CN Lab Experiment 6

Objective:

In this experiment, you will configure Network Address Translation (NAT) on a router using Cisco Packet Tracer. NAT is used to translate private IP addresses within a local network to a public IP address for accessing the internet. This experiment will demonstrate the setup and configuration of NAT to allow internal network devices to communicate with external networks.

Requirements:

- Cisco Packet Tracer software.
- A GitHub account and a repository for lab assignments.
- Access to Google Classroom for submission.

Procedure:

Network Design:

● Router1 connected to Router2.

● PC0 connected to Router1.

● PC1 connected to Router2.

Step 1:

1. Determine IP address scheme:

○ Inside network (LAN): 192.168.10.0/24

○ Outside network (ISP): 200.0.0.0/30

Step 2: Configuring Router1

1. Select the router and open CLI.

2. Press ENTER to start configuring Router1.

3. Activate privileged mode:

    ○ Type enable

4. Access the configuration menu:

    ○ Type config t (configure terminal)

5. Configure interfaces of Router1:

    ○ FastEthernet0/0: (connected to PC0)

        ■ Type interface FastEthernet0/0

        ■ Configure with the IP address 192.168. 10.1 and Subnet mask 255.255.192.0

    ○ Serial 0/0/0: (connected to Router2)

        ■ Type interface Serial 0/0/0

        - ■ Configure with the IP address 192.168.1.1 and Subnet mask 255.255.255.252

6. Finish configuration:

    - ○ Type no shutdown to activate the interfaces

Step 3: Configuring ISP Router

1. Select the router and open CLI.

2. Press ENTER to start configuring Router1.

3. Activate privileged mode:

    - ○ Type enable

4. Access the configuration menu:

    - ○ Type config t (configure terminal)

5. Configure interfaces of Router1:

    - ○ Serial 0/0/0: (connected to Router1)

        - ■ Type interface Serial 0/0/0

        - ■ Configure with the IP address 192.168.1.2 and Subnet mask 255.255.255.252

6. Finish configuration:

    - ○ Type no shutdown to activate the interfaces

Step 4: Configuring PCs

1.Assign IP addresses to each PC:

    - ○ PC0:

        - ■ Go to the desktop, select IP Configuration, and assign the following:

            - ■ IP address: 192.168.10.2

            - ■ Subnet Mask: 255.255.255.0

            - ■ Default Gateway: 192.168.10.1

    - ○ PC1:

        - ■ Go to the desktop, select IP Configuration, and assign the following:

            - ■ IP address: 192.168.20.2

            - ■ Subnet Mask: 255.255.255.0

            - ■ Default Gateway: 192.168.20.1

Step 5: Configuring NAT on Router1

1. Define the inside and outside interfaces:

    - ○ Access Router1 CLI and type the following commands:

■ interface FastEthernet0/0

■ ip nat inside

■ exit

■ interface Serial0/0/0

■ ip nat outside

■ exit

2. Configure a standard access list to permit the internal network:

○ access-list 1 permit 192.168.10.0 0.0.0.255

3. Configure NAT overload (PAT) for the internal network:

○ ip nat inside source list 1 interface Serial0/0/0 overloadStep

Step 6: Verify NAT Configuration

1. Test the connectivity by pinging from PC0 to the ISP Router:

○ Open the command prompt on PC0.

○ Type ping 200.0.0.2 and observe the response.

2. Check NAT translation table on Router1:

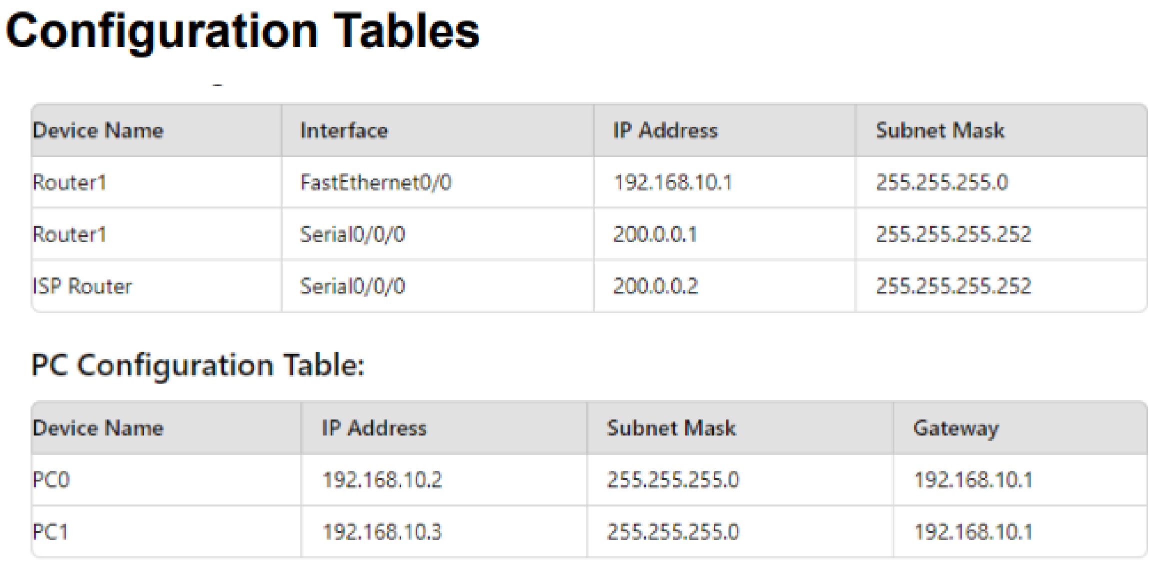
○ On Router1 CLI, type show ip nat translations to see the NAT entries.

