Department of Computer Science and Engineering

Islamic University of Technology (IUT)

A subsidiary organ of OIC

Laboratory Report

CSE 4412 : Data Communication and Networking Lab

Name	**: M M Nazmul Hossain**
Student ID	**: 200042118**
Section	**: 1**
Semester	**: 4th**
Academic Year	**: 2021-2022**
Date of Submission	**: 11.04.2023**
Lab No	**: 10**

Title: Understanding the concept of NAT and configuration of NAT.

Objective:

1. Understand NAT
2. Configuration of NAT

Devices Used In the Experiment: Cisco Packet Tracer, Routers, Switches, PCs

Theory:

NAT Definition

Network Address Translation makes it possible for devices on a private network to communicate with those on the internet.

Private IP addresses on a private network are translated into public IP addresses on the internet through NAT. Public IP addresses are used on the internet to identify devices, but private IP addresses are frequently used on local networks and are not globally routable.

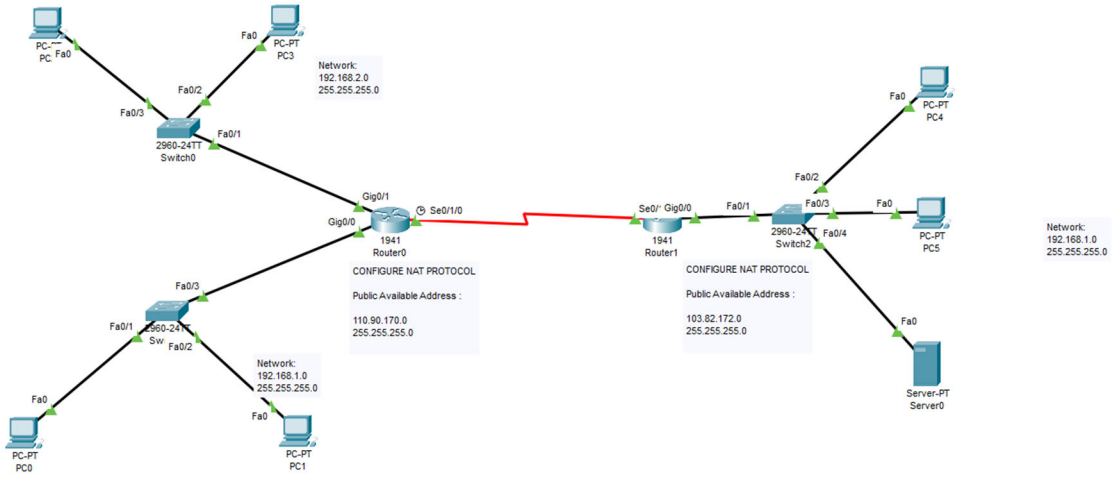
For most houses, the network 192.168.1.X is used. However, this would lead to multiple devices on the internet having the same IP address. The NAT device in control of the private network changes the device's private IP address to the NAT device's public IP address when it tries to connect to the internet. The device can now communicate with internet servers.

NAT allows the conservation of IP address space by allowing multiple devices on a private network to share a single public IP address.

Usage of NAT:

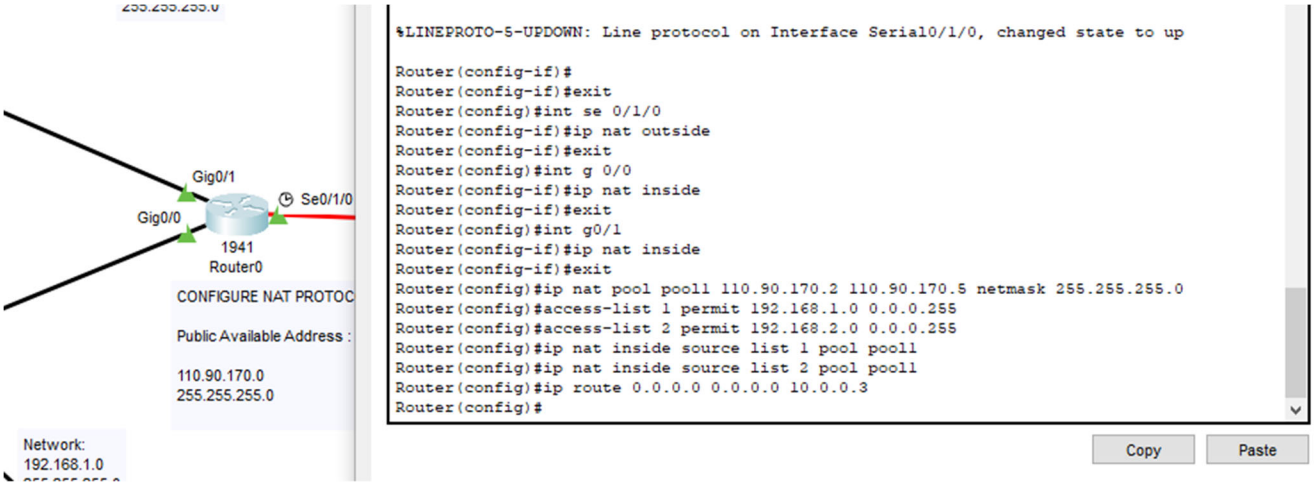
Explain the usage of NAT with an example.
Suppose I have a home network with the IP address 192.168.0.X assigned. One of my friends also has a home network with the IP address 192.168.0.X. In fact, most home networks are designed with the IP address 192.168.0.X and this is possible because of NAT. Multiple devices are connected to these home networks. But the local ISP only assigns one public IP address to these devices via NAT. This allows for private networks to have an organized mode of IP distribution while allowing for IP conservation under IpV4. Otherwise, we would have had to have moved on to IpV6 by now.

Diagram of the experiment:

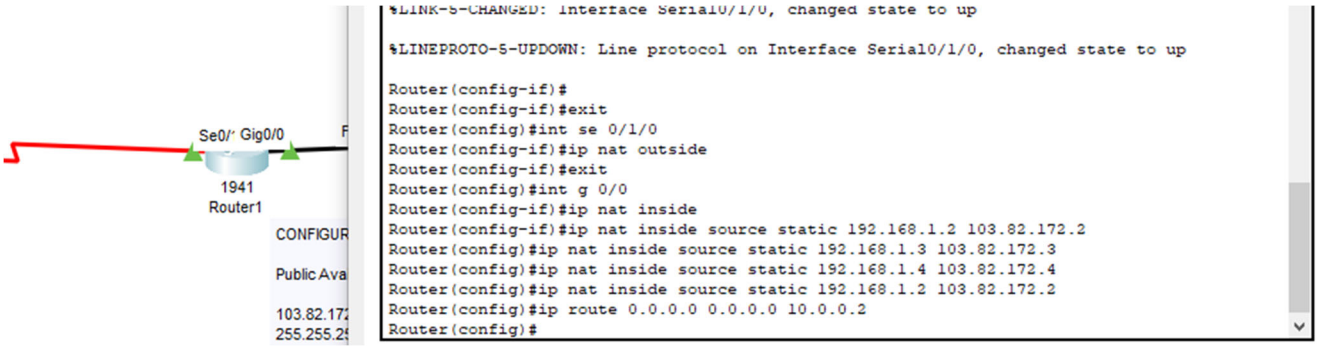


Configuration of NAT in Router:

Router 0



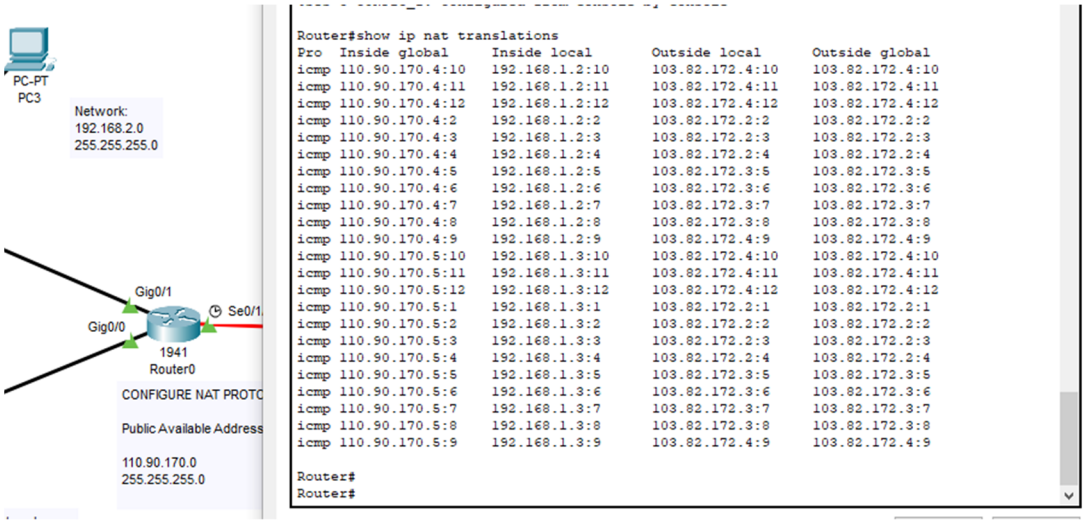
Router 1



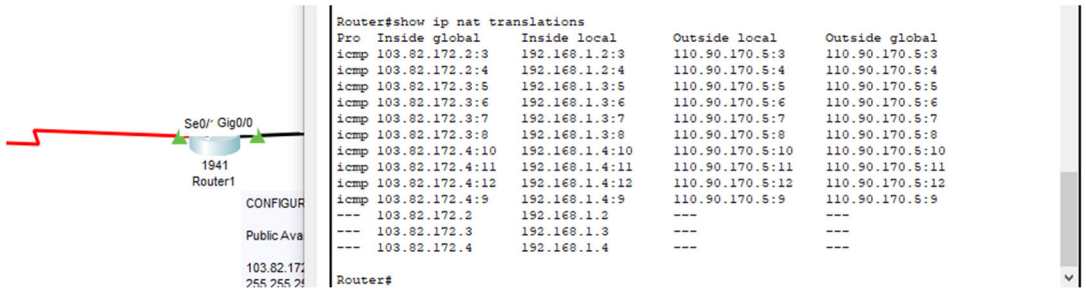
Observation:

The screenshots of ***show nat*** command in two switches are shown below:

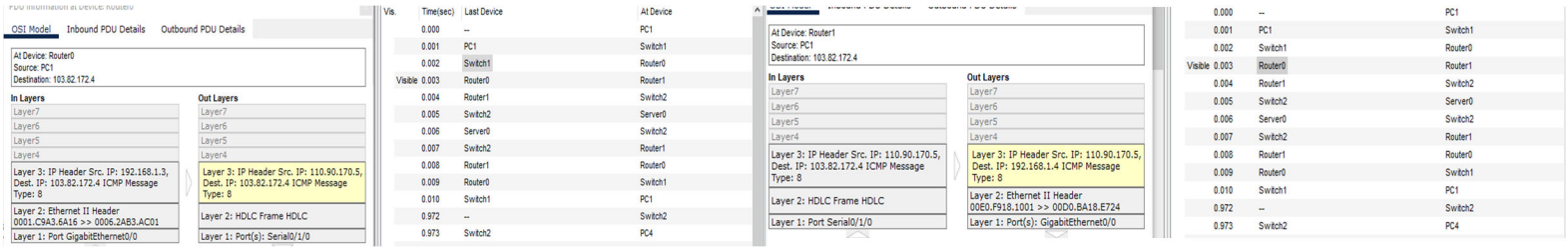
Router 0



Router 1



IP translation



Challenges:

I simply couldn't understand why NAT in both routers couldn't be configured dynamically. When I did it for both routers and tried to ping all the IP addresses in the pool, none of the packets reached properly still. I assume this is because the dynamic public IP allocation occurs at the time of sending the packet and not receiving the packet which resulted in all the packets getting lost. Understanding all the parts of dynamic NAT allocation was a bit difficult.