

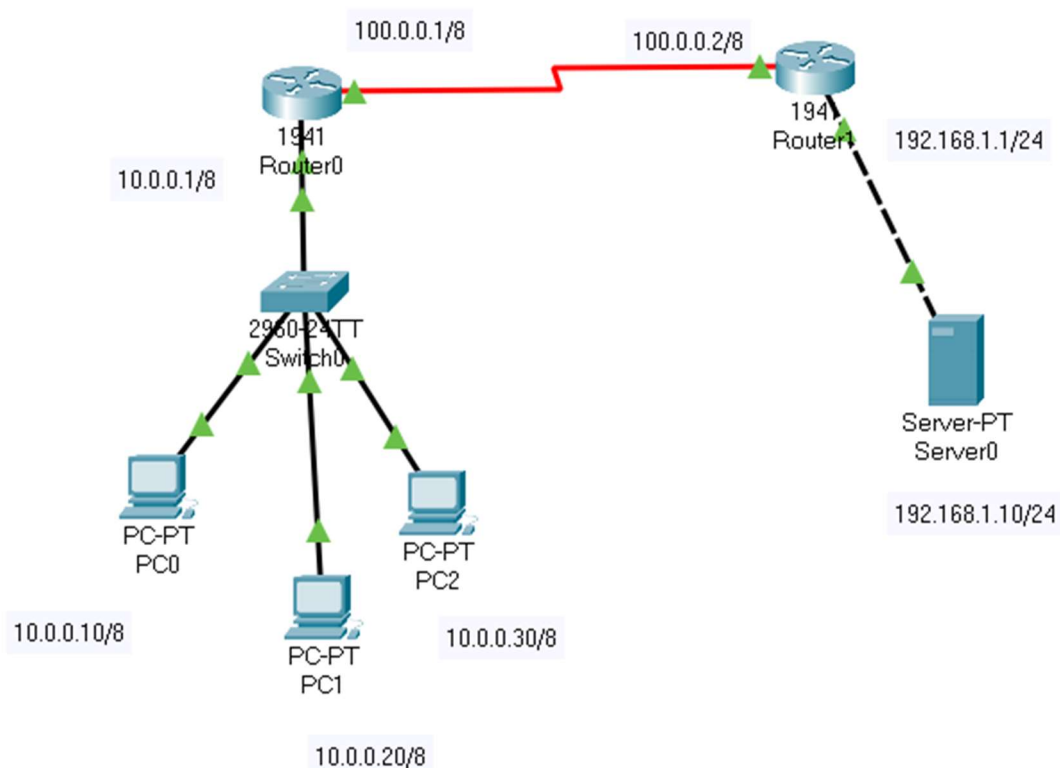
Ex.No:12	IMPLEMENTATION OF NETWORK ADDRESS TRANSLATION
Date:	

Aim:

To study and perform Network Address Translation (NAT) using cisco packet tracer.

Procedure:

1. Assign the following topology with respective IP addresses to pc, routers, servers and connection between them.



2. Configure static NAT configuration

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.

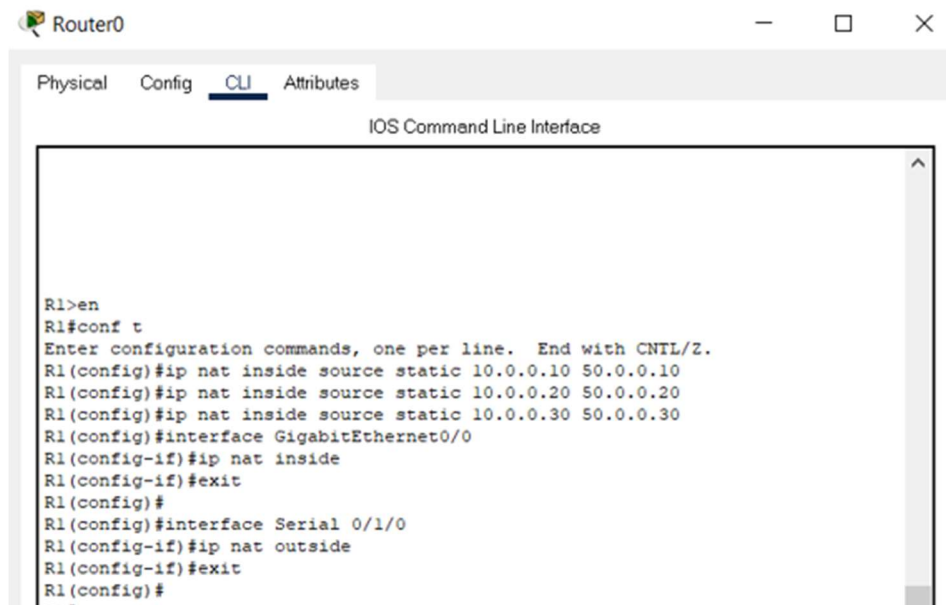
```
Router(config)#ip nat inside source static [inside local ip address] [inside global IP address]
```

