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** | **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.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Subnet | Network Address | Usable Host Addresses | | Broadcast Address | SubnetMask |
| Subnet1 | 192.168.1.64 | 192.168.1.65 | 192.168.1.126 | 192.168.1.17 | /26 |
| Subnet2 | 192.168.1.128 | 192.168.1.129 | 192.168.1.190 | 192.168.1.191 | /26 |
| Subnet3 | 192.168.1.192 | 192.168.1.193 | 192.168.1.254 | 192.168.1.255 | /26 |

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 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.

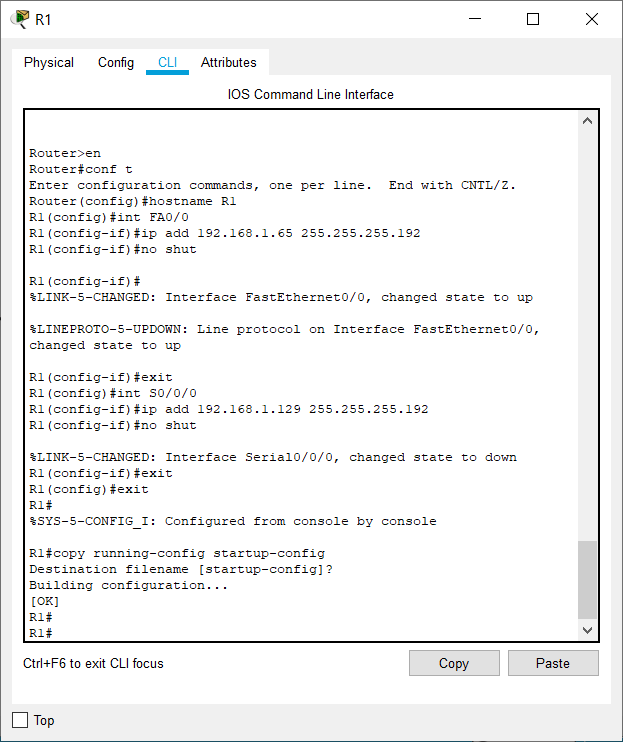


Fig. 6.1 – Setting up IP Address of LAN interface on R1, Starting the Interface (Using no shutdown) and saving the configuration to NVRAM

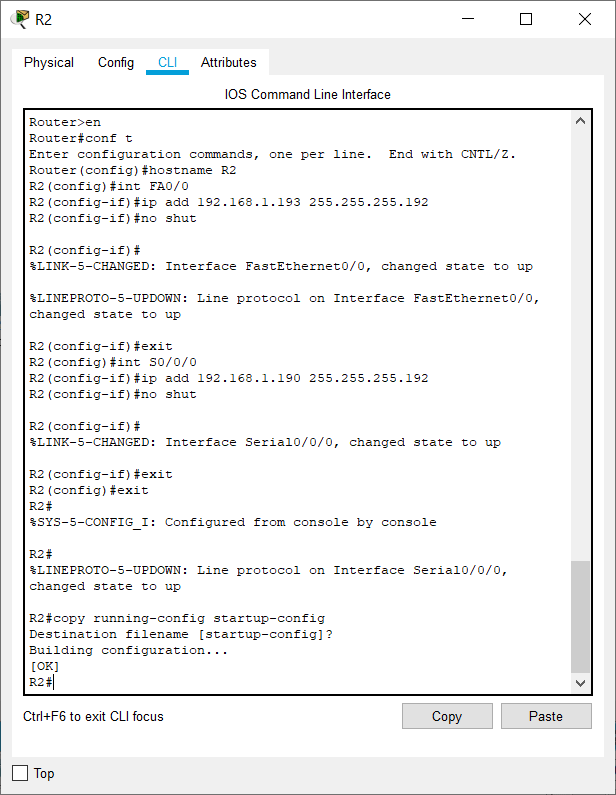


Fig. 6.2 – Setting up IP Address of LAN and WAN interfaces on R2, Starting the interfaces (Using no shutdown) and saving the configuration to NVRAM

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.