Step 7: Verify External Connectivity

1. Test external connectivity by pinging a public IP (simulated):

○ On PC0, type ping 8.8.8.8 (replace with an actual reachable IP in Packet Tracer).

○ On PC1, type ping 8.8.8.8.



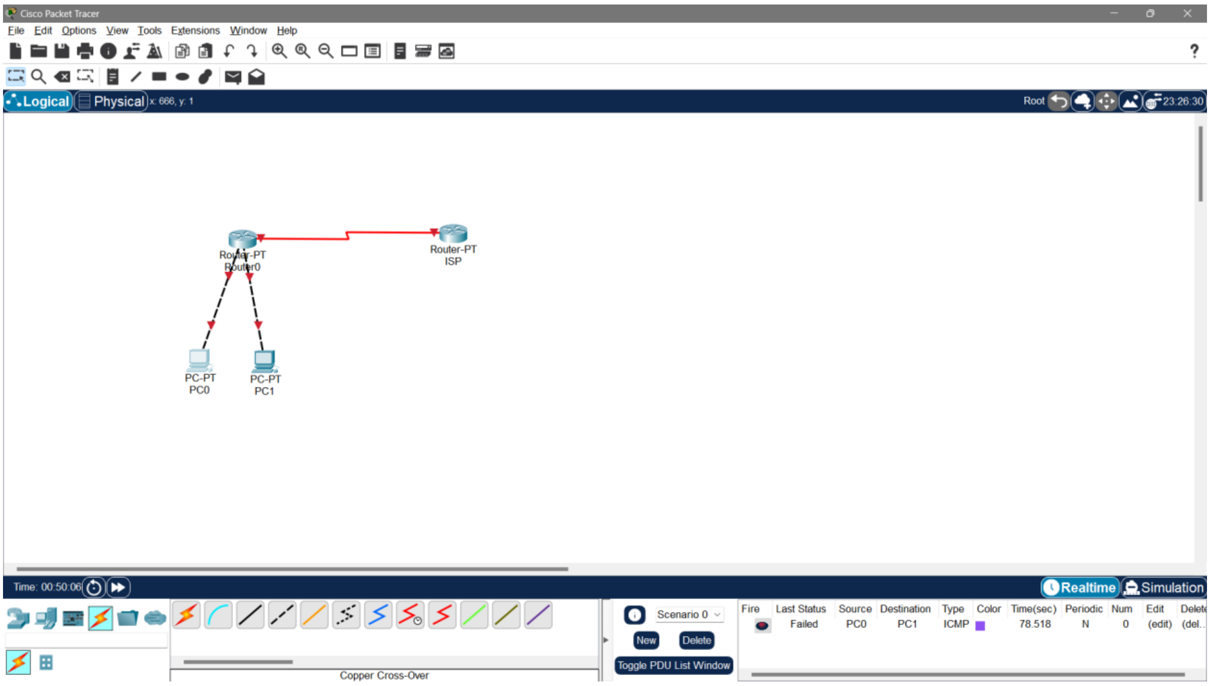
Configuration Tables

Device Name	Interface	IP Address	Subnet Mask
Router1	FastEthernet0/0	192.168.10.1	255.255.255.0
Router1	Serial0/0/0	200.0.0.1	255.255.255.252
ISP Router	Serial0/0/0	200.0.0.2	255.255.255.252

PC Configuration Table:

Device Name	IP Address	Subnet Mask	Gateway
PC0	192.168.10.2	255.255.255.0	192.168.10.1
PC1	192.168.10.3	255.255.255.0	192.168.10.1

Results:



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- We Observe the packet traveling from PC0 to Router1, NAT translation occurring, then to the ISP Router and the external network.
- The acknowledgment packet travels back from the external network to PC0, confirming successful NAT configuration and communication.