

CNC Lab Experiment-5

Procedure

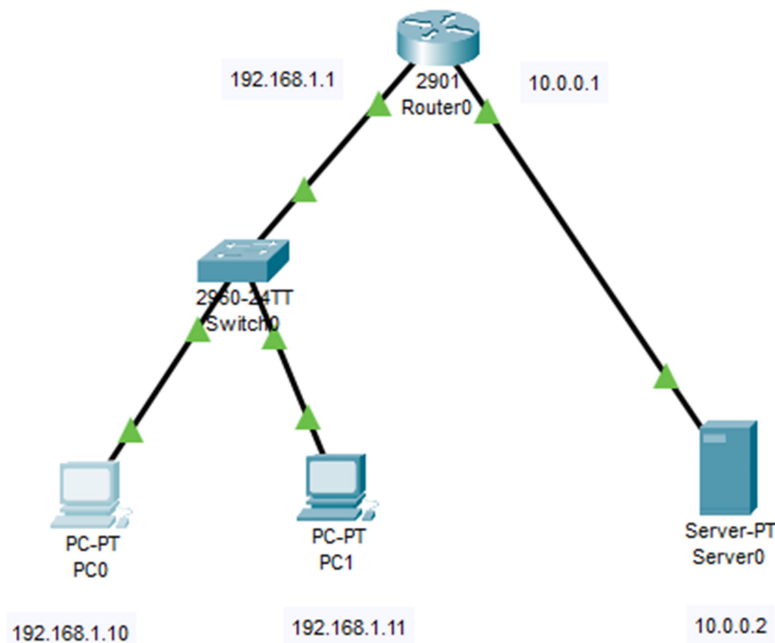
Procedure using CLI Mode

Notes: Create separate experiment for NAT (Step 4), DNAT (Step 5), and PAT (Step 6). All other steps for NAT, DNAT, and PAT are same. In CLI mode, all available commands at the current level / possible next words after a partial command can be seen using the symbol "?".

Network Setup

Device	Interface	IP Address	Subnet Mask	Description
Router0	G0/0	192.168.1.1	255.255.255.0	Inside LAN
Router0	G0/1	10.0.0.1	255.0.0.0	Outside Network
PC0	NIC	192.168.1.10	255.255.255.0	Gateway: 192.168.1.1
PC1	NIC	192.168.1.11	255.255.255.0	Gateway: 192.168.1.1
Server0	NIC	10.0.0.2	255.0.0.0	Gateway: 10.0.0.1

Step 1: Create the Network Topology



1. Open **Cisco Packet Tracer**.
2. Place the following devices:
 - 1 Router (Cisco 2911), 1 Switch, 2 PCs, and 1 Server

3. Connect devices using **Copper Straight-Through Cables**:

- PCs → Switch → Router (G0/0)
- Router (G0/1) → Server0

Step 2: Assign IP Addresses

1. **PC0:**

- IP: 192.168.1.10
- Subnet Mask: 255.255.255.0
- Default Gateway: 192.168.1.1

2. **PC1:**

- IP: 192.168.1.11
- Subnet Mask: 255.255.255.0
- Default Gateway: 192.168.1.1

3. **Server0:**

- IP: 10.0.0.2
- Subnet Mask: 255.0.0.0
- Default Gateway: 10.0.0.1

4. **Router0 Interfaces:**

- **Gig0/0:** IP 192.168.1.1, Mask 255.255.255.0, *Port Status: On*
- **Gig0/1:** IP 10.0.0.1, Mask 255.0.0.0, *Port Status: On*

Same Router0 Interface configuration can also be done in CLI mode.

- Enter privileged EXEC mode and do the following:

```
Router> enable
Router# configure terminal
Router(config)# interface gig0/0
Router(config-if)# ip address 192.168.1.1 255.255.255.0
Router(config-if)# no shutdown
Router(config)# interface gig0/1
Router(config-if)# ip address 10.0.0.1 255.0.0.0
Router(config-if)# no shutdown
Router(config)# exit
```

