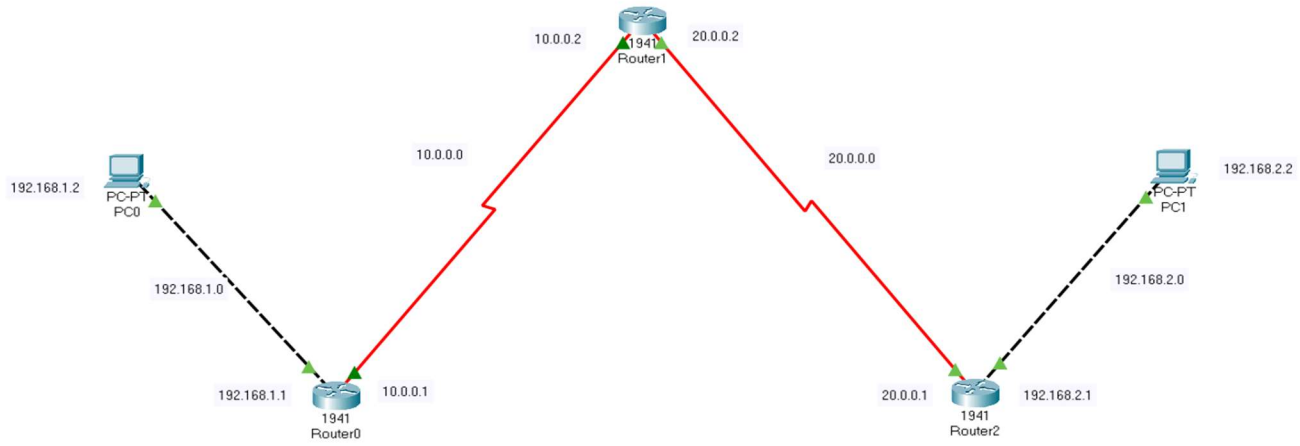
Ex.No:13	IMPLEMENTATION OF VPN
Date:	

AIM :

To configure VPN using routers in Cisco Packet Tracer.

PROCEDURE :

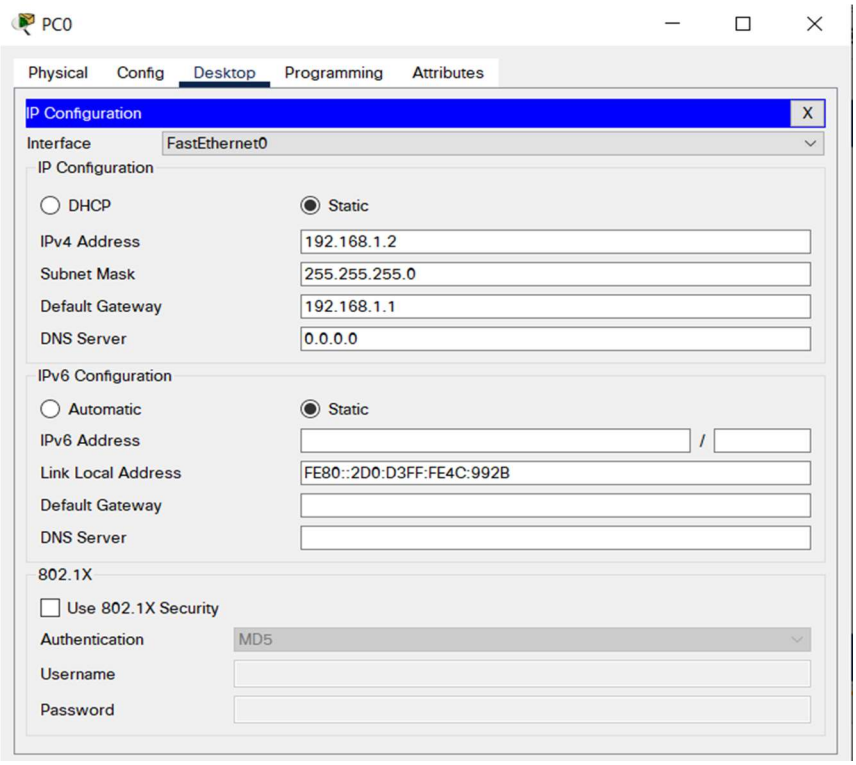
1 . Connect the devices as shown in the below figure.



2 . Initial IP configuration.