And use the following commands to define inside and outside network connection for your local and global IP addresses.

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

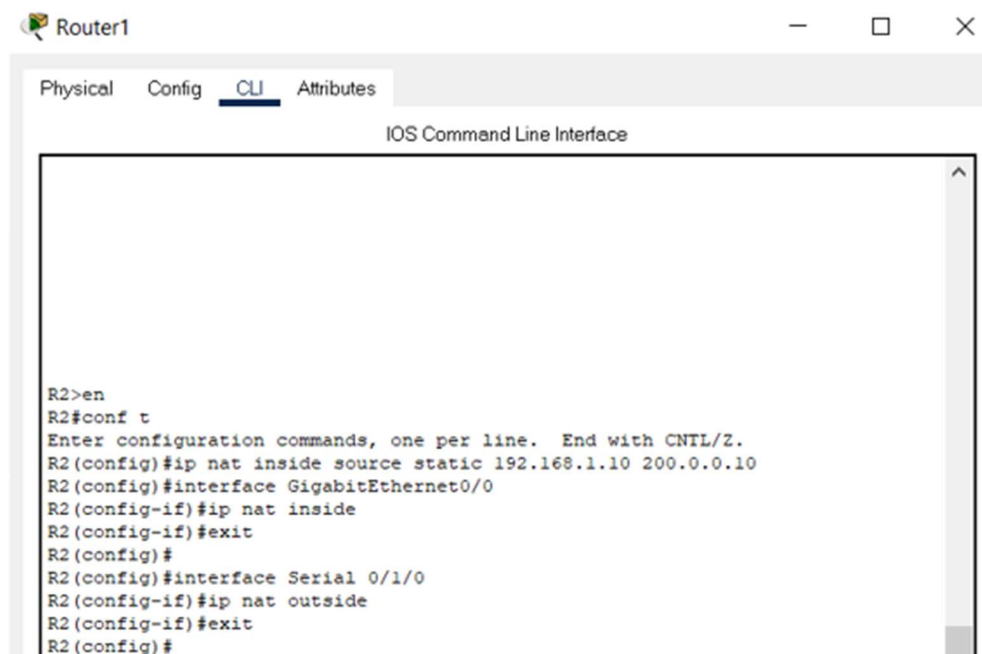
```
Router(config-if)#ip nat outside
```

Static NAT configuration for Router0 connected with 3 pc's:

A screenshot of a network simulator window titled "Router0". It has tabs for "Physical", "Config", "CLI", and "Attributes", with "CLI" selected. The main area is labeled "IOS Command Line Interface" and contains a terminal session. The user enters "R1>en" to enter enable mode, then "R1#conf t" to enter configuration mode. They then enter three static NAT commands: "ip nat inside source static 10.0.0.10 50.0.0.10", "ip nat inside source static 10.0.0.20 50.0.0.20", and "ip nat inside source static 10.0.0.30 50.0.0.30". Next, they enter "interface GigabitEthernet0/0", then "ip nat inside", and finally "exit" to return to configuration mode. They then enter "interface Serial 0/1/0", "ip nat outside", and "exit" to return to configuration mode. The prompt "R1(config)#" is visible at the bottom.

```
R1>en
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip nat inside source static 10.0.0.10 50.0.0.10
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
R1(config)#interface GigabitEthernet0/0
R1(config-if)#ip nat inside
R1(config-if)#exit
R1(config)#
R1(config)#interface Serial 0/1/0
R1(config-if)#ip nat outside
R1(config-if)#exit
R1(config)#
---
```

