

Group No:6

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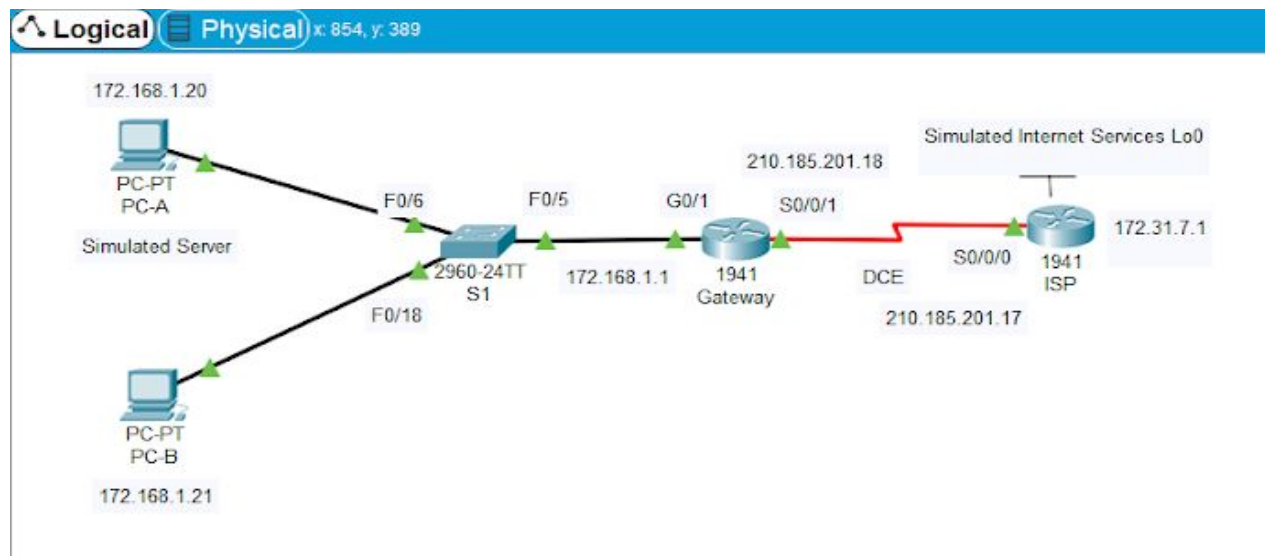
Mahipal Purohit: 2018130041

Pritam Rao: 2018130044

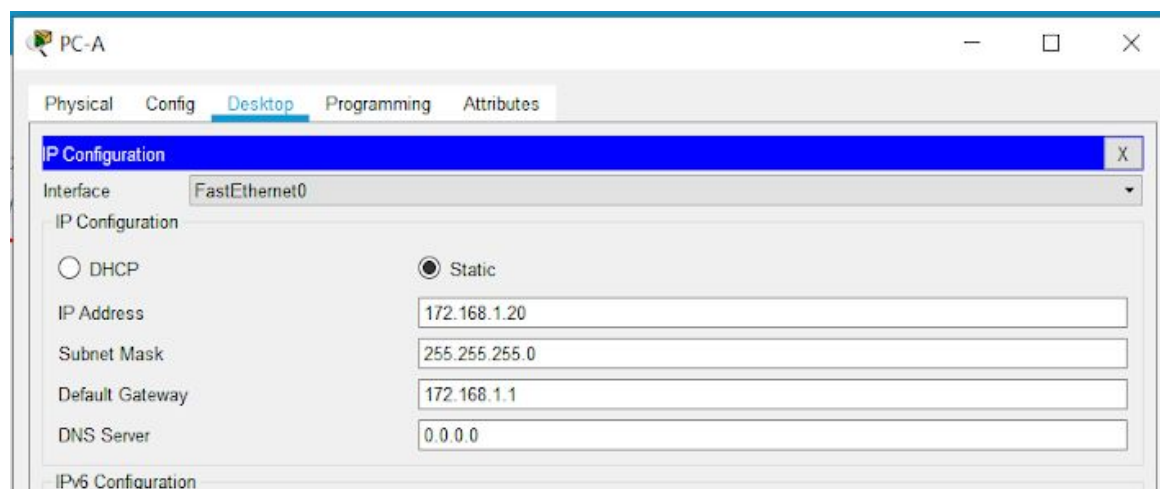
DCCN LAB ISE

Task 1:

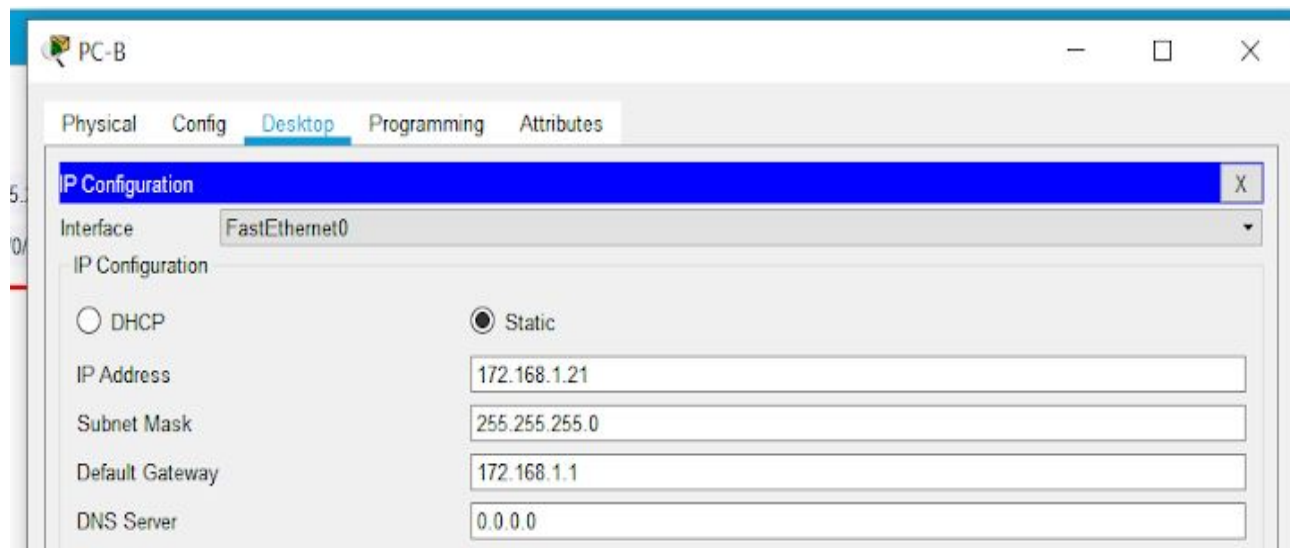
Final Topology:



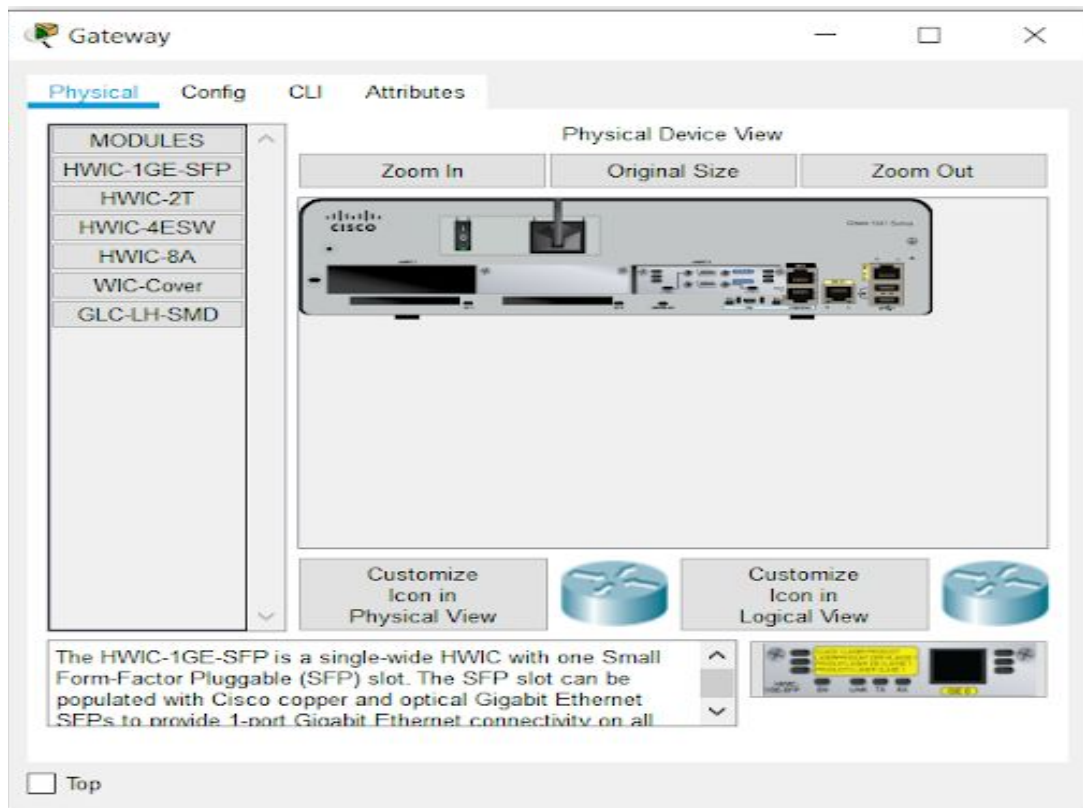
PC-A configuration:

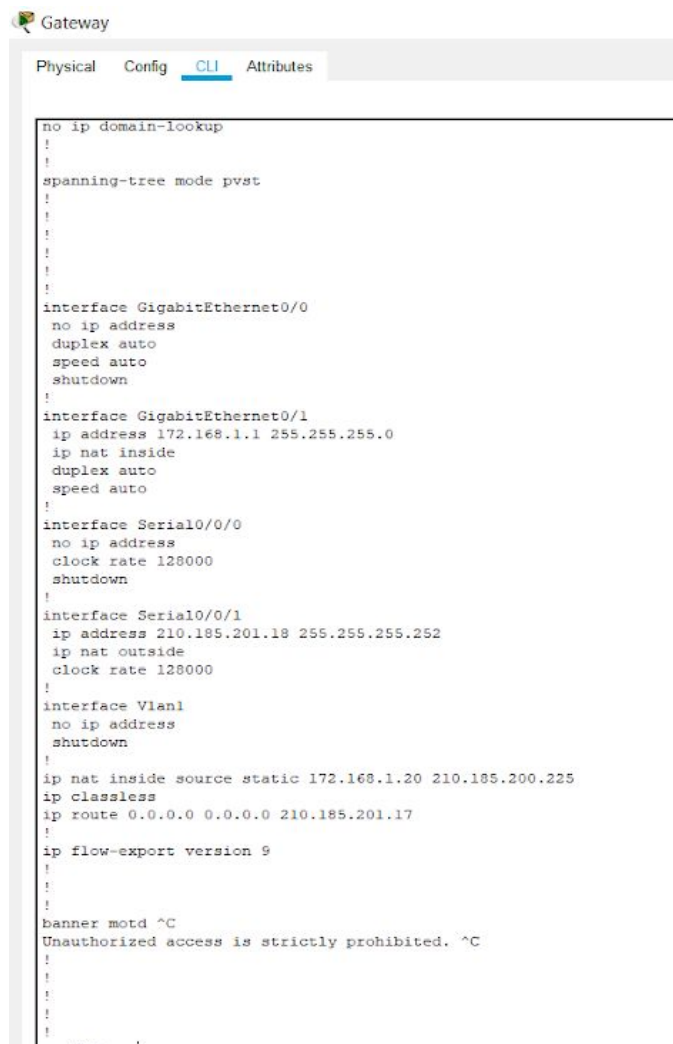
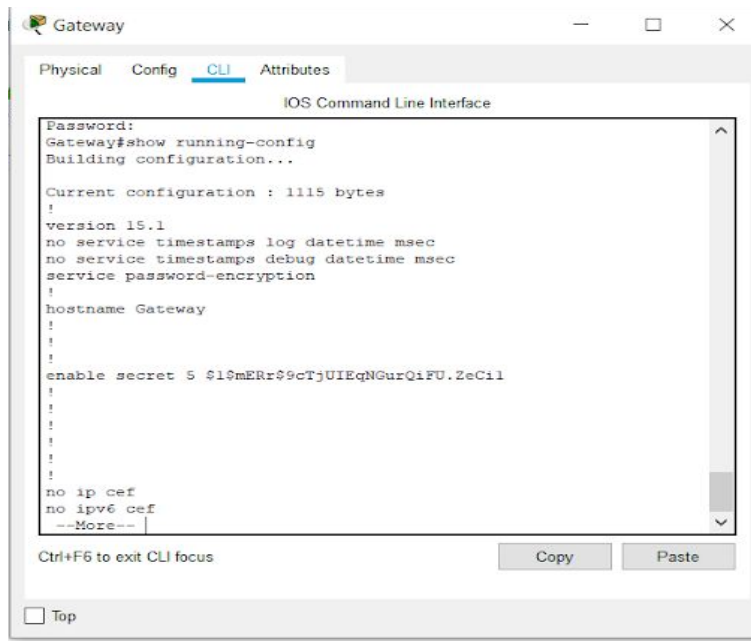


