DCCN ISE - Configuring Dynamic and Static NAT

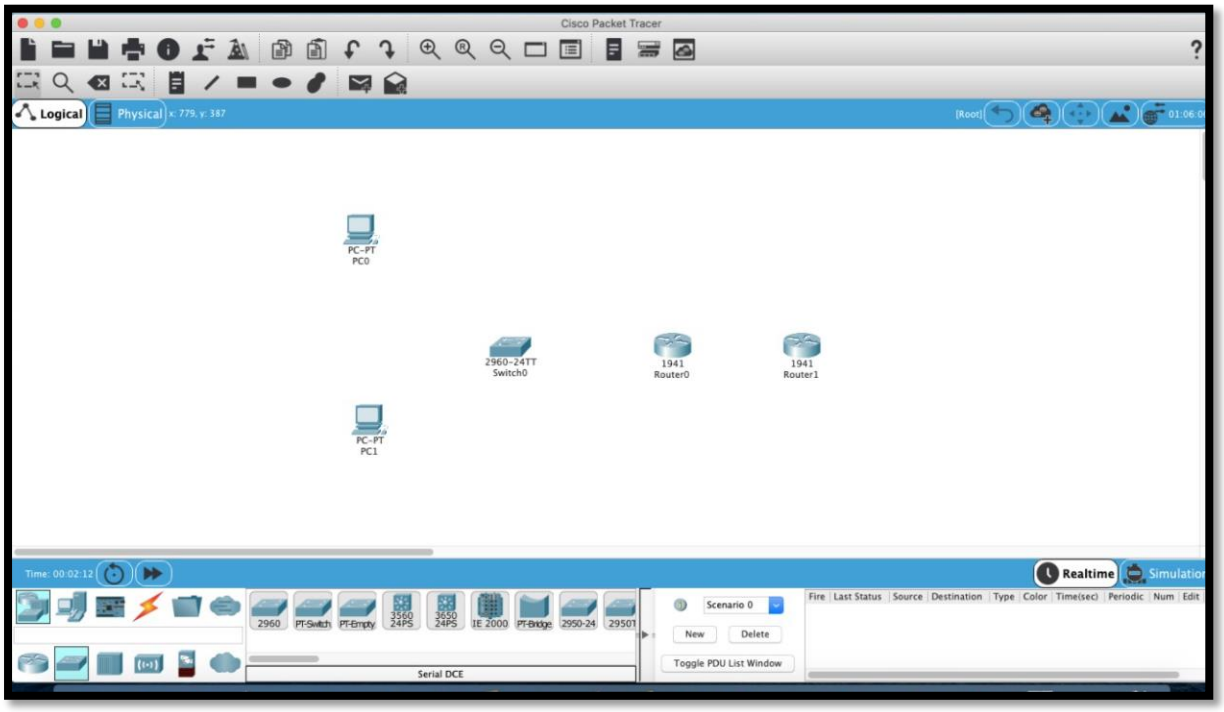
Harshal Dahat - 2018130009

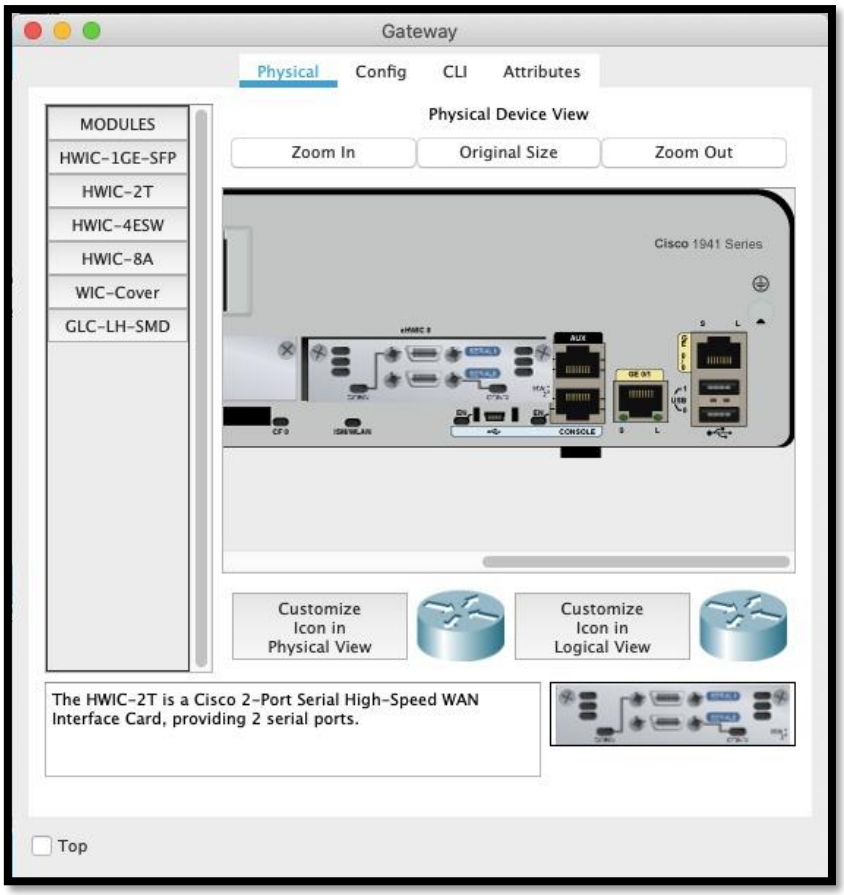
Raj Gorhekar - 2018130013

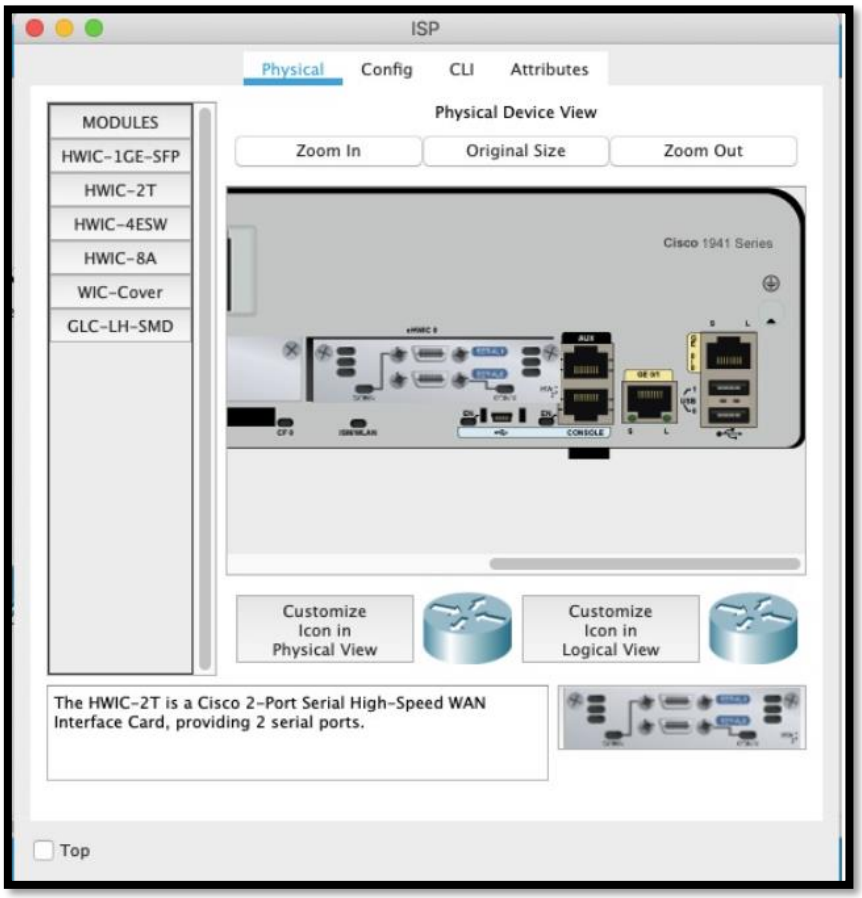
Affan Ansari – 2019230064

Task 1

Basic Setup of Devices :




