Ex:No:11

Date:

11.Examine Network Address Translation (NAT) using Cisco Packet Tracer

Introduction:

Network Address Translation (NAT) is a method used in routers to modify IP address information in packet headers while they are in transit across a traffic routing device. NAT allows multiple devices on a private network to access the internet using a single public IP address.

Types of NAT:

1. **Static NAT** – Maps a private IP to a fixed public IP.

2. **Dynamic NAT** – Maps a private IP to a public IP from a pool of available public IPs.

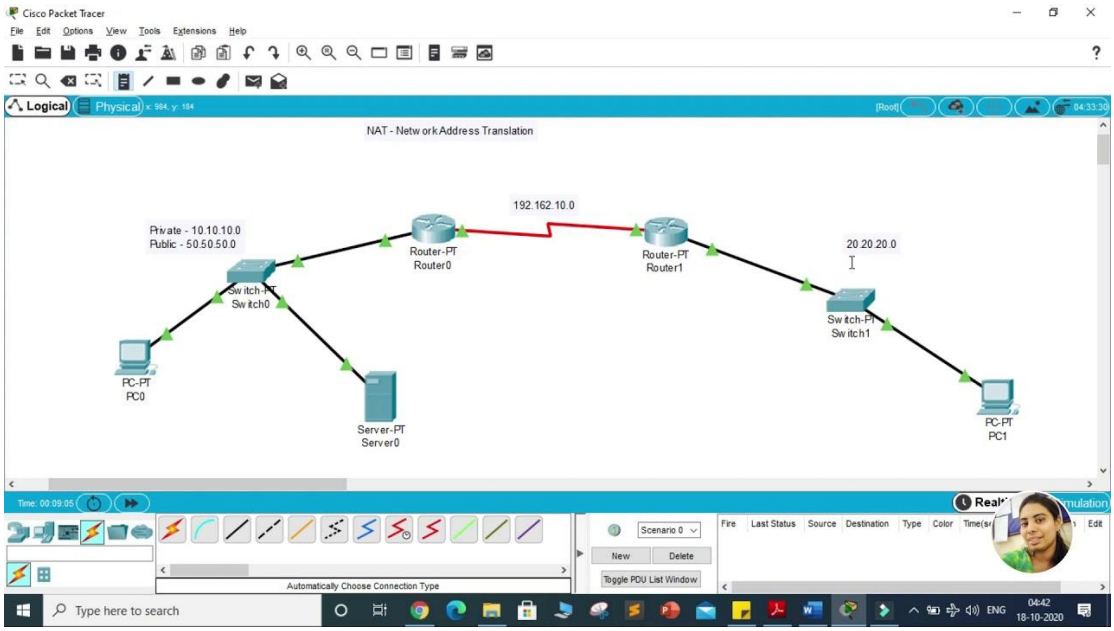
3. **PAT (Port Address Translation) / NAT Overload** – Many private IPs share a single public IP using different ports.

Equipment/Software Required:

- Cisco Packet Tracer (latest version)
- Devices: 2 PCs, 1 Router, 1 Switch
- IP Address Scheme (example):

Device	Interface	IP Address	Subnet Mask	Gateway
PC1	NIC	192.168.1.10	255.255.255.0	192.168.1.1
PC2	NIC	192.168.1.20	255.255.255.0	192.168.1.1
Router	Fa0/0	192.168.1.1	255.255.255.0	–
Router	Fa0/1	203.0.113.1	255.255.255.0	–

Network Address Translation (NAT):



In Cisco Packet Tracer, connect PCs to Switch using Copper Straight-Through cables and Router to Switch using Copper Straight-Through cable.

Procedure:

1. Configure IP Addresses on PCs:

- PC1 → IP: 192.168.1.10, Subnet: 255.255.255.0, Gateway: 192.168.1.1
- PC2 → IP: 192.168.1.20, Subnet: 255.255.255.0, Gateway: 192.168.1.1

2. Configure Router Interfaces:

Router> enable

Router# configure terminal

Router(config)# interface fa0/0

Router(config-if)# ip address 192.168.1.1 255.255.255.0

Router(config-if)# no shutdown

Router(config-if)# exit

Router(config)# interface fa0/1

Router(config-if)# ip address 203.0.113.1 255.255.255.0

Router(config-if)# no shutdown

Router(config-if)# exit

3. Configure NAT (Example: NAT Overload / PAT):

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

Router(config)# ip nat inside source list 1 interface fa0/1 overload

Router(config)# interface fa0/0

Router(config-if)# ip nat inside

Router(config-if)# exit

Router(config)# interface fa0/1

Router(config-if)# ip nat outside

Router(config-if)# exit

4. Test NAT Configuration:

· Use the ping command on PC1 or PC2 to ping an external IP (simulate internet IP in Packet Tracer).

· Check NAT translations on the router:

Router# show ip nat translations

Router# show ip nat statistics

Observations:

1. Private IP addresses (192.168.1.x) are translated to the router's public IP (203.0.113.1) when accessing external network.

2. NAT table shows dynamic mappings for outgoing connections.

3. Multiple PCs can share the same public IP using PAT (overload).