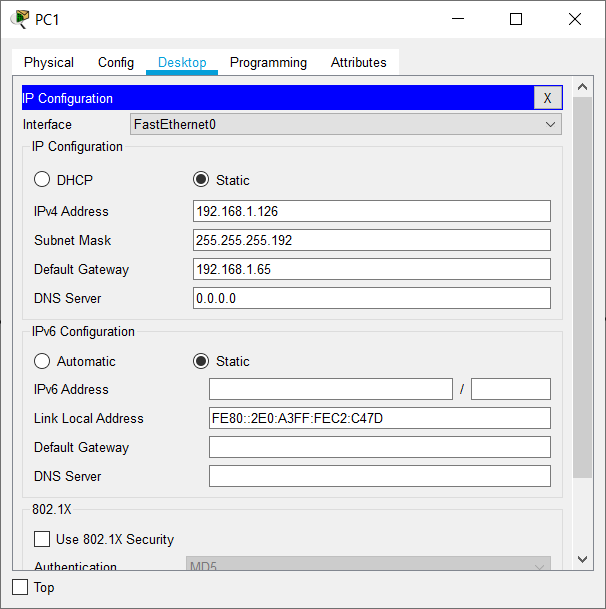


Fig. 6.3 – Setting up IP Address, Subnet Mask and Default Gateway of PC1

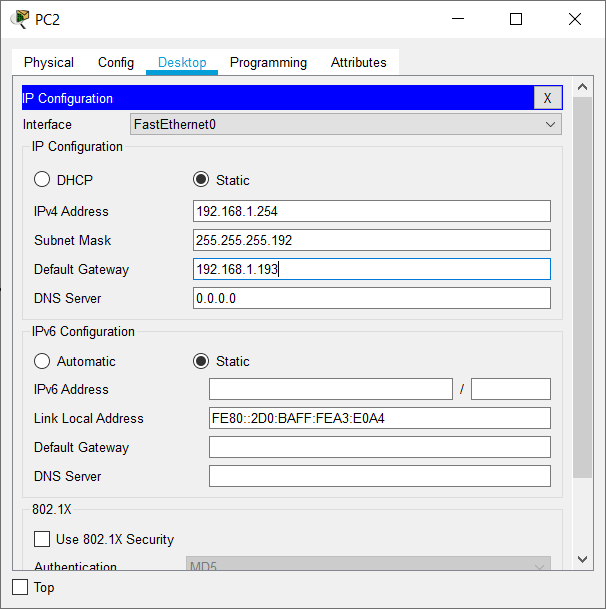


Fig. 6.4 – Setting up IP Address, Subnet Mask and Default Gateway of PC2

Task 4: Verify the Configurations.