Device / Interface	IP Address	Connected with
PC0 / Fa0	192.168.1.2 /24	Router1 / Gig0/0
PC1 / Fa0	192.168.2.2 /24	Router2 / Gig0/0
Router1 / Se0/1/0	10.0.0.1 /8	Router 2 / Se0/1/0
Router2 / Se0/1/0	10.0.0.2 /8	Router 1 / Se0/1/0
Router2 / Se0/1/1	20.0.0.1 /8	Router3 / Se0/1/0
Router3 / Se0/1/0	20.0.0.2 /8	Router2 / Se0/1/1

3 .To assign IP address in Laptop click Laptop and click Desktop and IP configuration and Select Static and set IP address as given in above table.



Following the same way, configure the IP address in PC1.

4. We have to assign ip address on each and every interface of router

CONFIGURATION ON ROUTER1:

```
Router>enable

Router#config t

Router(config)#int gig0/0

Router(config-if)#ip add 192.168.1.1 255.255.255.0

Router(config-if)#no shut

Router(config-if)#exit

Router(config)#int se0/1/0

Router(config-if)#ip address 10.0.0.1 255.0.0.0

Router(config-if)#no shut
```

CONFIGURATION ON ROUTER2:

```
Router>enable
Router#config t
Router(config)#int se0/1/0
Router(config-if)#ip add 10.0.0.2 255.0.0.0
Router(config-if)#no shut
Router(config-if)#exit
Router(config)#int se0/1/1
Router(config-if)#ip add 20.0.0.1 255.0.0.0
Router(config-if)#no shut
```

CONFIGURATION ON ROUTER3:

```
Router>enable
Router#config t
Router(config)#int se0/1/0
Router(config-if)#ip add 20.0.0.2 255.0.0.0
Router(config-if)#no shut
Router(config-if)#exit
Router(config)#int gig0/0
Router(config-if)#ip add 192.168.2.1 255.255.255.0
Router(config-if)#no shut
```

5. Now it's time to do routing. Here we have to configure default routing.

DEFAULT ROUTING CONFIGURATION ON ROUTER1:

```
Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip route 0.0.0.0 0.0.0.0 10.0.0.2
Router(config)#
```

DEFAULT ROUTING CONFIGURATION ON ROUTER3:

```
Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip route 0.0.0.0 0.0.0.0 20.0.0.1
Router(config)#
```

6. NOW CHECK THE CONNECTION BY PINGING EACH OTHER.

First we go to Router1 and ping with Router3:

```
Router#ping 20.0.0.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 20.0.0.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 26/28/33 ms
```

Now we go to Router3 and test the network by pinging Router1 interface.

```
Router#ping 10.0.0.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.0.0.1, timeout is 2 seconds:
!!!!!
```

```
Success rate is 100 percent (5/5), round-trip min/avg/max = 25/28/32 ms
```

You can clearly see both routers pinging each other successfully.

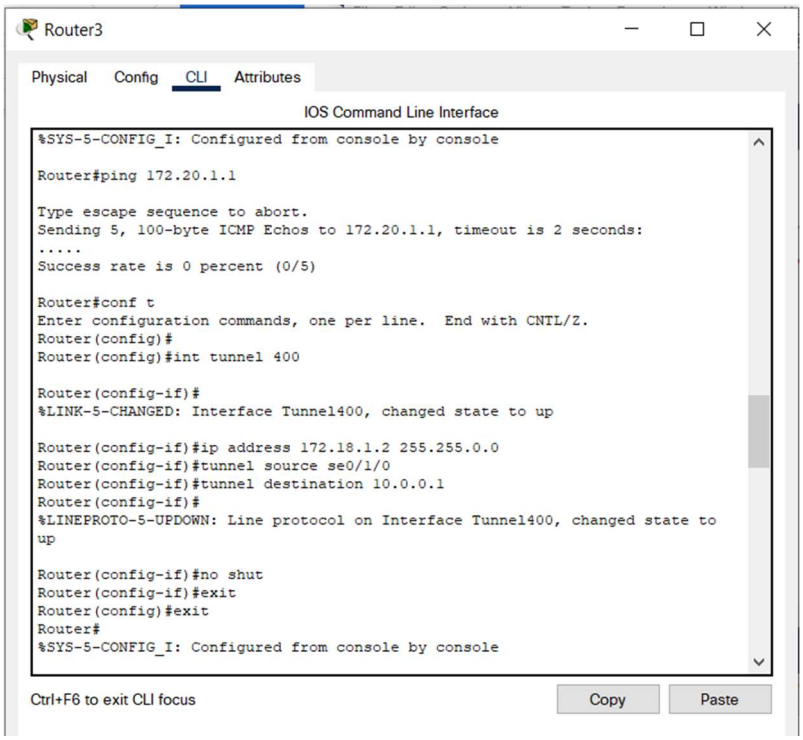
7. NOW CREATE VPN TUNNEL between Router1 and Router3:

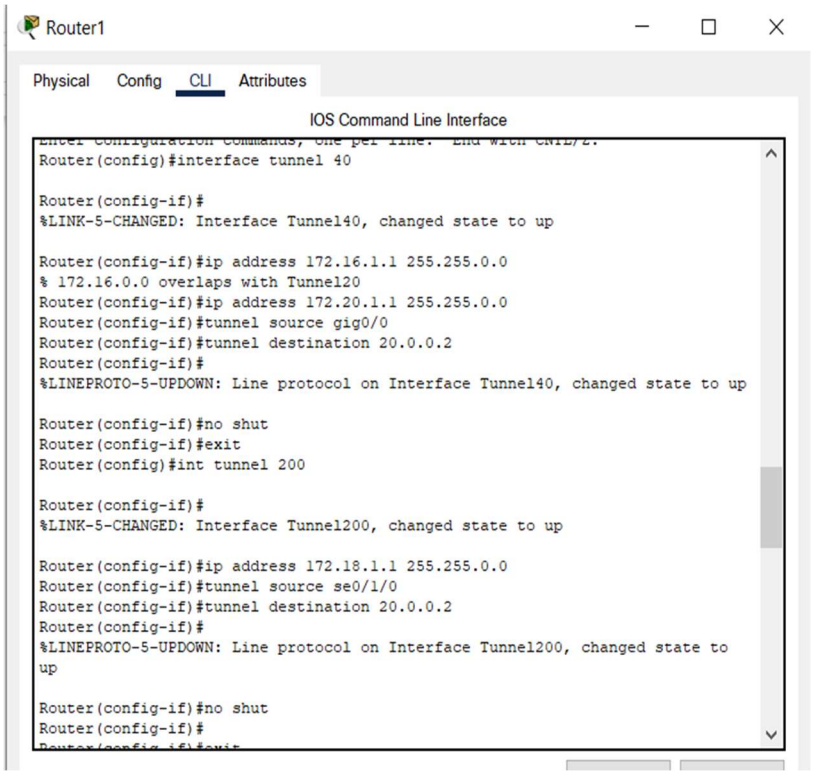
FIRST CREATE A VPN TUNNEL ON ROUTER1:

```
Router#config t
Router(config)#interface tunnel 200
Router(config-if)#ip address 172.18.1.1 255.255.0.0
Router(config-if)#tunnel source se0/1/0
Router(config-if)#tunnel destination 20.0.0.2
Router(config-if)#no shut
```

NOW CREATE A VPN TUNNEL ON ROUTER R3:

```
Router#config t
Router(config)#interface tunnel 400
Router(config-if)#ip address 172.18.1.2 255.255.0.0
Router(config-if)#tunnel source se0/1/0
Router(config-if)#tunnel destination 10.0.0.1
Router(config-if)#no shut
```


Router3
Physical
Config
CLI
Attributes
IOS Command Line Interface
%SYS-5-CONFIG_I: Configured from console by console
Router#ping 172.20.1.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.20.1.1, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#int tunnel 400
Router(config-if)#
%LINK-5-CHANGED: Interface Tunnel400, changed state to up
Router(config-if)#ip address 172.18.1.2 255.255.0.0
Router(config-if)#tunnel source se0/1/0
Router(config-if)#tunnel destination 10.0.0.1
Router(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Tunnel400, changed state to up
Router(config-if)#no shut
Router(config-if)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
Ctrl+F6 to exit CLI focus
Copy
Paste


Router1
Physical
Config
CLI
Attributes
IOS Command Line Interface
Router(config)#interface tunnel 40
Router(config-if)#
%LINK-5-CHANGED: Interface Tunnel40, changed state to up
Router(config-if)#ip address 172.16.1.1 255.255.0.0
% 172.16.0.0 overlaps with Tunnel20
Router(config-if)#ip address 172.20.1.1 255.255.0.0
Router(config-if)#tunnel source gig0/0
Router(config-if)#tunnel destination 20.0.0.2
Router(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Tunnel40, changed state to up
Router(config-if)#no shut
Router(config-if)#exit
Router(config)#int tunnel 200
Router(config-if)#
%LINK-5-CHANGED: Interface Tunnel200, changed state to up
Router(config-if)#ip address 172.18.1.1 255.255.0.0
Router(config-if)#tunnel source se0/1/0
Router(config-if)#tunnel destination 20.0.0.2
Router(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Tunnel200, changed state to up
Router(config-if)#no shut
Router(config-if)#