Gateway
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
Cisco 1941 Series
Customize Icon in Physical View
Customize Icon in Logical View
The HWIC-2T is a Cisco 2-Port Serial High-Speed WAN Interface Card, providing 2 serial ports.
Top


ISP
Physical
Config
CLI
Attributes
MODULES
HWIC-1GE-SFP
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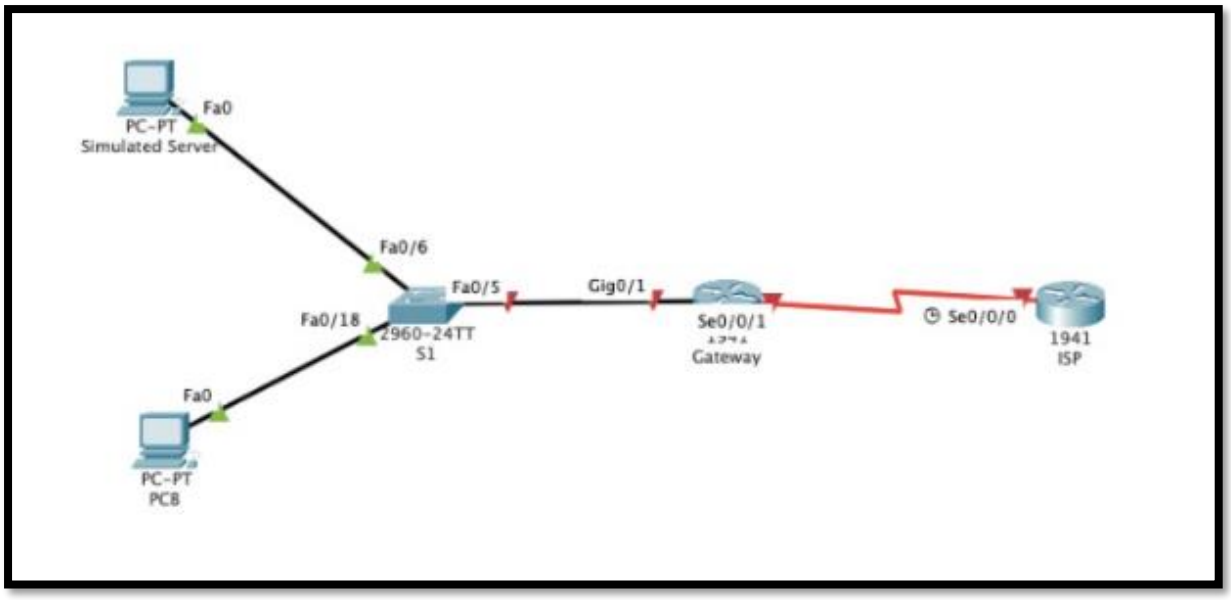
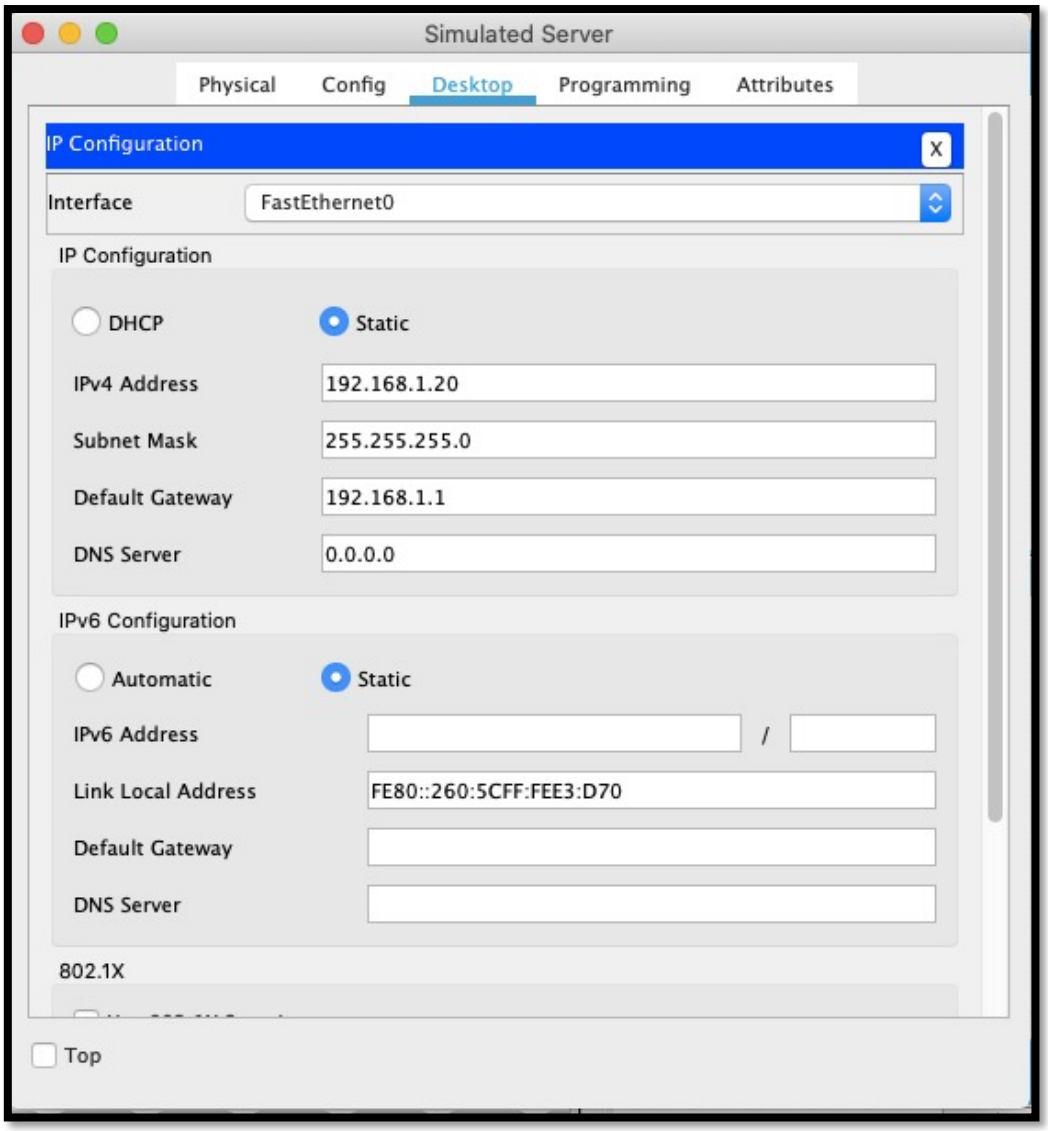
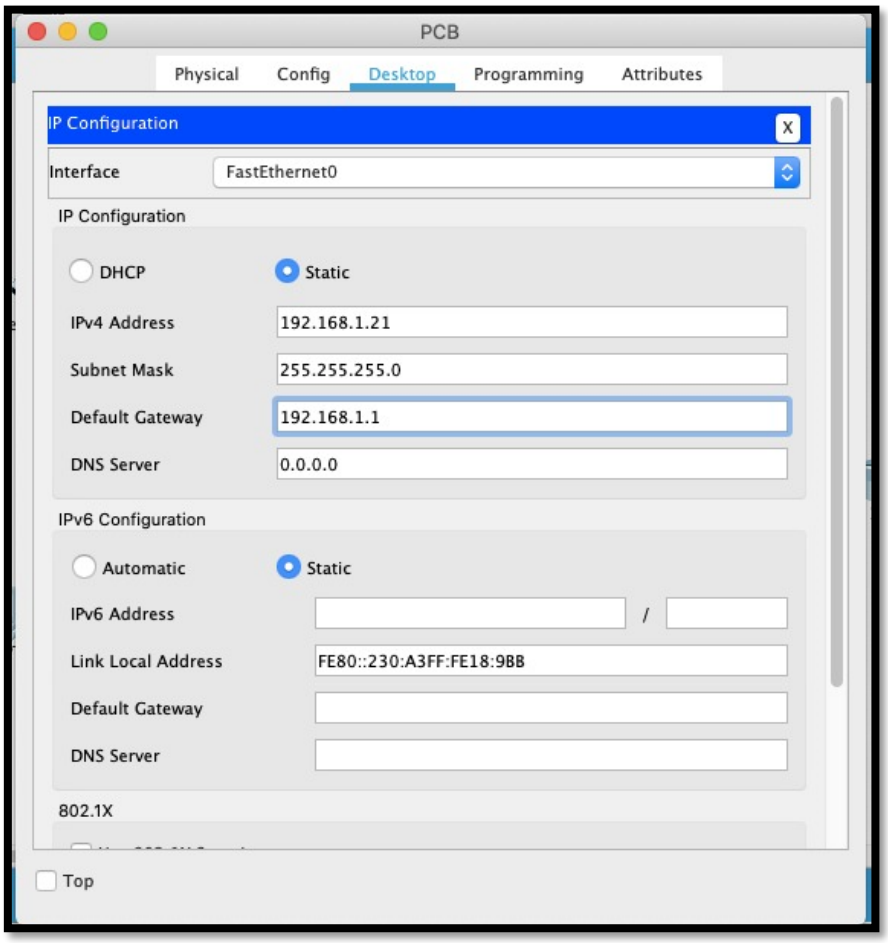


