

DCCN ISE- NAT TASK 1

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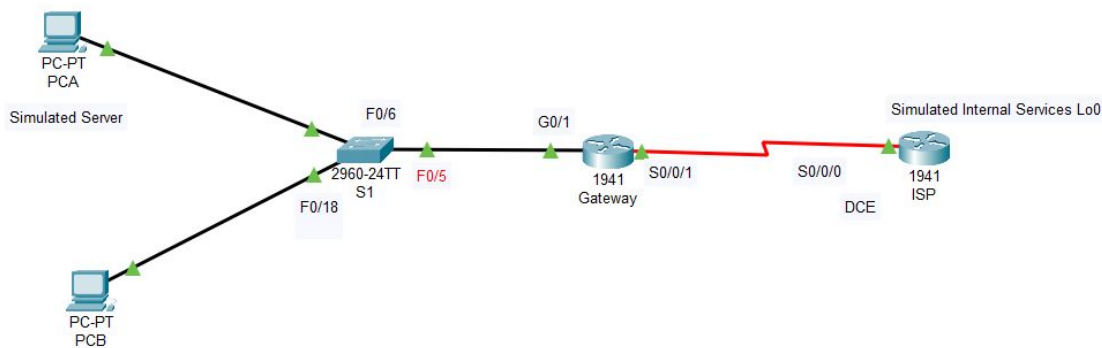
Shivangi Kochrekar(2018130020)

Rishita Mote(2018130029)

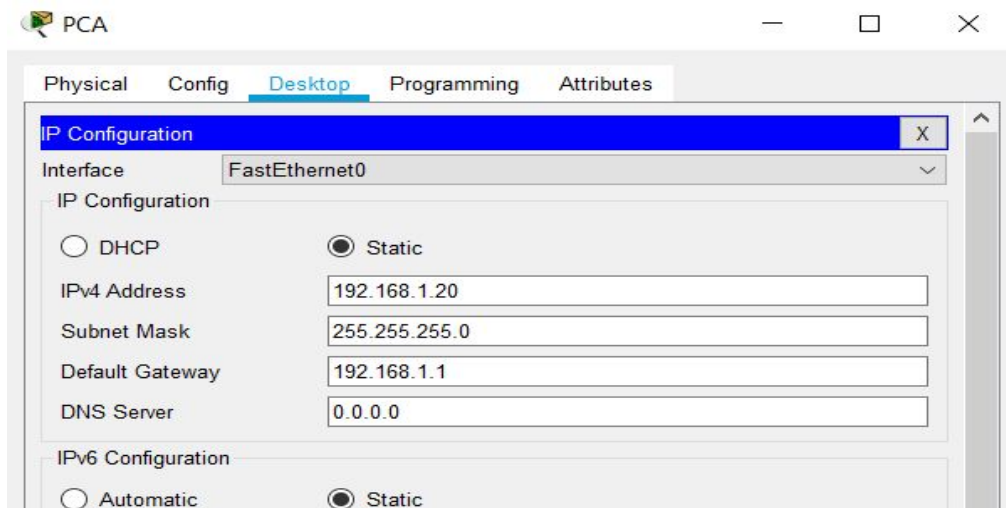
Batch B (TE COMPS)

TASK 1: To set up the topology and verify end to end configuration.

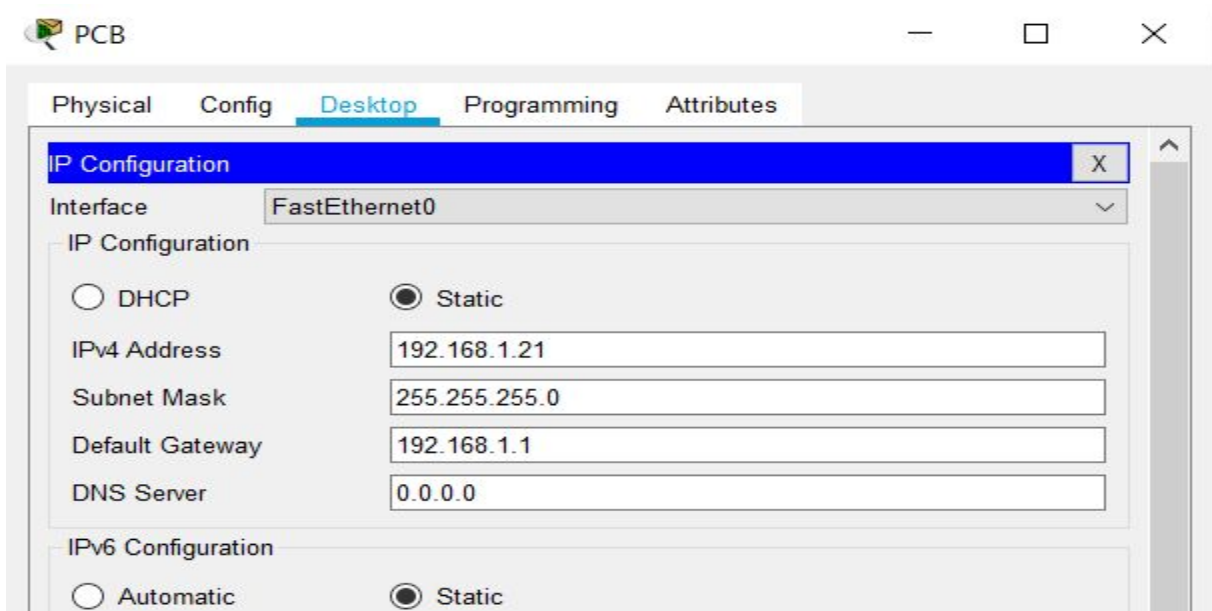
Complete Network:



PC-A Configuration:



PC-B Configuration:



The image shows a software window titled "PCB" with a standard Windows interface (minimize, maximize, close buttons). It has four tabs: "Physical", "Config", "Desktop" (which is selected), and "Programming", followed by an "Attributes" button. The "Desktop" tab contains a sub-window titled "IP Configuration" with a close button. Inside this sub-window, the "Interface" dropdown is set to "FastEthernet0". Below this, there are two sections: "IP Configuration" and "IPv6 Configuration". In the "IP Configuration" section, the "Static" radio button is selected, and the following fields are filled: "IPv4 Address" (192.168.1.21), "Subnet Mask" (255.255.255.0), "Default Gateway" (192.168.1.1), and "DNS Server" (0.0.0.0). In the "IPv6 Configuration" section, the "Static" radio button is also selected.

