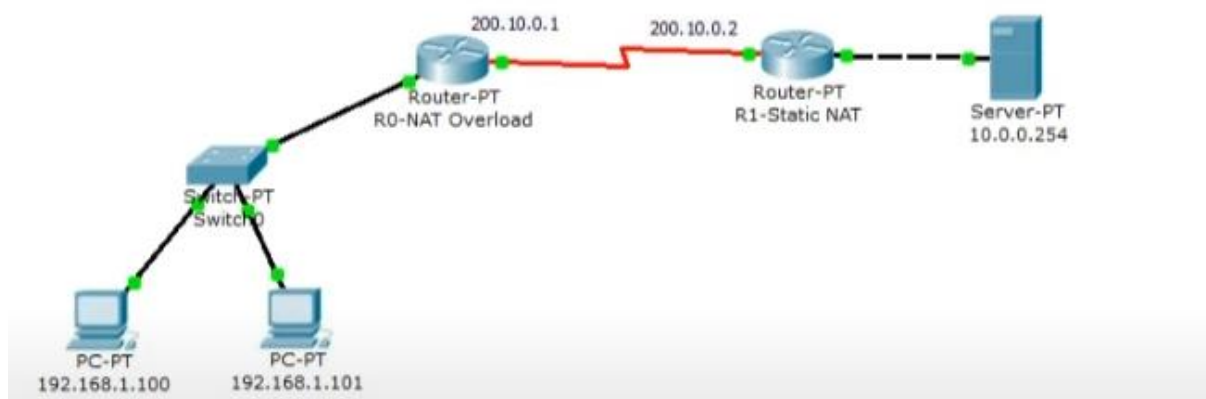


ARYAMAN MISHRA

19BCE1027

NAT AND PAT



To assign IP address in Laptop click Laptop and click Desktop and IP configuration and Select Static and set IP address.

Two interfaces of Router1 are used in topology; FastEthernet0/0 and Serial 0/0/0.

By default interfaces on router are remain administratively down during the start up. We need to configure IP address and other parameters on interfaces before we could actually use them for routing. Interface mode is used to assign the IP address and other parameters. Interface mode can be accessed from global configuration mode. Following commands are used to access the global configuration mode.

```
Router>enable
```

```
Router# configure terminal
```

Enter configuration commands, one per line. End with CNTL/Z.

```
Router(config)#
```

Before we configure IP address in interfaces let's assign a unique descriptive name to router.

```
Router(config)#hostname R1
```

```
R1#
```

Now execute the following commands to set IP address in FastEthernet 0/0 interface.

```
R1(config)#interface FastEthernet0/0
```

```
R1(config-if)#ip address 10.0.0.1 255.0.0.0
```

```
R1(config-if)#no shutdown
```

```
R1(config-if)#exit
```

`interface FastEthernet 0/0` command is used to enter in interface mode.

`ip address 10.0.0.1 255.0.0.0` command assigns IP address to interface.

`no shutdown` command is used to bring the interface up.

`exit` command is used to return in global configuration mode.

Serial interface needs two additional parameters clock rate and bandwidth. Every serial cable has two ends DTE and DCE. These parameters are always configured at DCE end.

We can use `show controllers interface` command from privilege mode to check the cable's end.

```
R1(config)#exit
```

```
R1#show controllers serial 0/0/0
```

```
Interface Serial0/0/0
```

```
Hardware is PowerQUICC MPC860
```

```
DCE V.35, clock rate 2000000
```

```
[Output omitted]
```

Fourth line of output confirms that DCE end of serial cable is attached. If you see DTE here instead of DCE skip these parameters.

Now we have necessary information let's assign IP address to serial interface.

```
R1#configure terminal
```

```
R1(config)#interface Serial0/0/0
```

```
R1(config-if)#ip address 100.0.0.1 255.0.0.0
```

```
R1(config-if)#clock rate 64000
```

```
R1(config-if)#bandwidth 64
```

```
R1(config-if)#no shutdown
```

```
R1(config-if)#exit
```

```
R1(config)#
```

`Router#configure terminal` Command is used to enter in global configuration mode.

`Router(config)#interface serial 0/0/0` Command is used to enter in interface mode.

`Router(config-if)#ip address 100.0.0.1 255.0.0.0` Command assigns IP address to interface.

```
Router(config-if)#clock rate 64000
```

In real life environment this parameter controls the data flow between serial links and need to be set at service provider's end. In lab environment we need not to worry about this value. We can use any valid rate here.

```
Router(config-if)#bandwidth 64
```

Bandwidth works as an influencer. It is used to influence the metric calculation of EIGRP or any other routing protocol which uses bandwidth parameter in route selection process.

Router(config-if)#no shutdown Command brings interface up.

Router(config-if)#exit Command is used to return in global configuration mode.

We will use same commands to assign IP addresses on interfaces of Router2. We need to provided clock rate and bandwidth only on DCE side of serial interface. Following command will assign IP addresses on interface of Router2.

Initial IP configuration in R2

```
Router>enable
```

```
Router#configure terminal
```

```
Router(config)#hostname R2
```

```
R2(config)#interface FastEthernet0/0
```

```
R2(config-if)#ip address 192.168.1.1 255.255.255.0
```

```
R2(config-if)#no shutdown
```

```
R2(config-if)#exit
```

```
R2(config)#interface Serial0/0/0
```

```
R2(config-if)#ip address 100.0.0.2 255.0.0.0
```

```
R2(config-if)#no shutdown
```

```
R2(config-if)#exit
```

```
R2(config)#
```

That's all initial IP configuration we need. Now this topology is ready for the practice of static nat.

Configure Static NAT

Static NAT configuration requires three steps: -

Define IP address mapping

Define inside local interface

Define inside global interface

Since static NAT use manual translation, we have to map each inside local IP address (which needs a translation) with inside global IP address. Following command is used to map the inside local IP address with inside global IP address.

```
Router(config)#ip nat inside source static [inside local ip address] [inside global IP address]
```

For example in our lab Laptop1 is configured with IP address 10.0.0.10. To map it with 50.0.0.10 IP address we will use following command

```
Router(config)#ip nat inside source static 10.0.0.10 50.0.0.10
```

In second step we have to define which interface is connected with local the network. On both routers interface Fa0/0 is connected with the local network which need IP translation.

Following command will define interface Fa0/0 as inside local.

```
Router(config-if)#ip nat inside
```

In third step we have to define which interface is connected with the global network. On both routers serial 0/0/0 interface is connected with the global network. Following command will define interface Serial0/0/0 as inside global.

```
Router(config-if)#ip nat outside
```

Following figure illustrates these terms.

R0-NAT Overload

Physical Config CLI

IOS Command Line Interface

```
Router(config-if)#int s2/0
Router(config-if)#ip address 200.10.0.1 255.255.255.0
Router(config-if)#clock rate 64000
Router(config-if)#no shut

%LINK-5-CHANGED: Interface Serial2/0, changed state to down
Router(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0,
Router(config-if)#
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#
```

R1-Static NAT

Physical Config CLI

IOS Command Line Interface

```
Router(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0,

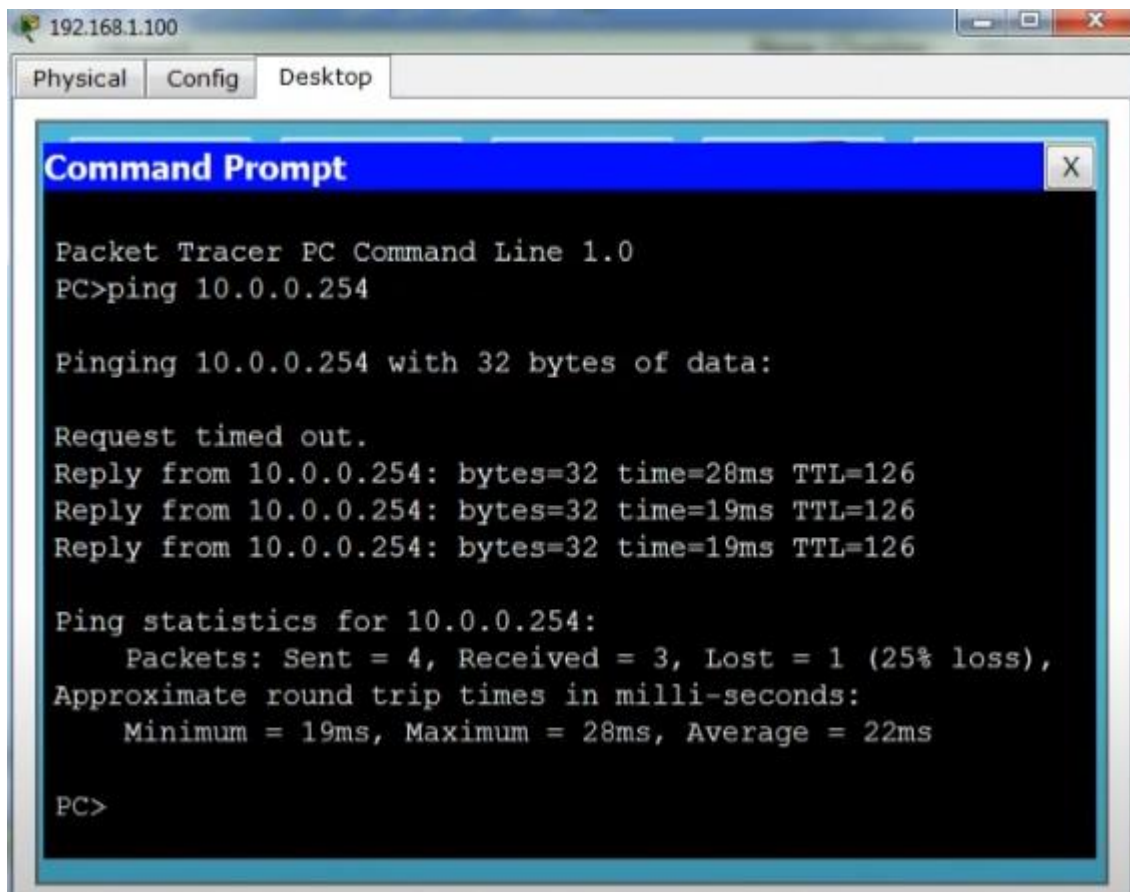
Router(config-if)#int fa0/0
Router(config-if)#ip address 10.0.0.1 255.0.0.0
Router(config-if)#no shut

%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet
o up

Router(config-if)#
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#
```

Copy Paste



Let's implement all these commands together and configure the static NAT.