PC-B configuration:

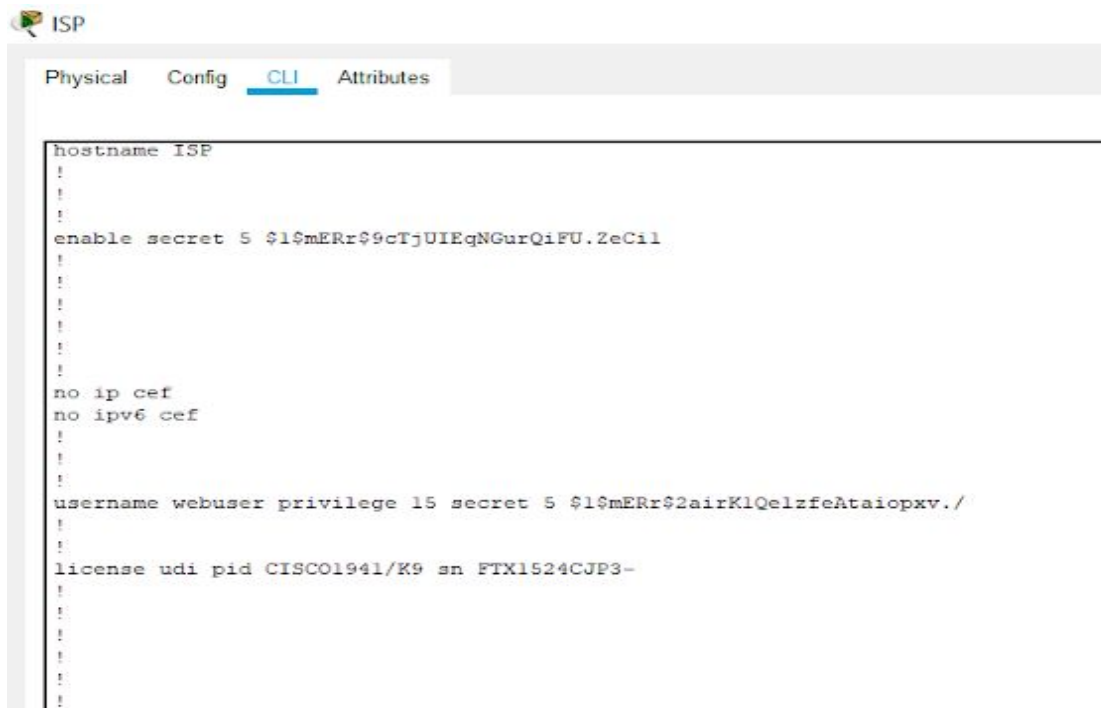
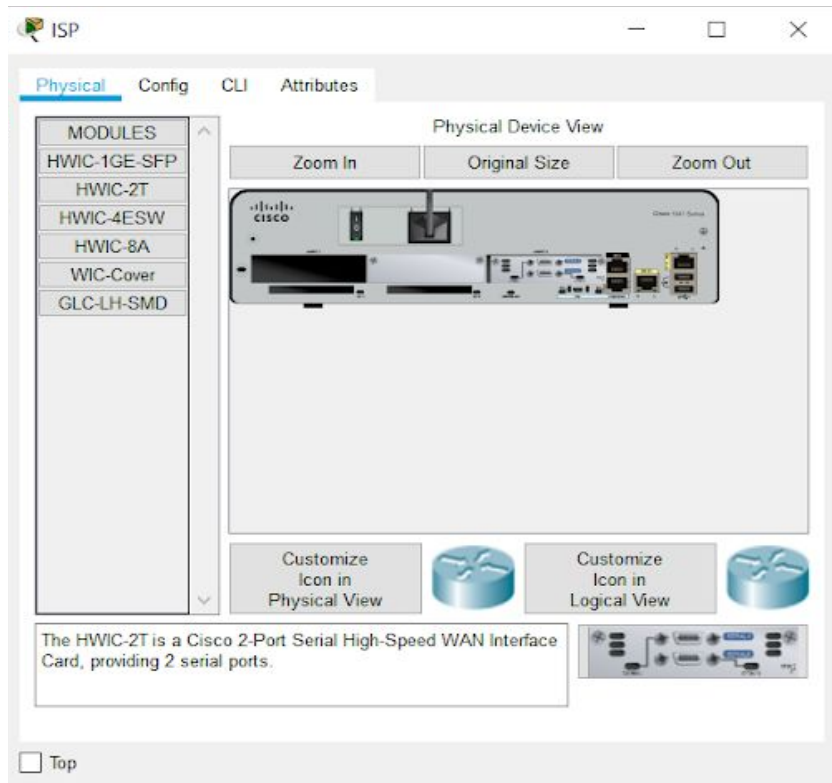


Gateway configuration:





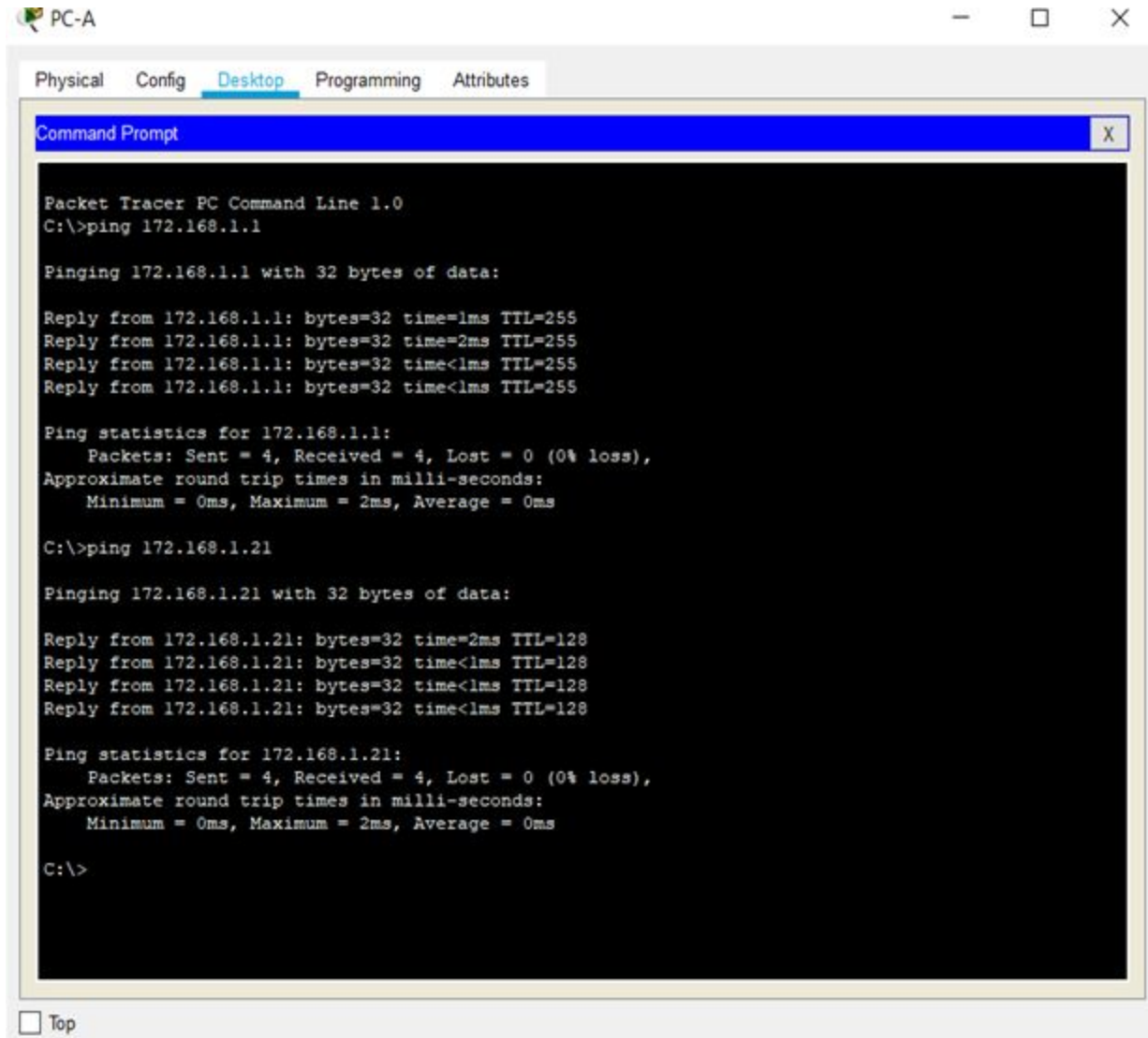
ISP configuration:



```
!  
no ip domain-lookup  
!  
!  
spanning-tree mode pvst  
!  
!  
!  
!  
!  
!  
interface Loopback0  
 ip address 172.31.7.1 255.255.255.255  
!  
interface GigabitEthernet0/0  
 no ip address  
 duplex auto  
 speed auto  
 shutdown  
!  
interface GigabitEthernet0/1  
 no ip address  
 duplex auto  
 speed auto  
 shutdown  
!  
interface Serial0/0/0  
 ip address 210.185.201.17 255.255.255.252  
!  
interface Serial0/0/1  
 no ip address  
 clock rate 2000000  
 shutdown  
!  
interface Vlan1  
 no ip address  
 shutdown  
!  
ip classless  
ip route 210.185.200.224 255.255.255.224 210.185.201.18  
!  
ip flow-export version 9  
!  
!  
!  
banner motd ^C  
Unauthorized access is strictly prohibited. ^C  
!  
!  
!  
!  
--More--
```

Verify connectivity:

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 active, displaying a 'Command Prompt' window. The window contains the output of two ping commands. The first command is 'ping 172.168.1.1', which shows four successful replies with 32 bytes of data, times of 1ms, 2ms, 1ms, and 1ms, and a TTL of 255. The statistics for this ping show 4 packets sent, 4 received, 0 lost, and an average round trip time of 0ms. The second command is 'ping 172.168.1.21', which also shows four successful replies with 32 bytes of data, times of 2ms, 1ms, 1ms, and 1ms, and a TTL of 128. The statistics for this ping show 4 packets sent, 4 received, 0 lost, and an average round trip time of 0ms. The Command Prompt window has a blue title bar and a close button (X) in the top right corner. Below the Command Prompt window, there is a 'Top' button.

```
Packet Tracer PC Command Line 1.0
C:\>ping 172.168.1.1

Pinging 172.168.1.1 with 32 bytes of data:

Reply from 172.168.1.1: bytes=32 time=1ms TTL=255
Reply from 172.168.1.1: bytes=32 time=2ms TTL=255
Reply from 172.168.1.1: bytes=32 time<1ms TTL=255
Reply from 172.168.1.1: bytes=32 time<1ms TTL=255

Ping statistics for 172.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 2ms, Average = 0ms

C:\>ping 172.168.1.21

Pinging 172.168.1.21 with 32 bytes of data:

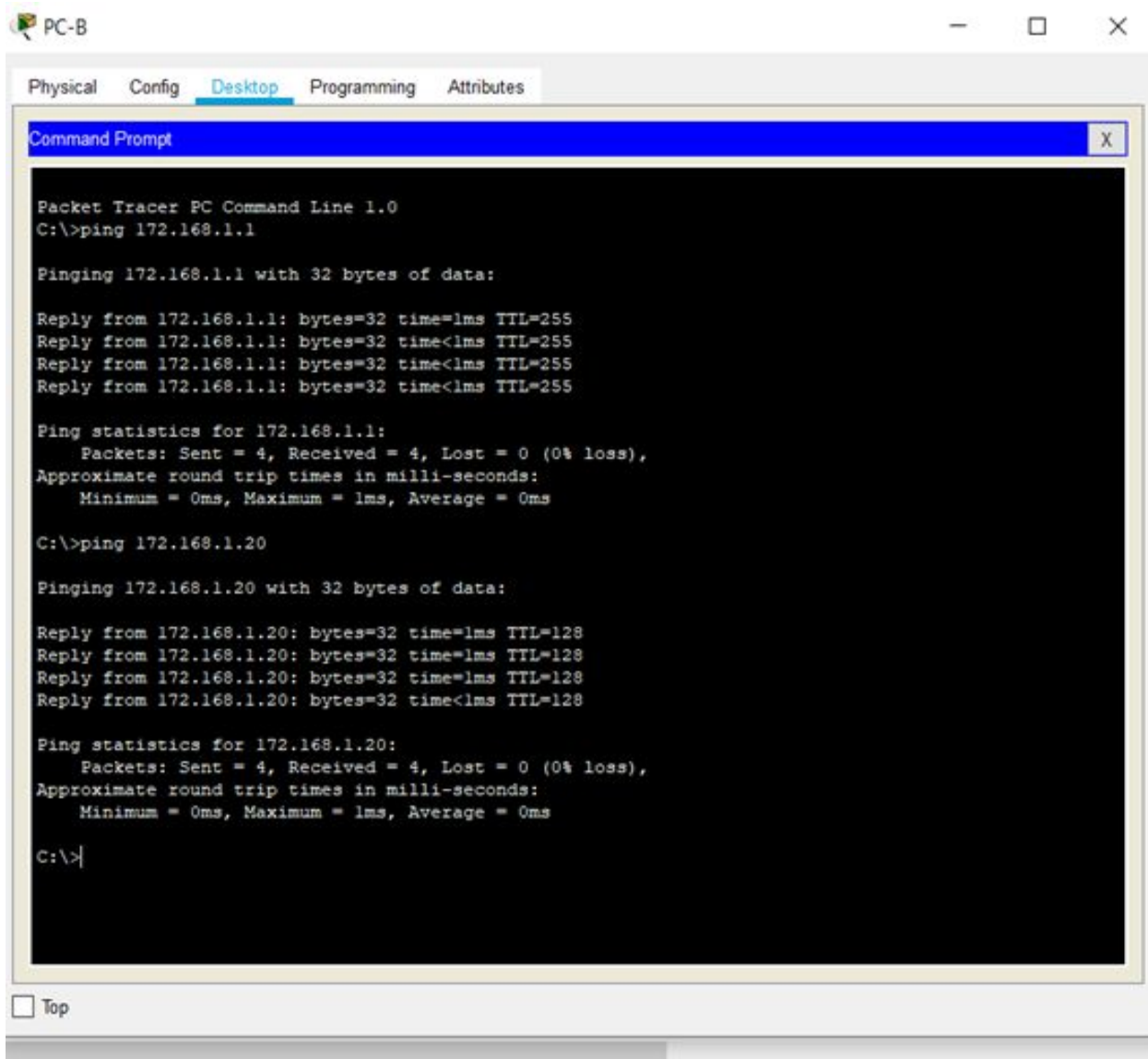
Reply from 172.168.1.21: bytes=32 time=2ms TTL=128
Reply from 172.168.1.21: bytes=32 time<1ms TTL=128
Reply from 172.168.1.21: bytes=32 time<1ms TTL=128
Reply from 172.168.1.21: bytes=32 time<1ms TTL=128

Ping statistics for 172.168.1.21:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 2ms, Average = 0ms

C:\>
```

☐ Top

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



```
Packet Tracer PC Command Line 1.0
C:\>ping 172.168.1.1

Pinging 172.168.1.1 with 32 bytes of data:

Reply from 172.168.1.1: bytes=32 time=1ms TTL=255
Reply from 172.168.1.1: bytes=32 time<1ms TTL=255
Reply from 172.168.1.1: bytes=32 time<1ms TTL=255
Reply from 172.168.1.1: bytes=32 time<1ms TTL=255

Ping statistics for 172.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ping 172.168.1.20

Pinging 172.168.1.20 with 32 bytes of data:

Reply from 172.168.1.20: bytes=32 time=1ms TTL=128
Reply from 172.168.1.20: bytes=32 time=1ms TTL=128
Reply from 172.168.1.20: bytes=32 time=1ms TTL=128
Reply from 172.168.1.20: bytes=32 time<1ms TTL=128

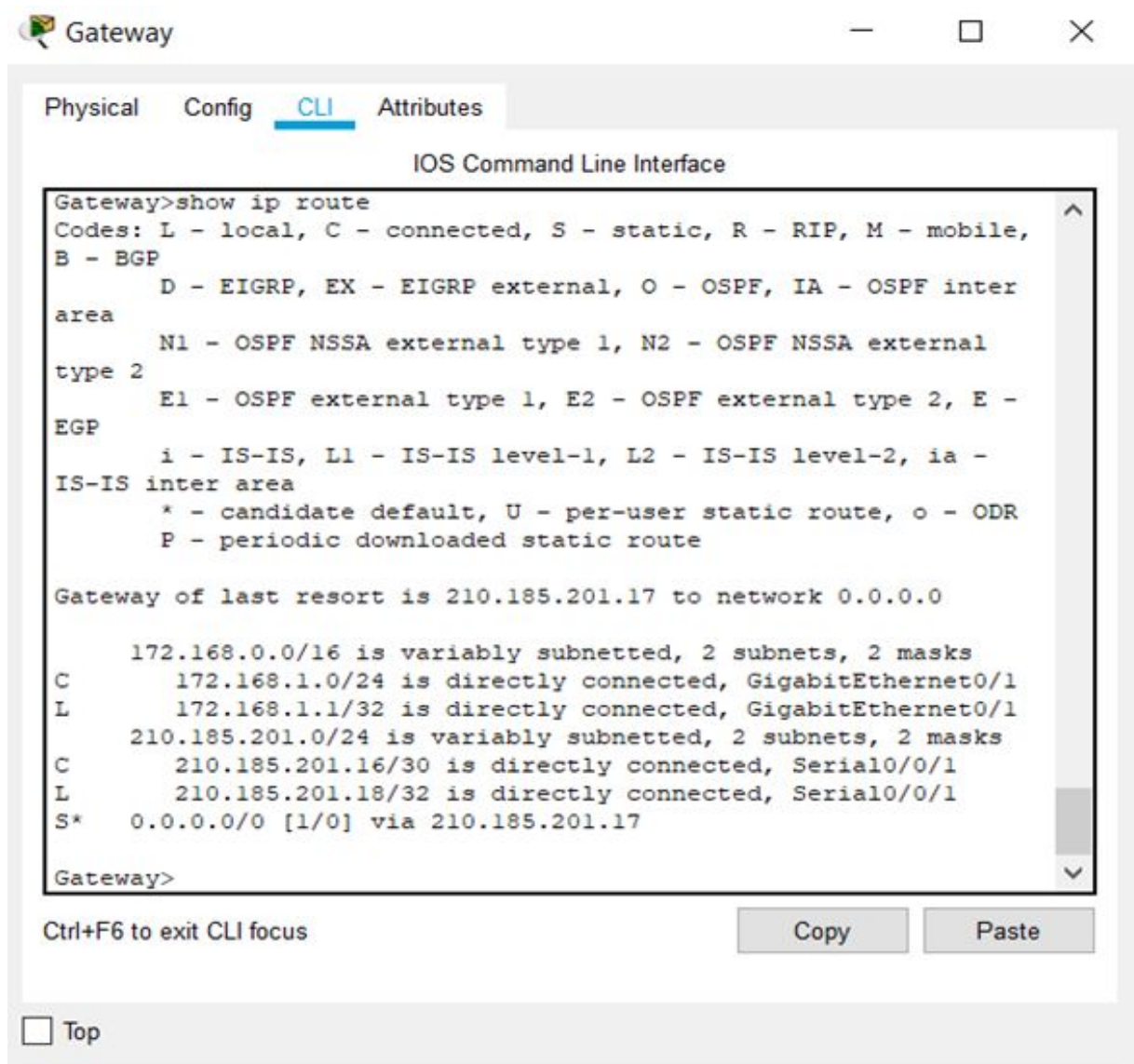
Ping statistics for 172.168.1.20:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

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 "show ip route" has been entered, and the output shows the routing table. The table lists various routes, including local, connected, static, and OSPF routes. The static route for 0.0.0.0/0 is highlighted with an asterisk (*).