PCB

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 192.168.1.21

Subnet Mask 255.255.255.0

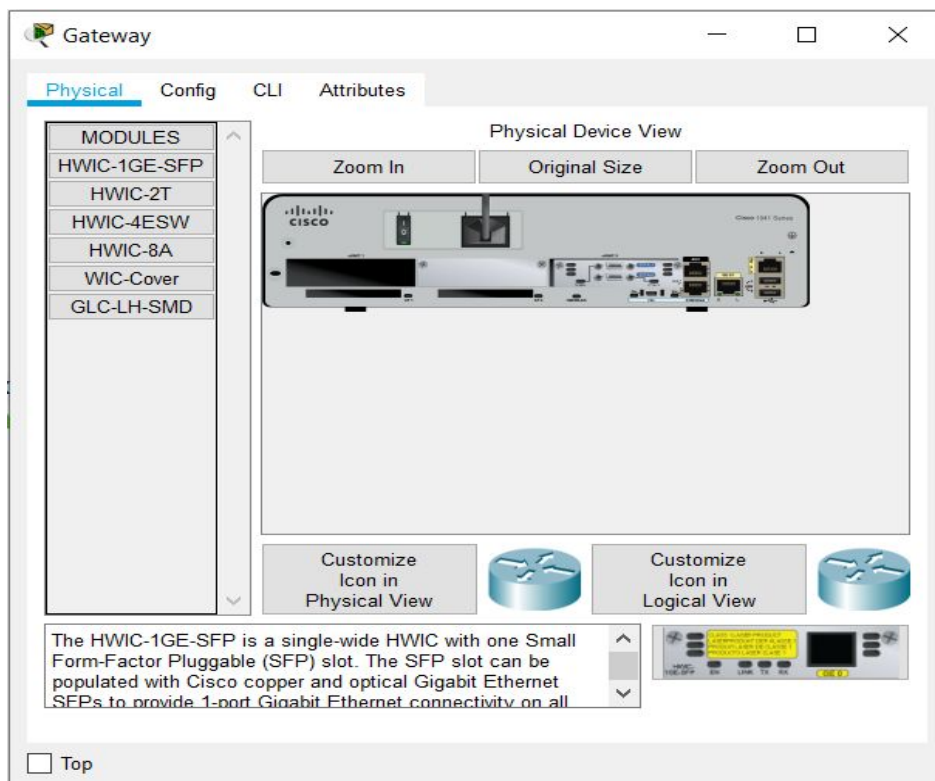
Default Gateway 192.168.1.1

DNS Server 0.0.0.0

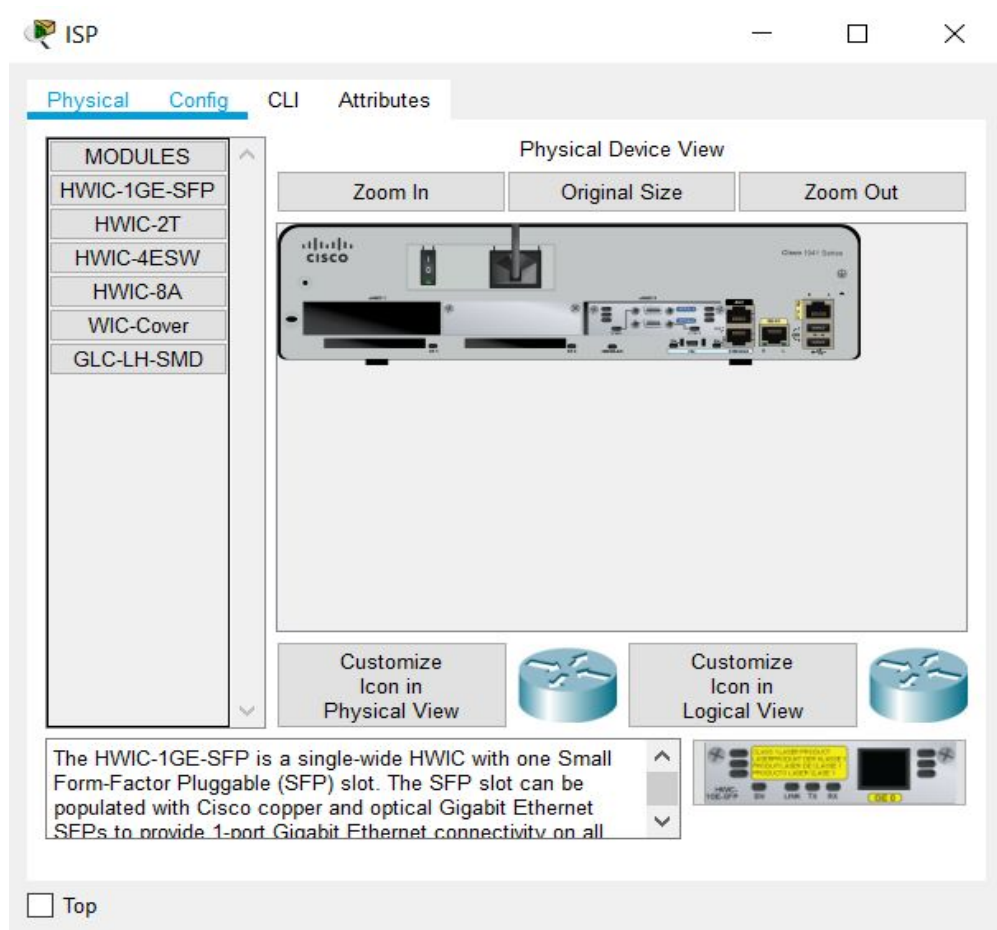
IPv6 Configuration

☐ Automatic ☒ Static

Gateway configuration:



ISP configuration:

 ISP

Physical Config CLI Attributes

MODULES

HWIC-1GE-SFP

HWIC-2T

HWIC-4ESW

HWIC-8A

WIC-Cover


GLC-LH-SMD

Physical Device View


Zoom In

Original Size


Zoom Out




Customize Icon in Physical View



Customize Icon in Logical View



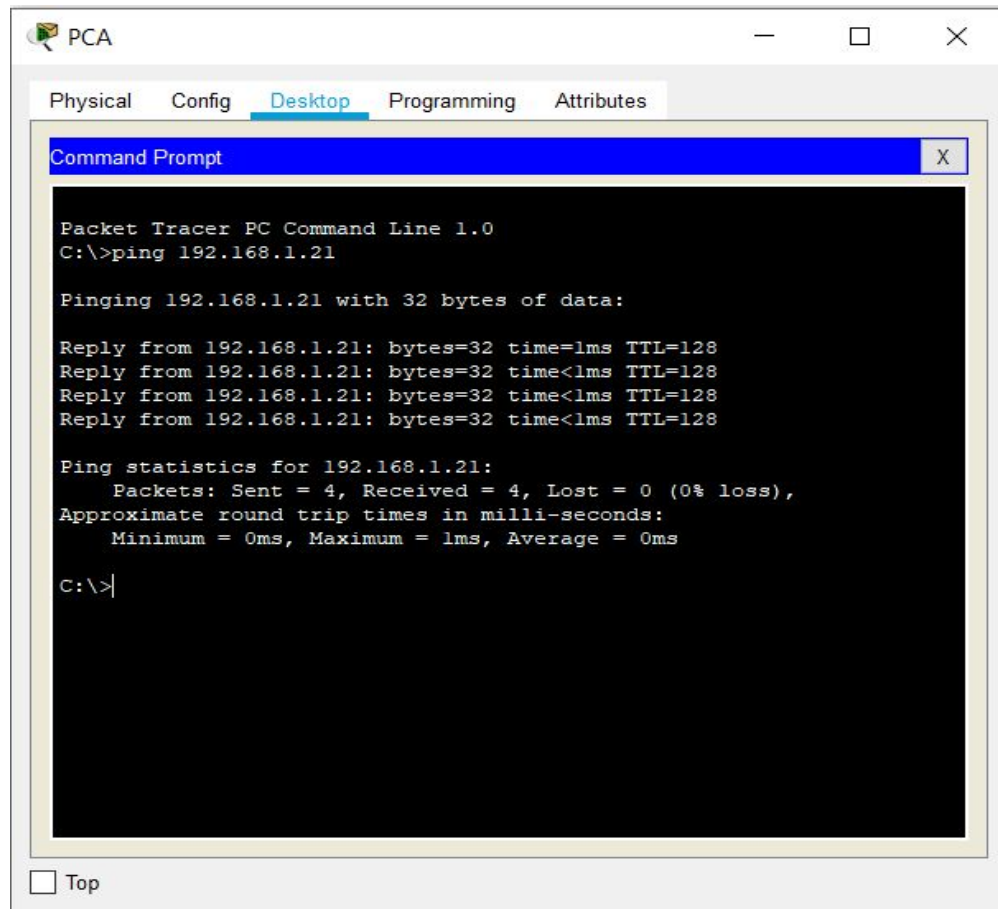
The HWIC-1GE-SFP is a single-wide HWIC with one Small Form-Factor Pluggable (SFP) slot. The SFP slot can be populated with Cisco copper and optical Gigabit Ethernet SFPs to provide 1-port Gigabit Ethernet connectivity on all