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

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

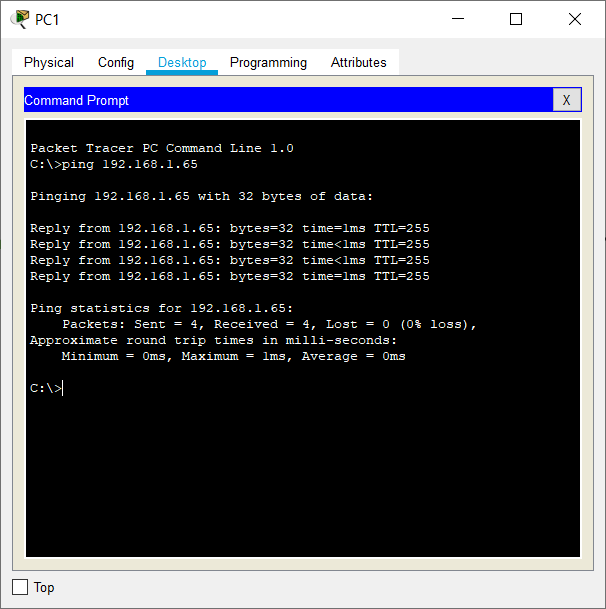


Fig 6.5 – Successful ping from PC1 to default gateway i.e. FA0/0 of R1

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

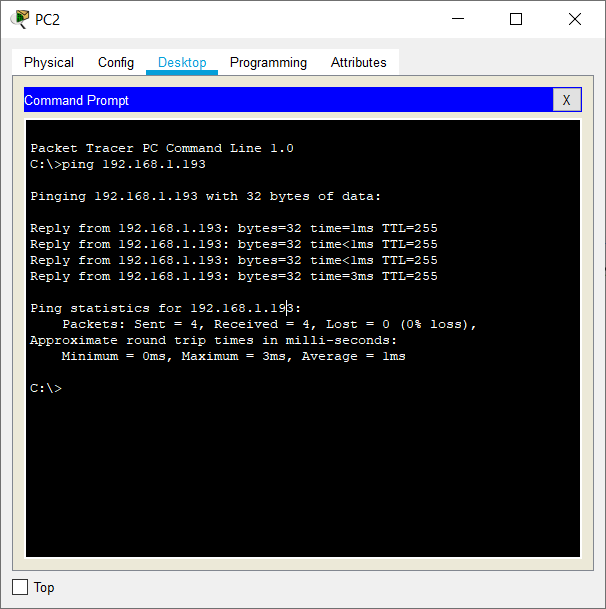


Fig 6.6 – Successful ping from PC2 to default gateway i.e. FA0/0 of R2

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

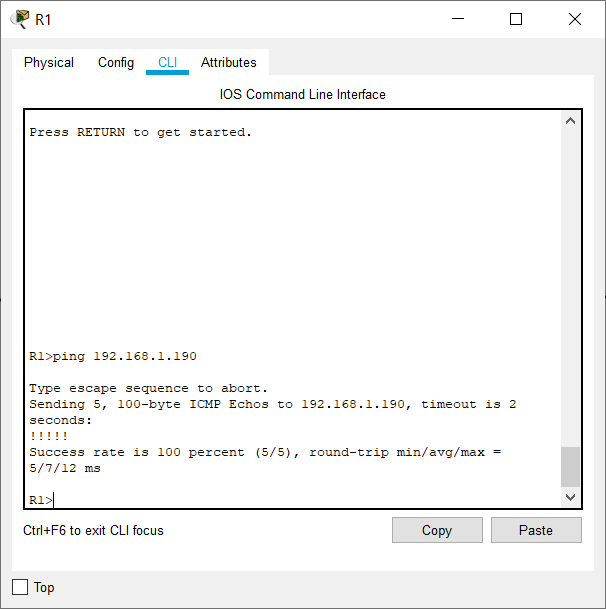


Fig 6.7 – Successful ping from R1 to port S0/0/0 of R2

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

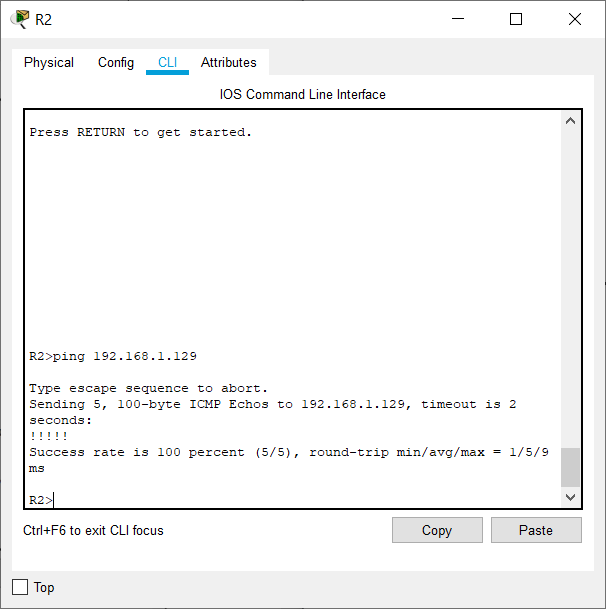


Fig 6.8 – Successful ping from R2 to port S0/0/0 of R1

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, there are devices on the network that cannot ping each other. These are –