Static NAT configuration for Router0 connected with server:

A screenshot of a network simulator window titled "Router1". It has tabs for "Physical", "Config", "CLI", and "Attributes", with "CLI" selected. The main area is labeled "IOS Command Line Interface" and contains a terminal session. The user enters "R2>en" to enter enable mode, then "R2#conf t" to enter configuration mode. They then enter a static NAT command: "ip nat inside source static 192.168.1.10 200.0.0.10". Next, they enter "interface GigabitEthernet0/0", then "ip nat inside", and finally "exit" to return to configuration mode. They then enter "interface Serial 0/1/0", "ip nat outside", and "exit" to return to configuration mode. The prompt "R2(config)#" is visible at the bottom.

```
R2>en
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#ip nat inside source static 192.168.1.10 200.0.0.10
R2(config)#interface GigabitEthernet0/0
R2(config-if)#ip nat inside
R2(config-if)#exit
R2(config)#
R2(config)#interface Serial 0/1/0
R2(config-if)#ip nat outside
R2(config-if)#exit
R2(config)#
```

3.Configure the IP routing

IP routing is the process which allows router to route the packet between different networks.

IP routing on router0:

```
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip route 200.0.0.0 255.255.255.0 100.0.0.2
R1(config)#no shutdown
      ^
```

IP routing on router1:

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

4. Testing Static NAT Configuration

To test this setup click on any PC and Desktop and click Command Prompt.

- Run ipconfig command.
- Run ping 200.0.0.10 command.
- Run ping 192.168.1.10 command

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.