☐ Top

Verify Connectivity:

a) Ping from PC-A to gateway G0/1 and PC-B:



The screenshot shows the Packet Tracer interface for PC-A. The 'Desktop' tab is selected, and a 'Command Prompt' window is open. The command prompt displays the output of a ping command to 192.168.1.21. The output shows four successful replies with 32 bytes of data, a time of 1ms, and a TTL of 128. The ping statistics indicate that all four packets were sent and received, with 0% loss. The approximate round trip times are 0ms, 1ms, and 0ms.

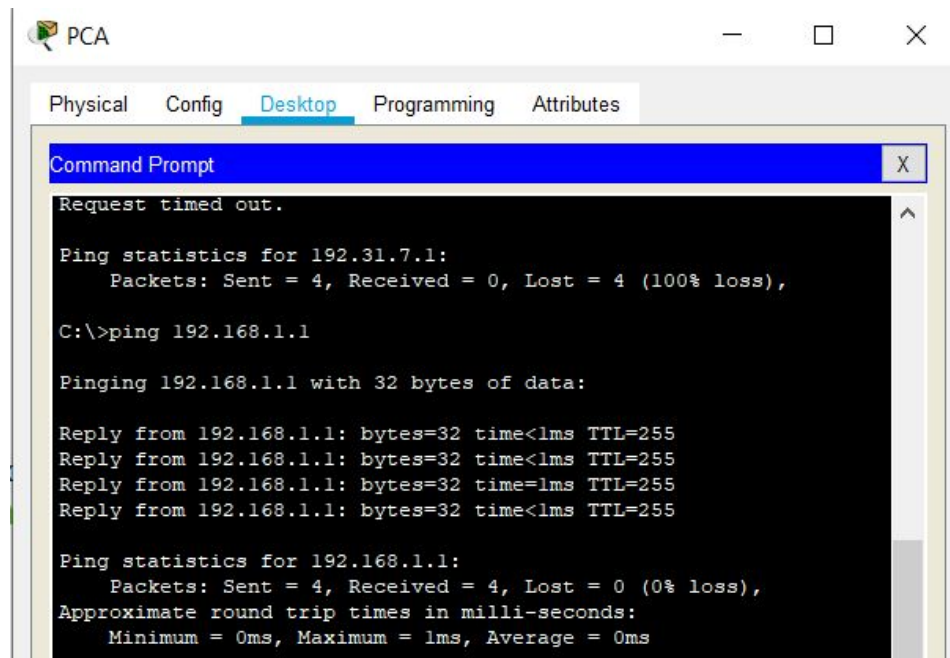
```
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.21

Pinging 192.168.1.21 with 32 bytes of data:

Reply from 192.168.1.21: bytes=32 time=1ms TTL=128
Reply from 192.168.1.21: bytes=32 time<1ms TTL=128
Reply from 192.168.1.21: bytes=32 time<1ms TTL=128
Reply from 192.168.1.21: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.21:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>
```



The screenshot shows the Packet Tracer interface for PC-A. The 'Desktop' tab is selected, and a 'Command Prompt' window is open. The command prompt displays the output of two ping commands. The first command is a ping to 192.31.7.1, which results in a 'Request timed out.' and 'Ping statistics for 192.31.7.1: Packets: Sent = 4, Received = 0, Lost = 4 (100% loss)'. The second command is a ping to 192.168.1.1, which results in four successful replies with 32 bytes of data, a time of 1ms, and a TTL of 255. The ping statistics indicate that all four packets were sent and received, with 0% loss. The approximate round trip times are 0ms, 1ms, and 0ms.

```
Request timed out.

Ping statistics for 192.31.7.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

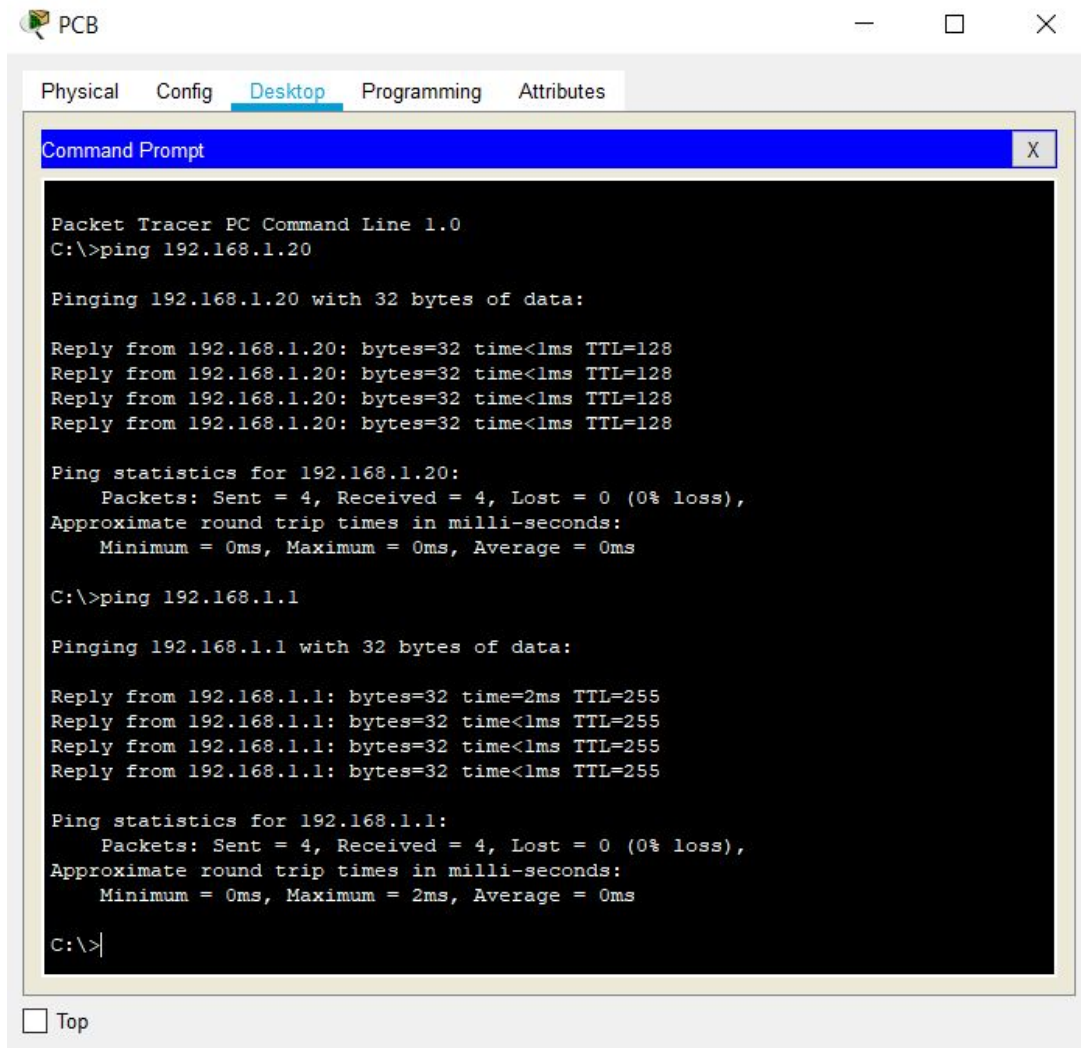
C:\>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:

Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time=1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

b) Ping from PC-B to gateway G0/1 and PC-A:



The screenshot shows a Packet Tracer window for PC-B. The 'Desktop' tab is active, displaying a 'Command Prompt' window. The command prompt shows the execution of two ping commands. The first command is 'ping 192.168.1.20', which results in four successful replies from 192.168.1.20 with 32 bytes of data, a time of less than 1ms, and a TTL of 128. The ping statistics for 192.168.1.20 show 4 packets sent, 4 received, 0 lost (0% loss), and approximate round trip times of 0ms. The second command is 'ping 192.168.1.1', which results in four successful replies from 192.168.1.1 with 32 bytes of data, a time of 2ms, and a TTL of 255. The ping statistics for 192.168.1.1 show 4 packets sent, 4 received, 0 lost (0% loss), and approximate round trip times of 0ms, 2ms, and 0ms.