1. PC1 cannot ping WAN interface of R2, LAN interface of R2 and PC2

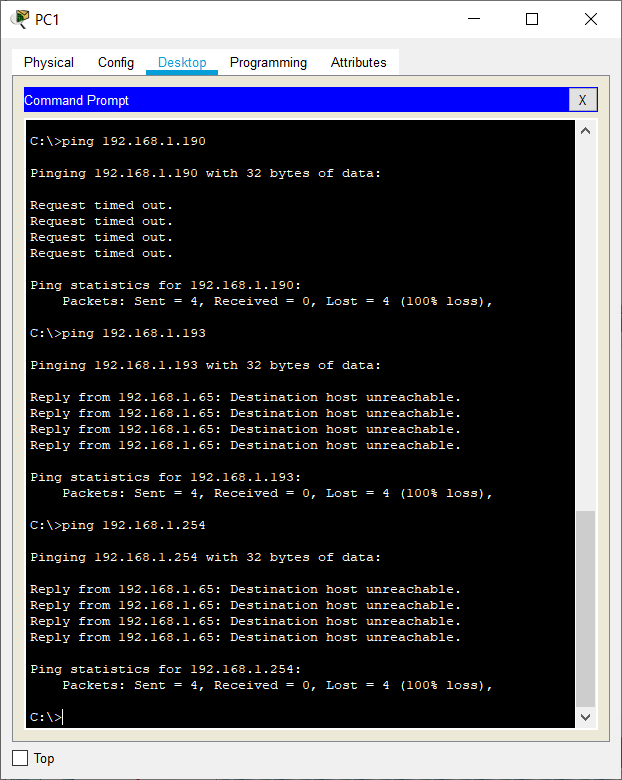


Fig. 6.9 – Shows all unsuccessful pings from PC1

1. PC2 cannot ping WAN interface of R1, LAN interface of R1 and PC1

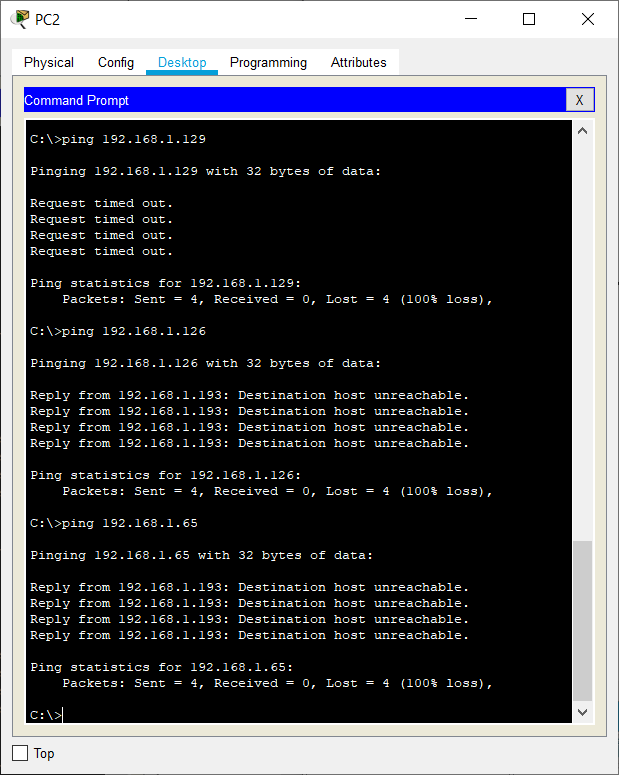


Fig. 6.10 – Shows all unsuccessful pings from PC2

1. R2 cannot ping PC1 and LAN interface of R1