```
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

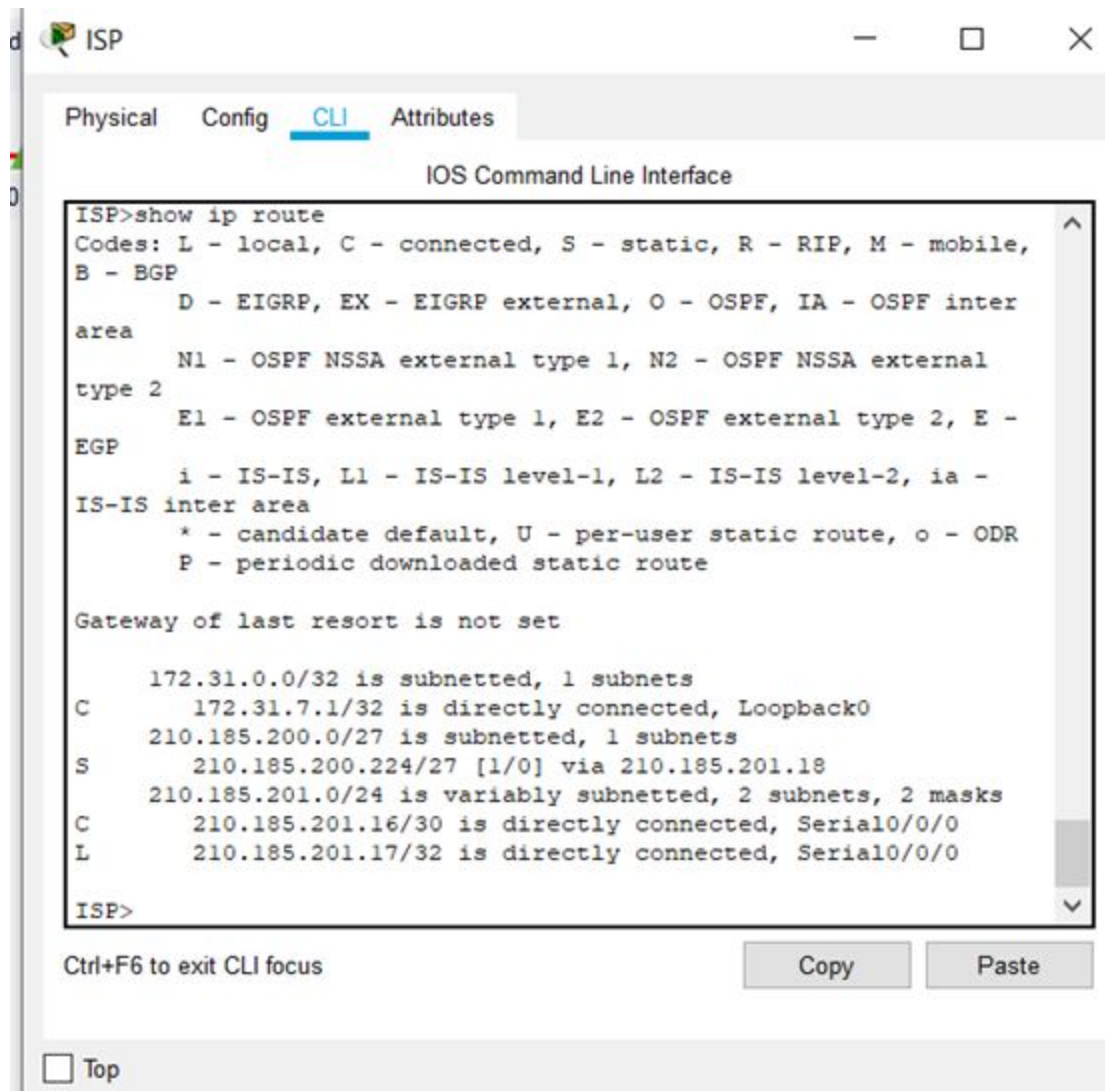
Gateway of last resort is 210.185.201.17 to network 0.0.0.0

      172.168.0.0/16 is variably subnetted, 2 subnets, 2 masks
C       172.168.1.0/24 is directly connected, GigabitEthernet0/1
L       172.168.1.1/32 is directly connected, GigabitEthernet0/1
      210.185.201.0/24 is variably subnetted, 2 subnets, 2 masks
C       210.185.201.16/30 is directly connected, Serial0/0/1
L       210.185.201.18/32 is directly connected, Serial0/0/1
S*    0.0.0.0/0 [1/0] via 210.185.201.17

Gateway>
```

Below the CLI window, there is a "Ctrl+F6 to exit CLI focus" label and two buttons: "Copy" and "Paste". At the bottom left, there is a "Top" button.

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 command "ISP>show ip route" has been entered, and the output shows the routing table. The output includes a legend for route codes (L, C, S, R, M, B, D, N1, N2, E1, E2, E, i, L1, L2, ia, *, U, o, P) and a list of routes. The routes are: 172.31.0.0/32 (subnetted), 172.31.7.1/32 (connected to Loopback0), 210.185.200.0/27 (subnetted), 210.185.200.224/27 (static via 210.185.201.18), 210.185.201.0/24 (variably subnetted), 210.185.201.16/30 (connected to Serial0/0/0), and 210.185.201.17/32 (connected to Serial0/0/0). The window also has a "Top" button and "Copy" and "Paste" buttons.

ISP

Physical Config CLI Attributes

IOS Command Line Interface

```
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

    172.31.0.0/32 is subnetted, 1 subnets
C      172.31.7.1/32 is directly connected, Loopback0
    210.185.200.0/27 is subnetted, 1 subnets
S      210.185.200.224/27 [1/0] via 210.185.201.18
    210.185.201.0/24 is variably subnetted, 2 subnets, 2 masks
C      210.185.201.16/30 is directly connected, Serial0/0/0
L      210.185.201.17/32 is directly connected, Serial0/0/0