```
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.20

Pinging 192.168.1.20 with 32 bytes of data:

Reply from 192.168.1.20: bytes=32 time<1ms TTL=128
Reply from 192.168.1.20: bytes=32 time<1ms TTL=128
Reply from 192.168.1.20: bytes=32 time<1ms TTL=128
Reply from 192.168.1.20: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.20:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:

Reply from 192.168.1.1: bytes=32 time=2ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255

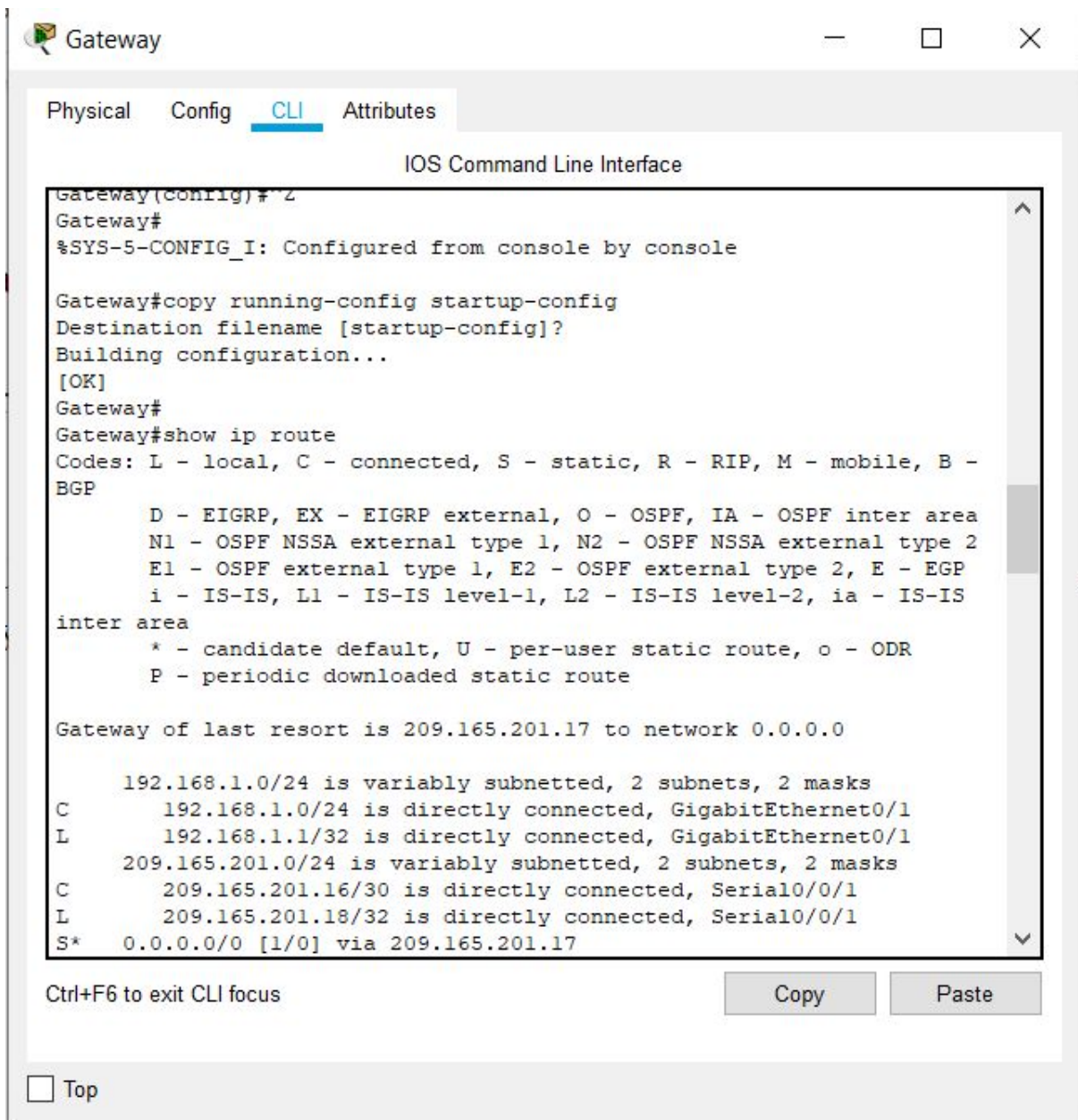
Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 2ms, Average = 0ms