Step 3: Define Inside and Outside Interfaces

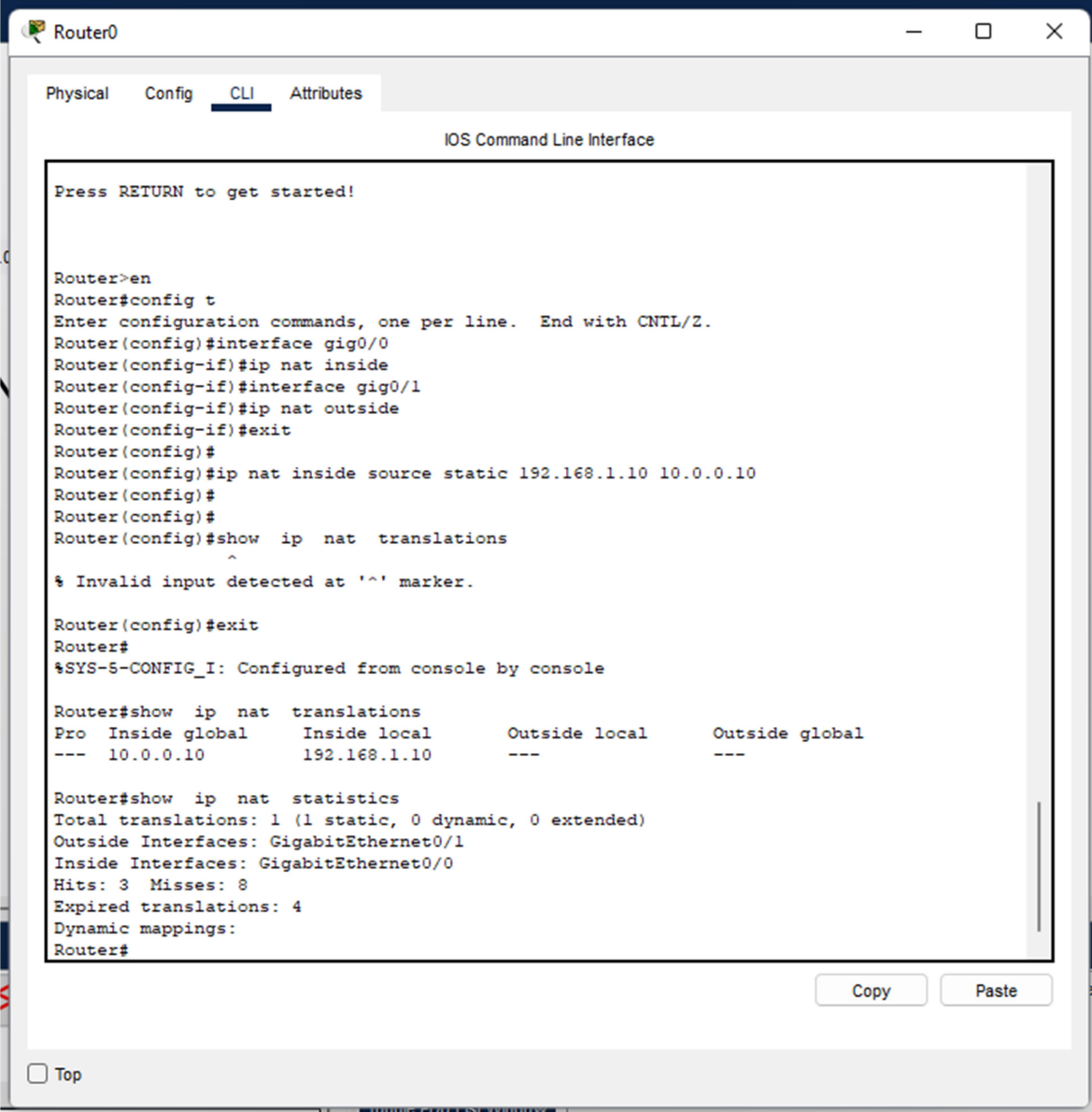
```
Router(config)# interface gig0/0
Router(config-if)# ip nat inside
Router(config)# interface gig0/1
```

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

```
Router(config)# exit
```

Step 4: Configure Static NAT

```
Router(config)# ip nat inside source static 192.168.1.10 10.0.0.10
```