PC A Configuration



PC B configuration



Configuration for Gateway

```
Router>enable
Router#configure t
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#
Router(config)#
Router(config)#no ip domain-lookup
Router(config)#service password-encryption
Router(config)#enable secret class
Router(config)#line con 0
Router(config-line)#password cisco
Router(config-line)#login
Router(config-line)#logging synchronous
Router(config-line)#line vty 0 4
Router(config-line)#password cisco
Router(config-line)#login
Router(config-line)#
Router(config-line)#exit
Router(config)#
Router(config)#
```

```
Router(config)#
Router(config)#
Router(config)#hostn
Router(config)#hostname Gateway
Gateway(config)#inter
Gateway(config)#interface giga
Gateway(config)#interface gigabitEthernet 0/1
Gateway(config-if)#ip ad
Gateway(config-if)#ip address 192.168.1.1 255.255.255.0
Gateway(config-if)#exit
Gateway(config)#inter
Gateway(config)#interface ser
Gateway(config)#interface serial 0/0/1
Gateway(config-if)#ip ad
Gateway(config-if)#ip address 209.165.201.10 255.255.255.252
Gateway(config-if)#cloc
Gateway(config-if)#clock r
Gateway(config-if)#clock rate 128000
This command applies only to DCE interfaces
Gateway(config-if)#no shutd
Gateway(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
Gateway(config-if)#
```

Configuration for ISP

```
Router>enable
Router#configure t
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#
Router(config)#
Router(config)#no ip domain-lookup
Router(config)#service password-encryption
Router(config)#enable secret class
Router(config)#line con 0
Router(config-line)#password cisco
Router(config-line)#login
Router(config-line)#logging synchronous
Router(config-line)#line vty 0 4
Router(config-line)#password cisco
Router(config-line)#login
Router(config-line)#
Router(config-line)#exit
Router(config)#
Router(config)#
```

```
Router(config)#
Router(config)#host
Router(config)#hostname ISP
ISP(config)#
ISP(config)#
ISP(config)#inter
ISP(config)#interface se
ISP(config)#interface serial 0/0/0
ISP(config-if)#ip ad
ISP(config-if)#ip address 209.165.201.17 255.255.255.252
ISP(config-if)#clo
ISP(config-if)#clock ra
ISP(config-if)#clock rate 128000
ISP(config-if)#exi
ISP(config-if)#exit
ISP(config)#int
ISP(config)#interface loo
ISP(config)#interface loopback 0

ISP(config-if)#
%LINK-5-CHANGED: Interface Loopback0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to up

ISP(config-if)#ip ad
ISP(config-if)#ip address 192.31.7.1 255.255.255.255
ISP(config-if)#
```

Create Web Server on Isp

```
ISP#
ISP#
ISP#
ISP#configur
ISP#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
ISP(config)#
ISP(config)#
ISP(config)#
ISP(config)#username webuser privilege 15 secret webpass
ISP(config)#
```

Configure Static Routing

```
ISP(config)#
ISP(config)#
ISP(config)#username webuser privilege 15 secret webpass
ISP(config)#ip route 209.165.200.224 255.255.255.224 209.165.201.18
ISP(config)#
```

```
Gateway#confi
Gateway#configure
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
Gateway(config)# ip route 0.0.0.0 0.0.0.0 209.165.201.17
Gateway(config)#
```

Running Configuration Start UP

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

Command+F6 to exit CLI focus

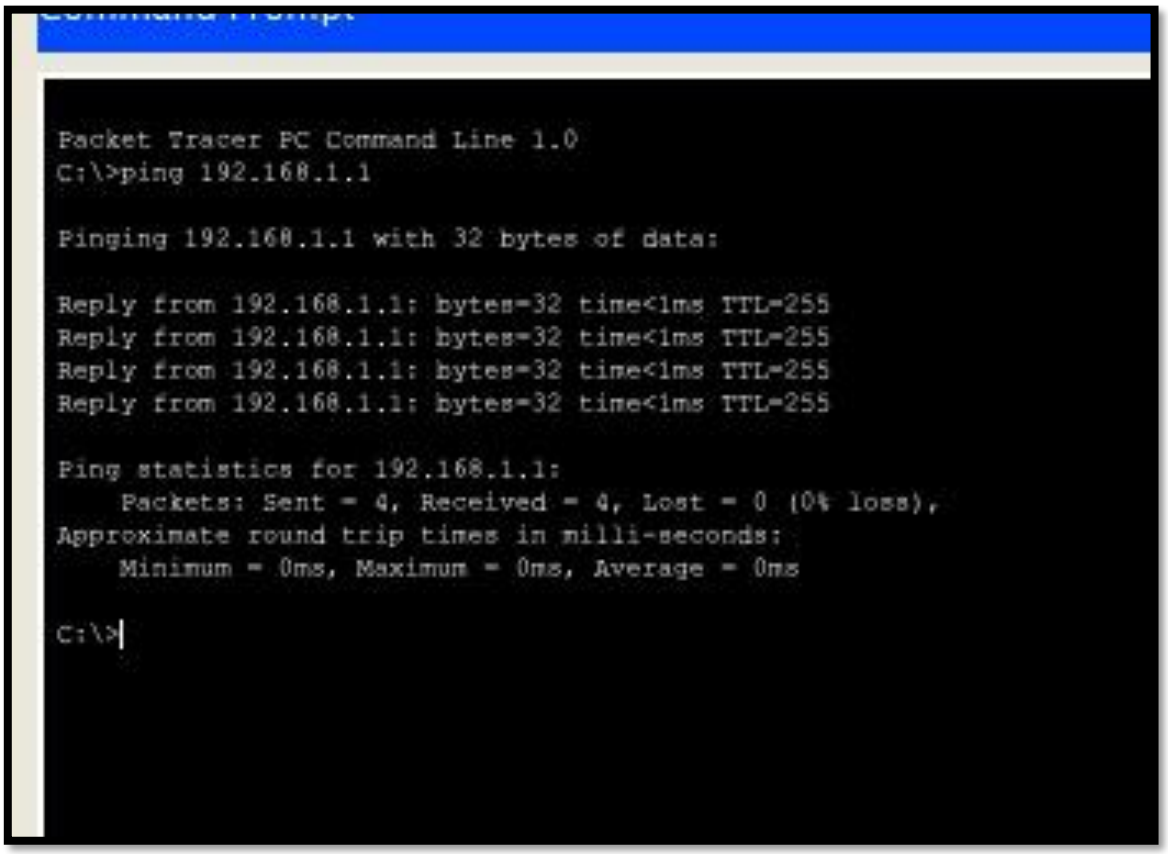
```
ISP#
ISP#
ISP#cop
ISP#copy runn
ISP#copy running-config star
ISP#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
ISP#
```