C:\>
```

All the pings are successfully completed.

Routing tables on both routers to verify static route in routing table:

Gateway routing table:



The screenshot shows a window titled "Gateway" with tabs for "Physical", "Config", "CLI", and "Attributes". The "CLI" tab is active, displaying the "IOS Command Line Interface". The command prompt is "Gateway(Config)#". The user has entered the command "show ip route", and the output is displayed. The output shows the routing table for the Gateway router, including the default route (0.0.0.0/0) via 209.165.201.17. The window also includes a "Copy" button, a "Paste" button, and a "Top" button.

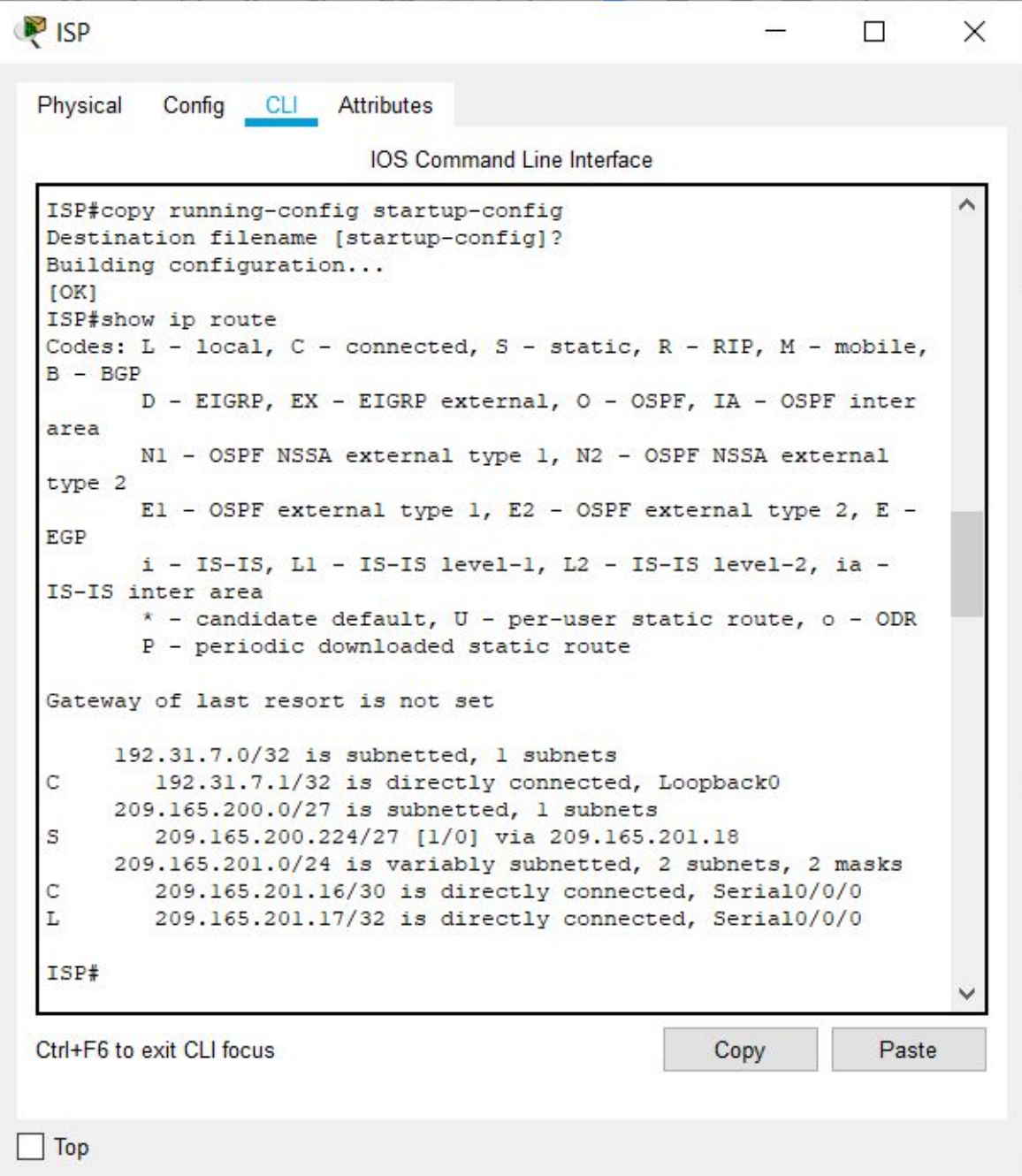
```
Gateway(Config)#  
Gateway#  
%SYS-5-CONFIG_I: Configured from console by console  
  
Gateway#copy running-config startup-config  
Destination filename [startup-config]?  
Building configuration...  
[OK]  
Gateway#  
Gateway#show ip route  
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B -  
BGP  
        D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area  
        N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2  
        E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP  
        i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS  
inter area  
        * - candidate default, U - per-user static route, o - ODR  
        P - periodic downloaded static route  
  
Gateway of last resort is 209.165.201.17 to network 0.0.0.0  
  
      192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks  
C       192.168.1.0/24 is directly connected, GigabitEthernet0/1  
L       192.168.1.1/32 is directly connected, GigabitEthernet0/1  
      209.165.201.0/24 is variably subnetted, 2 subnets, 2 masks  
C       209.165.201.16/30 is directly connected, Serial0/0/1  
L       209.165.201.18/32 is directly connected, Serial0/0/1  
S*    0.0.0.0/0 [1/0] via 209.165.201.17
```

Ctrl+F6 to exit CLI focus

Copy Paste

☐ Top

ISP routing table:



The screenshot shows a window titled "ISP" with a tabbed interface. The "CLI" tab is selected, displaying the "IOS Command Line Interface". The terminal output shows the following commands and results:

```
ISP#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
ISP#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile,
B - BGP
      D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter
area
      N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external
type 2
      E1 - OSPF external type 1, E2 - OSPF external type 2, E -
EGP
      i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia -
IS-IS inter area
      * - candidate default, U - per-user static route, o - ODR
      P - periodic downloaded static route