ISP>
```

Ctrl+F6 to exit CLI focus

Copy Paste

☐ Top

Task2:

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



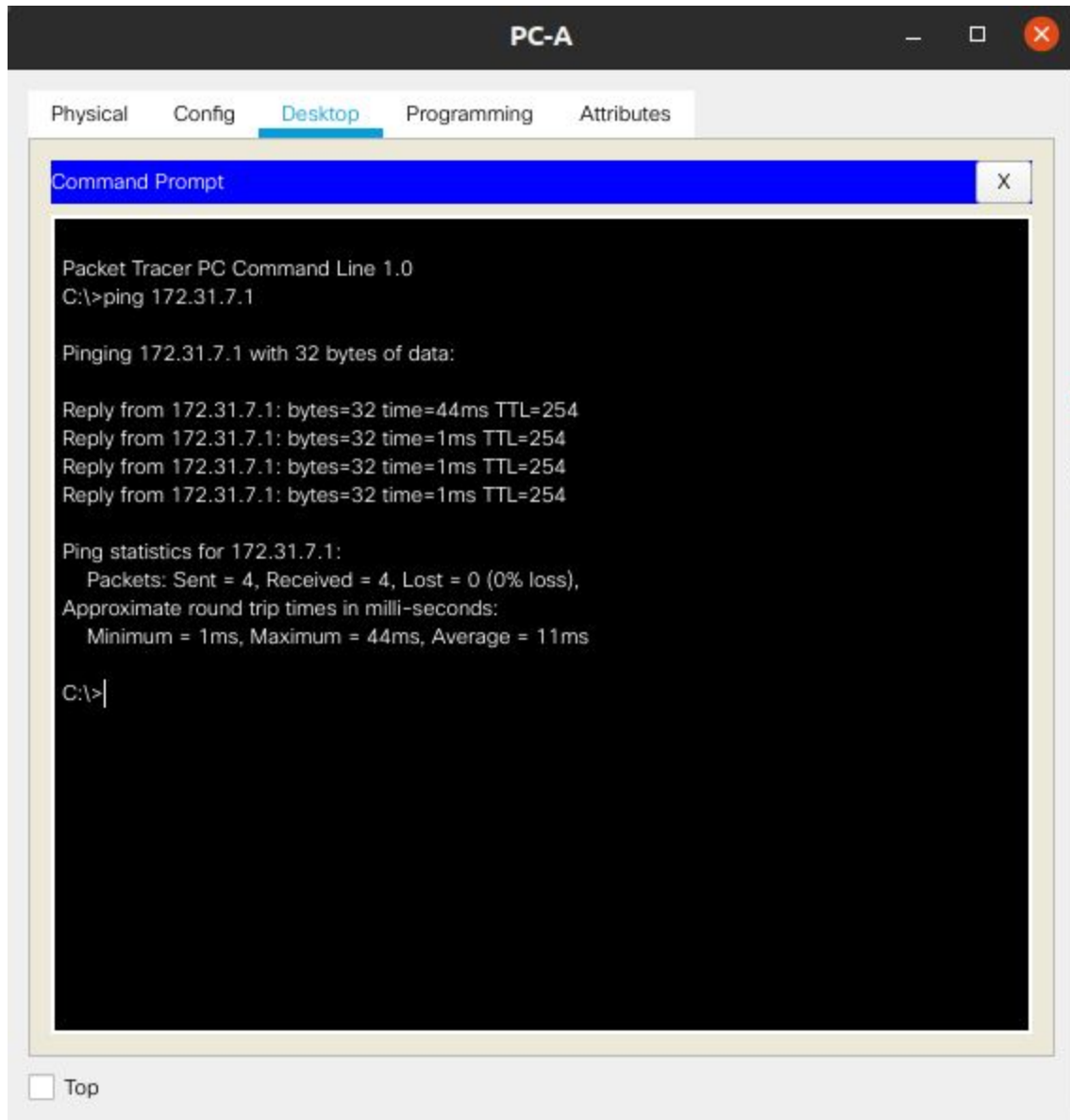
Step 3: Test the configuration.

What is the translation of the Inside local host address?

172.168.1.20 ---> 210.185.200.225



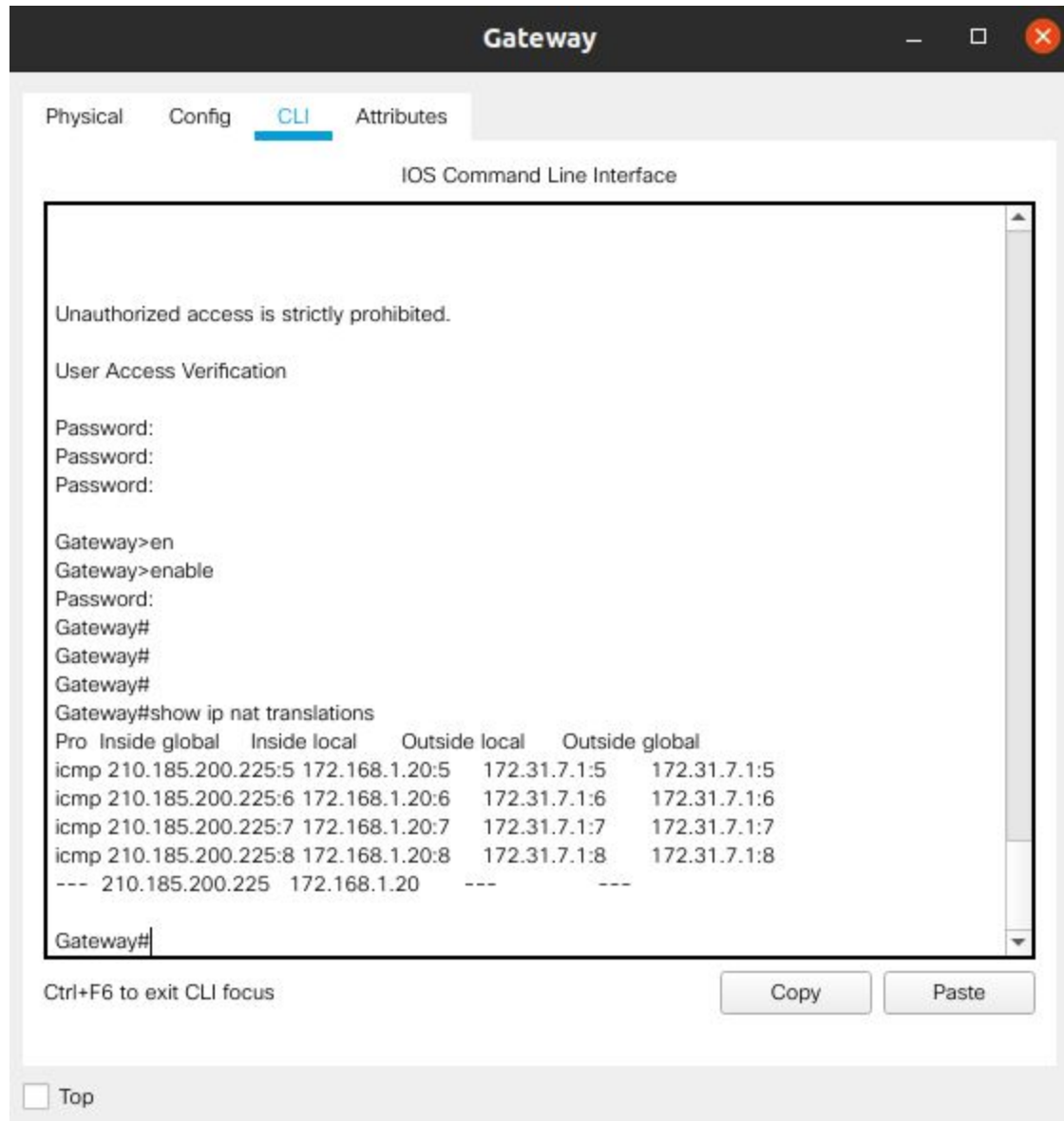
From PC-A, ping the Lo0 interface (172.31.7.1) on ISP.



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.

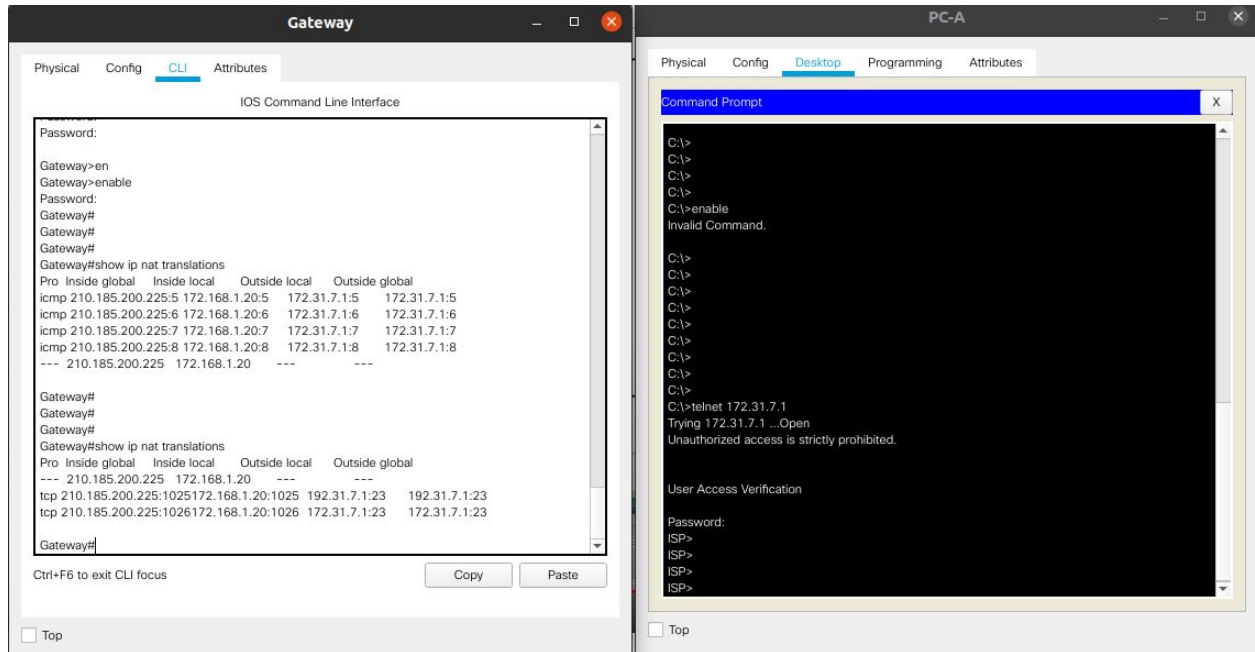
What port number was used in this ICMP exchange?

5,6,7,8

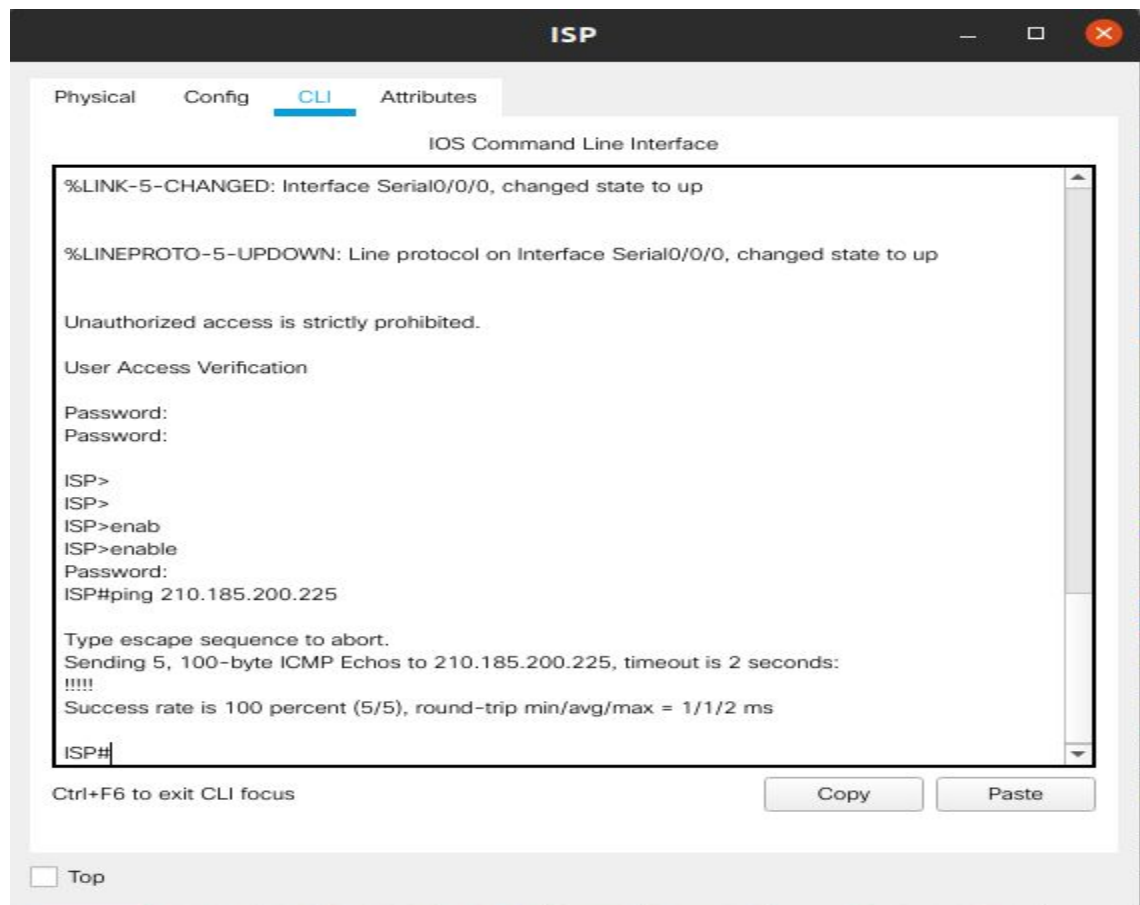


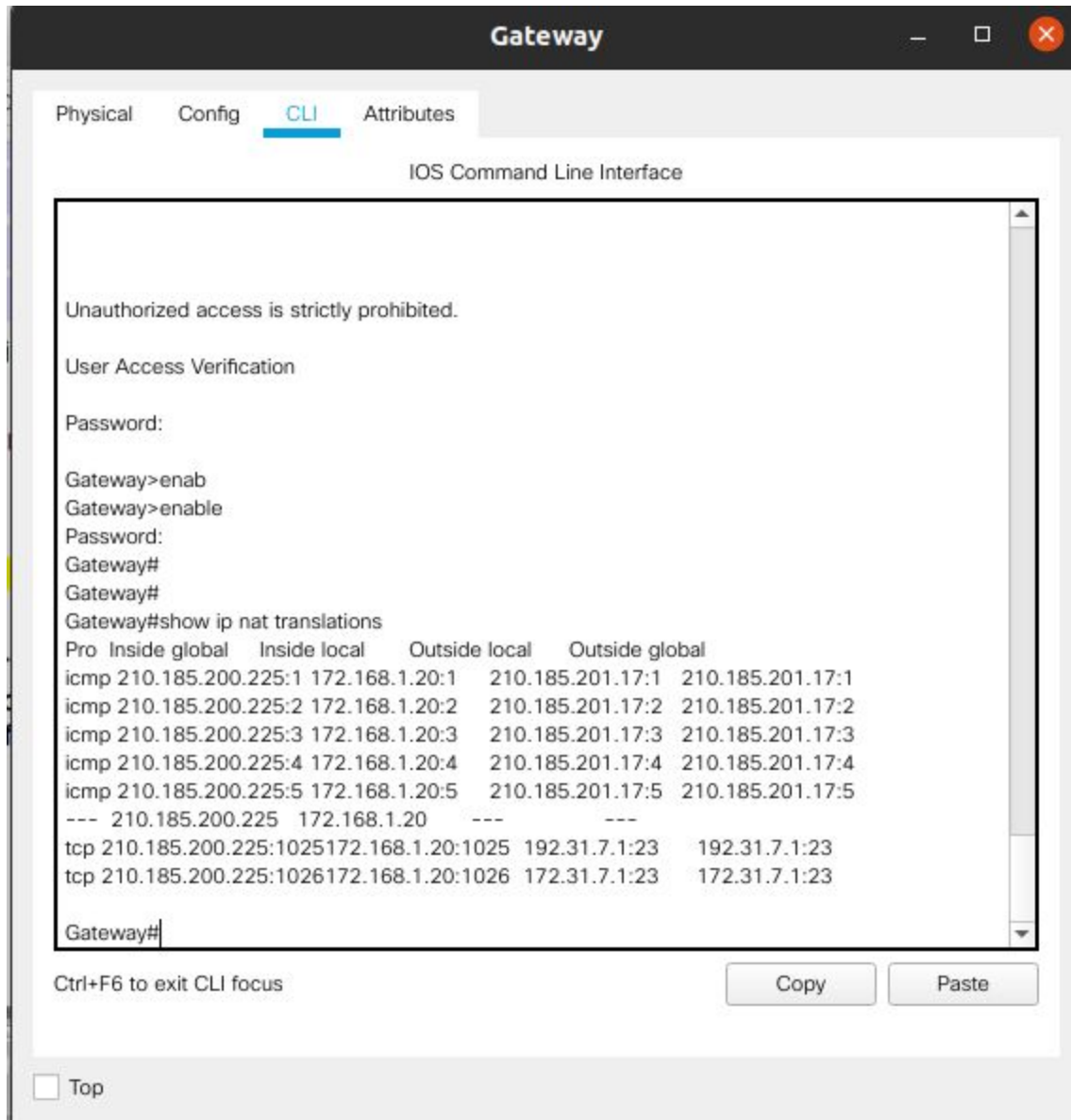
C] From PC-A, telnet to the ISP Lo0 interface and display the NAT table.
What was the protocol used in this translation?
tcp

What are the port numbers used?
Inside global / local: 1026
Outside global / local: 23



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





Gateway

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Gateway#
Gateway#
Gateway#show ip nat translations
Pro Inside global   Inside local   Outside local   Outside global
icmp 210.185.200.225:1 172.168.1.20:1 210.185.201.17:1 210.185.201.17:1
icmp 210.185.200.225:2 172.168.1.20:2 210.185.201.17:2 210.185.201.17:2
icmp 210.185.200.225:3 172.168.1.20:3 210.185.201.17:3 210.185.201.17:3
icmp 210.185.200.225:4 172.168.1.20:4 210.185.201.17:4 210.185.201.17:4
icmp 210.185.200.225:5 172.168.1.20:5 210.185.201.17:5 210.185.201.17:5
--- 210.185.200.225 172.168.1.20 --- ---
tcp 210.185.200.225:1025 172.168.1.20:1025 192.31.7.1:23 192.31.7.1:23
tcp 210.185.200.225:1026 172.168.1.20:1026 172.31.7.1:23 172.31.7.1:23

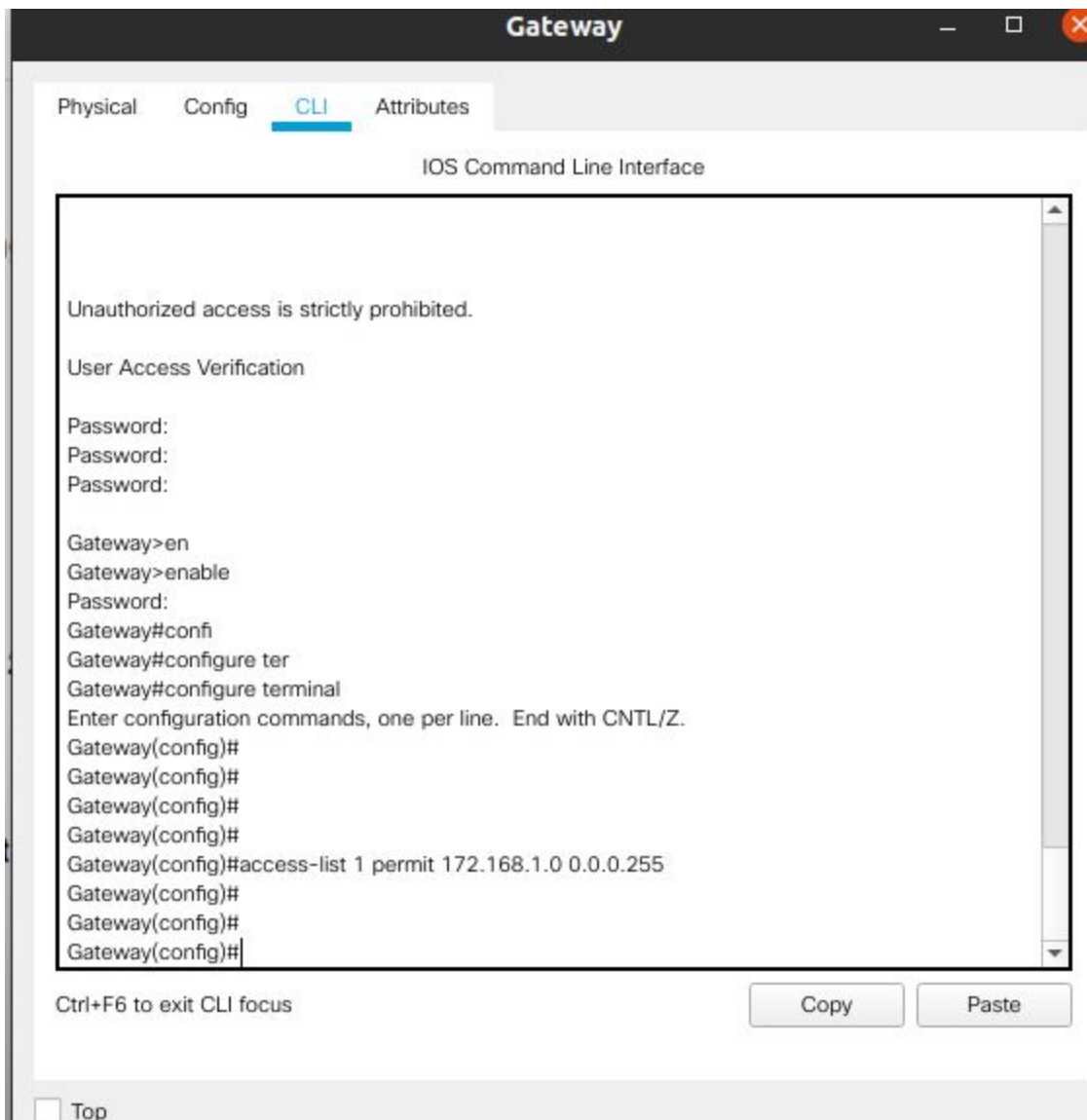
Gateway#
Gateway#
Gateway#show ip
Gateway#show ip na
Gateway#show ip nat stat
Gateway#show ip nat statistics
Total translations: 3 (1 static, 2 dynamic, 2 extended)
Outside Interfaces: Serial0/0/1
Inside Interfaces: GigabitEthernet0/1
Hits: 70 Misses: 21
Expired translations: 14
Dynamic mappings:
Gateway#
```