R1 Static NAT Configuration

```
R1(config)#ip nat inside source static 10.0.0.10 50.0.0.10
```

```
R1(config)#interface FastEthernet 0/0
```

```
R1(config-if)#ip nat inside
```

```
R1(config-if)#exit
```

```
R1(config)#
```

```
R1(config)#interface Serial 0/0/0
```

```
R1(config-if)#ip nat outside
```

```
R1(config-if)#exit
```

For testing purpose I configured only one static translation. You may use following commands to configure the translation for remaining address.

```
R1(config)#ip nat inside source static 10.0.0.20 50.0.0.20
```

```
R1(config)#ip nat inside source static 10.0.0.30 50.0.0.30
```

R2 Static NAT Configuration

```
R2(config)#ip nat inside source static 192.168.1.10 200.0.0.10
```

```
R2(config)#interface FastEthernet 0/0
```

```
R2(config-if)#ip nat inside
```

```
R2(config-if)#exit
```

```
R2(config)#
```

```
R2(config)#interface Serial 0/0/0
```

```
R2(config-if)#ip nat outside
```

```
R2(config-if)#exit
```

Before we test this lab we need to configure the IP routing. IP routing is the process which allows router to route the packet between different networks. Following tutorial explain routing in detail with examples

[Routing concepts Explained with Examples](#)

Configure static routing in R1

```
R1(config)#ip route 200.0.0.0 255.255.255.0 100.0.0.2
```

Configure static routing in R2

```
R2(config)#ip route 50.0.0.0 255.0.0.0 100.0.0.1
```

Testing Static NAT Configuration

In this lab we configured static NAT on R1 and R2. On R1 we mapped inside local IP address 10.0.0.10 with inside global address 50.0.0.10 while on R2 we mapped inside local IP address 192.168.1.10 with inside global IP address 200.0.0.10.

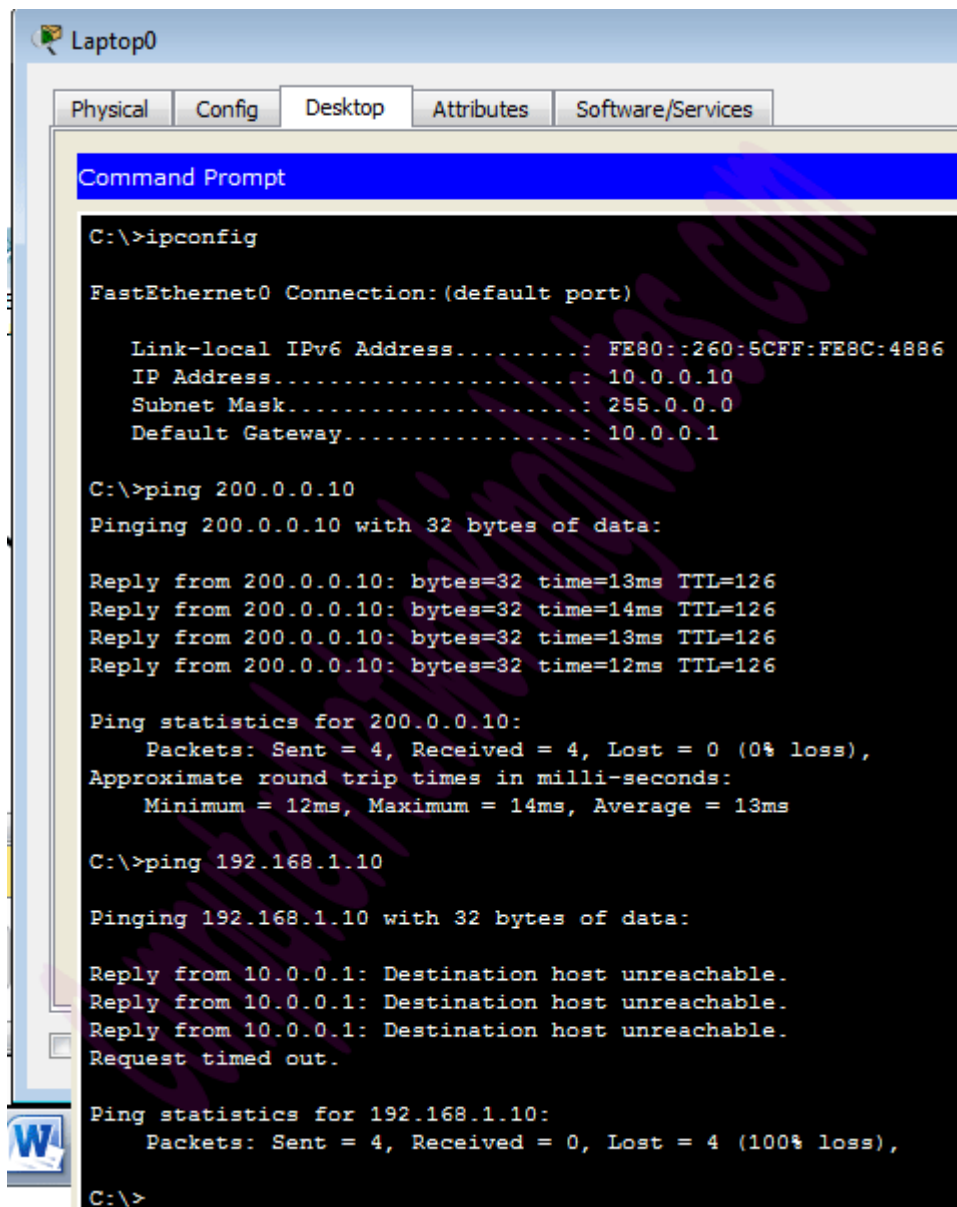
Device	Inside Local IP Address	Inside Global I
Laptop0	10.0.0.10	50.0.0.10
Server	192.168.1.10	200.0.0.10

To test this setup click Laptop0 and Desktop and click Command Prompt.

Run **ipconfig** command.

Run **ping 200.0.0.10** command.

Run **ping 192.168.1.10** command.



```
C:\>ipconfig

FastEthernet0 Connection: (default port)

    Link-local IPv6 Address . . . . . : FE80::260:5CFF:FE8C:4886
    IP Address. . . . . : 10.0.0.10
    Subnet Mask . . . . . : 255.0.0.0
    Default Gateway . . . . . : 10.0.0.1

C:\>ping 200.0.0.10

Pinging 200.0.0.10 with 32 bytes of data:

Reply from 200.0.0.10: bytes=32 time=13ms TTL=126
Reply from 200.0.0.10: bytes=32 time=14ms TTL=126
Reply from 200.0.0.10: bytes=32 time=13ms TTL=126
Reply from 200.0.0.10: bytes=32 time=12ms TTL=126

Ping statistics for 200.0.0.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 12ms, Maximum = 14ms, Average = 13ms

C:\>ping 192.168.1.10

Pinging 192.168.1.10 with 32 bytes of data:

Reply from 10.0.0.1: Destination host unreachable.
Reply from 10.0.0.1: Destination host unreachable.
Reply from 10.0.0.1: Destination host unreachable.
Request timed out.

Ping statistics for 192.168.1.10:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

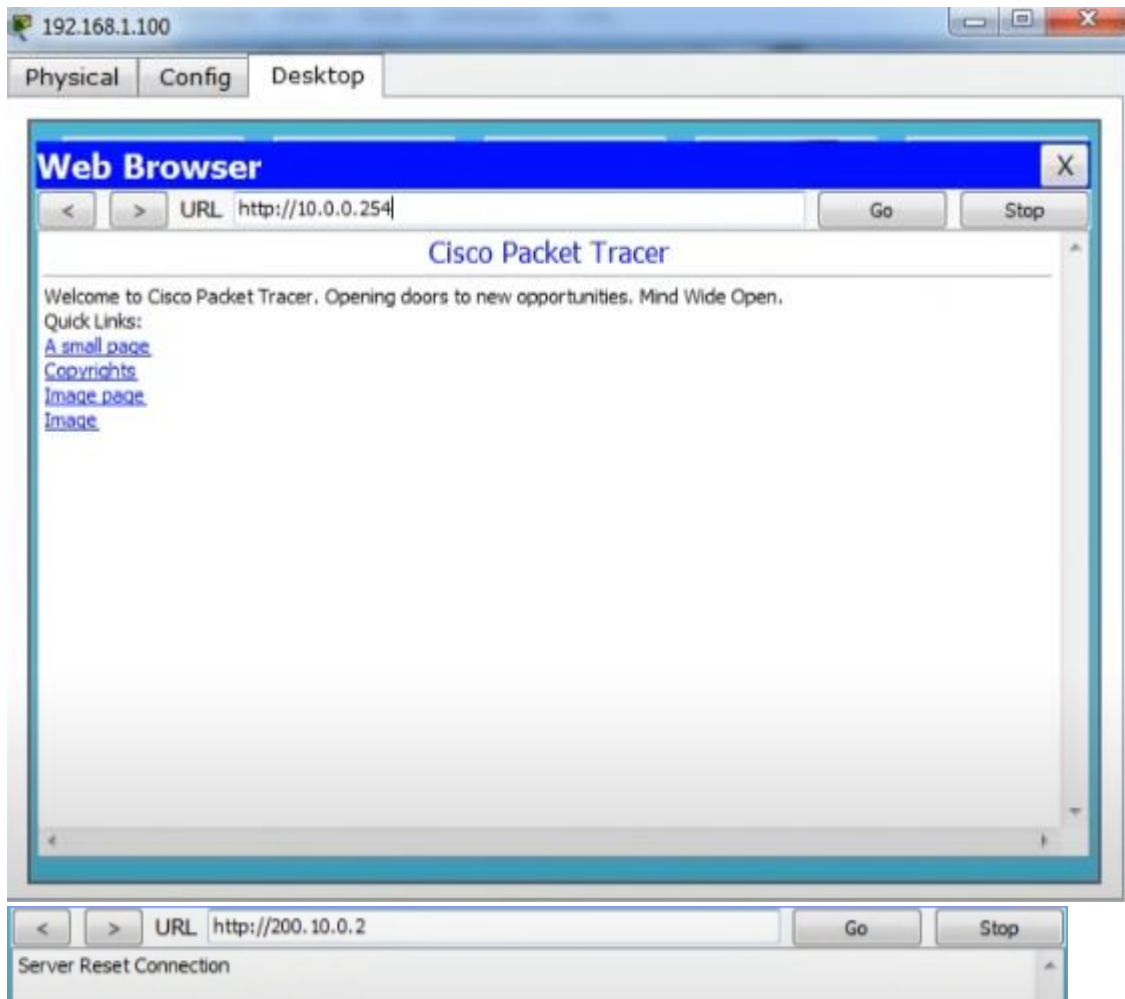
C:\>
```