The screenshot shows a Cisco Router CLI window titled "Router0". The window has tabs for "Physical", "Config", "CLI", and "Attributes", with "CLI" selected. The main area displays the "IOS Command Line Interface" with the following text:

```
Press RETURN to get started!

Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface gig0/0
Router(config-if)#ip nat inside
Router(config-if)#interface gig0/1
Router(config-if)#ip nat outside
Router(config-if)#exit
Router(config)#
Router(config)#ip nat inside source static 192.168.1.10 10.0.0.10
Router(config)#
Router(config)#
Router(config)#show ip nat translations
^
% Invalid input detected at '^' marker.

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

Router#show ip nat translations
Pro Inside global      Inside local      Outside local      Outside global
--- 10.0.0.10           192.168.1.10      ---                ---

Router#show ip nat statistics
Total translations: 1 (1 static, 0 dynamic, 0 extended)
Outside Interfaces: GigabitEthernet0/1
Inside Interfaces: GigabitEthernet0/0
Hits: 3 Misses: 8
Expired translations: 4
Dynamic mappings:
Router#
```

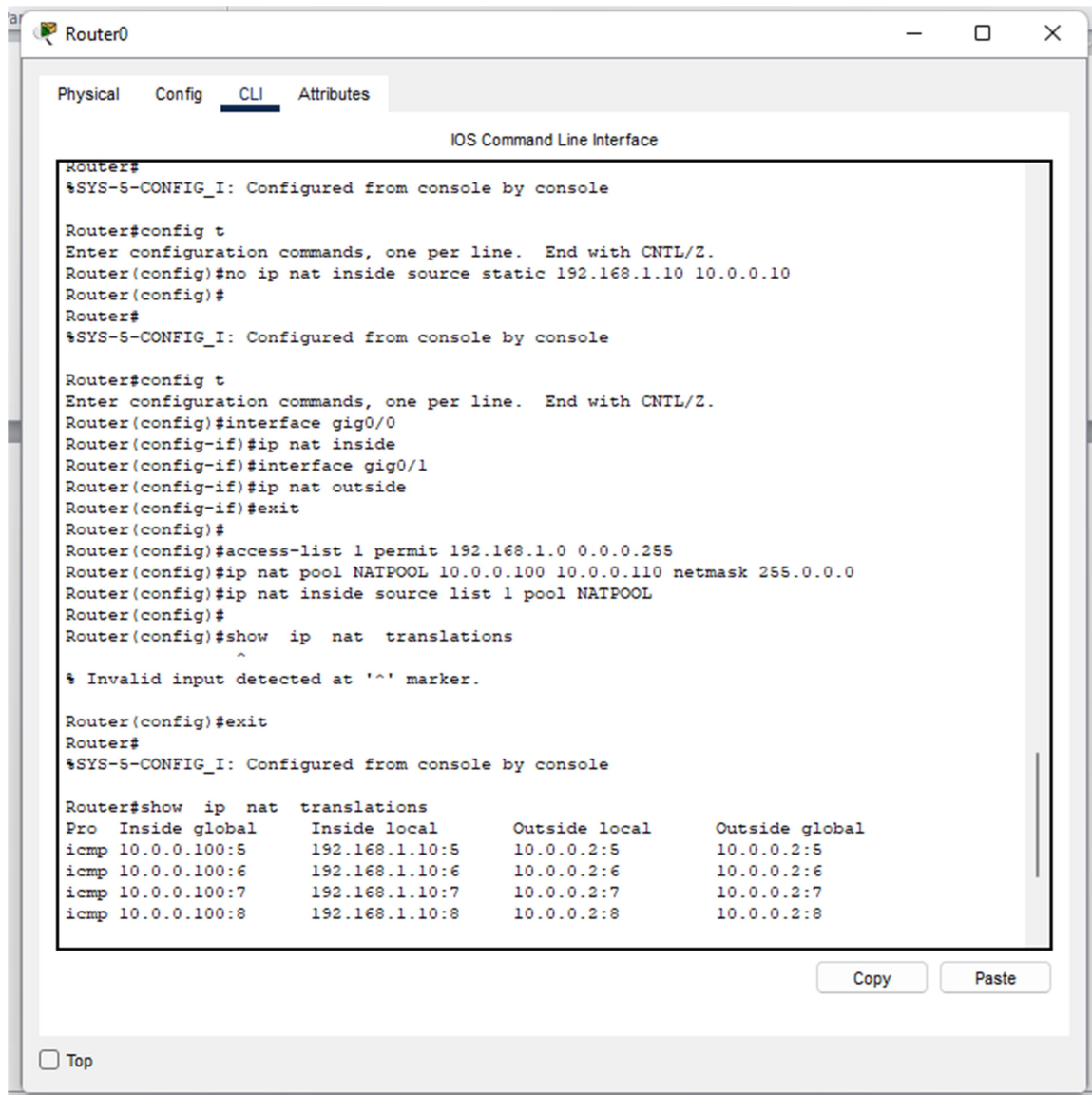
At the bottom of the window, there are "Copy" and "Paste" buttons, and a "Top" button with a checkbox.

