

**Exp No: 07**

**Date:03/09/2024**

**ROLLNO:231901048**

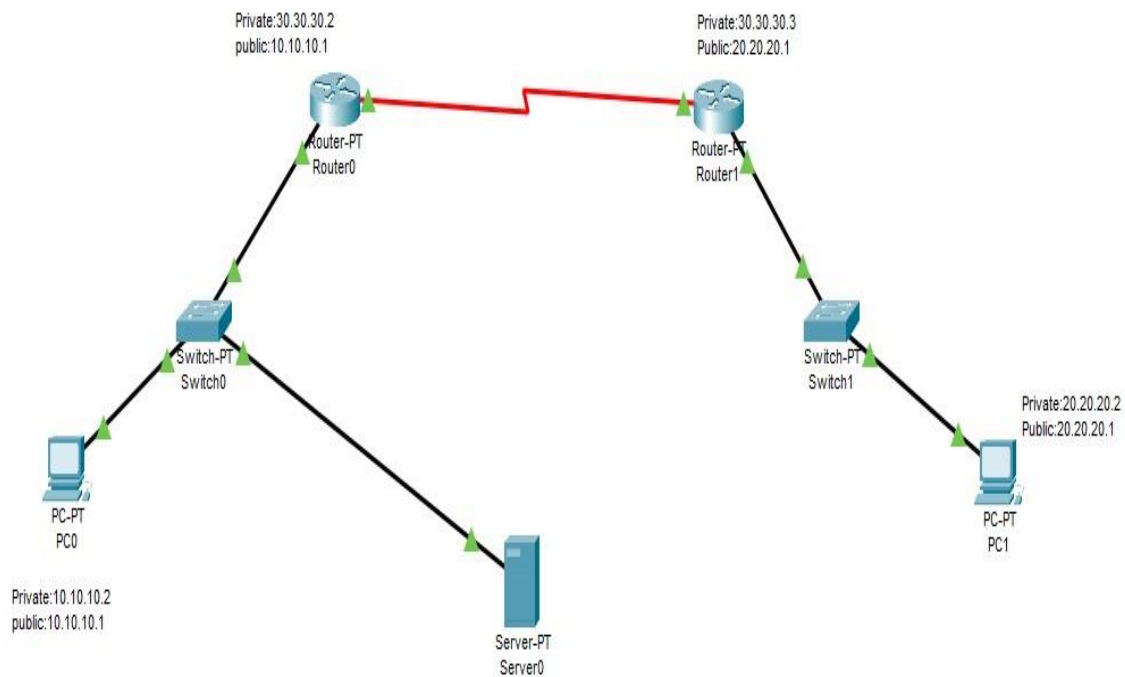
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## **Examining Network Address Translation (NAT) using Cisco Packet Tracer**