Command+F6 to exit CLI focus

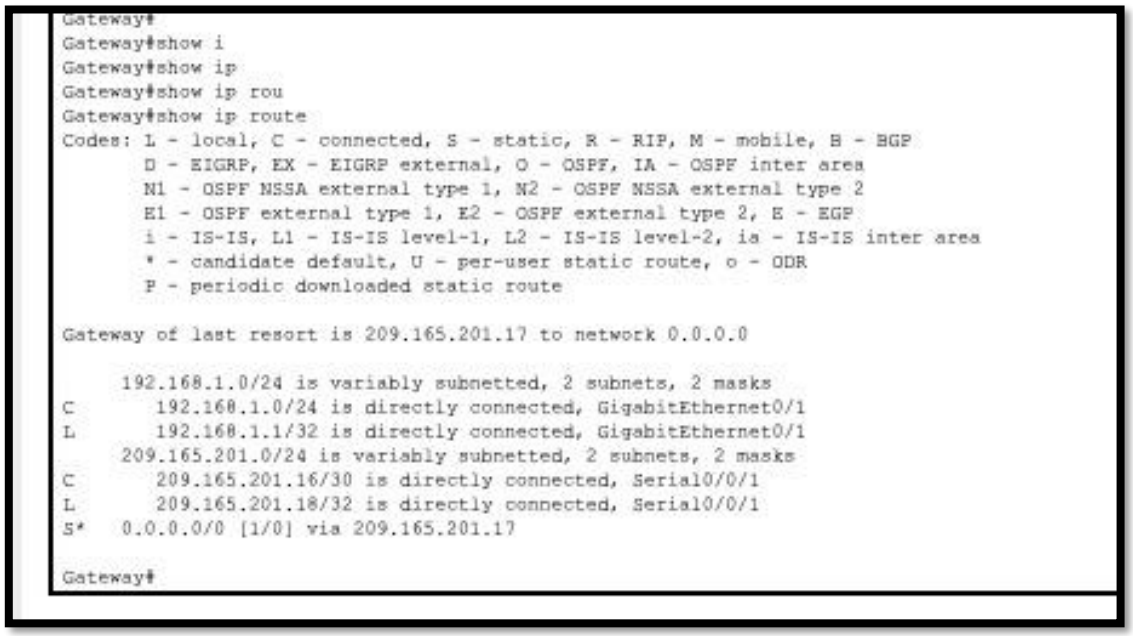
Testing by Running Ping Command from PC A

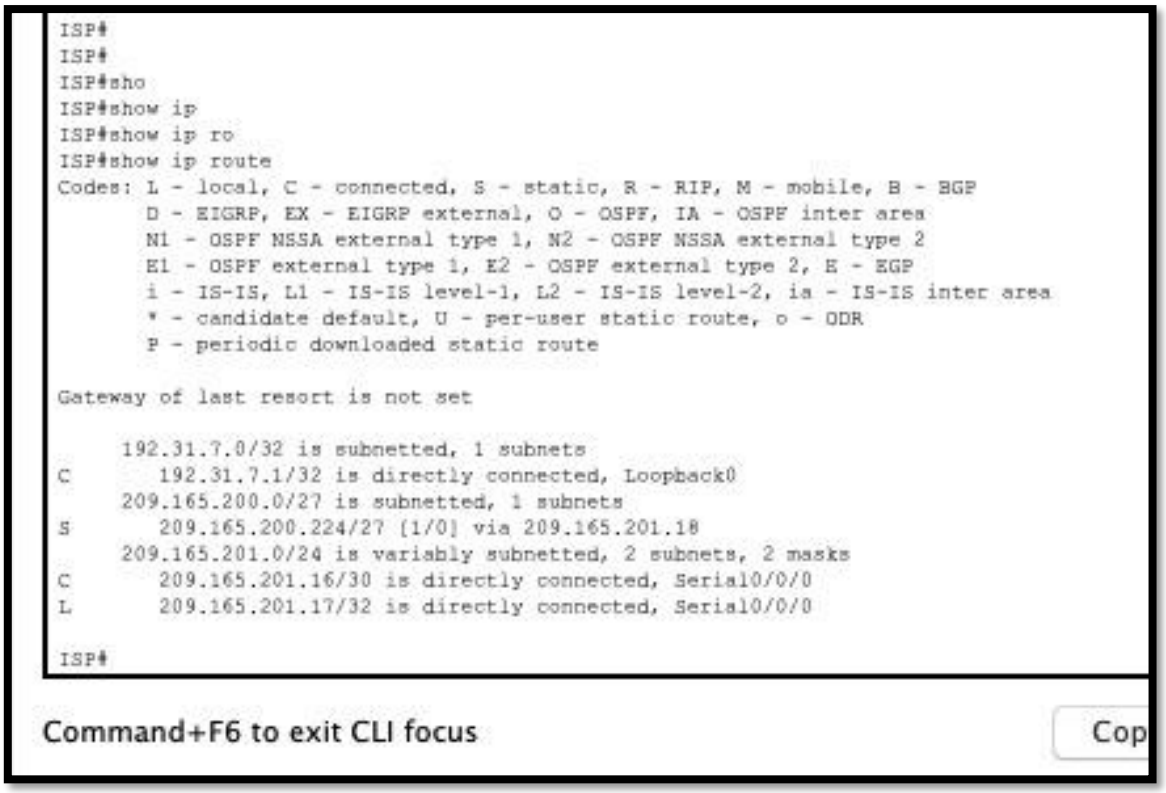
```
C:\>
C:\>
C:\>
C:\>ping 192.168.1.1

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

C:\>
```

Testing by Running Ping Command from PC B



Displaying Routing Tables




ISP#
ISP#
ISP#sho
ISP#show ip
ISP#show ip ro
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#
Command+F6 to exit CLI focus
Cop