First command verifies that we are testing from correct NAT device.

Second command checks whether we are able to access the remote device or not. A ping reply confirms that we are able to connect with remote device on this IP address.

Third command checks whether we are able to access the remote device on its actual IP address or not. A ping error confirms that we are not able to connect with remote device on this IP address.

Let's do one more testing. Click **Laptop0** and click **Desktop** and click **Web Browser** and access 200.0.0.10.



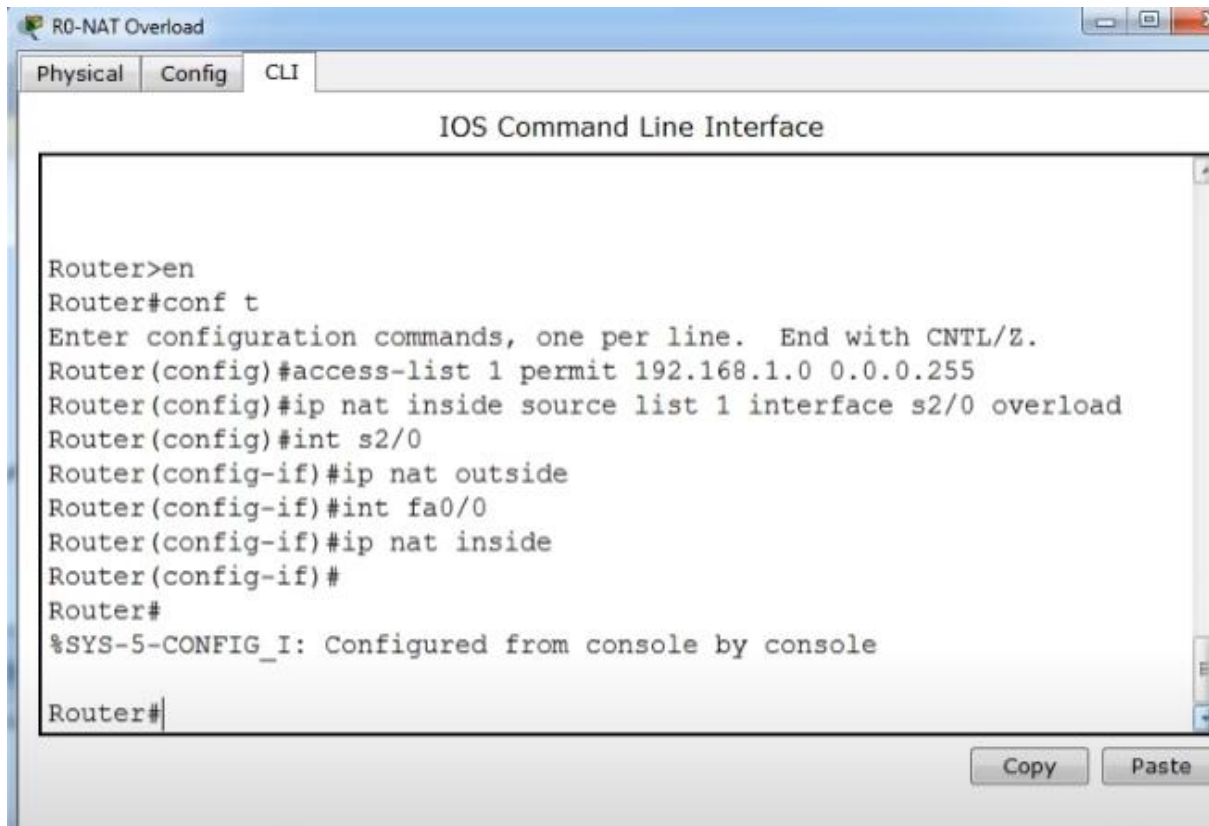
We can also verify this translation on router with **show ip nat translation** command.

Following figure illustrate this translation on router R1.

```
R1#show ip nat translations
Pro Inside global      Inside local      Outside local      Outside global
icmp 50.0.0.10:13      10.0.0.10:13      200.0.0.10:13      200.0.0.10:13
icmp 50.0.0.10:14      10.0.0.10:14      200.0.0.10:14      200.0.0.10:14
icmp 50.0.0.10:15      10.0.0.10:15      200.0.0.10:15      200.0.0.10:15
icmp 50.0.0.10:16      10.0.0.10:16      200.0.0.10:16      200.0.0.10:16
tcp 50.0.0.10:1030      10.0.0.10:1030      200.0.0.10:80      200.0.0.10:80
tcp 50.0.0.10:1031      10.0.0.10:1031      200.0.0.10:80      200.0.0.10:80
R1#
```

Following figure illustrate this translation on router R2

```
R2#show ip nat translations
Pro Inside global      Inside local      Outside local      Outside global
icmp 200.0.0.10:13      192.168.1.10:13      50.0.0.10:13      50.0.0.10:13
icmp 200.0.0.10:14      192.168.1.10:14      50.0.0.10:14      50.0.0.10:14
icmp 200.0.0.10:15      192.168.1.10:15      50.0.0.10:15      50.0.0.10:15
icmp 200.0.0.10:16      192.168.1.10:16      50.0.0.10:16      50.0.0.10:16
tcp 200.0.0.10:80      192.168.1.10:80      50.0.0.10:1030      50.0.0.10:1030
tcp 200.0.0.10:80      192.168.1.10:80      50.0.0.10:1031      50.0.0.10:1031
R2#
```

At Device: R1-Static NAT
 Source: 192.168.1.100
 Destination: 200.10.0.2

In Layers

Layer7
Layer6
Layer5
Layer4
Layer 3: IP Header Src. IP: 200.10.0.1, Dest. IP: 200.10.0.2 ICMP Message Type: 8
Layer 2: HDLC Frame HDLC
Layer 1: Port Serial2/0