Gateway of last resort is not set

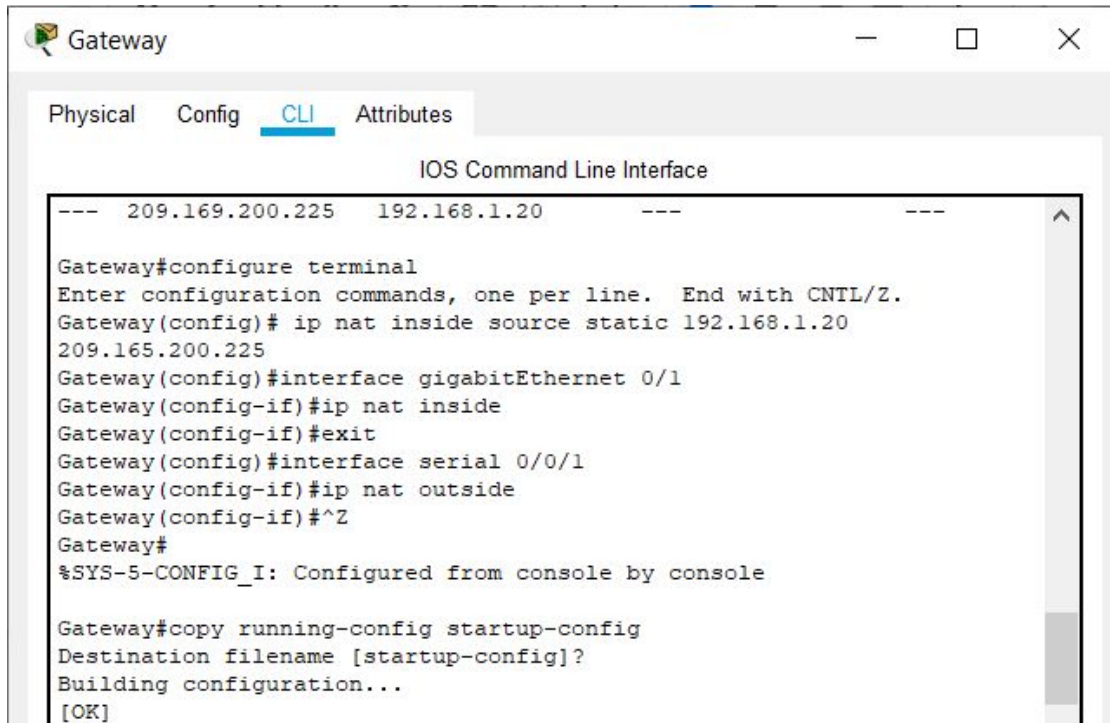
      192.31.7.0/32 is subnetted, 1 subnets
C      192.31.7.1/32 is directly connected, Loopback0
      209.165.200.0/27 is subnetted, 1 subnets
S      209.165.200.224/27 [1/0] via 209.165.201.18
      209.165.201.0/24 is variably subnetted, 2 subnets, 2 masks
C      209.165.201.16/30 is directly connected, Serial0/0/0
L      209.165.201.17/32 is directly connected, Serial0/0/0

ISP#
```

Below the terminal output, there is a text label "Ctrl+F6 to exit CLI focus" and two buttons: "Copy" and "Paste". At the bottom left, there is a checkbox labeled "Top".

Task 2 :

Step 1: Configure a static mapping and specify the interfaces.



```
Gateway
Physical Config CLI Attributes
IOS Command Line Interface
--- 209.169.200.225 192.168.1.20 ---
Gateway#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Gateway(config)# ip nat inside source static 192.168.1.20
209.165.200.225
Gateway(config)#interface gigabitEthernet 0/1
Gateway(config-if)#ip nat inside
Gateway(config-if)#exit
Gateway(config)#interface serial 0/0/1
Gateway(config-if)#ip nat outside
Gateway(config-if)#^Z
Gateway#
%SYS-5-CONFIG_I: Configured from console by console

Gateway#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
```

Step 3: Test the configuration.

What is the configuration of the inside local host address?

192.168.1.20 → 209.165.200.225

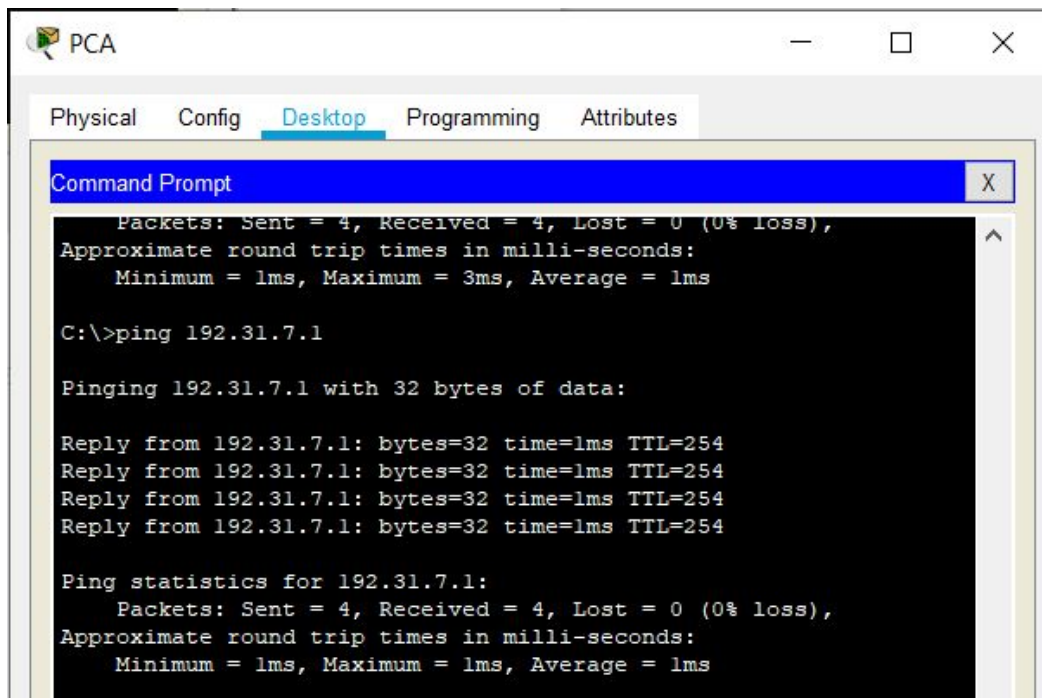


```
Gateway
Physical Config CLI Attributes
IOS Command Line Interface

Gateway#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]

Gateway#show ip nat translations
Pro Inside global      Inside local      Outside local      Outside
global
--- 209.165.200.225    192.168.1.20      ---                ---
--- 209.169.200.225    192.168.1.20      ---                ---
```


From PC-A, ping the Lo0 interface (172.31.7.1) on ISP:



```
PCA
Physical Config Desktop Programming Attributes

Command Prompt
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
  Minimum = 1ms, Maximum = 3ms, Average = 1ms

C:\>ping 192.31.7.1

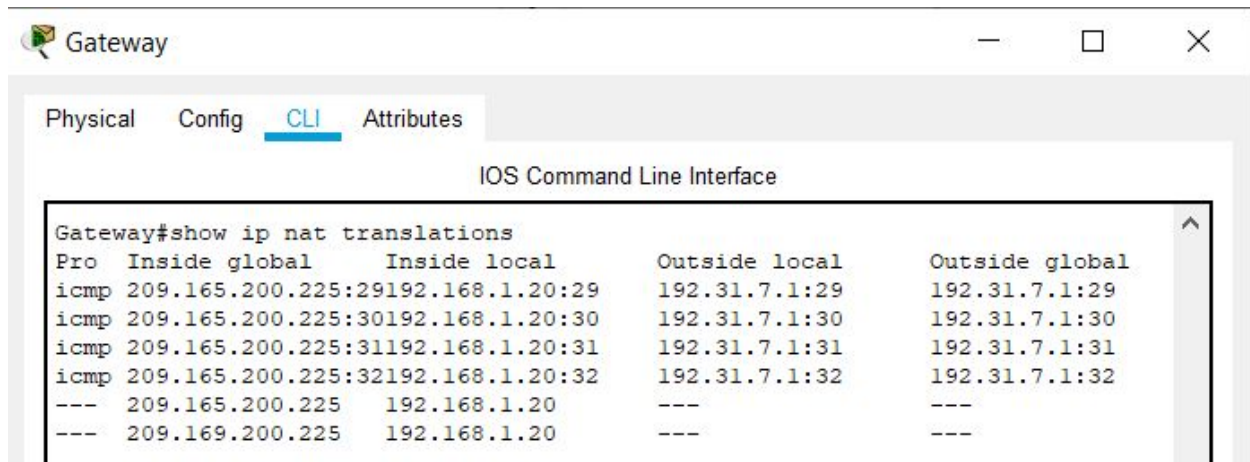
Pinging 192.31.7.1 with 32 bytes of data:

Reply from 192.31.7.1: bytes=32 time=1ms TTL=254
Reply from 192.31.7.1: bytes=32 time=1ms TTL=254
Reply from 192.31.7.1: bytes=32 time=1ms TTL=254
Reply from 192.31.7.1: bytes=32 time=1ms TTL=254

Ping statistics for 192.31.7.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 1ms, Average = 1ms
```

A NAT entry was added to the table with ICMP listed as the protocol when PC-A sent an ICMP request (ping) to 192.31.7.1 on ISP.

What port number was used in this ICMP exchange? 5,6,7,8



```
Gateway
Physical Config CLI Attributes

IOS Command Line Interface

Gateway#show ip nat translations
Pro  Inside global      Inside local      Outside local      Outside global
icmp 209.165.200.225:29 192.168.1.20:29 192.31.7.1:29 192.31.7.1:29
icmp 209.165.200.225:30 192.168.1.20:30 192.31.7.1:30 192.31.7.1:30
icmp 209.165.200.225:31 192.168.1.20:31 192.31.7.1:31 192.31.7.1:31
icmp 209.165.200.225:32 192.168.1.20:32 192.31.7.1:32 192.31.7.1:32
--- 209.165.200.225 192.168.1.20 --- ---
--- 209.169.200.225 192.168.1.20 --- ---
```

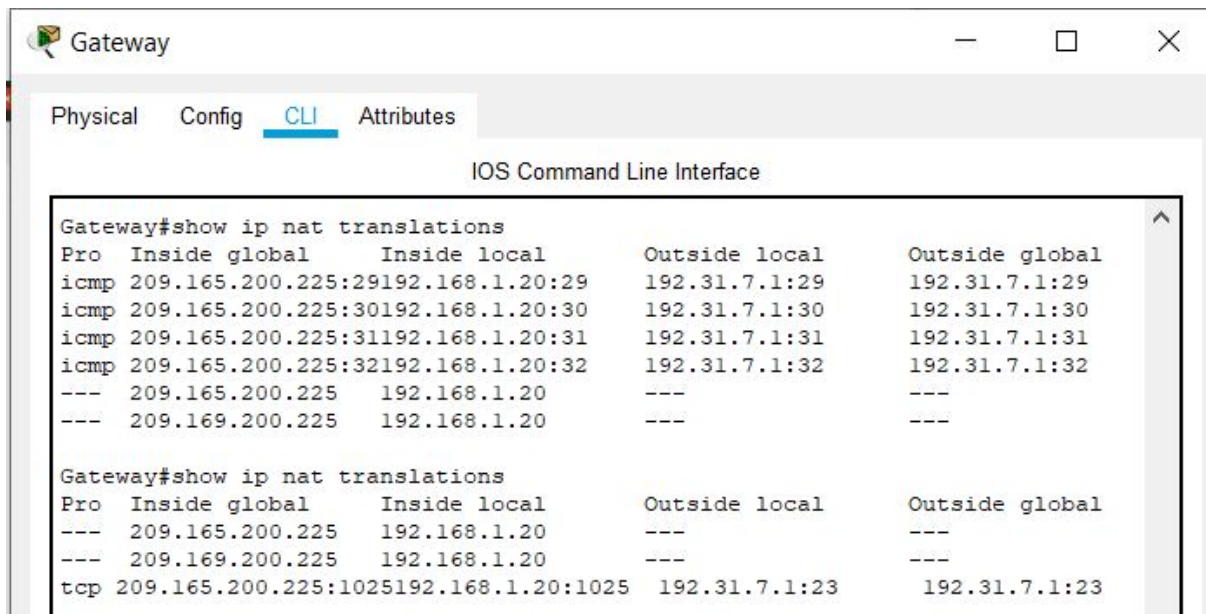
C] From PC-A, telnet to the ISP Lo0 interface and display the NAT table.

What was the protocol used in this translation? tcp

What are the port numbers used?

Inside global / local: 1026

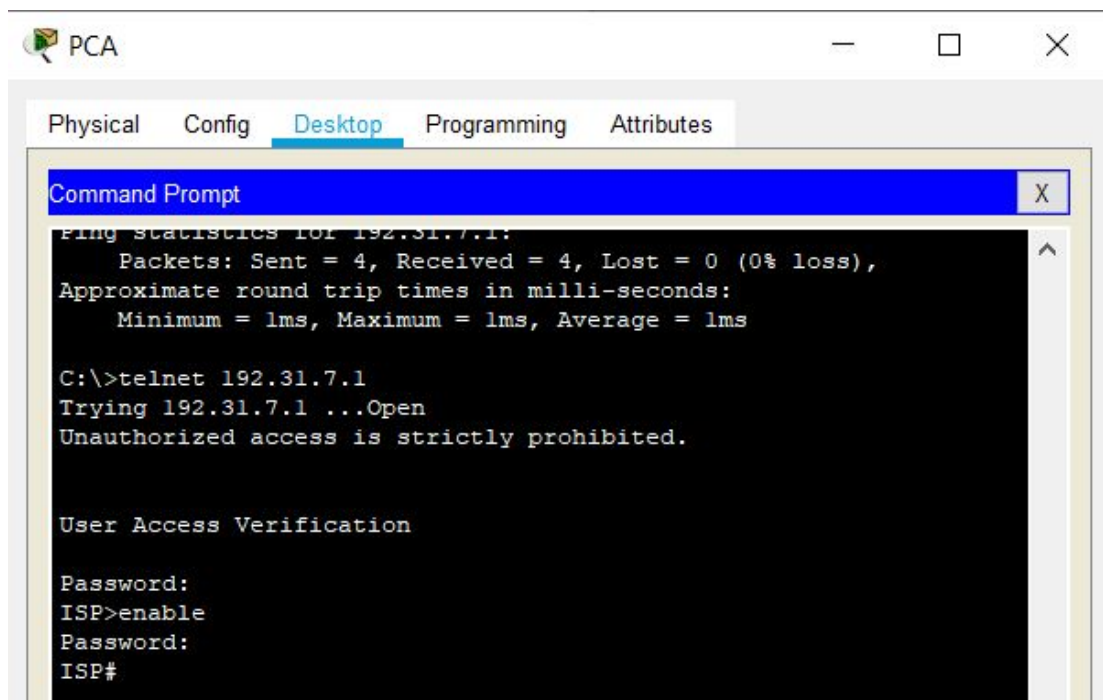
Outside global / local:23



The image shows a 'Gateway' window with the 'CLI' tab selected. The title bar includes 'Gateway', a minimize button, a maximize button, and a close button. The main content area is titled 'IOS Command Line Interface'. It displays two screenshots of the 'show ip nat translations' command output. The first screenshot shows four ICMP translations from 209.165.200.225 to 192.168.1.20 with various ports. The second screenshot shows the same four ICMP translations plus one TCP translation from 209.165.200.225 to 192.168.1.20 on port 1025, which is translated to 192.31.7.1 on port 23.