Task 2

Configure static mapping

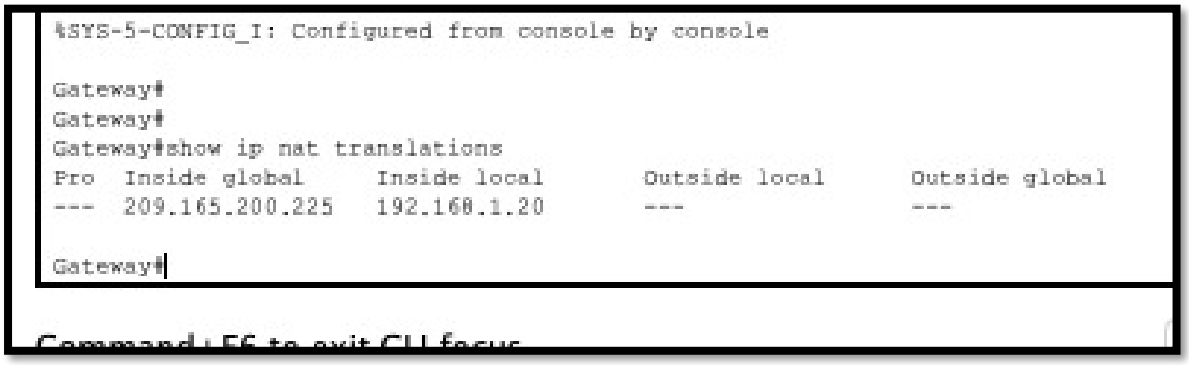
```
User Access Verification

Password:

Gateway>en
Password:
Gateway#
Gateway#
Gateway#
Gateway#conf
Gateway#configure term
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)#
Gateway(config)#
```

Specifying the Interface

```
Gateway(config)#
Gateway(config)#
Gateway(config)#
Gateway(config)#interface g0/1
Gateway(config-if)# ip nat inside
Gateway(config-if)#exit
Gateway(config)# interface s0/0/1
Gateway(config-if)#ip nat outside
Gateway(config-if)#
```

Command+F6 to exit CLI focus

Testing the Configuration



What is the translation of the Inside local host address?

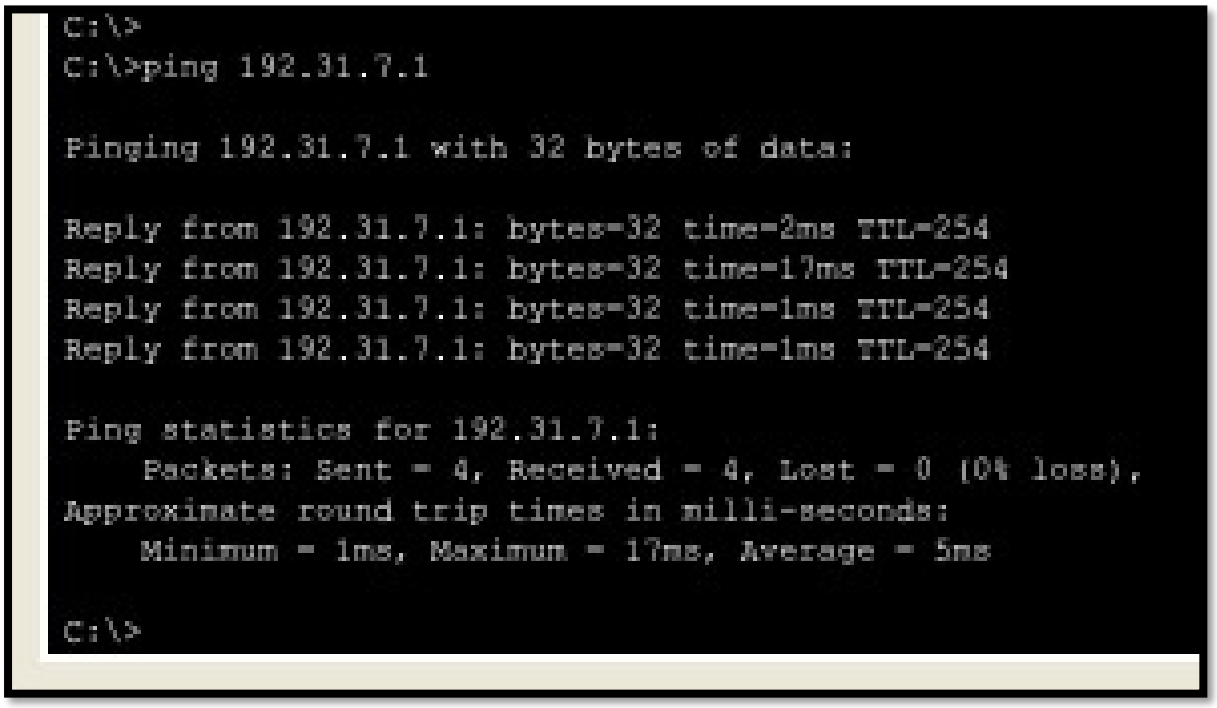
192.168.1.20 = 209.165.200.225

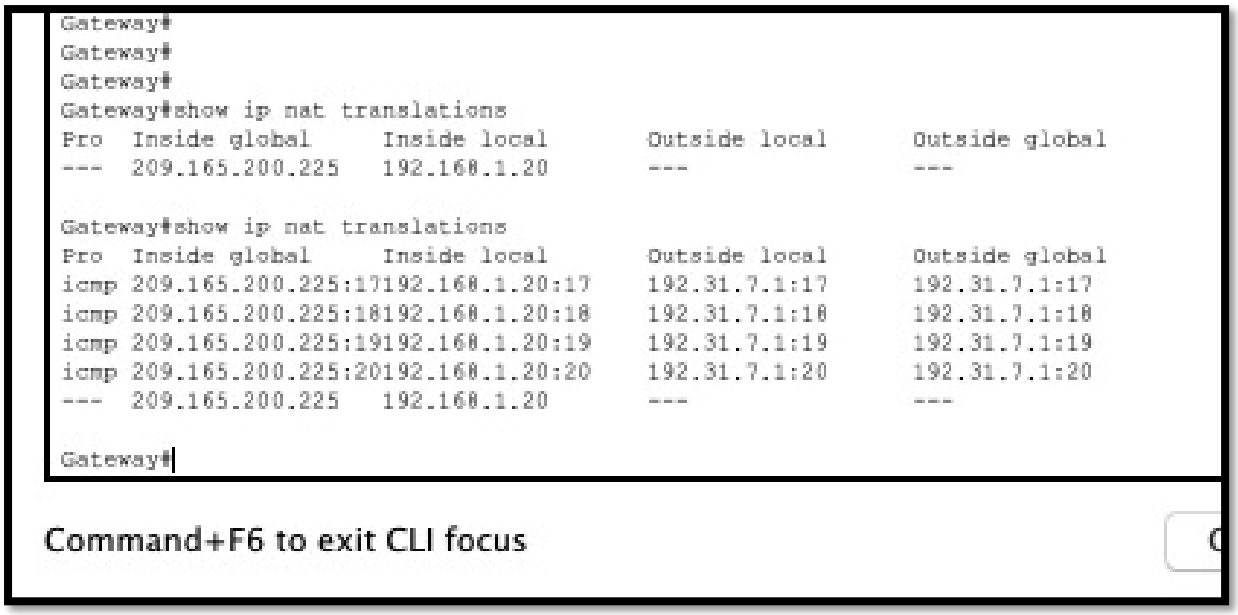
The Inside global address is assigned by?

ISP

The Inside local address is assigned by?