Ctrl+F6 to exit CLI focus

Copy

Paste

☐ Top



Gateway

PhysicalConfigCLIAttributes

IOS Command Line Interface

Gateway#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Gateway(config)#
Gateway(config)#
Gateway(config)#
Gateway(config)#
Gateway(config)#access-list 1 permit 172.168.1.0 0.0.0.255
Gateway(config)#
Gateway(config)#
Gateway(config)#sho
Gateway(config)#sho^Z
Gateway#
%SYS-5-CONFIG_I: Configured from console by console

Gateway#sho
Gateway#show ip
Gateway#show ip na
Gateway#show ip nat st
Gateway#show ip nat statistics
Total translations: 1 (1 static, 0 dynamic, 0 extended)
Outside Interfaces: Serial0/0/1
Inside Interfaces: GigabitEthernet0/1
Hits: 73 Misses: 21
Expired translations: 14
Dynamic mappings:
Gateway#

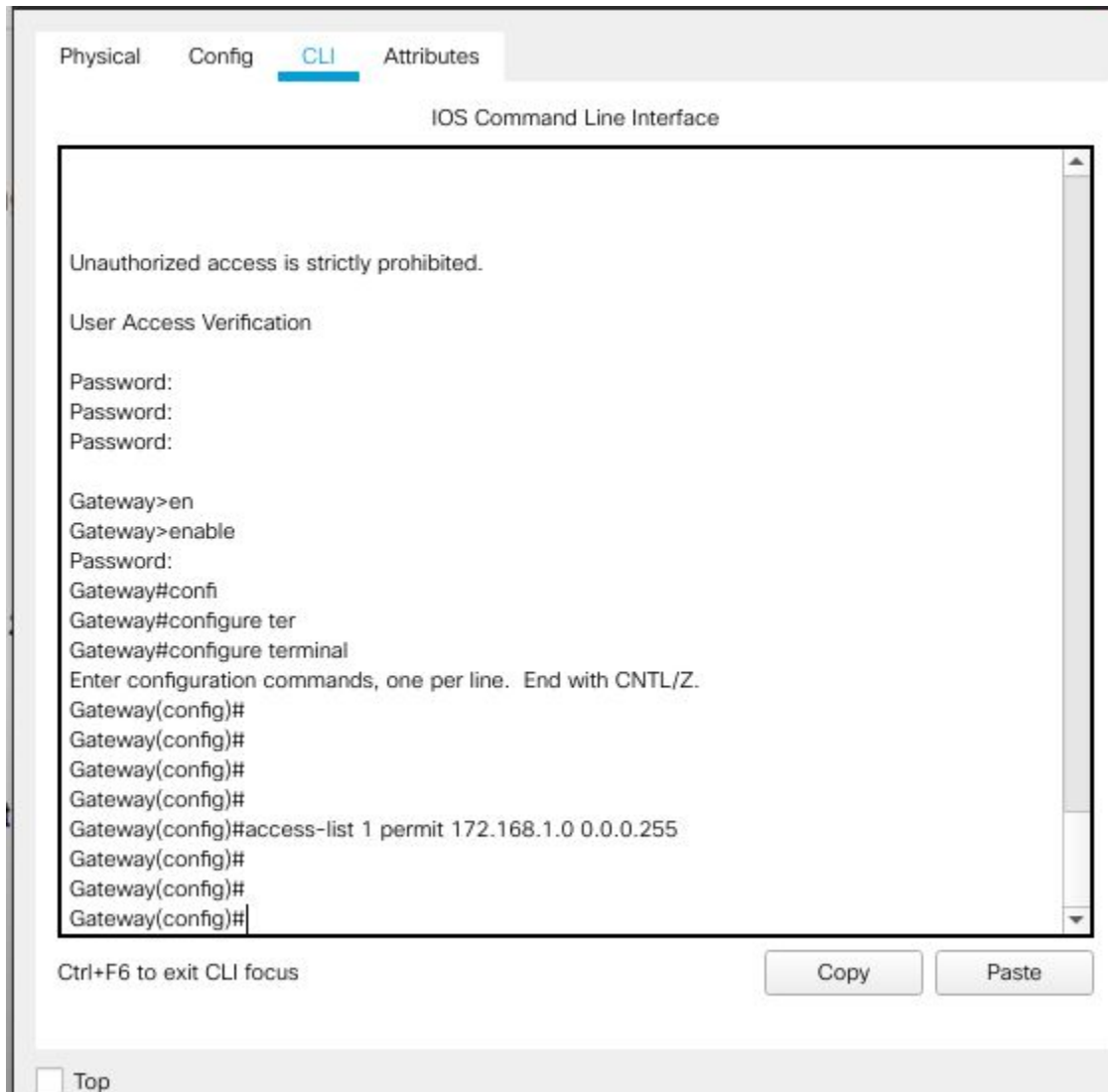
Ctrl+F6 to exit CLI focus

CopyPaste

☐ Top

Task 3:

Step 1: Clear NATs. and Step 2: Define an access control list (ACL) that matches the LAN private IP address range.



Step 3: Verify that the NAT interface configurations are still valid.

Physical

Config

CLI

Attributes

IOS Command Line Interface

```
Gateway#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Gateway(config)#
Gateway(config)#
Gateway(config)#
Gateway(config)#
Gateway(config)#access-list 1 permit 172.168.1.0 0.0.0.255
Gateway(config)#
Gateway(config)#
Gateway(config)#sho
Gateway(config)#sho^Z
Gateway#
%SYS-5-CONFIG_I: Configured from console by console

Gateway#sho
Gateway#show ip
Gateway#show ip na
Gateway#show ip nat st
Gateway#show ip nat statistics
Total translations: 1 (1 static, 0 dynamic, 0 extended)
Outside Interfaces: Serial0/0/1
Inside Interfaces: GigabitEthernet0/1
Hits: 73 Misses: 21
Expired translations: 14
Dynamic mappings:
Gateway#
```