Out Layers

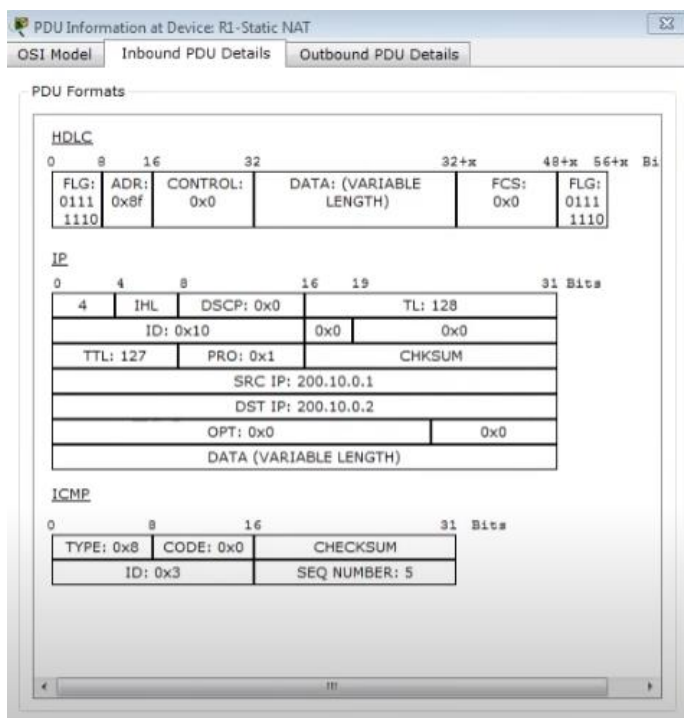
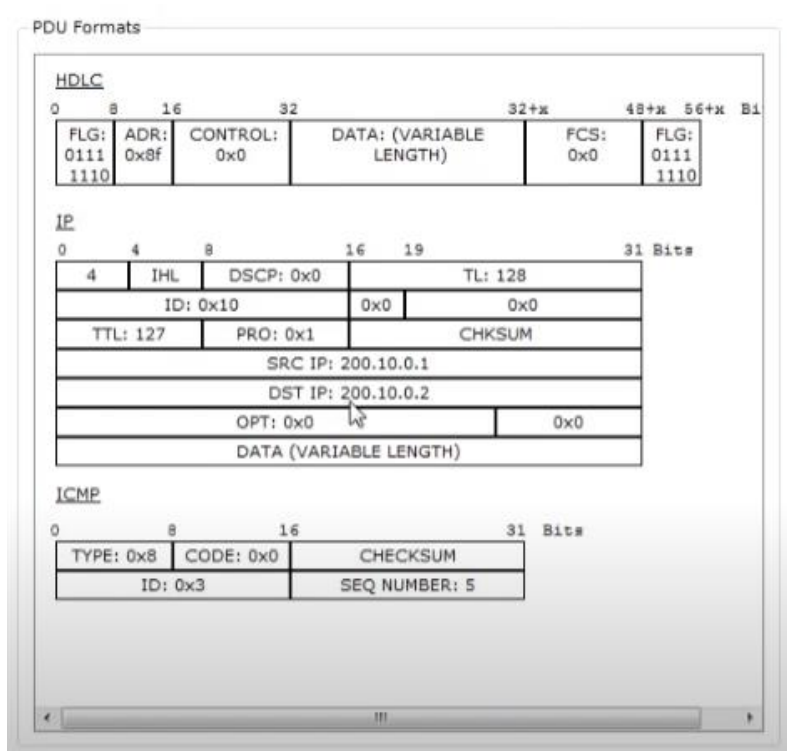
Layer7
Layer6
Layer5
Layer4
Layer 3: IP Header Src. IP: 200.10.0.1, Dest. IP: 10.0.0.254 ICMP Message Type: 8
Layer 2: Ethernet II Header 0040.0BA1.9783 >> 00E0.8F7E.B84E
Layer 1: Port(s): FastEthernet0/0

1. Serial2/0 receives the frame.

Challenge Me

<< Previous Layer

Next Layer >>



The actual IP address is not listed here because router is receiving packets after the translation. From R1's point of view remote device's IP address is 200.0.0.10 while from R2's point of view end device's IP address is 50.0.0.10.

This way if NAT is enabled we would not be able to trace the actual end device.

PC0

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 192.168.1.2

Subnet Mask 255.255.255.0

Default Gateway 192.168.1.1

DNS Server 8.8.8.8

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::260:70FF:FE4D:7B33

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Password

☐ Top

PC1

PC1

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 192.168.1.3

Subnet Mask 255.255.255.0

Default Gateway 192.168.1.1

DNS Server 8.8.8.8

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::20C:CFFF:FED4:3BAC

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Password

☐ Top

PC2

PC2

Physical Config **Desktop** Programming Attributes

IP Configuration

Interface: FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address: 192.168.2.2

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.2.1

DNS Server: 8.8.8.8

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address: /

Link Local Address: FE80::207:ECFF:FE55:429C

Default Gateway:

DNS Server:

802.1X

☐ Use 802.1X Security

Authentication: MD5

Username:

Password:

Top

PC3

PC3

Physical Config **Desktop** Programming Attributes

IP Configuration

Interface: FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address: 192.168.2.3

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.2.1

DNS Server: 8.8.8.8

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address: /

Link Local Address: FE80::20C:CFFF:FECE:2C67

Default Gateway:

DNS Server:

802.1X

☐ Use 802.1X Security

Authentication: MD5

Username:

Password:

Top

WEB SERVER

WebServer

Physical Config Services **Desktop** Programming Attributes

IP Configuration

IP Configuration

☐ DHCP ☒ Static

IPv4 Address: 8.8.8.9

Subnet Mask: 255.255.255.0

Default Gateway: 8.8.8.1

DNS Server: 8.8.8.8

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address: /

Link Local Address: FE80::290:CFF:FE58:181E

Default Gateway:

DNS Server:

802.1X

☐ Use 802.1X Security

Authentication: MD5

Username:

Password:

Top

CISCO.COM

Cisco.com

Physical Config Services **Desktop** Programming Attributes

IP Configuration

IP Configuration

☐ DHCP ☒ Static

IPv4 Address: 8.8.8.8

Subnet Mask: 255.255.255.0

Default Gateway: 8.8.8.1

DNS Server: 8.8.8.8

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address: /

Link Local Address: FE80::201:97FF:FE1C:6D5A

Default Gateway:

DNS Server:

802.1X

☐ Use 802.1X Security

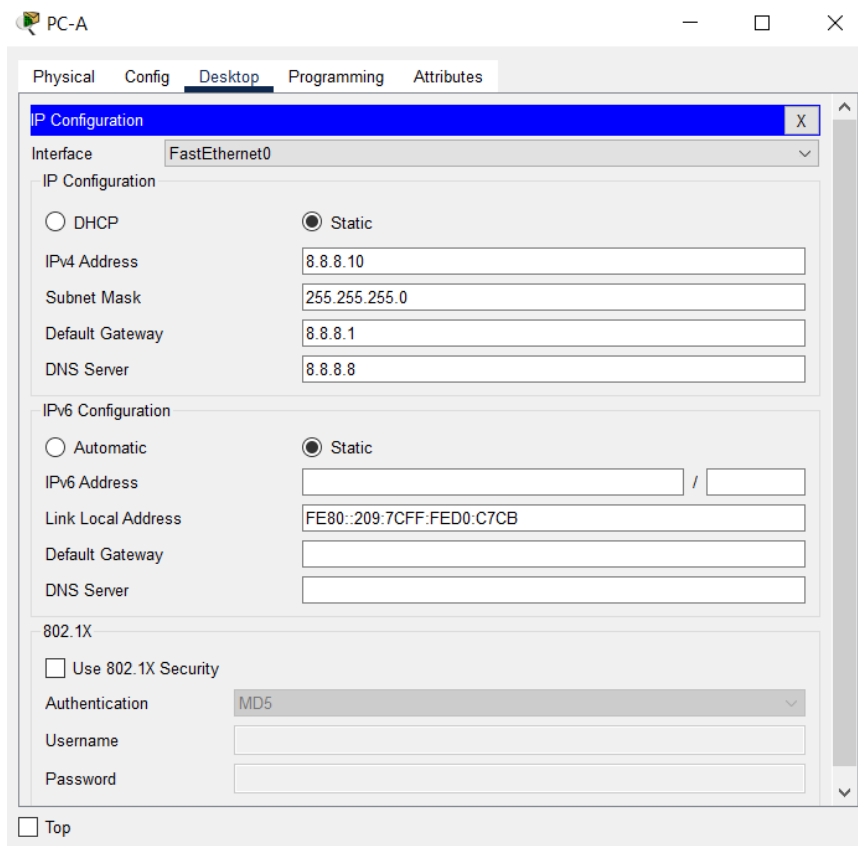
Authentication: MD5

Username:

Password:

Top

PC-A



PC-A

Physical Config **Desktop** Programming Attributes

IP Configuration

Interface: FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address: 8.8.8.10

Subnet Mask: 255.255.255.0

Default Gateway: 8.8.8.1

DNS Server: 8.8.8.8

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address: /

Link Local Address: FE80::209:7CFF:FED0:C7CB

Default Gateway:

DNS Server:

802.1X

☐ Use 802.1X Security

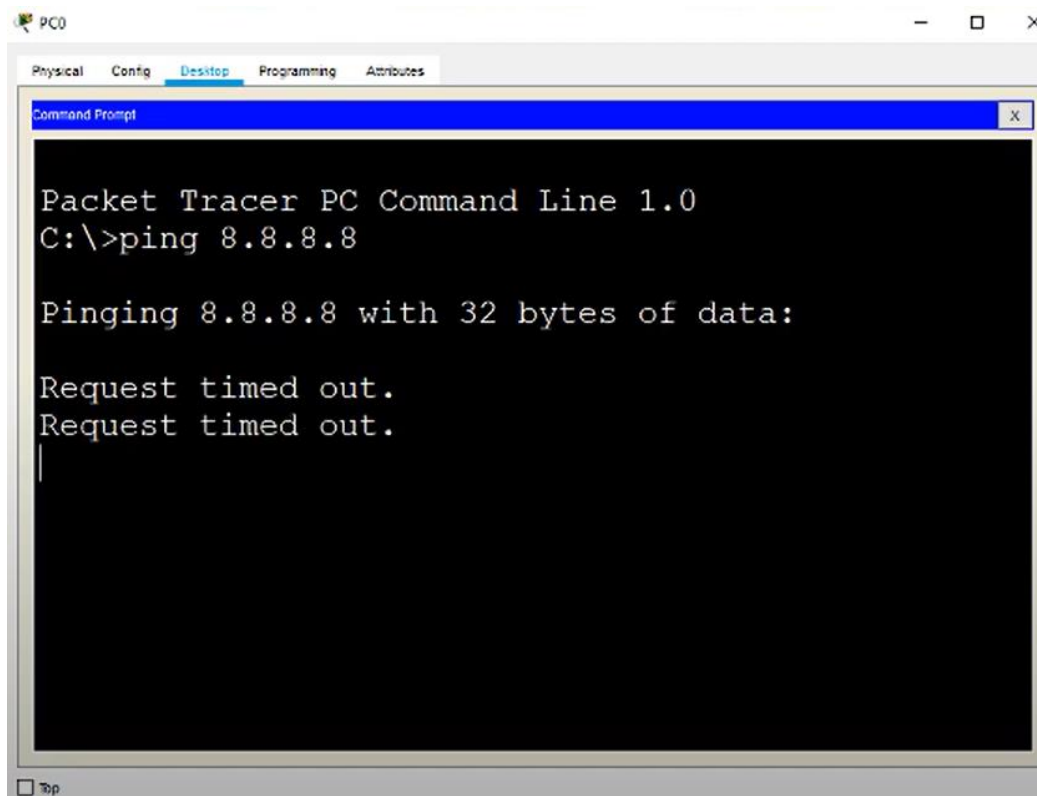
Authentication: MD5

Username:

Password:

☐ Top

CHECKING THE PING REQUEST



PC0

Physical Config **Desktop** Programming Attributes

Command Prompt

```
Packet Tracer PC Command Line 1.0
C:\>ping 8.8.8.8

Pinging 8.8.8.8 with 32 bytes of data:

Request timed out.
Request timed out.
|
```

☐ Top

Router 1941(for more switches) configurations

ROUTER 1

Router1

Physical Config CLI Attributes

GLOBAL

- Settings
- Algorithm Settings
- ROUTING**
- Static
- RIP
- SWITCHING**
- VLAN Database
- INTERFACE**
- GigabitEthernet0/0
- GigabitEthernet0/1
- Serial0/0/0
- Serial0/0/1

GigabitEthernet0/0

Port Status ☒ On

Bandwidth ☒ 1000 Mbps ☐ 100 Mbps ☐ 10 Mbps ☒ Auto

Duplex ☐ Half Duplex ☒ Full Duplex ☒ Auto

MAC Address 0030.A37B.B901

IP Configuration

IPv4 Address 192.168.1.1

Subnet Mask 255.255.255.0

Tx Ring Limit 10

Equivalent IOS Commands

```
Router1>enable
Router1#
Router1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router1(config)#interface GigabitEthernet0/0
Router1(config-if)#
```

☐ Top

Router1

Physical Config CLI Attributes

GLOBAL

- Settings
- Algorithm Settings
- ROUTING**
- Static
- RIP
- SWITCHING**
- VLAN Database
- INTERFACE**
- GigabitEthernet0/0
- GigabitEthernet0/1
- Serial0/0/0
- Serial0/0/1

GigabitEthernet0/1

Port Status ☒ On

Bandwidth ☒ 1000 Mbps ☐ 100 Mbps ☐ 10 Mbps ☒ Auto

Duplex ☐ Half Duplex ☒ Full Duplex ☒ Auto

MAC Address 0030.A37B.B902

IP Configuration

IPv4 Address 192.168.2.1

Subnet Mask 255.255.255.0

Tx Ring Limit 10

Equivalent IOS Commands

```
Router1>enable
Router1#
Router1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router1(config)#interface GigabitEthernet0/0
Router1(config-if)#
Router1(config-if)#exit
Router1(config)#interface GigabitEthernet0/1
Router1(config-if)#
```

☐ Top

Router1

Physical **Config** CLI Attributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

GigabitEthernet0/0

GigabitEthernet0/1

Serial0/0/0

Serial0/0/1

Serial0/0/0

Port Status ☒ On

Duplex ☐ Full Duplex

Clock Rate 2000000

IP Configuration

IPv4 Address 10.1.1.1

Subnet Mask 255.255.255.0

Tx Ring Limit 10

Equivalent IOS Commands

```

Enter configuration commands, one per line. End with CNTL/Z.
Router1(config)#interface GigabitEthernet0/0
Router1(config-if)#
Router1(config-if)#exit
Router1(config)#interface GigabitEthernet0/1
Router1(config-if)#
Router1(config-if)#exit
Router1(config)#interface Serial0/0/0
Router1(config-if)#
  
```

☐ Top

ROUTER 2

Router2

Physical **Config** CLI Attributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

GigabitEthernet0/0

GigabitEthernet0/1

Serial0/0/0

Serial0/0/1

GigabitEthernet0/0

Port Status ☒ On

Bandwidth ☐ 1000 Mbps ☐ 100 Mbps ☐ 10 Mbps ☒ Auto

Duplex ☐ Half Duplex ☒ Full Duplex ☒ Auto

MAC Address 0001.63B5.CA01

IP Configuration

IPv4 Address 8.8.8.1

Subnet Mask 255.255.255.0

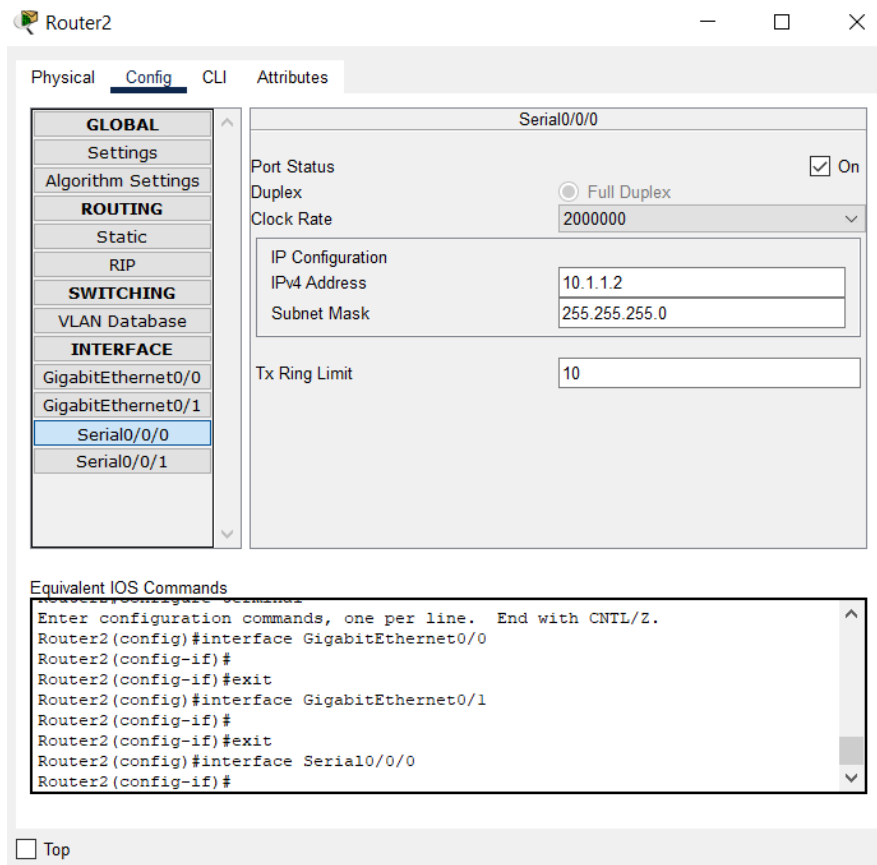
Tx Ring Limit 10

Equivalent IOS Commands

```

up
Router2>enable
Router2#
Router2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router2(config)#interface GigabitEthernet0/0
Router2(config-if)#
  
```

☐ Top



STATIC NAT

NAT of cisco.com device using IP address of 10.1.1.3

Static translation

Commands for static translation

First we mark interfaces as nat outside or nat inside and then using ip nat command to translate public ip address into a private ip address in our case for honeypot.

en

conf t

int g0/0

ip nat out

int g0/1

ip nat inside

ip nat inside source static 192.168.1.2 10.1.1.3

```
Router1
Physical Config CU Attributes
IOS Command Line Interface

Router1>en
Router1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router1(config)#int s0/0/0
Router1(config-if)#ip nat outside
Router1(config-if)#int g0/0
Router1(config-if)#ip nat inside
Router1(config-if)#exit
```

```
Router1
Physical Config CU Attributes
IOS Command Line Interface

Router1#show run | in nat
ip nat inside
ip nat outside
Router1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router1(config)#ip nat ?
    inside    Inside address translation
    outside   Outside address translation
    pool      Define pool of addresses
Router1(config)#ip nat inside

Ctrl+F5 to exit CLI focus
```