Admin

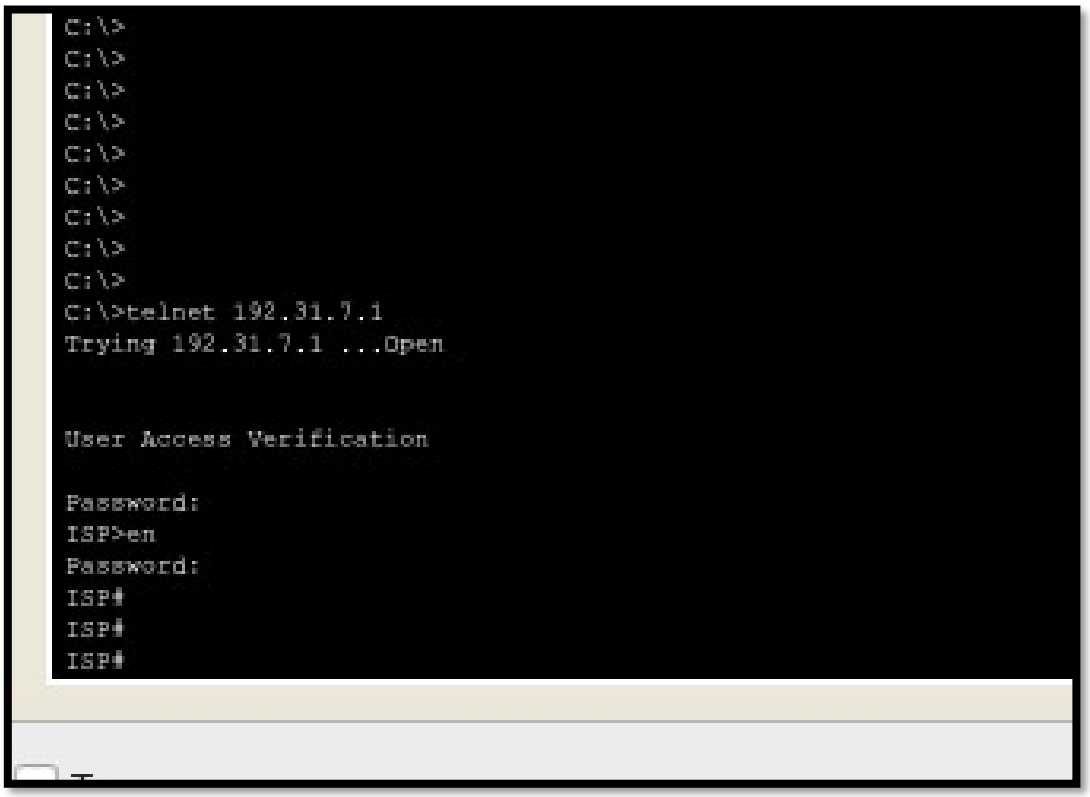


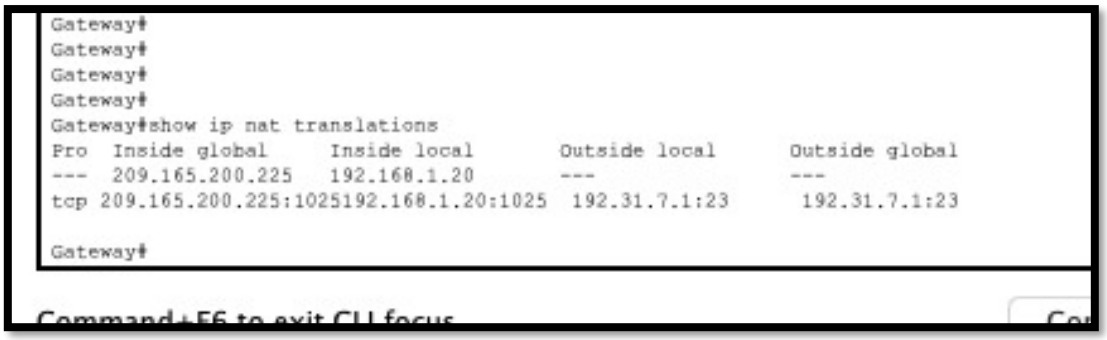


What port number was used in this ICMP exchange?

17,18,19,20

Telnet





What was the protocol used in this translation? tcp

What are the port numbers used?

1025 ,23

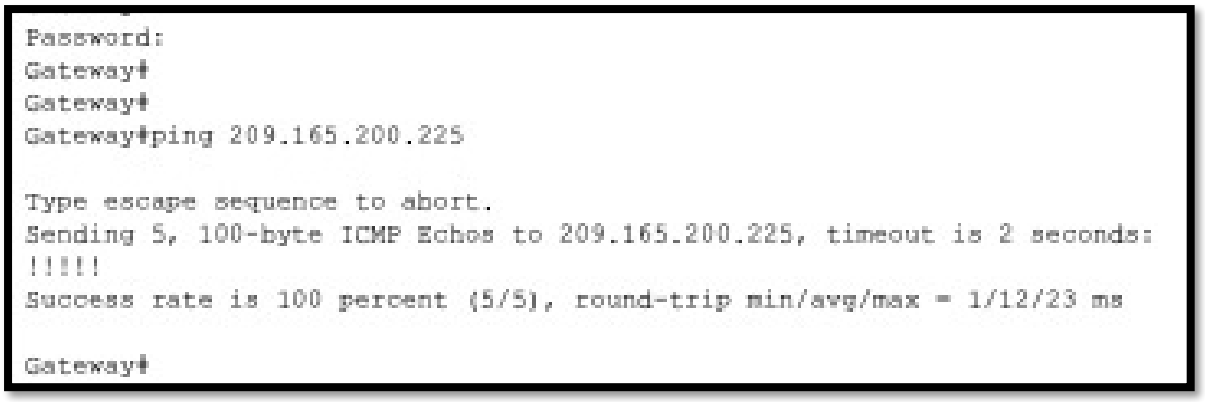
Inside global / local:

209.165.200.225:1025. 192.168.1.20:1025

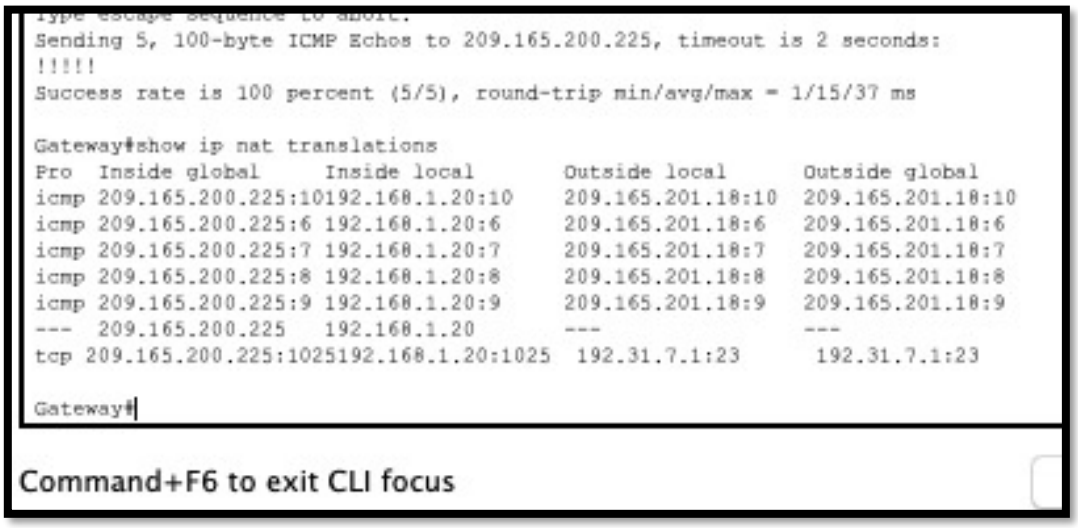
Outside global / local:

192.31.7.1:23 192.31.7.1:23

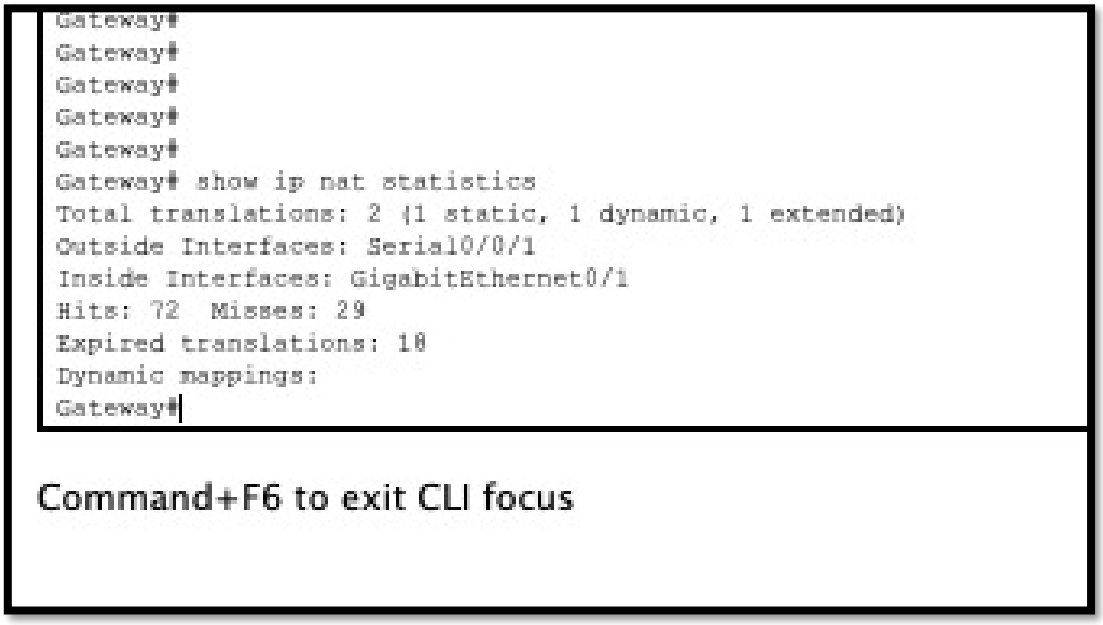
Ans d :



Ans e :


Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 209.165.200.225, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/15/37 ms
Gateway#show ip nat translations
Pro Inside global Inside local Outside local Outside global
icmp 209.165.200.225:10192.168.1.20:10 209.165.201.18:10 209.165.201.18:10
icmp 209.165.200.225:6 192.168.1.20:6 209.165.201.18:6 209.165.201.18:6
icmp 209.165.200.225:7 192.168.1.20:7 209.165.201.18:7 209.165.201.18:7
icmp 209.165.200.225:8 192.168.1.20:8 209.165.201.18:8 209.165.201.18:8
icmp 209.165.200.225:9 192.168.1.20:9 209.165.201.18:9 209.165.201.18:9
--- 209.165.200.225 192.168.1.20 --- ---
tcp 209.165.200.225:1025192.168.1.20:1025 192.31.7.1:23 192.31.7.1:23
Gateway#
Command+F6 to exit CLI focus

Ans F:


Gateway#
Gateway#
Gateway#
Gateway#
Gateway#
Gateway# show ip nat statistics
Total translations: 2 (1 static, 1 dynamic, 1 extended)
Outside Interfaces: Serial0/0/1
Inside Interfaces: GigabitEthernet0/1
Hits: 72 Misses: 29
Expired translations: 10
Dynamic mappings:
Gateway#
Command+F6 to exit CLI focus

Task 3

Clearing the old translations

```
Gateway#
Gateway#
Gateway# clear ip nat translation *
Gateway# clear ip nat translation *
Gateway# clear ip nat translation *
Gateway#cle
Gateway#clear ip na
```

Ip Nat Stats with 0 Dynamic Entries

```
Gateway#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Gateway(config)#access-list 1 permit 192.168.1.0 0.0.0.255
Gateway(config)#show ipna
Gateway(config)#show ip na
Gateway(config)#show ip na^Z
Gateway#
%SYS-5-CONFIG_I: Configured from console by console

Gateway#show ip nat s
Gateway#show ip nat statistics
Total translations: 1 (1 static, 0 dynamic, 0 extended)
Outside Interfaces: Serial0/0/1
Inside Interfaces: GigabitEthernet0/1
Hits: 137  Misses: 54
Expired translations: 42
Dynamic mappings:
Gateway#
```

```
Gateway#configure
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
Gateway(config)#
Gateway(config)#ip nat pool public_access 209.165.200.242 209.165.200.254 netmask 255.255.255.224
Gateway(config)#
Gateway(config)#
```

```
Gateway(config)#ip nat pool public_access 209.165.200.242 209.165.200.254 ne
Gateway(config)#
Gateway(config)#ip nat inside source list 1 pool public_access
Gateway(config)#
Gateway(config)#ip nat inside source list 1 pool public_access^Z
Gateway#
%SYS-5-CONFIG_I: Configured from console by console
```

```
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

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=13ms 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=0ms 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 = 13ms, Average = 5ms

C:\>
```

```
Gateway#^Z
Gateway#^Z
Gateway#^Z
Gateway# show ip nat translations
Pro  Inside global     Inside local       Outside local      Outside global
icmp 209.165.200.242:5 192.168.1.21:5     192.31.7.1:5       192.31.7.1:5
icmp 209.165.200.242:6 192.168.1.21:6     192.31.7.1:6       192.31.7.1:6
icmp 209.165.200.242:7 192.168.1.21:7     192.31.7.1:7       192.31.7.1:7
icmp 209.165.200.242:8 192.168.1.21:8     192.31.7.1:8       192.31.7.1:8
---  209.165.200.225   192.168.1.20       ---                ---

Gateway#
```