**Aim :** 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:**
  - One or more PCs (for testing connectivity)
  - One router (to configure NAT)
  - One switch (to connect the PCs and the router)
  - One server (to simulate an external network, like the internet)
- **Steps:**
  - **Place the Devices:** Drag and drop the required devices onto the workspace.
  - **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.
  - **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:**
- **Access the Router CLI:** Click on the router and go to the CLI tab.
- **Enter Global Configuration Mode:**

```
Router#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

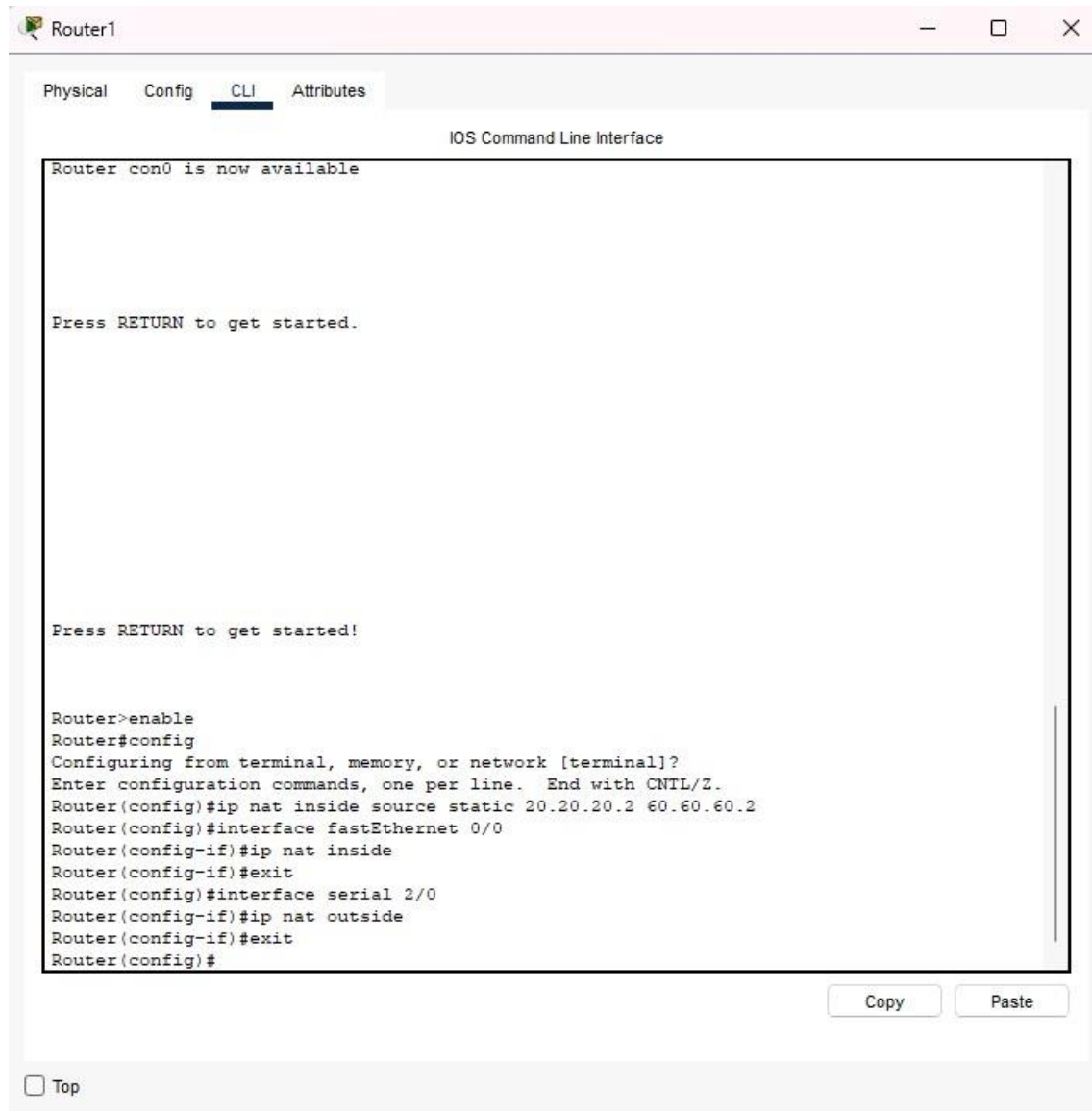
Gateway of last resort is not set

C    20.0.0.0/8 is directly connected, FastEthernet0/0
C    30.0.0.0/8 is directly connected, Serial2/0
S    50.0.0.0/8 [1/0] via 30.30.30.1

Router#
```