8. Now test communication between these two routers again by pinging each other:

Router1

```
Router#ping 172.18.1.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.18.1.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 30/32/36 ms
Router#
```

Router2

```
Router#ping 172.18.1.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.18.1.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 33/45/83 ms
```

9. Now do routing for created VPN Tunnel on Both Router1 and Router3:

```
Router(config)#ip route 192.168.2.0 255.255.255.0 172.18.1.2

Router(config)#ip route 192.168.1.0 255.255.255.0 172.18.1.1
```

10. TEST VPN TUNNEL CONFIGURATION:

Now we have to test whether tunnel is created or not for Router1

```
Router#show interfaces Tunnel 200
Tunnel200 is up, line protocol is up (connected)
Hardware is Tunnel
Internet address is 172.18.1.1/16
```

MTU 17916 bytes, BW 100 Kbit/sec, DLY 50000 usec,

reliability 255/255, txload 1/255, rxload 1/255

Encapsulation TUNNEL, loopback not set

Keepalive not set

Tunnel source 10.0.0.1 (FastEthernet0/1), destination 20.0.0.2

Tunnel protocol/transport GRE/IP

Key disabled, sequencing disabled

Checksumming of packets disabled

Tunnel TTL 255

Fast tunneling enabled

Tunnel transport MTU 1476 bytes

Tunnel transmit bandwidth 8000 (kbps)

Tunnel receive bandwidth 8000 (kbps)

Last input never, output never, output hang never

Last clearing of "show interface" counters never

Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 1

Queueing strategy: fifo

Output queue: 0/0 (size/max)

5 minute input rate 32 bits/sec, 0 packets/sec

5 minute output rate 32 bits/sec, 0 packets/sec

52 packets input, 3508 bytes, 0 no buffer

Received 0 broadcasts, 0 runts, 0 giants, 0 throttles

0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort

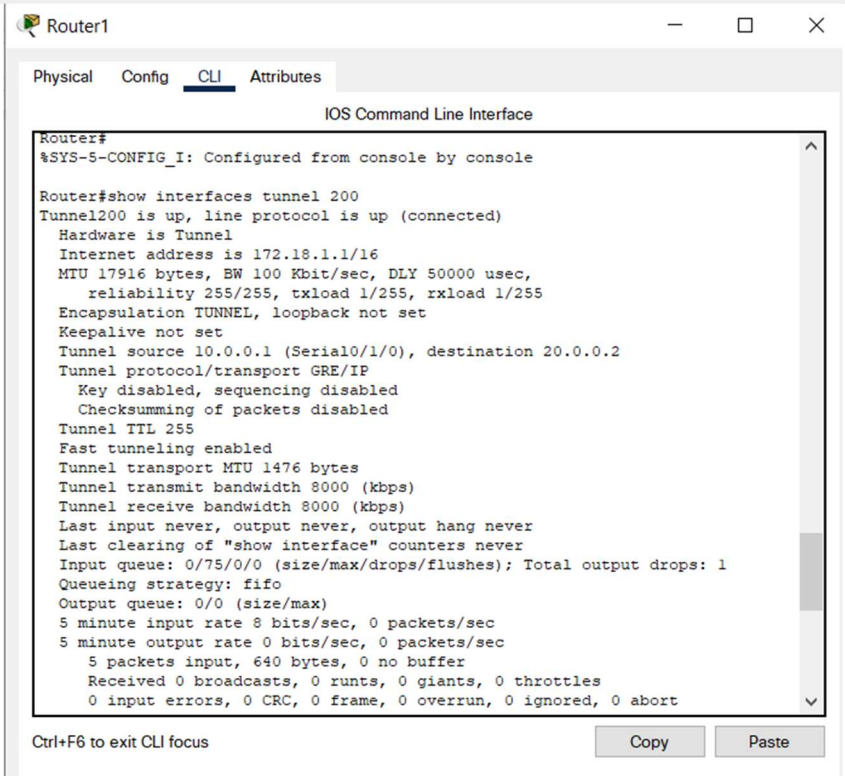
0 input packets with dribble condition detected