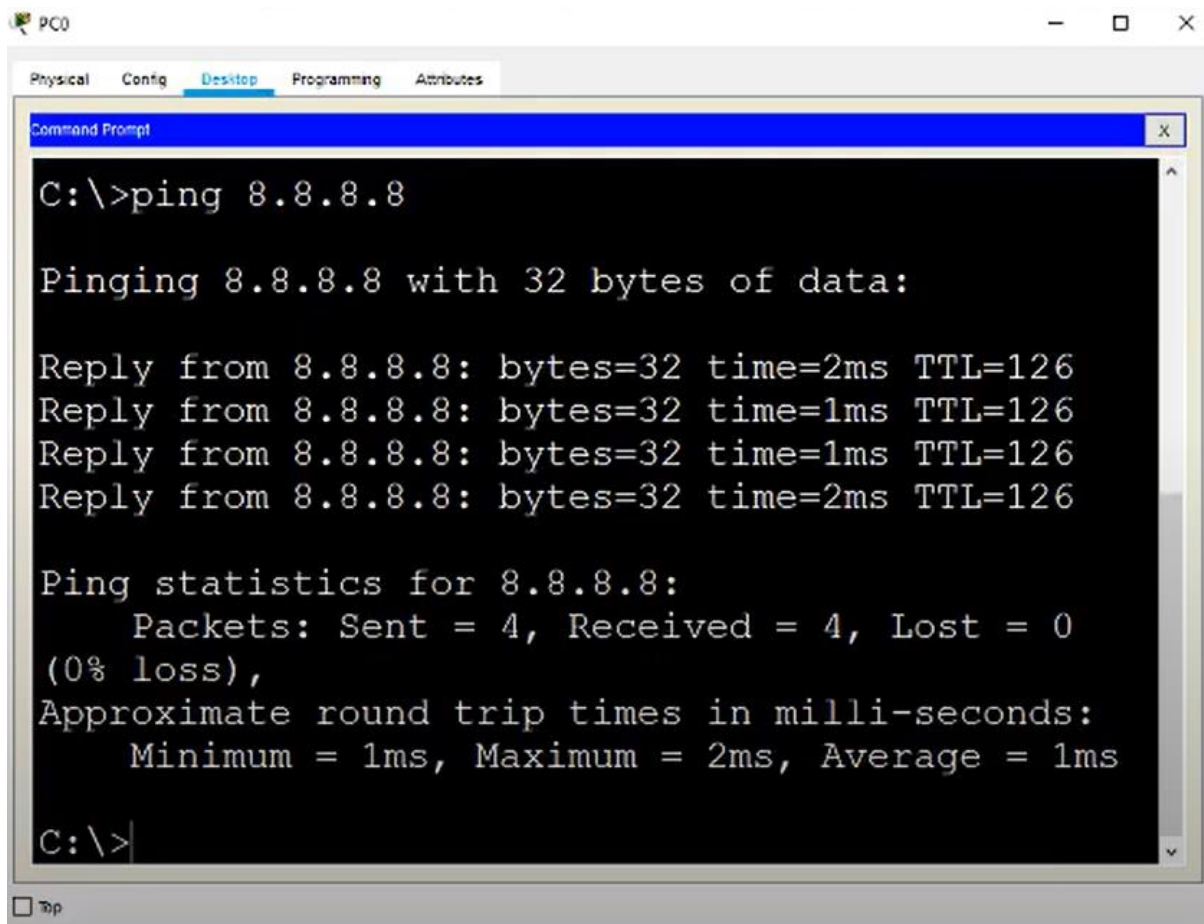
```
Router1
Physical Config CU Attributes
IOS Command Line Interface

pool      Define pool of addresses
Router1(config)#ip nat inside ?
    source   Source address translation
Router1(config)#ip nat inside source ?
    list     Specify access list describing local addresses
    static   Specify static local->global mapping
Router1(config)#ip nat inside source static ?
    A.B.C.D  Inside local IP address
    tcp      Transmission Control Protocol
    udp      User Datagram Protocol
Router1(config)#ip nat inside source static 192.168.1.2
```

```
Router1(config)#ip nat inside source static 192.168.1.2 ?
    A.B.C.D  Inside global IP address
Router1(config)#ip nat inside source static 192.168.1.2 10.1.1.3
Router1(config)#exit
Router1#
%SYS-5-CONFIG_I: Configured from console by console

Router1#

Ctrl+F5 to exit CLI focus
```



PC0

Physical Config Desktop Programming Attributes

Command Prompt

```
C:\>ping 8.8.8.8

Pinging 8.8.8.8 with 32 bytes of data:

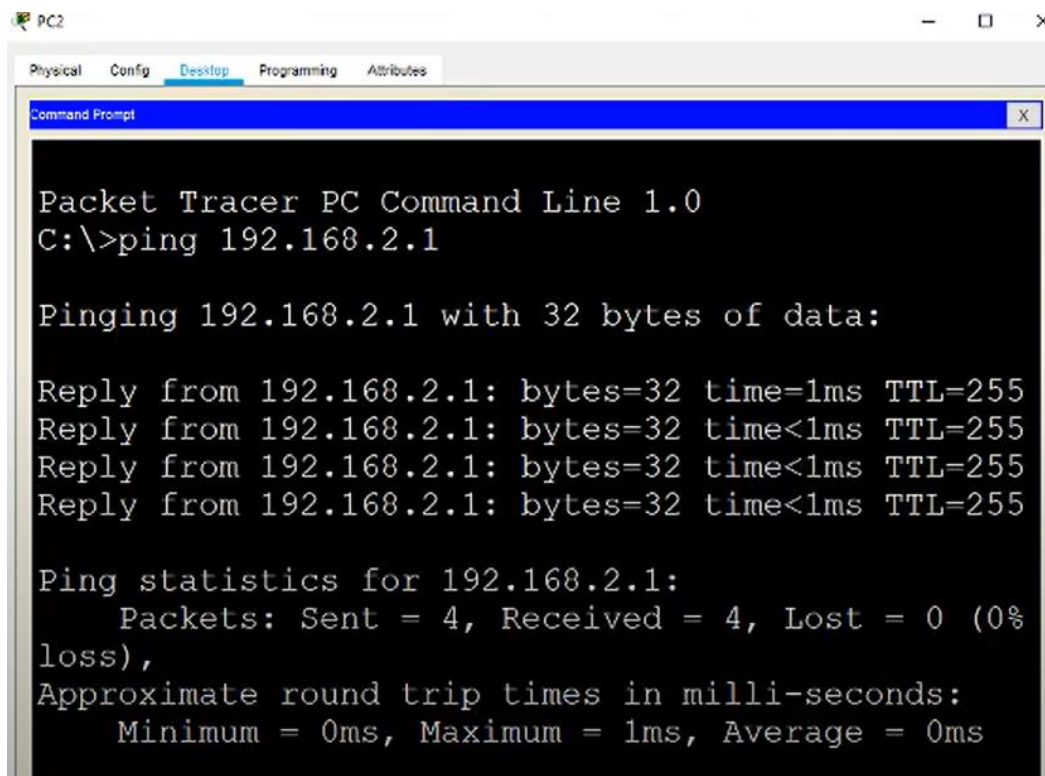
Reply from 8.8.8.8: bytes=32 time=2ms TTL=126
Reply from 8.8.8.8: bytes=32 time=1ms TTL=126
Reply from 8.8.8.8: bytes=32 time=1ms TTL=126
Reply from 8.8.8.8: bytes=32 time=2ms TTL=126

Ping statistics for 8.8.8.8:
    Packets: Sent = 4, Received = 4, Lost = 0
    (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 2ms, Average = 1ms

C:\>
```

☐ Top

DYNAMIC NAT



PC2

Physical Config Desktop Programming Attributes

Command Prompt

```
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.2.1

Pinging 192.168.2.1 with 32 bytes of data:

Reply from 192.168.2.1: bytes=32 time=1ms TTL=255
Reply from 192.168.2.1: bytes=32 time<1ms TTL=255
Reply from 192.168.2.1: bytes=32 time<1ms TTL=255
Reply from 192.168.2.1: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.2.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0%
    loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

```
Router1
Physical Config CLI Attributes
IOS Command Line Interface

%SYS-5-CONFIG_I: Configured from console by console

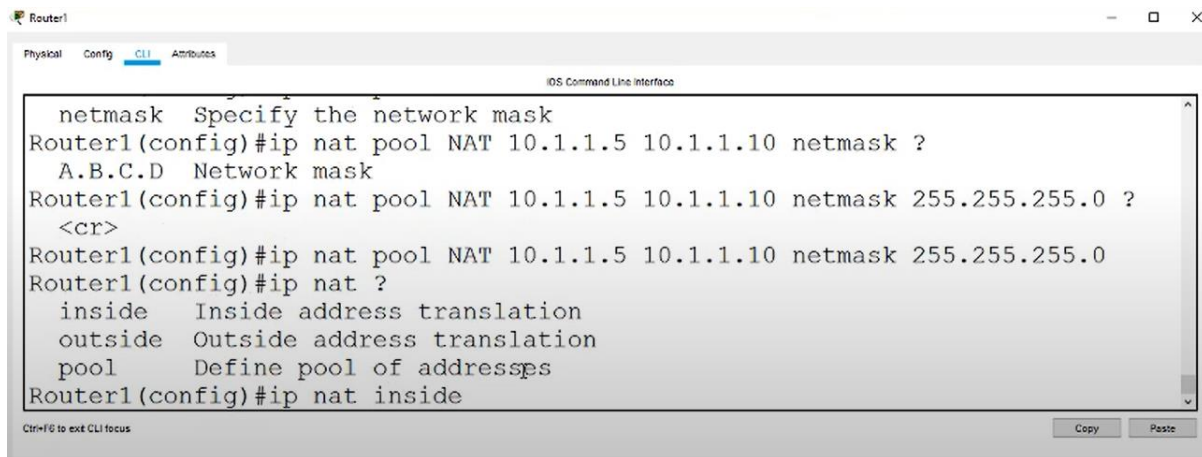
Router1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router1(config)#int s0/0/0
Router1(config-if)#ip nat outside
Router1(config-if)#int g0/1
Router1(config-if)#ip nat inside
Router1(config-if)#exit
Router1(config)#access
Router1(config)#access-list 1 permit
```