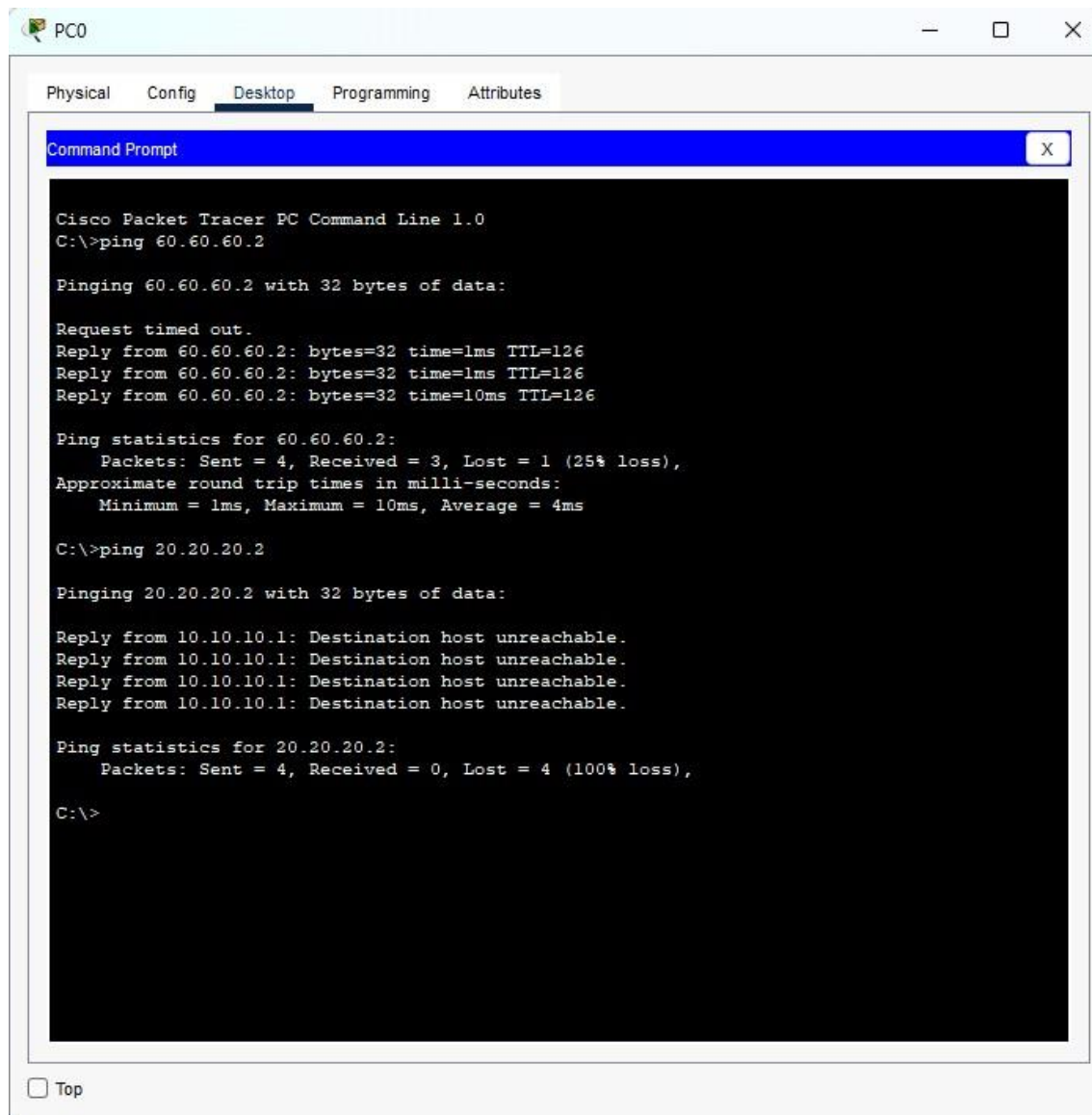
### Configure Interfaces:

Set up the internal and external interfaces:



### 3. Testing NAT

- **Steps:**
- **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](#)).



The screenshot shows a Cisco Packet Tracer PC Command Prompt window for PC0. The window has tabs for Physical, Config, Desktop, Programming, and Attributes. The Desktop tab is active, showing a black command prompt window with white text. The text shows the execution of two ping commands. The first command is 'ping 60.60.60.2', which results in a 25% loss (1 out of 4 packets lost). The second command is 'ping 20.20.20.2', which results in a 100% loss (4 out of 4 packets lost). The window also has a 'Top' button at the bottom left.

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 60.60.60.2

Pinging 60.60.60.2 with 32 bytes of data:

Request timed out.
Reply from 60.60.60.2: bytes=32 time=1ms TTL=126
Reply from 60.60.60.2: bytes=32 time=1ms TTL=126
Reply from 60.60.60.2: bytes=32 time=10ms TTL=126

Ping statistics for 60.60.60.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 10ms, Average = 4ms

C:\>ping 20.20.20.2

Pinging 20.20.20.2 with 32 bytes of data:

Reply from 10.10.10.1: Destination host unreachable.
Reply from 10.10.10.1: Destination host unreachable.
Reply from 10.10.10.1: Destination host unreachable.
Reply from 10.10.10.1: Destination host unreachable.