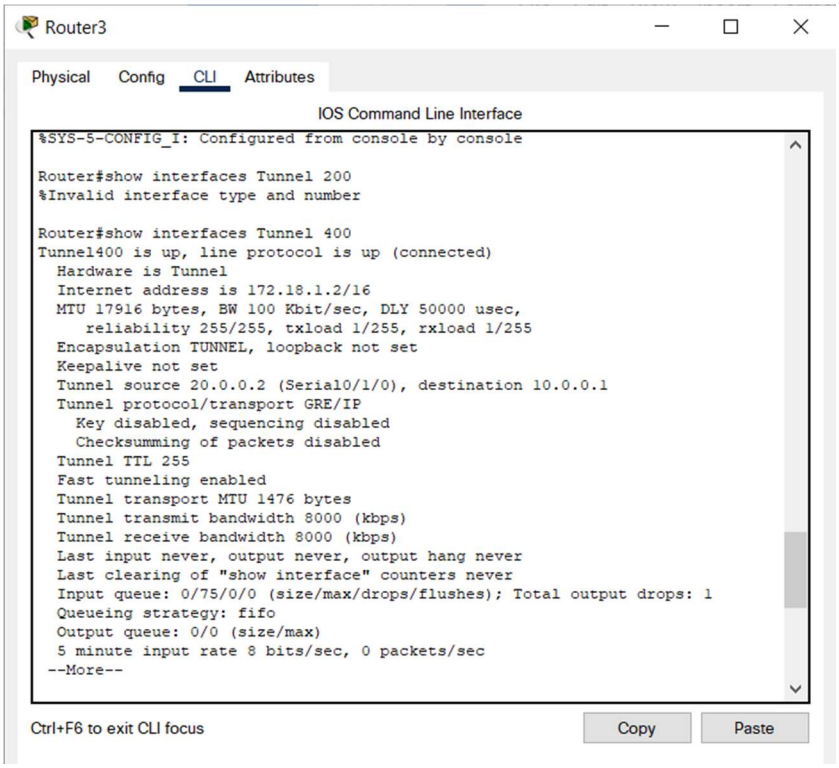
52 packets output, 3424 bytes, 0 underruns

0 output errors, 0 collisions, 0 interface resets

0 unknown protocol drops

0 output buffer failures, 0 output buffers swapped out





Now going to Router3 and test VPN Tunnel Creation:

```
Router #show interface Tunnel 400
Tunnel400 is up, line protocol is up (connected)
Hardware is Tunnel
Internet address is 172.18.1.2/16
MTU 17916 bytes, BW 100 Kbit/sec, DLY 50000 usec,
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation TUNNEL, loopback not set
Keepalive not set
Tunnel source 20.0.0.2 (FastEthernet0/0), destination 10.0.0.1
Tunnel protocol/transport GRE/IP
Key disabled, sequencing disabled
Checksumming of packets disabled
Tunnel TTL 255
Fast tunneling enabled
Tunnel transport MTU 1476 bytes
Tunnel transmit bandwidth 8000 (kbps)
Tunnel receive bandwidth 8000 (kbps)
Last input never, output never, output hang never
Last clearing of "show interface" counters never
Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 1
Queueing strategy: fifo


Output queue: 0/0 (size/max)
5 minute input rate 32 bits/sec, 0 packets/sec
```