```
Router1
Physical Config CLI Attributes
IOS Command Line Interface

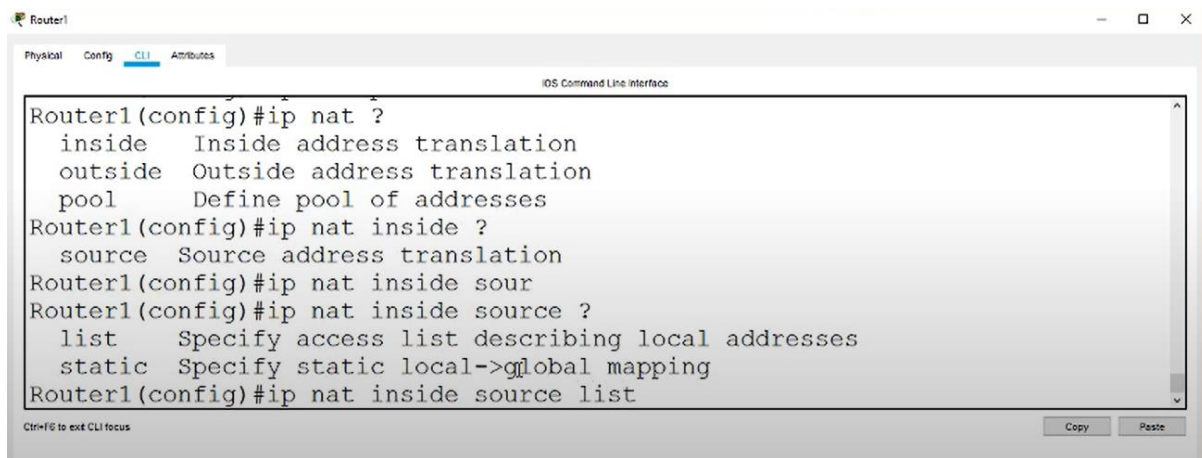
Router1(config-if)#exit
Router1(config)#access
Router1(config)#access-list 1 permit ?
  A.B.C.D  Address to match
  any      Any source host
  host     A single host address
Router1(config)#access-list 1 permit 192.168.2.0 ?
  A.B.C.D  Wildcard bits
  <cr>
Router1(config)#access-list 1 permit 192.168.2.0 0.0.0.255
Router1(config)#ip nat
```

```
Router1
Physical Config CLI Attributes
IOS Command Line Interface

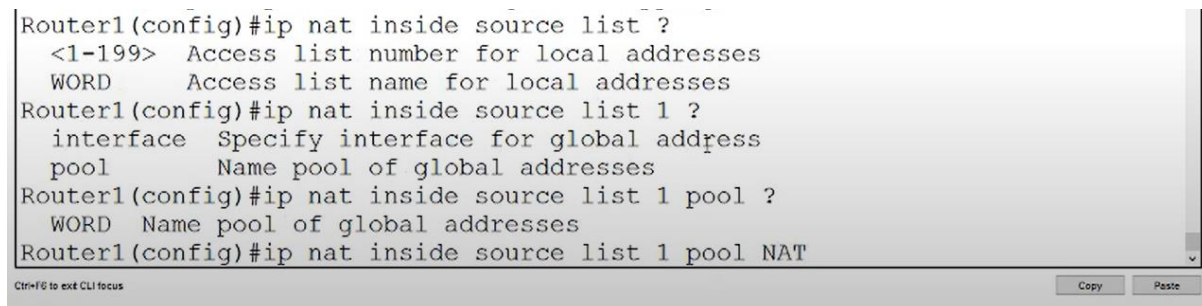
Router1(config)#ip nat ?
  inside  Inside address translation
  outside Outside address translation
  pool    Define pool of addresses
Router1(config)#ip nat pool ?
  WORD    Pool name
Router1(config)#ip nat pool NAT ?
  A.B.C.D Start IP address
Router1(config)#ip nat pool NAT 10.1.1.5 ?
  A.B.C.D End IP address      I
Router1(config)#ip nat pool NAT 10.1.1.5 10.1.1.10
```

```
netmask Specify the network mask
Router1(config)#ip nat pool NAT 10.1.1.5 10.1.1.10 netmask ?
A.B.C.D Network mask
Router1(config)#ip nat pool NAT 10.1.1.5 10.1.1.10 netmask 255.255.255.0 ?
<cr>
Router1(config)#ip nat pool NAT 10.1.1.5 10.1.1.10 netmask 255.255.255.0
Router1(config)#ip nat ?
inside Inside address translation
outside Outside address translation
pool Define pool of addresses
Router1(config)#ip nat inside
```

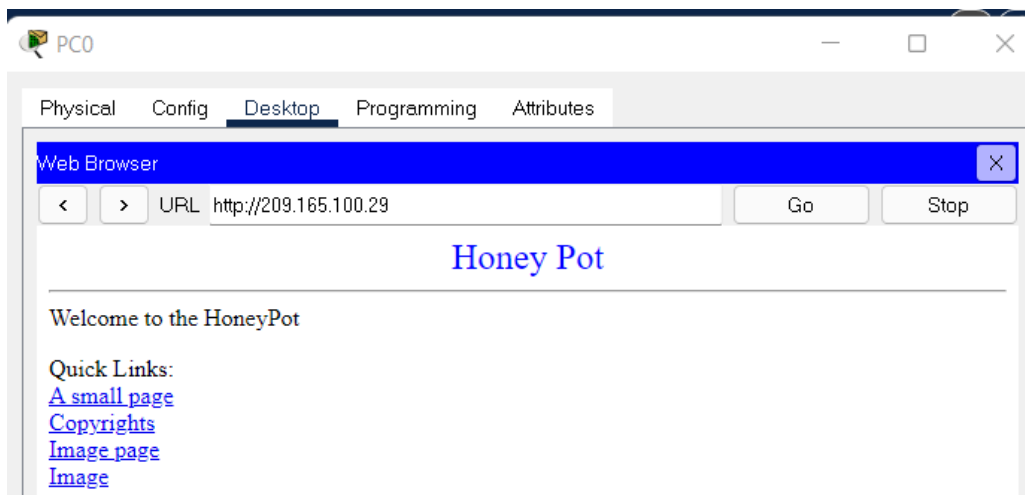


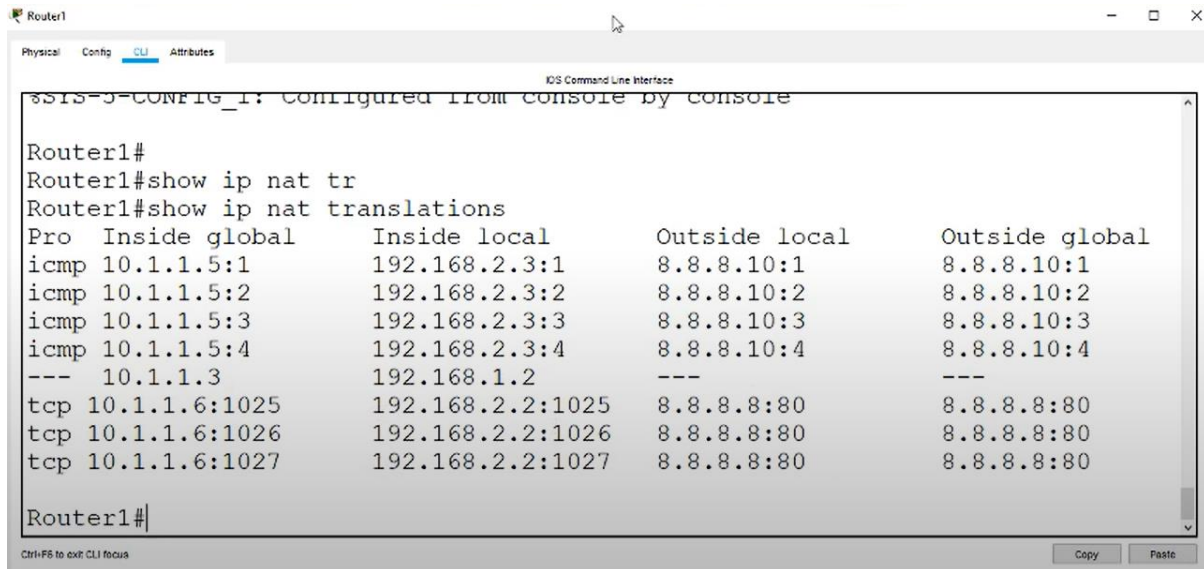
```
Router1(config)#ip nat ?
inside Inside address translation
outside Outside address translation
pool Define pool of addresses
Router1(config)#ip nat inside ?
source Source address translation
Router1(config)#ip nat inside sour
Router1(config)#ip nat inside source ?
list Specify access list describing local addresses
static Specify static local->global mapping
Router1(config)#ip nat inside source list
```



```
Router1(config)#ip nat inside source list ?
<1-199> Access list number for local addresses
WORD Access list name for local addresses
Router1(config)#ip nat inside source list 1 ?
interface Specify interface for global address
pool Name pool of global addresses
Router1(config)#ip nat inside source list 1 pool ?
WORD Name pool of global addresses
Router1(config)#ip nat inside source list 1 pool NAT
```

When we put public address from pc0 it gets translated and displays honeypot





Router1#
Router1#show ip nat tr
Router1#show ip nat translations

Pro	Inside global	Inside local	Outside local	Outside global
icmp	10.1.1.5:1	192.168.2.3:1	8.8.8.10:1	8.8.8.10:1
icmp	10.1.1.5:2	192.168.2.3:2	8.8.8.10:2	8.8.8.10:2
icmp	10.1.1.5:3	192.168.2.3:3	8.8.8.10:3	8.8.8.10:3
icmp	10.1.1.5:4	192.168.2.3:4	8.8.8.10:4	8.8.8.10:4
---	10.1.1.3	192.168.1.2	---	---
tcp	10.1.1.6:1025	192.168.2.2:1025	8.8.8.8:80	8.8.8.8:80
tcp	10.1.1.6:1026	192.168.2.2:1026	8.8.8.8:80	8.8.8.8:80
tcp	10.1.1.6:1027	192.168.2.2:1027	8.8.8.8:80	8.8.8.8:80

Router1#

PAT (Network Overload Translation)

To translate any computer's ip address across the network of 192.168.1.0

We use PAT.

Commands