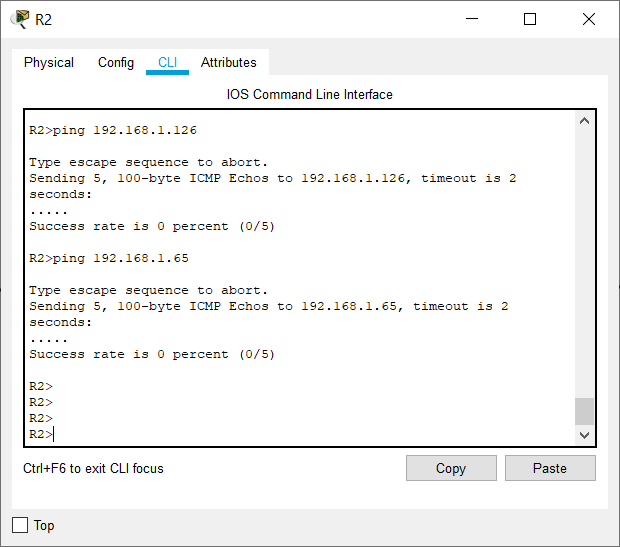


Fig. 6.11 – Shows all unsuccessful pings from R2

1. R1 cannot ping PC2 and LAN interface of R2

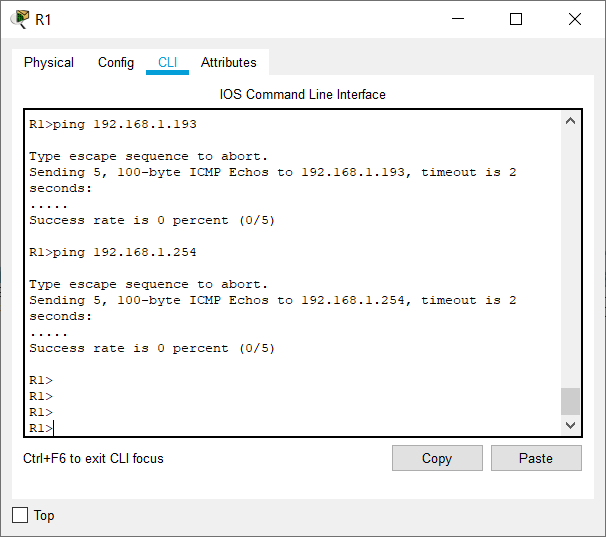


Fig. 6.12 – Shows all unsuccessful pings from R1

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

A routing table is missing in the given routers. A switch can also be used instead of a routing table.