Ctrl+F6 to exit CLI focus

Copy

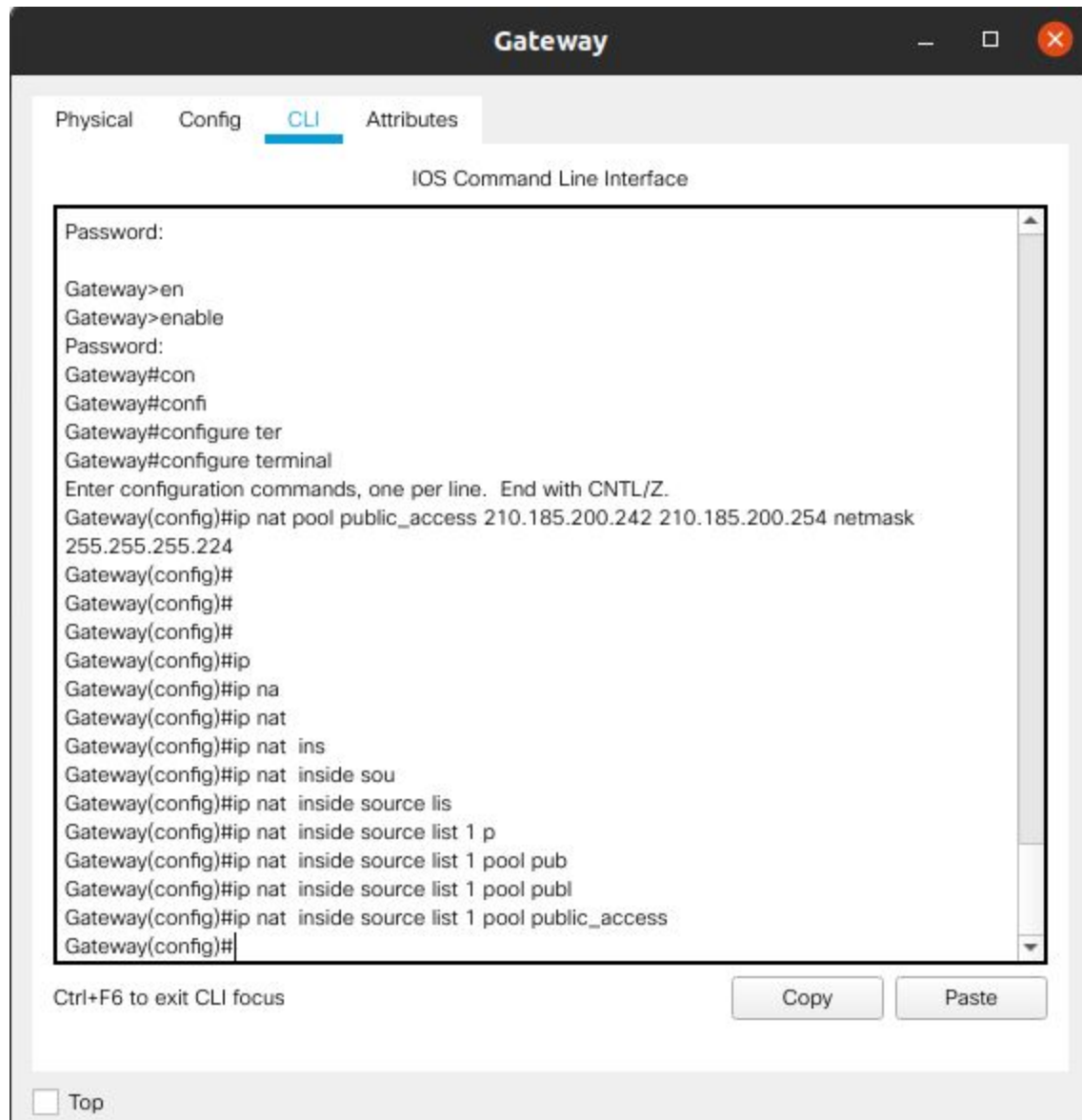
Paste

☐ Top

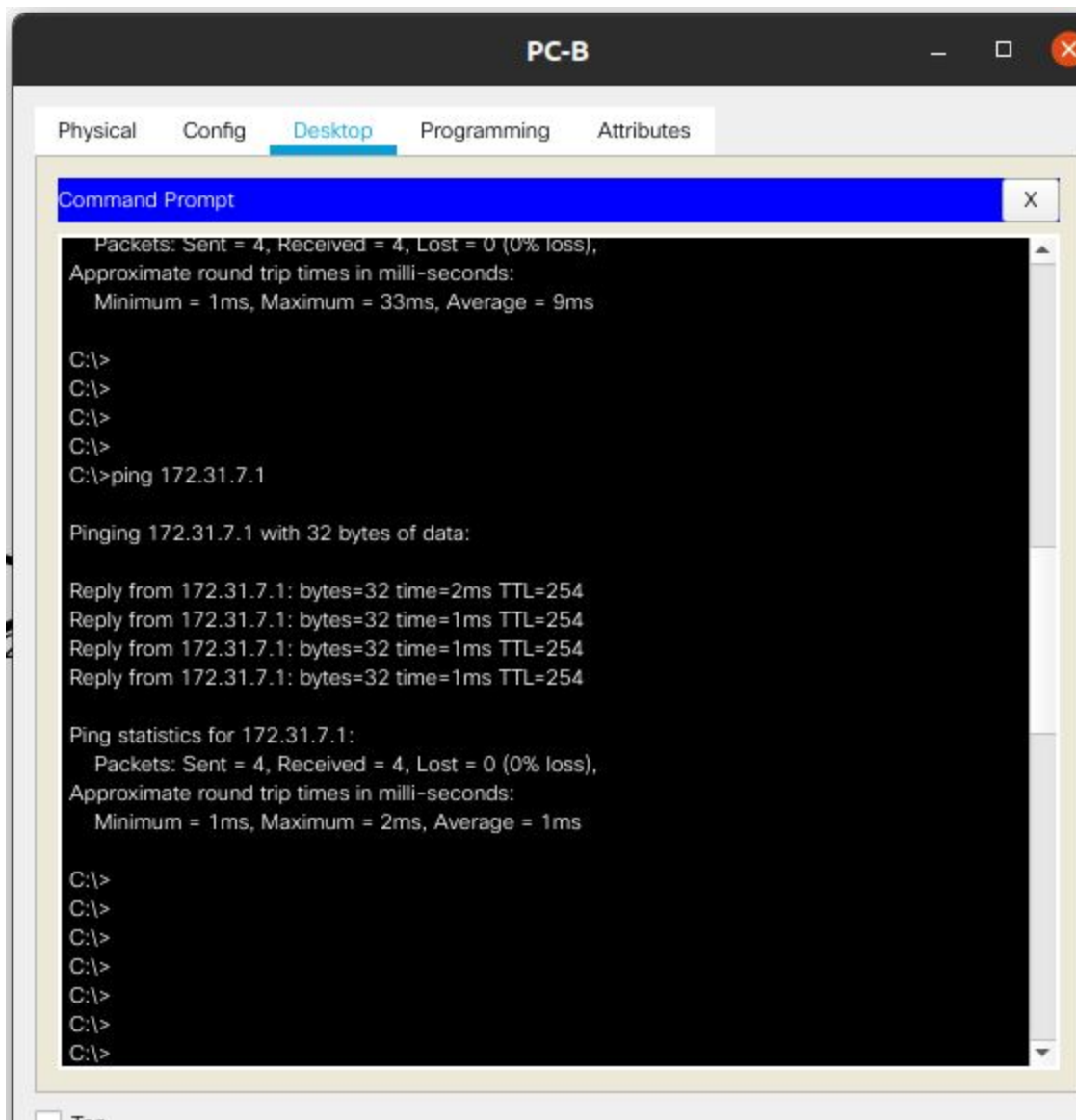
Step 4 Define the pool of usable public IP addresses.

Step 5

Define the NAT from the inside source list to the outside pool.



Step 6 : Test configuration by pinging from PC-b to ISP loopback



Gateway

Physical Config CLI Attributes

IOS Command Line Interface

```
Gateway>en
Gateway>enable
Password:
Gateway#
Gateway#
Gateway#
Gateway#sho
Gateway#show ip
Gateway#show ip na
Gateway#show ip nat tra
Gateway#show ip nat translations
Pro Inside global Inside local Outside local Outside global
--- 210.185.200.225 172.168.1.20 --- ---

Gateway#
Gateway#
Gateway#show ip nat tra
Gateway#show ip nat translations
Pro Inside global Inside local Outside local Outside global
icmp 210.185.200.242:10172.168.1.21:10 172.31.7.1:10 172.31.7.1:10
icmp 210.185.200.242:11172.168.1.21:11 172.31.7.1:11 172.31.7.1:11
icmp 210.185.200.242:12172.168.1.21:12 172.31.7.1:12 172.31.7.1:12
icmp 210.185.200.242:13172.168.1.21:13 172.31.7.1:13 172.31.7.1:13
--- 210.185.200.225 172.168.1.20 --- ---

Gateway#
```

Ctrl+F6 to exit CLI focus

Copy

Paste

☐ Top

Gateway

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Gateway#
Gateway#show ip n
Gateway#show ip n
Gateway#show ip n
Gateway#show ip na
Gateway#show ip nat tr
Gateway#show ip nat translations
Pro Inside global Inside local Outside local Outside global
--- 210.185.200.225 172.168.1.20 --- ---

Gateway#
Gateway#
Gateway#
Gateway#show ip nat statistics
Total translations: 1 (1 static, 0 dynamic, 0 extended)
Outside Interfaces: Serial0/0/1
Inside Interfaces: GigabitEthernet0/1
Hits: 81 Misses: 29
Expired translations: 22
Dynamic mappings:
-- Inside Source
access-list 1 pool public_access refCount 0
pool public_access: netmask 255.255.255.224
start 210.185.200.242 end 210.185.200.254
type generic, total addresses 13 , allocated 0 (0%), misses 0
Gateway#
```

Ctrl+F6 to exit CLI focus

Copy

Paste

☐ Top

Step 7: Remove the static NAT entry.



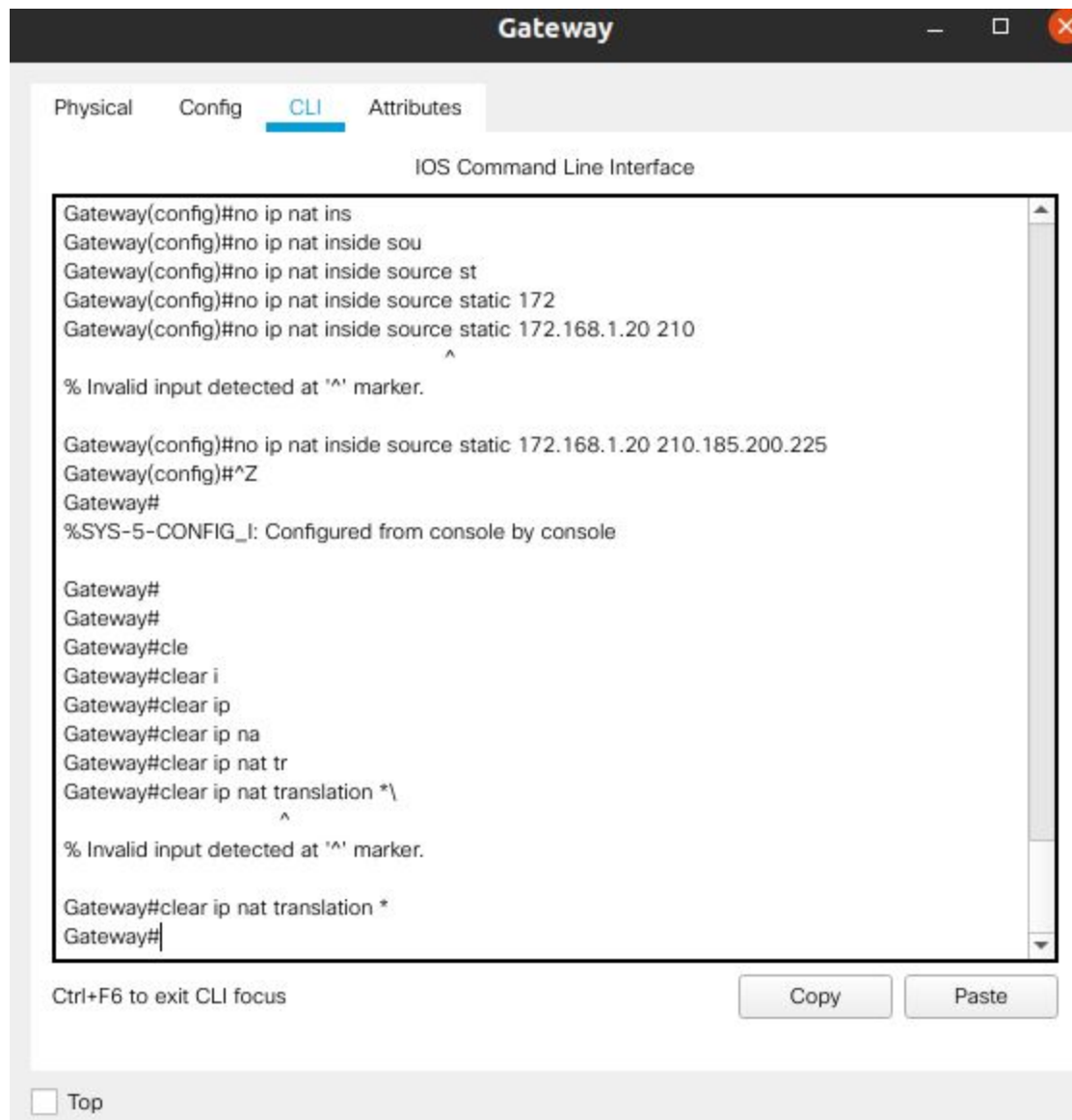
The screenshot shows a window titled "Gateway" with a dark header bar. Below the header, there are four tabs: "Physical", "Config", "CLI" (which is selected and highlighted with a blue underline), and "Attributes". The main content area is titled "IOS Command Line Interface" and contains a text box with the following text:

```
Gateway#enable
Gateway#con
Gateway#confi
Gateway#configure ter
Gateway#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Gateway(config)#
Gateway(config)#
Gateway(config)#
Gateway(config)#
Gateway(config)#no ip nat insd
Gateway(config)#no ip nat ins
Gateway(config)#no ip nat inside sou
Gateway(config)#no ip nat inside source st
Gateway(config)#no ip nat inside source static 172
Gateway(config)#no ip nat inside source static 172.168.1.20 210
                                     ^
% Invalid input detected at '^' marker.