Step 5: Configure Dynamic NAT (do a separate experiment)

```
Router(config)# access-list 1 permit 192.168.1.0 0.0.0.255
```

```
Router(config)# ip nat pool NATPOOL 10.0.0.100 10.0.0.110 netmask 255.0.0.0
```

```
Router(config)# ip nat inside source list 1 pool NATPOOL
```



The screenshot shows a Cisco Router CLI window titled "Router0". The "CLI" tab is selected. The window displays the following commands and output:

```
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#no ip nat inside source static 192.168.1.10 10.0.0.10
Router(config)#
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface gig0/0
Router(config-if)#ip nat inside
Router(config-if)#interface gig0/1
Router(config-if)#ip nat outside
Router(config-if)#exit
Router(config)#
Router(config)#access-list 1 permit 192.168.1.0 0.0.0.255
Router(config)#ip nat pool NATPOOL 10.0.0.100 10.0.0.110 netmask 255.0.0.0
Router(config)#ip nat inside source list 1 pool NATPOOL
Router(config)#
Router(config)#show ip nat translations
^
% Invalid input detected at '^' marker.

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

Router#show ip nat translations
Pro Inside global      Inside local      Outside local      Outside global
icmp 10.0.0.100:5       192.168.1.10:5    10.0.0.2:5         10.0.0.2:5
icmp 10.0.0.100:6       192.168.1.10:6    10.0.0.2:6         10.0.0.2:6
icmp 10.0.0.100:7       192.168.1.10:7    10.0.0.2:7         10.0.0.2:7
icmp 10.0.0.100:8       192.168.1.10:8    10.0.0.2:8         10.0.0.2:8
```

At the bottom of the window, there are "Copy" and "Paste" buttons, and a "Top" link.

Step 6: Configure Port Address Translation (PAT)

To enable PAT, we need to

- Define an **Access Control List (ACL)** to identify which **inside** source addresses are allowed to be translated.
- Configure the **NAT Overload** rule, using the router's **outside interface IP address** and the **overload** keyword.

```
Router(config)# access-list 1 permit 192.168.1.0 0.0.0.255
Router(config)# ip nat inside source list 1 interface gig0/1 overload
Router(config)# end
```

The screenshot shows a Cisco Router CLI window titled "Router1". The window has tabs for "Physical", "Config", "CLI", and "Attributes", with "CLI" selected. The main area displays the "IOS Command Line Interface". The user has entered the following commands:

```
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int gig0/0
Router(config-if)#ip address 192.168.1.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#exit
Router(config)#int gig0/1
Router(config-if)#ip address 10.0.0.1 255.0.0.0
Router(config-if)#no shutdown
Router(config-if)#exit
Router(config)#
Router(config)#
Router(config)#int gig0/0
Router(config-if)#ip nat inside
Router(config-if)#exit
Router(config)#int gig0/1
Router(config-if)#ip nat outside
Router(config-if)#exit
Router(config)#
Router(config)#
Router(config)#access-list 1 permit 192.168.1.0 0.0.0.255
Router(config)#ip nat inside source list 1 interface gig0/1 overload
Router(config)#end
Router#
```

The output of the command `Router#show ip nat translations` is displayed below:

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

Router#show ip nat translations
Pro  Inside global      Inside local      Outside local      Outside global
icmp 10.0.0.1:6             192.168.1.10:6    10.0.0.2:6         10.0.0.2:6
icmp 10.0.0.1:7             192.168.1.10:7    10.0.0.2:7         10.0.0.2:7
icmp 10.0.0.1:8             192.168.1.10:8    10.0.0.2:8         10.0.0.2:8
icmp 10.0.0.1:9             192.168.1.10:9    10.0.0.2:9         10.0.0.2:9

Router#
```

At the bottom of the window, there are "Copy" and "Paste" buttons, and a "Top" button.

Step 7: Verification

From PC0, ping the server: `ping 10.0.0.2`

You should receive successful replies.

Step 8: Check Translations

Check NAT translations on the router: `Router# show ip nat translations`

Check NAT statistics: `Router# show ip nat statistics`

Step 9: Save Configuration

`Router# copy running-config startup-config`