```
access-list 1 permit 192.168.1.0 0.0.0.255
```

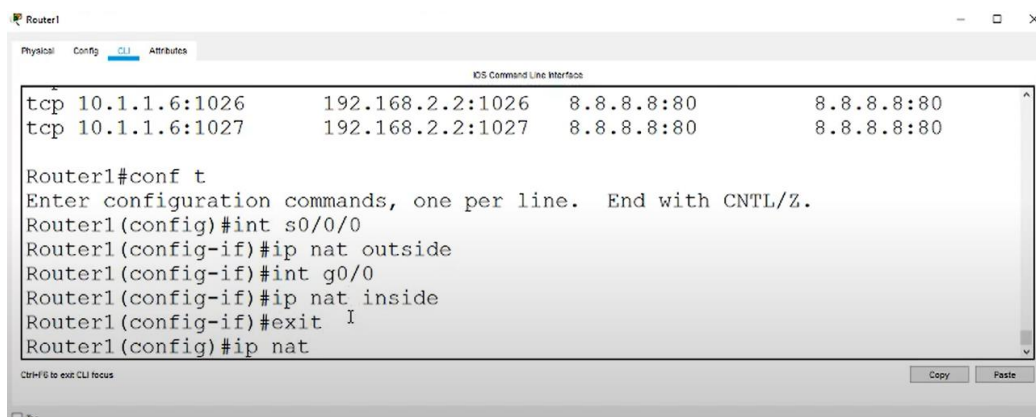
```
ip nat inside source list 10 interface g0/0 overload
```

Port Address Translation

Now we want the server to be only available for port 80.

Earlier there was just static translation over all ports but now we will restrict it to only port 80.

Commands

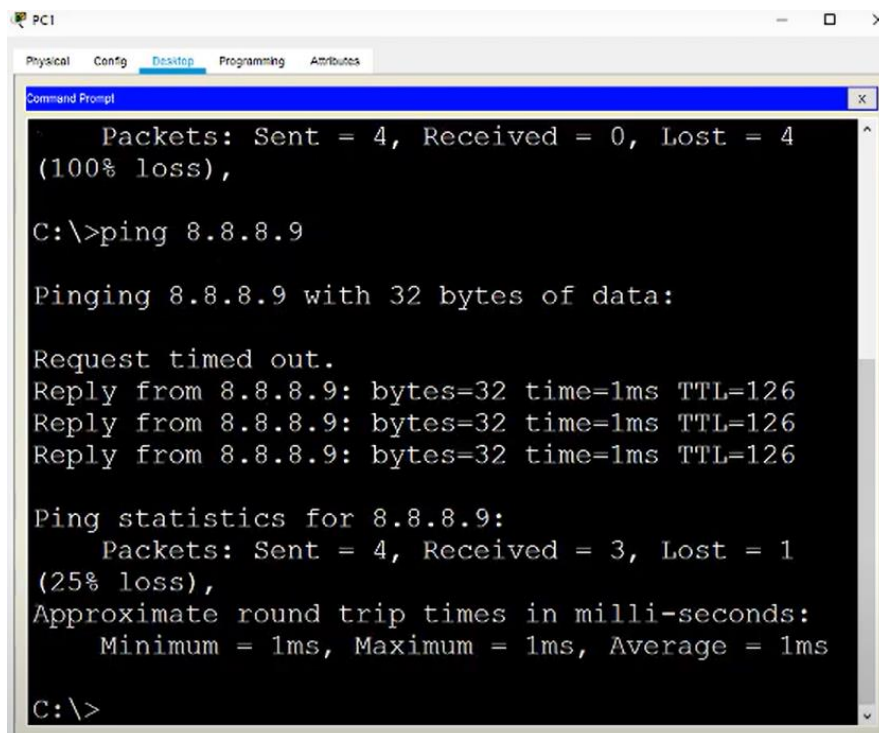


```
tcp 10.1.1.6:1026 192.168.2.2:1026 8.8.8.8:80 8.8.8.8:80
tcp 10.1.1.6:1027 192.168.2.2:1027 8.8.8.8:80 8.8.8.8:80

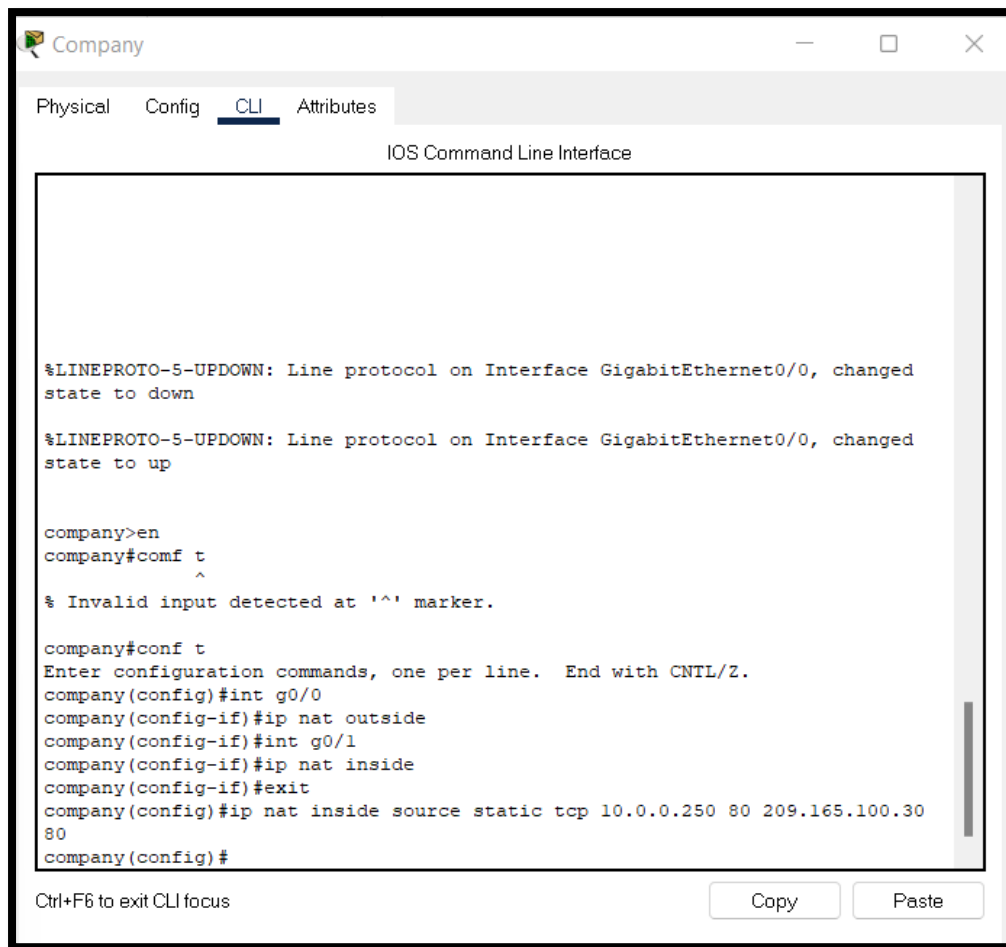
Router1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router1(config)#int s0/0/0
Router1(config-if)#ip nat outside
Router1(config-if)#int g0/0
Router1(config-if)#ip nat inside
Router1(config-if)#exit
Router1(config)#ip nat
```

```
Router1(config)#ip nat inside source list 1 ?  
  interface Specify interface for global address  
  pool Name pool of global addresses  
Router1(config)#ip nat inside source list 1 int  
Router1(config)#ip nat inside source list 1 interface s0/0/0 ?  
  overload Overload an address translation  
  <cr>  
Router1(config)#ip nat inside source list 1 interface s0/0/0 overload  
Router1(config)#acc  
Router1(config)#access-list 1
```

```
Router1(config)#access-list 1 permit 192.168.1.0 ?  
  A.B.C.D Wildcard bits  
  <cr>  
Router1(config)#access-list 1 permit 192.168.1.0 0.0.0.255  
Router1(config)#exit  
Router1#  
%SYS-5-CONFIG_I: Configured from console by console
```



```
Physical Config Desktop Programming Attributes  
Command Prompt  
Packets: Sent = 4, Received = 0, Lost = 4  
(100% loss),  
C:\>ping 8.8.8.9  
Pinging 8.8.8.9 with 32 bytes of data:  
Request timed out.  
Reply from 8.8.8.9: bytes=32 time=1ms TTL=126  
Reply from 8.8.8.9: bytes=32 time=1ms TTL=126  
Reply from 8.8.8.9: bytes=32 time=1ms TTL=126  
Ping statistics for 8.8.8.9:  
Packets: Sent = 4, Received = 3, Lost = 1  
(25% loss),  
Approximate round trip times in milli-seconds:  
Minimum = 1ms, Maximum = 1ms, Average = 1ms  
C:\>
```



On typing ip address it hits other web server and displays output



This was the port forwarding to 10.0.0.250 port 80

Conclusion: Static NAT, dynamic NAT and PAT have been successfully implemented.