Ping statistics for 20.20.20.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

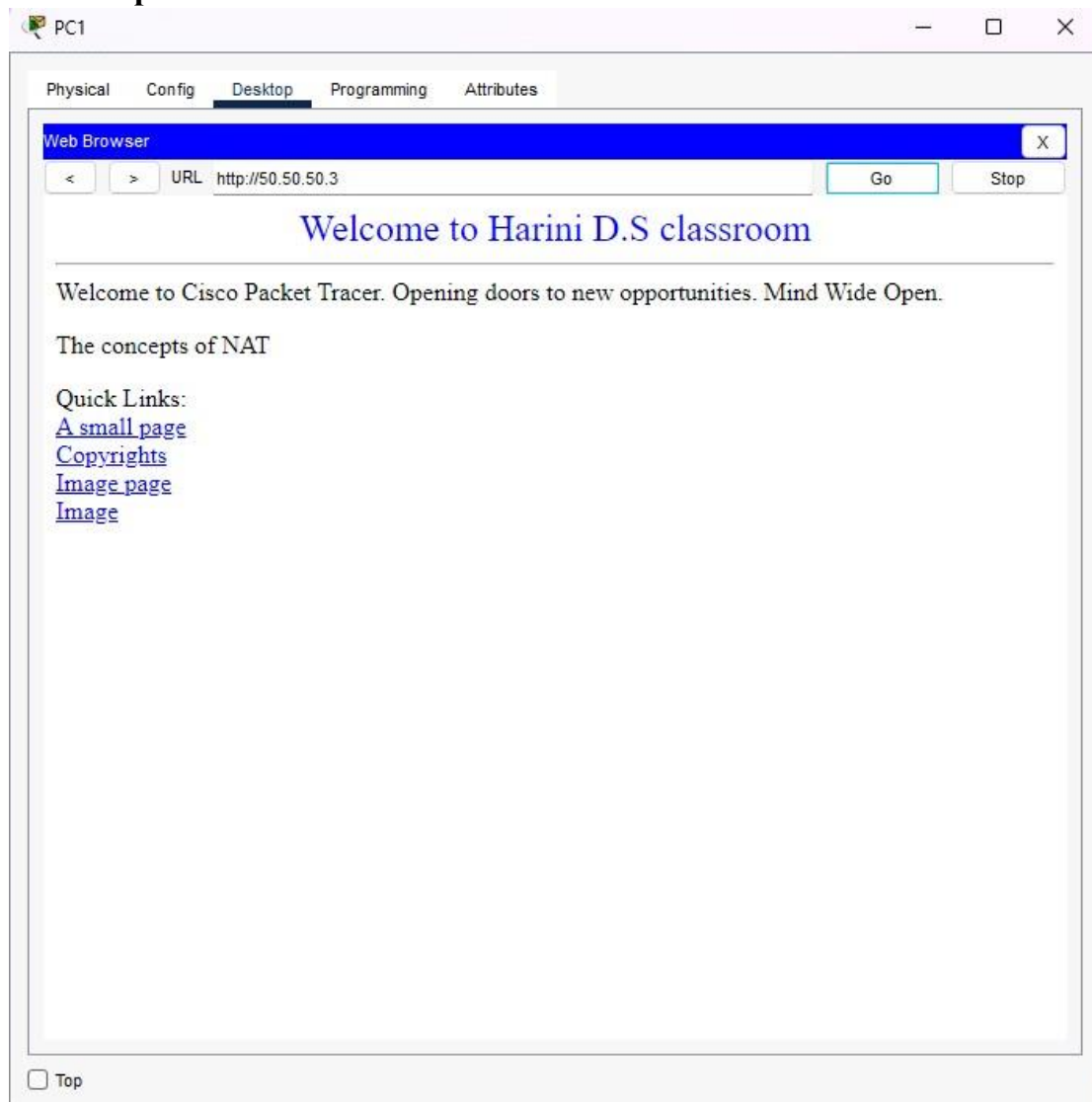
### Observe the Output:

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

## 4. 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.

## Final output:



**Result: Network Address Translation (NAT) using Cisco Packet Tracer has been examined.**