```
Gateway#show ip nat translations
Pro Inside global      Inside local      Outside local      Outside global
icmp 209.165.200.225:29 192.168.1.20:29   192.31.7.1:29     192.31.7.1:29
icmp 209.165.200.225:30 192.168.1.20:30   192.31.7.1:30     192.31.7.1:30
icmp 209.165.200.225:31 192.168.1.20:31   192.31.7.1:31     192.31.7.1:31
icmp 209.165.200.225:32 192.168.1.20:32   192.31.7.1:32     192.31.7.1:32
--- 209.165.200.225     192.168.1.20     ---               ---
--- 209.169.200.225     192.168.1.20     ---               ---

Gateway#show ip nat translations
Pro Inside global      Inside local      Outside local      Outside global
--- 209.165.200.225     192.168.1.20     ---               ---
--- 209.169.200.225     192.168.1.20     ---               ---
tcp 209.165.200.225:1025 192.168.1.20:1025 192.31.7.1:23     192.31.7.1:23
```



The image shows a 'PCA' window with the 'Desktop' tab selected. The title bar includes 'PCA', a minimize button, a maximize button, and a close button. The main content area is titled 'Command Prompt'. It displays the output of a ping command to 192.31.7.1, showing 4 packets sent and received with 0% loss and 1ms round trip times. Below this, it shows the output of a telnet command to 192.31.7.1, which results in 'Unauthorized access is strictly prohibited.' and a 'User Access Verification' prompt. The user enters 'enable' as the password, and the prompt changes to 'ISP#'.

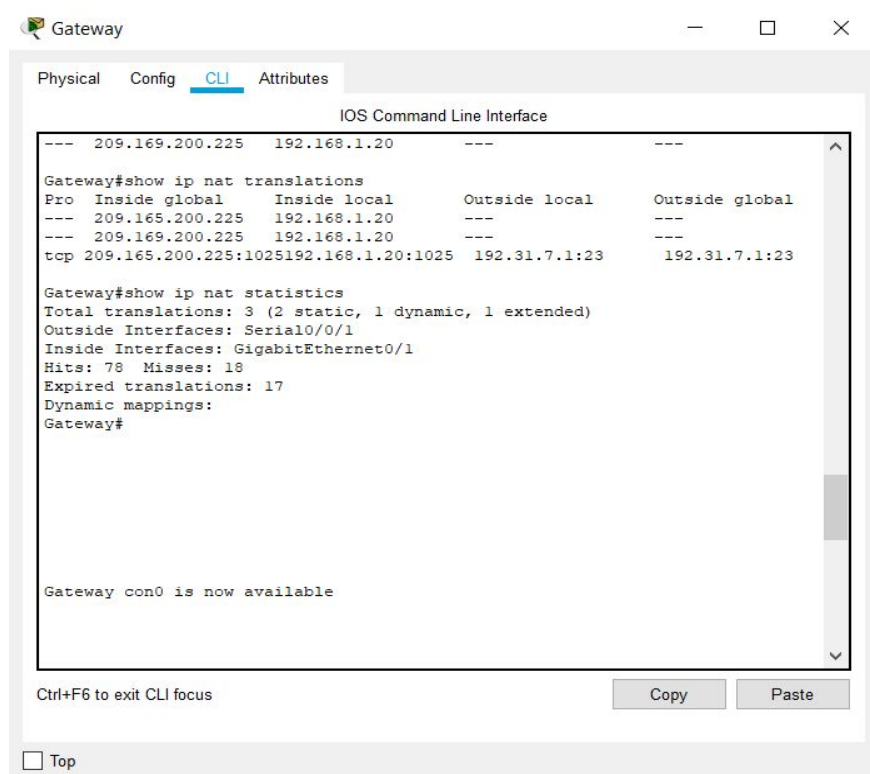
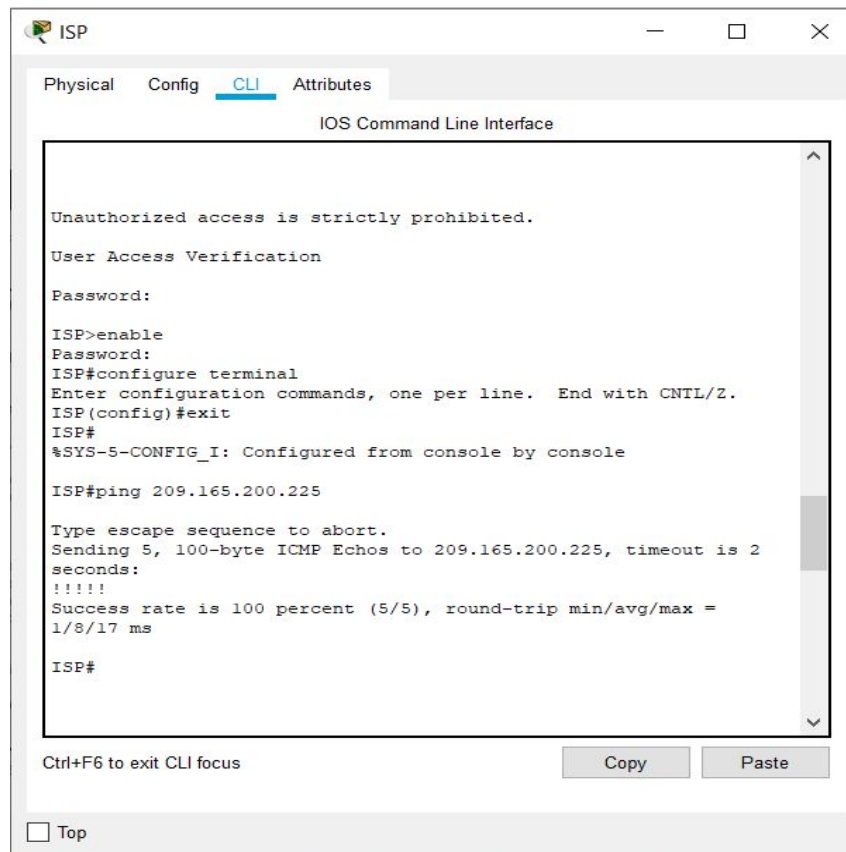
```
Command Prompt
Ping statistics for 192.31.7.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\>telnet 192.31.7.1
Trying 192.31.7.1 ...Open
Unauthorized access is strictly prohibited.

User Access Verification

Password:
ISP>enable
Password:
ISP#
```

Because static NAT was configured for PC-A, verify that pinging from ISP to PC-A



CONCLUSION: We successfully created topology and verified the end to end connectivity in CISCO Packet Tracer.