Command Prompt

```
Reply from 10.0.0.1: Destination host unreachable.

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

C:\>ipconfig

FastEthernet0 Connection:(default port)

    Connection-specific DNS Suffix...:
    Link-local IPv6 Address . . . . .: FE80::260:47FF:FE93:623B
    IPv6 Address . . . . .: ::
    IPv4 Address . . . . .: 10.0.0.10
    Subnet Mask . . . . .: 255.0.0.0
    Default Gateway . . . . .: ::
                                   10.0.0.1

Bluetooth Connection:

    Connection-specific DNS Suffix...:
    Link-local IPv6 Address . . . . .: ::
    IPv6 Address . . . . .: ::
    IPv4 Address . . . . .: 0.0.0.0
    Subnet Mask . . . . .: 0.0.0.0
    Default Gateway . . . . .: ::
                                   0.0.0.0

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=10ms TTL=126
Reply from 200.0.0.10: bytes=32 time=1ms TTL=126
Reply from 200.0.0.10: bytes=32 time=2ms TTL=126
Reply from 200.0.0.10: bytes=32 time=8ms 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 = 1ms, Maximum = 10ms, Average = 5ms

C:\>ping 192.168.1.10

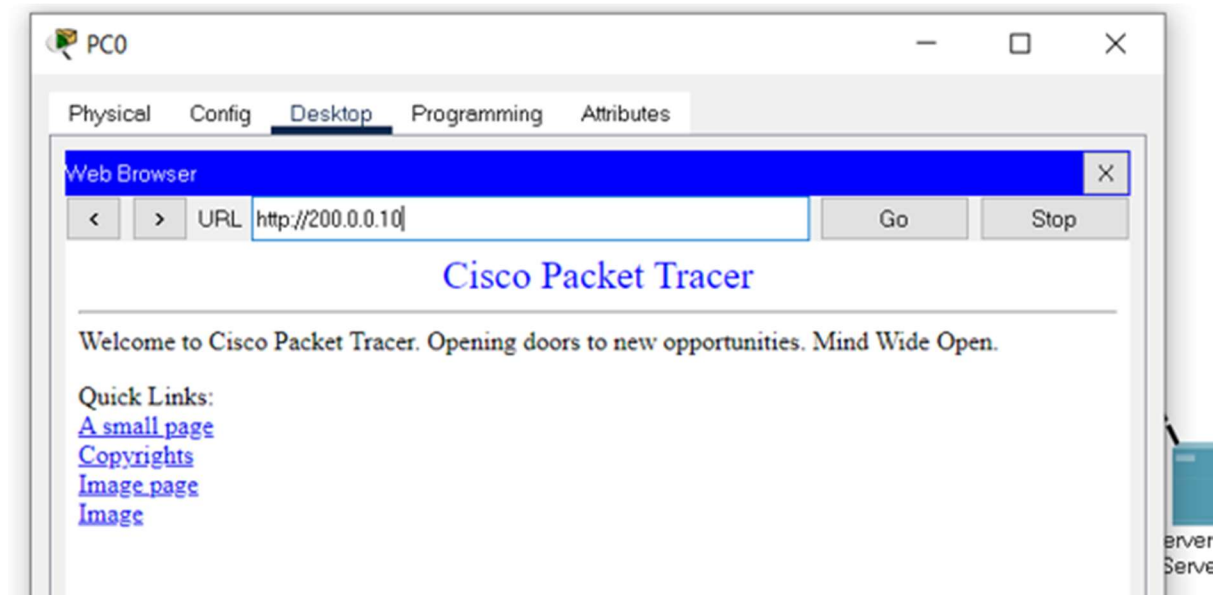
Pinging 192.168.1.10 with 32 bytes of data:

Reply from 10.0.0.1: Destination host unreachable.
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Reply from 10.0.0.1: Destination host unreachable.

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

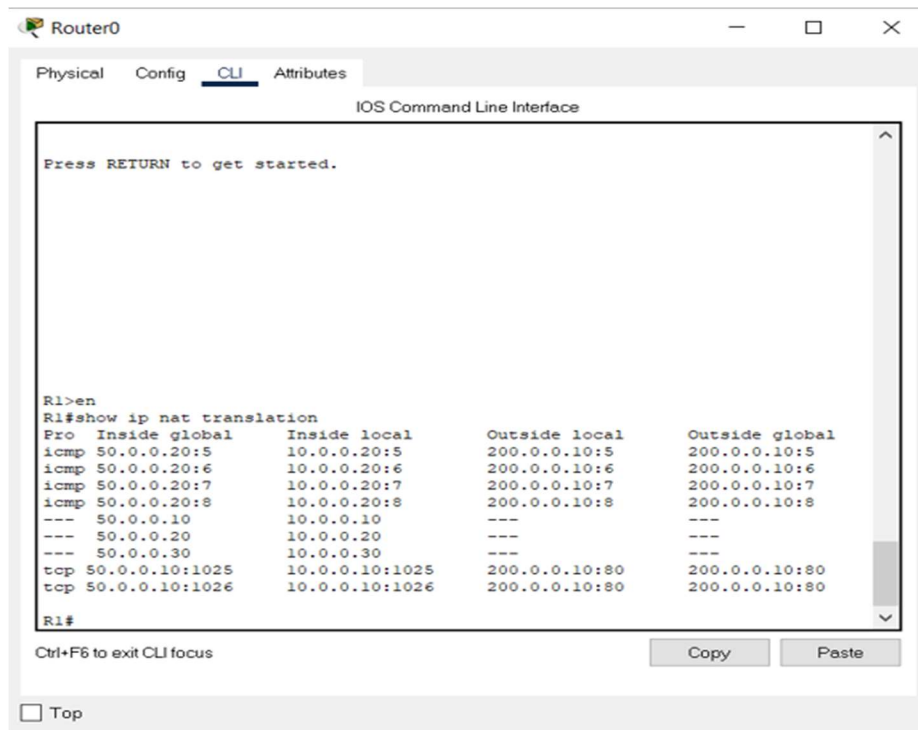
C:\>
```

Another way of testing is via browser:



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

For router0:



For router1:

```
R2#show ip nat translation
Pro  Inside global      Inside local      Outside local      Outside global
---  200.0.0.10         192.168.1.10     ---               ---
tcp  200.0.0.10:80    192.168.1.10:80  50.0.0.10:1025    50.0.0.10:1025
tcp  200.0.0.10:80    192.168.1.10:80  50.0.0.10:1026    50.0.0.10:1026
R2#
```

Result:

Henceforth, Network Address Translation (NAT) using cisco packet tracer implemented and verified.