**Extra**

**Adding Static Routing to Table 1 and Table 2**

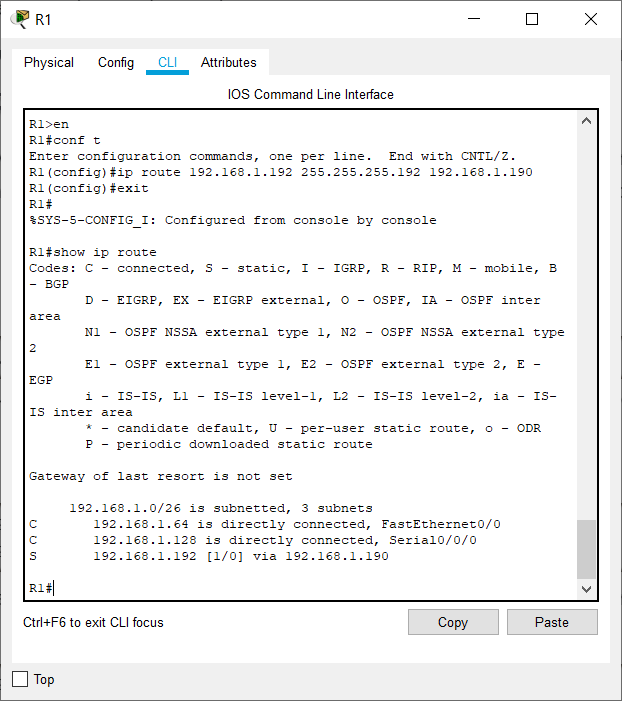


Fig. 6.13 – Added static route to the subnet 192.168.1.192 in R1

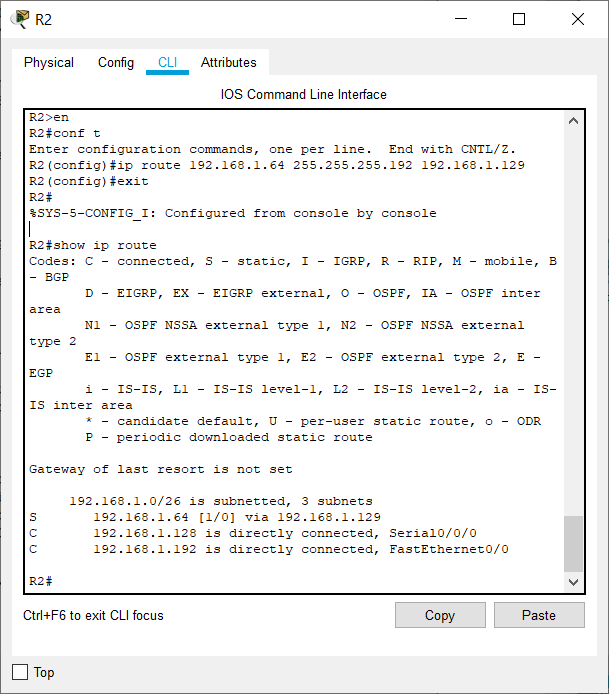


Fig. 6.14 – Added static route to the subnet 192.168.1.64 in R2

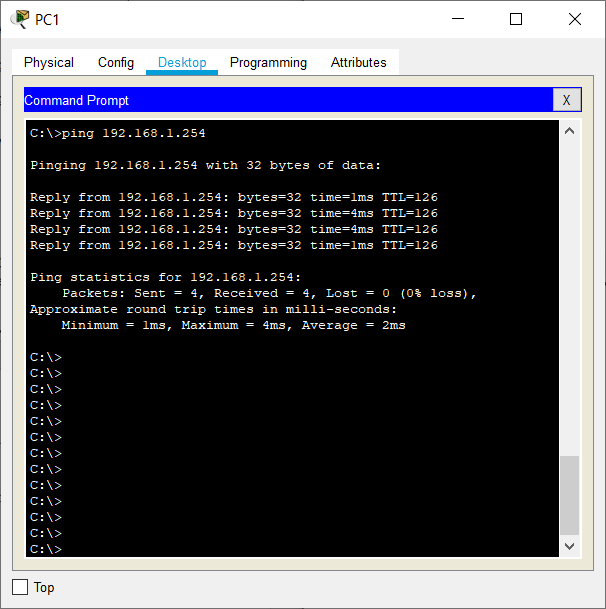


Fig. 6.15 – Shows successful ping from PC1 to PC2 after adding static route.

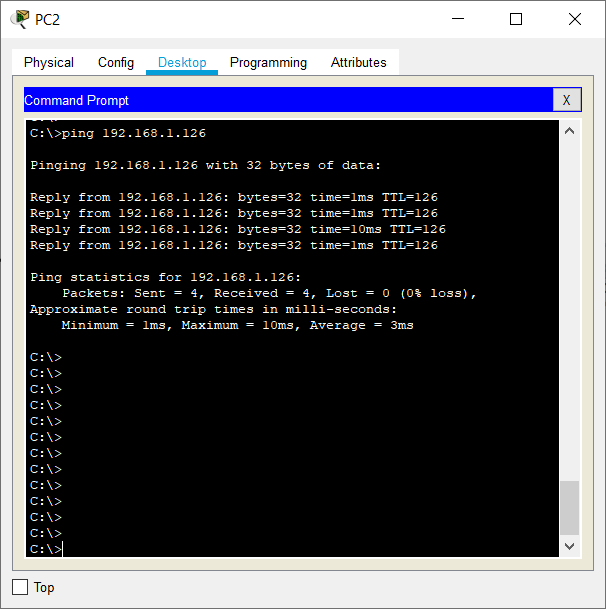


Fig. 6.16 – Shows successful ping from PC2 to PC1 after adding static route.