5 minute output rate 32 bits/sec, 0 packets/sec

52 packets input, 3424 bytes, 0 no buffer

Received 0 broadcasts, 0 runts, 0 giants, 0 throttles

0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort

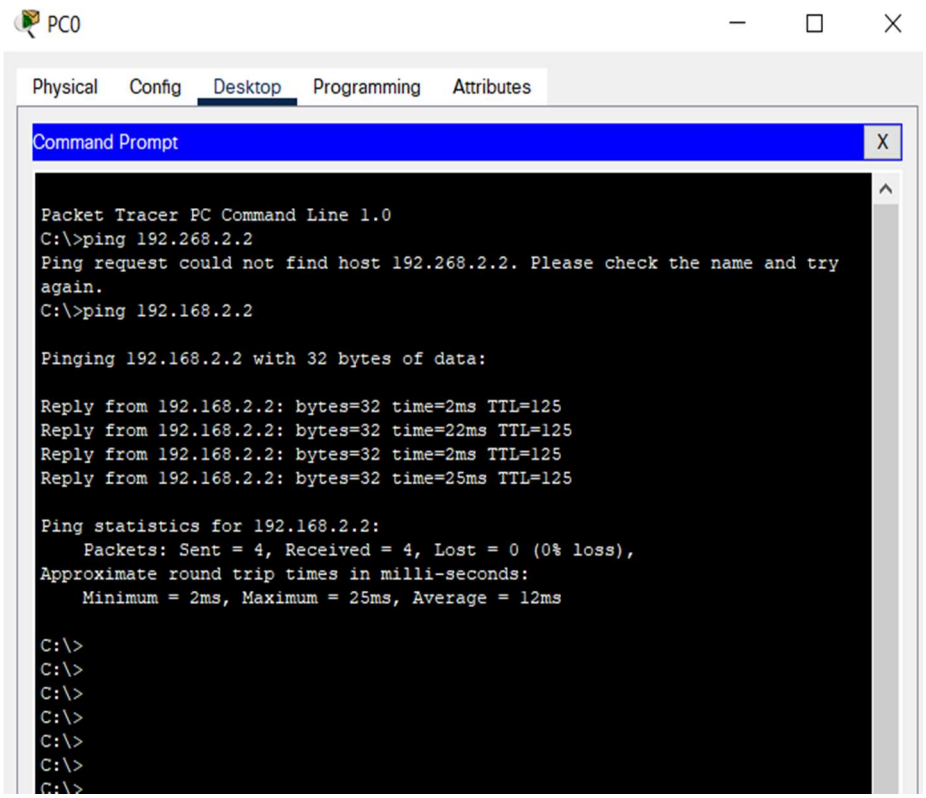
0 input packets with dribble condition detected

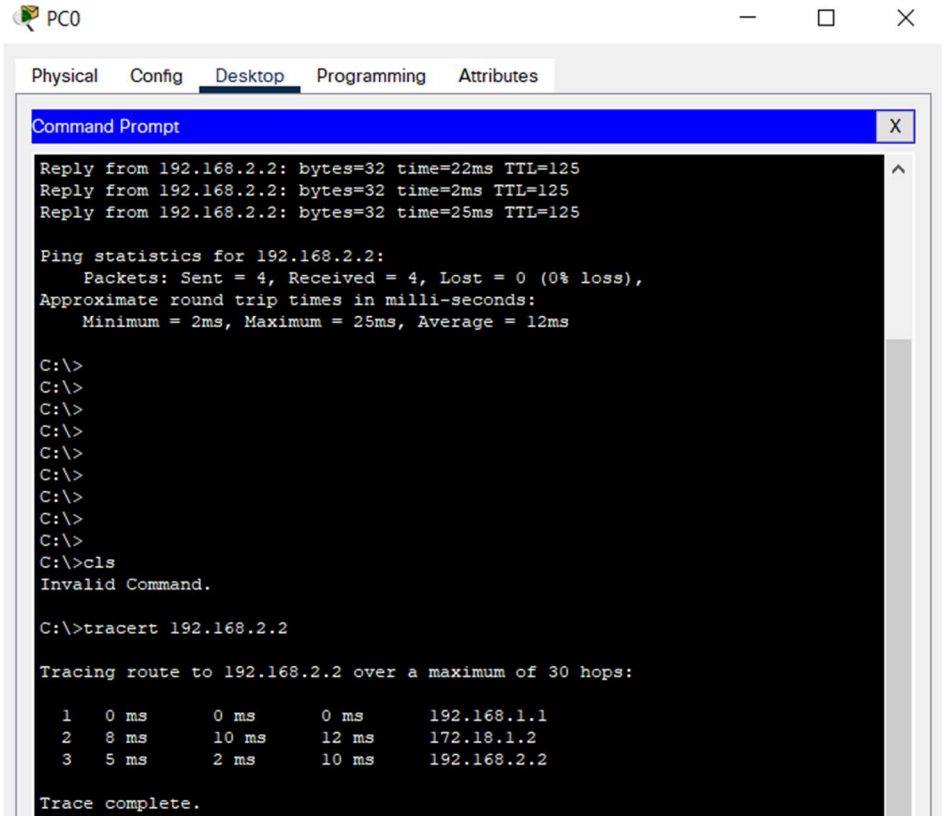
53 packets output, 3536 bytes, 0 underruns

0 output errors, 0 collisions, 0 interface resets

0 unknown protocol drops

11. Trace the VPN tunnel path.





RESULT:

Hence successfully, configured VPN using routers in Cisco Packet Tracer.