:
    Packets: Sent = 4, Received = 4, Lost = 0 (0%
loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

At the bottom left of the window, there is a checkbox labeled "Top" which is currently unchecked.

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

PC-2

Physical Config Desktop Programming Attributes

Command Prompt

```
C:\>ping 192.168.97
Ping request could not find host 192.168.97. Please
check the name and try again.
C:\>ping 192.168.1.97

Pinging 192.168.1.97 with 32 bytes of data:

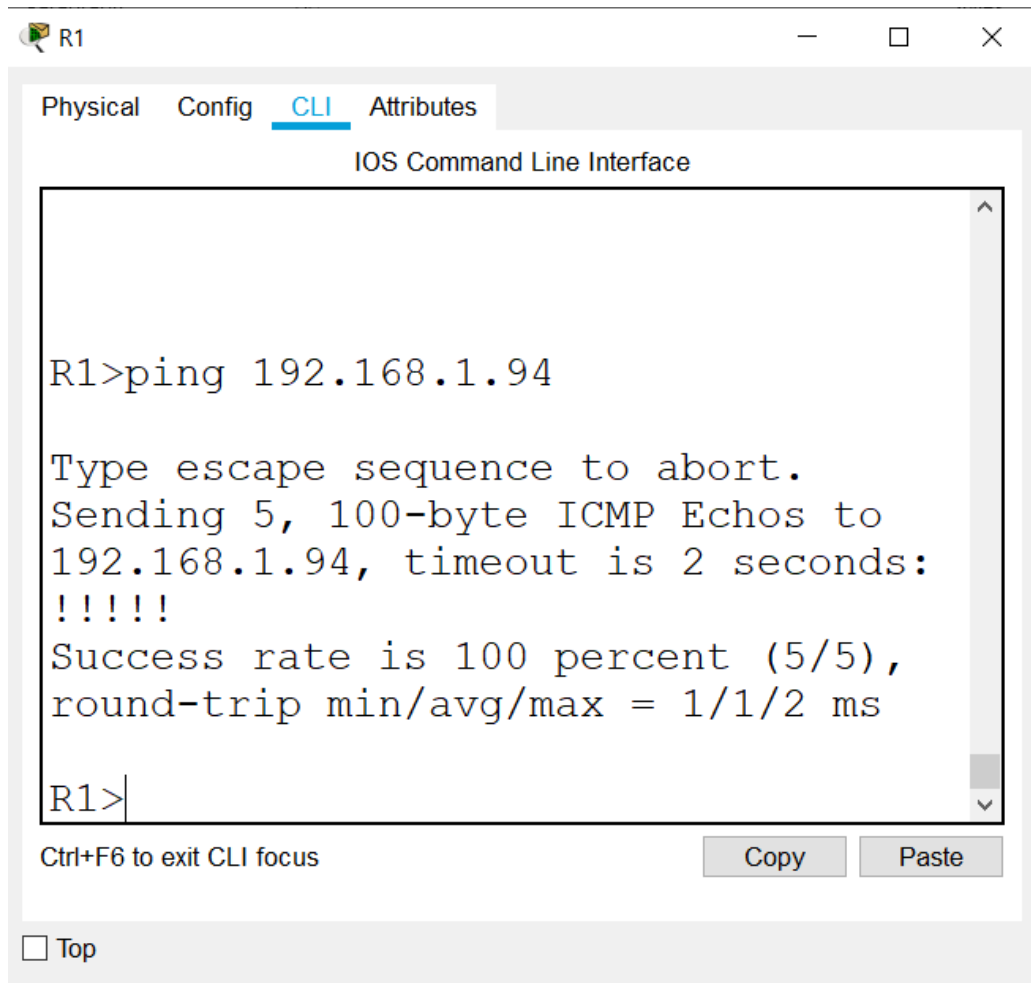
Reply from 192.168.1.97: bytes=32 time<1ms TTL=255
Reply from 192.168.1.97: bytes=32 time<1ms TTL=255
Reply from 192.168.1.97: bytes=32 time<1ms TTL=255
Reply from 192.168.1.97: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.1.97:
    Packets: Sent = 4, Received = 4, Lost = 0 (0%
loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

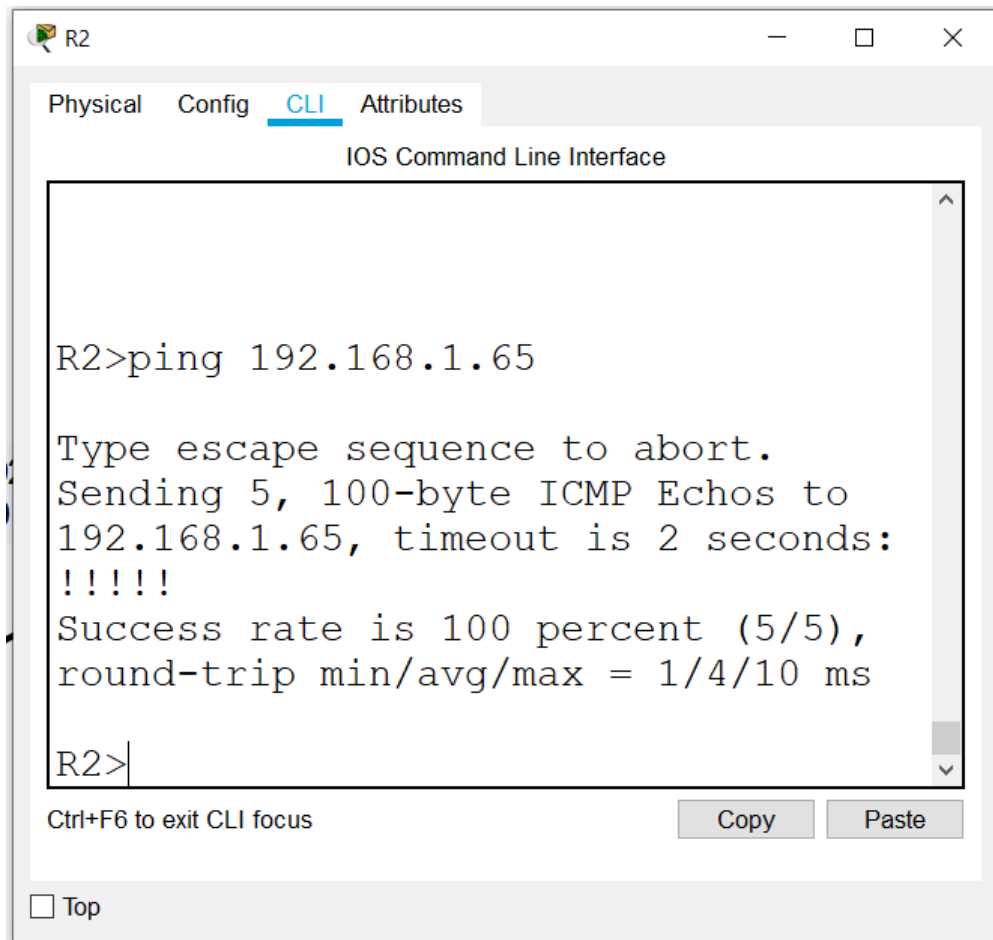
C:\>|
```

☐ Top

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?

Yes, from different network, we can't do ping, for example from PC1 to (PC2 R2) and PC2 to (PC1, R1) .

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

Routing has to be setup to enable communication between PC0 and PC1.