Examining Network Adress Translation(NAT)using Cisco Packet Tracer

EXP NO: 07 NAME: S KEERTHANA

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AIM:
To Examining Network Address Translation (NAT) using Cisco Packet Tracer

Examining Network Address Translation (NAT) using Cisco Packet Tracer involves several steps. NAT is commonly used to allow multiple devices on a local network to share a single public IP address for accessing the internet. Here's how you can set up and examine NAT using Cisco Packet Tracer:

1. Setting Up the Network Topology

- Devices Required:
    1. One or more PCs (for testing connectivity)
    2. One router (to configure NAT)
    3. One switch (to connect the PCs and the router)
    4. One server (to simulate an external network, like the internet)
- Steps:
    1. Place the Devices: Drag and drop the required devices onto the workspace.
    2. Connect the Devices: Use the appropriate cables (copper straight-through for PCs to the switch, copper cross-over for switch to router) to connect the devices.
    3. Assign IP Addresses:
        - Assign private IP addresses (e.g., 192.168.1.0/24) to the PCs and the router's internal interface.
        - Assign a public IP address (e.g., 200.0.0.1/30) to the router's external interface.
        - Assign an IP address to the server that simulates an external network (e.g., 200.0.0.2/30).

2. Configuring NAT on the Router

- Steps:
    1. Access the Router CLI: Click on the router and go to the CLI tab.
    2. Enter Global Configuration Mode:

```
Router> enable
Router# configure terminal
```

3,Configure Interfaces:
Set up the internal and external interfaces:

```
Router(config)# interface fastethernet 0/0
Router(config-if)# ip address 192.168.1.1 255.255.255.0
Router(config-if)# ip nat inside
Router(config-if)# no shutdown

Router(config-if)# interface fastethernet 0/1
Router(config-if)# ip address 200.0.0.1 255.255.255.252
Router(config-if)# ip nat outside
Router(config-if)# no shutdown
```

1. Configure NAT Overload (PAT):

Define an access list to match the internal IP range:

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

- Configure NAT to translate the internal addresses to the external address:

```
Router(config)# ip nat inside source list 1 interface fastethernet 0/1 overloa
```

- This configures PAT (Port Address Translation), which allows multiple internal IPs to share a single external IP.

3. Testing NAT

- Steps:
  1. Ping from a PC to the External Network:
     - From one of the PCs, open the command prompt and try to ping the external server (e.g., ping 200.0.0.2).
  2. Verify NAT Translations:

On the router CLI, check the NAT translation table to see the active translations:

```
Router# show ip nat translations
```

3. Observe the Output:

- The NAT translation table should show the mapping of the internal private IP addresses to the external public IP.

4. Advanced NAT Configurations (Optional)

Static NAT: Map a single internal IP to a single public IP:

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

- Dynamic NAT: Use a pool of public IPs:

```
Router(config)# ip nat pool MYPOOL 200.0.0.10 200.0.0.20 netmask 255.255.255.0
Router(config)# ip nat inside source list 1 pool MYPOOL
```

5. Observing the Traffic Use the simulation mode in Packet Tracer to visually observe the NAT process as packets move from the internal network to the external network.