What is the translation of the Inside local host address for PC-B?
192.168.1.21

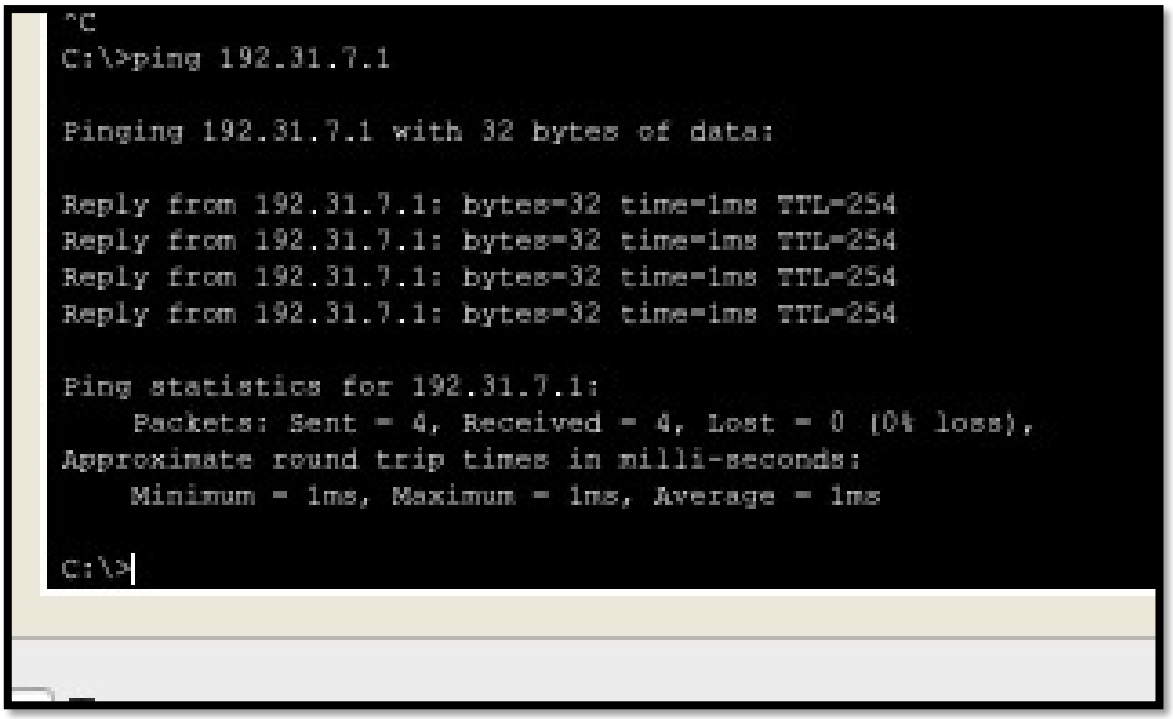
What port number was used in this ICMP exchange?

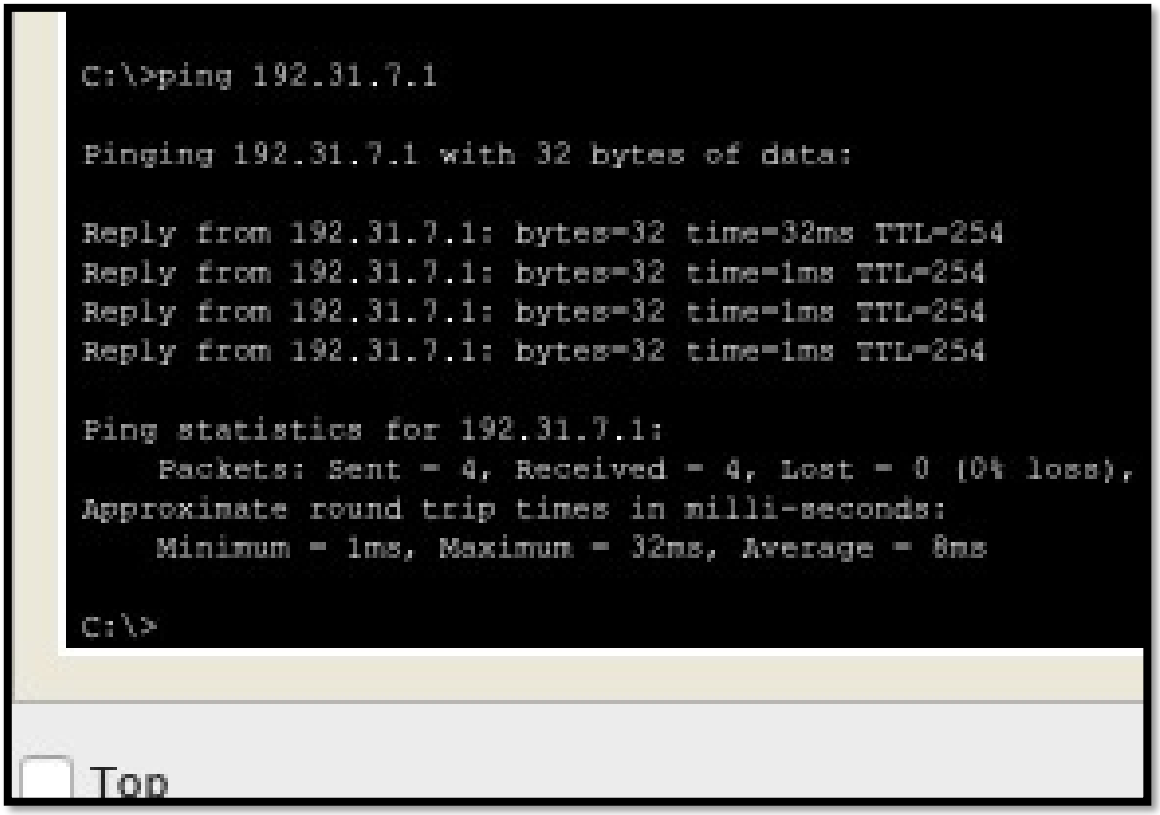
5 6 7 8

```
       start 209.165.200.242 end 209.165.200.254
       type generic, total addresses 13 , allocated 1 (7%), misses 0
Gateway# show ip nat translations
Pro  Inside global     Inside local       Outside local      Outside glob
---  209.165.200.225   192.168.1.20       ---                ---
tcp 209.165.200.242:1025192.168.1.21:1025  192.31.7.1:23      192.31.7.1:

Gateway#show ip nat statistics
Total translations: 2 (1 static, 1 dynamic, 1 extended)
Outside Interfaces: Serial0/0/1
Inside Interfaces: GigabitEthernet0/1
Hits: 194  Misses: 59
Expired translations: 46
Dynamic mappings:
-- Inside Source
access-list 1 pool public_access refCount 1
 pool public_access: netmask 255.255.255.224
       start 209.165.200.242 end 209.165.200.254
       type generic, total addresses 13 , allocated 1 (7%), misses 0
Gateway#
```

```
Gateway#configure
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
Gateway(config)# no ip nat inside source static 192.168.1.20 209.165.200.225
Gateway(config)#
```

```
Gateway#clear  ip nat translation
% Incomplete command.
Gateway#clear  ip nat translation *
Gateway#
```


^C
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
C:\>


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=32ms 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 = 32ms, Average = 8ms
C:\>
Top

```
Gateway# show ip nat translation
Pro  Inside global     Inside local       Outside local      Outside global
icmp 209.165.200.243:15192.168.1.21:15    192.31.7.1:15      192.31.7.1:15
icmp 209.165.200.243:16192.168.1.21:16    192.31.7.1:16      192.31.7.1:16
icmp 209.165.200.243:17192.168.1.21:17    192.31.7.1:17      192.31.7.1:17
icmp 209.165.200.243:18192.168.1.21:18    192.31.7.1:18      192.31.7.1:18
icmp 209.165.200.244:49192.168.1.20:49    192.31.7.1:49      192.31.7.1:49
icmp 209.165.200.244:50192.168.1.20:50    192.31.7.1:50      192.31.7.1:50
icmp 209.165.200.244:51192.168.1.20:51    192.31.7.1:51      192.31.7.1:51
icmp 209.165.200.244:52192.168.1.20:52    192.31.7.1:52      192.31.7.1:52
tcp 209.165.200.243:1026192.168.1.21:1026  192.31.7.1:23      192.31.7.1:23

Gateway#
```

Command+F6 to exit CLI focus

```
Gateway#show ip nat statistics
Total translations: 9 (0 static, 9 dynamic, 9 extended)
Outside Interfaces: Serial0/0/1
Inside Interfaces: GigabitEthernet0/1
Hits: 237  Misses: 89
Expired translations: 55
Dynamic mappings:
-- Inside Source
access-list 1 pool public_access refCount 9
 pool public_access: netmask 255.255.255.224
       start 209.165.200.242 end 209.165.200.254
       type generic, total addresses 13 , allocated 2 (15%), misses 0
Gateway#
```