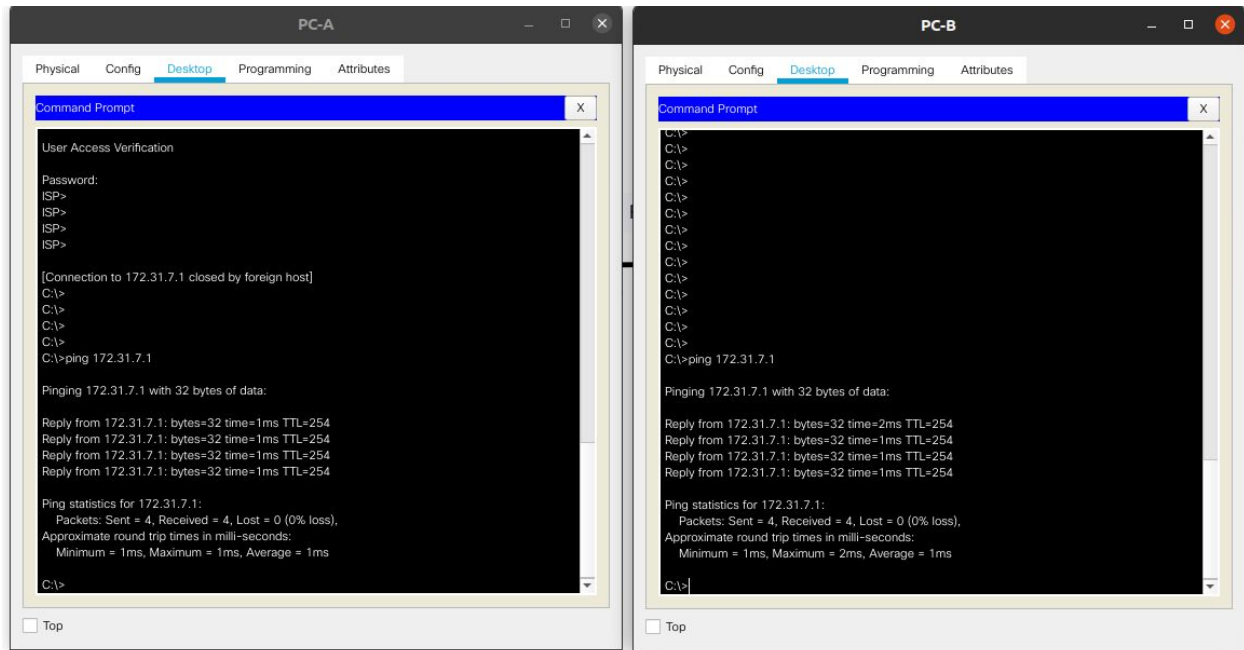
Gateway(config)#no ip nat inside source static 172.168.1.20 210.185.200.225
Gateway(config)#^Z
Gateway#
%SYS-5-CONFIG_I: Configured from console by console

Gateway#
Gateway#
Gateway#
```

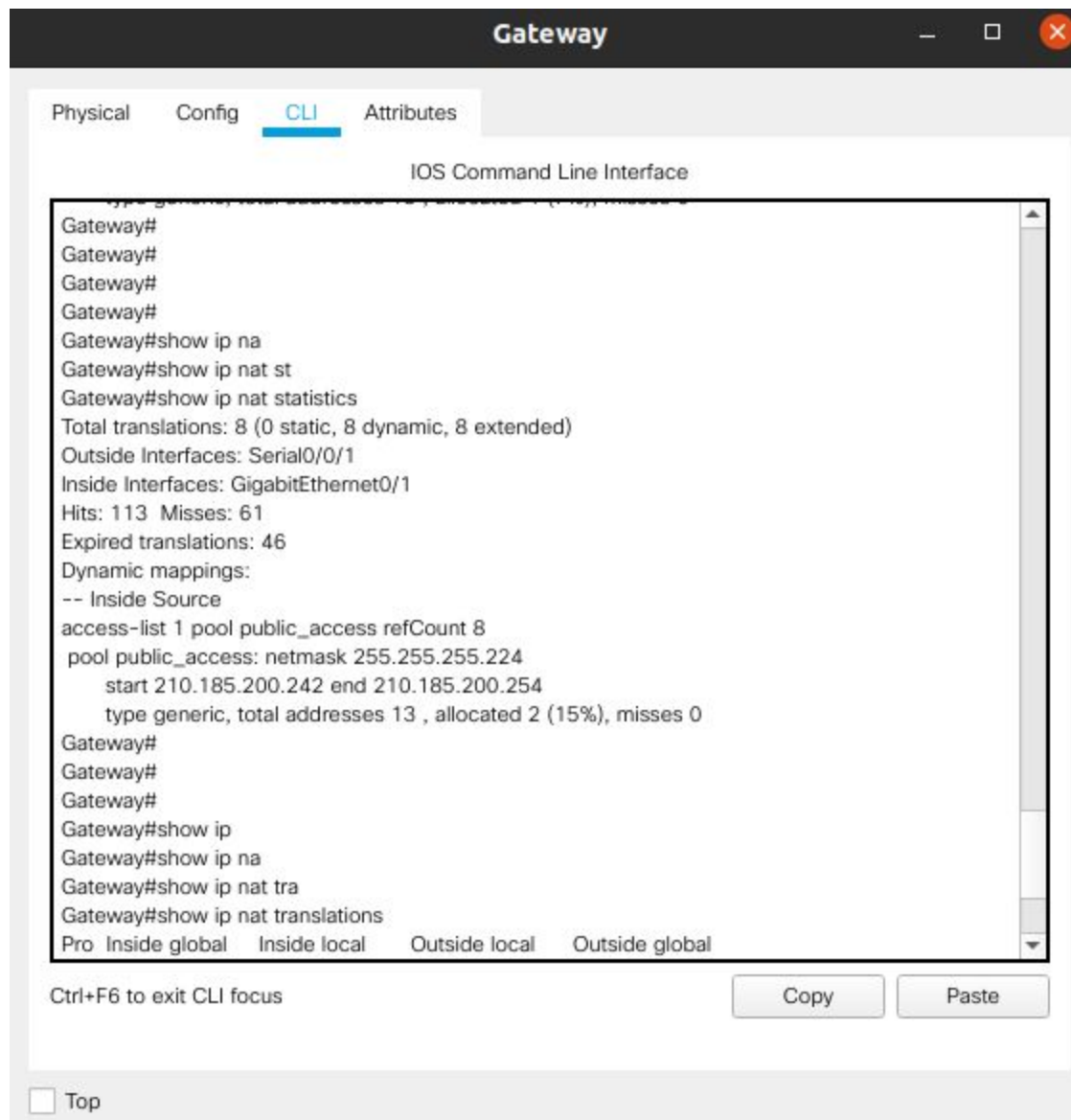
Below the text box, there is a label "Ctrl+F6 to exit CLI focus" and two buttons: "Copy" and "Paste". At the bottom left of the window, there is a checkbox labeled "Top".



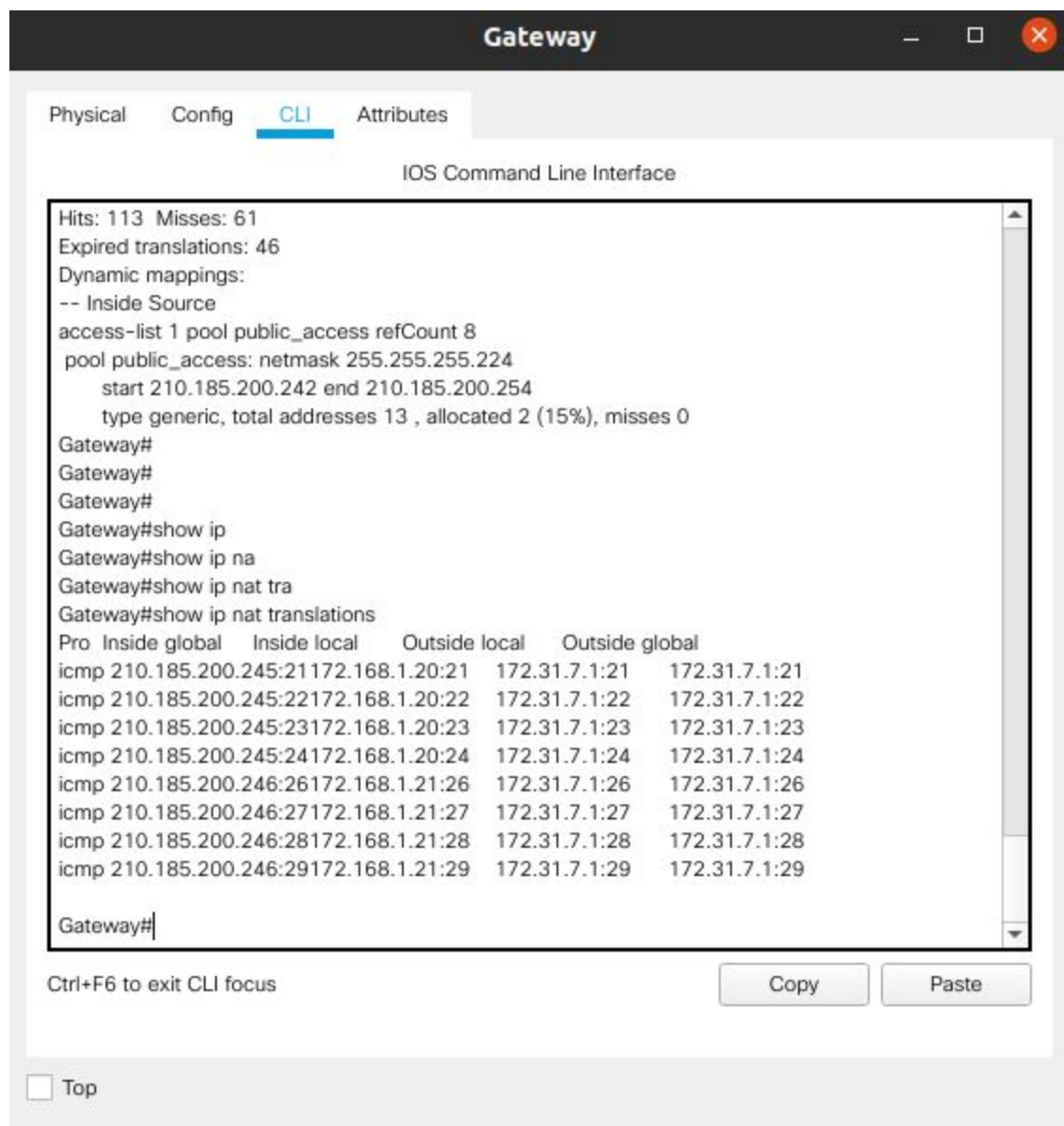
Clear ip translations



Ping from both hosts



Show ip nat statistics



And nat translations after pinging both hosts