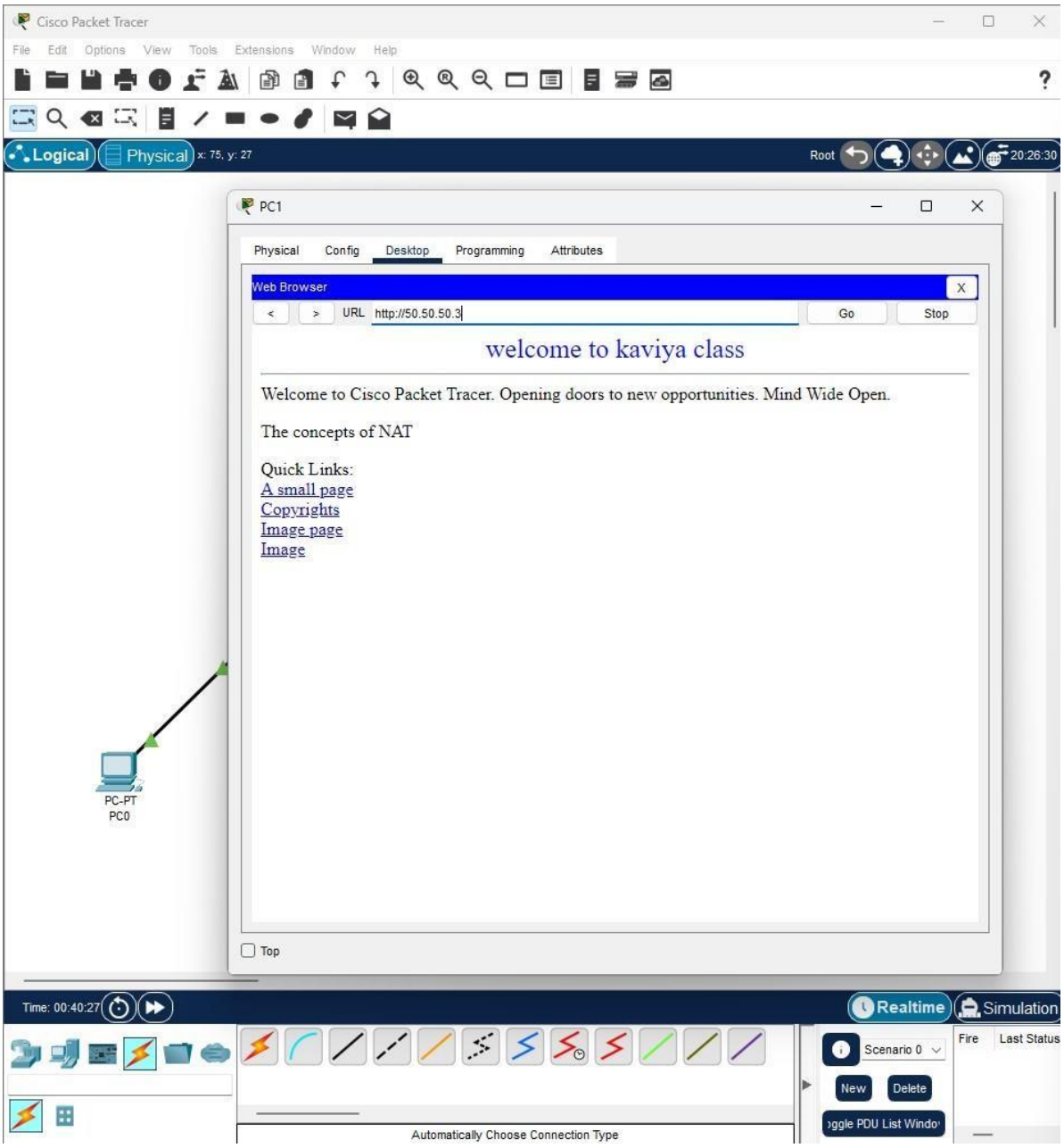
6. Saving the Configuration

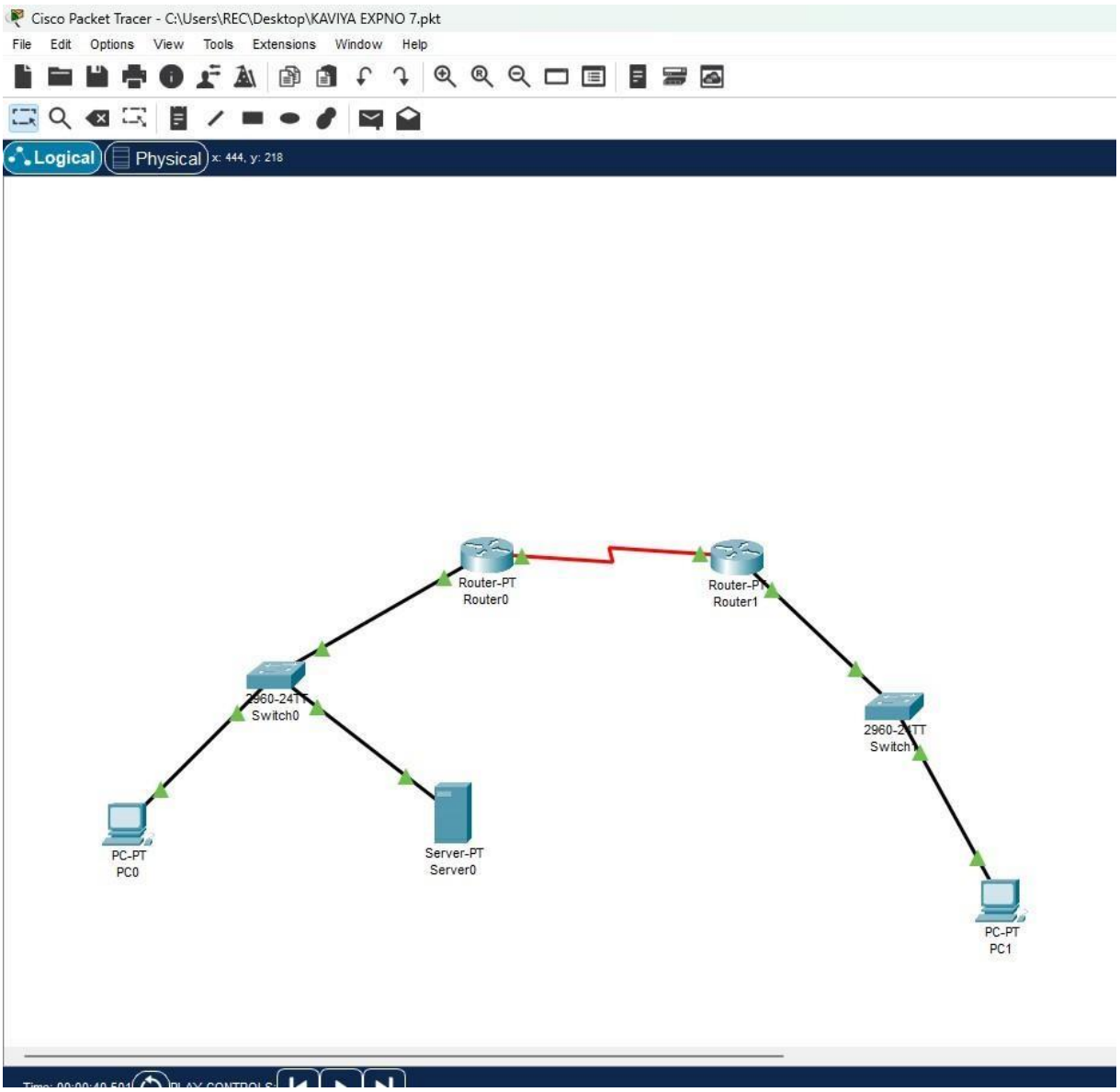
Don't forget to save the configuration on the router to avoid losing the settings:

```
Router# copy running-config startup-config
```

By following these steps, you can effectively examine and understand how NAT works in a network environment using Cisco Packet Tracer.

Output:


Cisco Packet Tracer
File Edit Options View Tools Extensions Window Help
Logical
Physical
x: 75, y: 27
Root
20:26:30
PC1
Physical Config Desktop Programming Attributes
Web Browser
URL http://50.50.50.3
Go
Stop
welcome to kaviya class
Welcome to Cisco Packet Tracer. Opening doors to new opportunities. Mind Wide Open.
The concepts of NAT
Quick Links:
A small page
Copyrights
Image page
Image
PC-PT
PC0
Top
Time: 00:40:27
Realtime
Simulation
Scenario 0
New
Delete
Fire
Last Status
Automatically Choose Connection Type



Result:

Network Address Translation (NAT) using Cisco Packet Tracer is examined