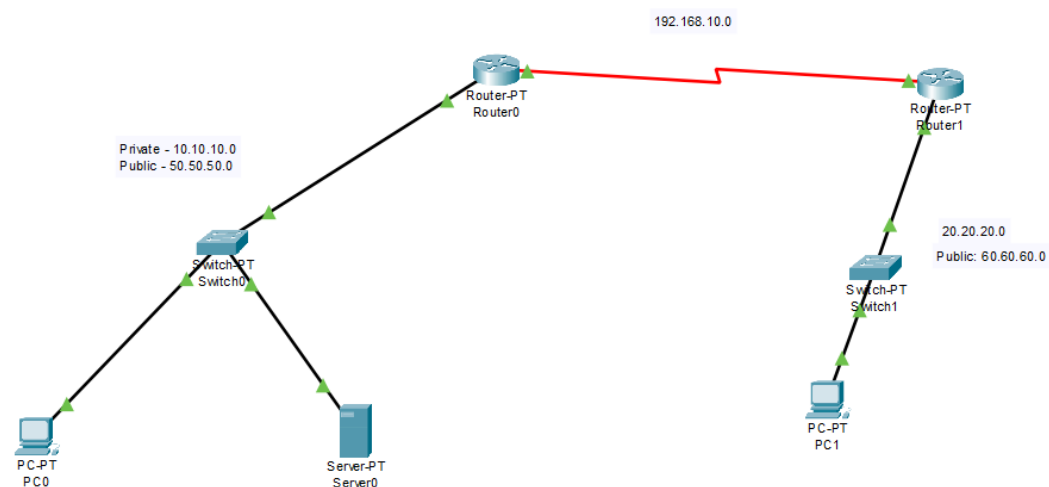


7 . In Cisco Packet Tracer, create a small network with multiple devices (e.g., 2 PCs and a router). Use private IP addresses (e.g., 192.168.1.x) on the PCs and configure the router to perform NAT to allow the PCs to access the internet. Task: Test the NAT configuration by pinging an external IP address from the PCs and capture the traffic using Wireshark. What is the source IP address before and after NAT? explain indetail what to do in cisco packet tracer .

- Public IP address range of one network is 50.50.50.0 and private as 10.10.10.0
- Public IP address range of one network is 60.60.60.0 and private as 20.20.20.0

## NETWORK TOPOLOGY



## PC CONFIGURATION :

PC0

Physical Config Desktop Programming Attributes

IP Configuration

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 10.10.10.2

Subnet Mask 255.0.0.0

Default Gateway 10.10.10.1

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address

Link Local Address FE80::2D0:BCFF:FEC9:516E

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Password

PC1

Physical Config Desktop Programming Attributes

IP Configuration

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 20.20.20.2

Subnet Mask 255.0.0.0

Default Gateway 20.20.20.1

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::260:47FF:FE29:DB65

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Password

## Server configuration:

Server0

Physical Config Services Desktop Programming Attributes

IP Configuration

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 10.10.10.3

Subnet Mask 255.0.0.0

Default Gateway 10.10.10.1

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::200:CFF:FEAB:69ED

Default Gateway

DNS Server

802.1X

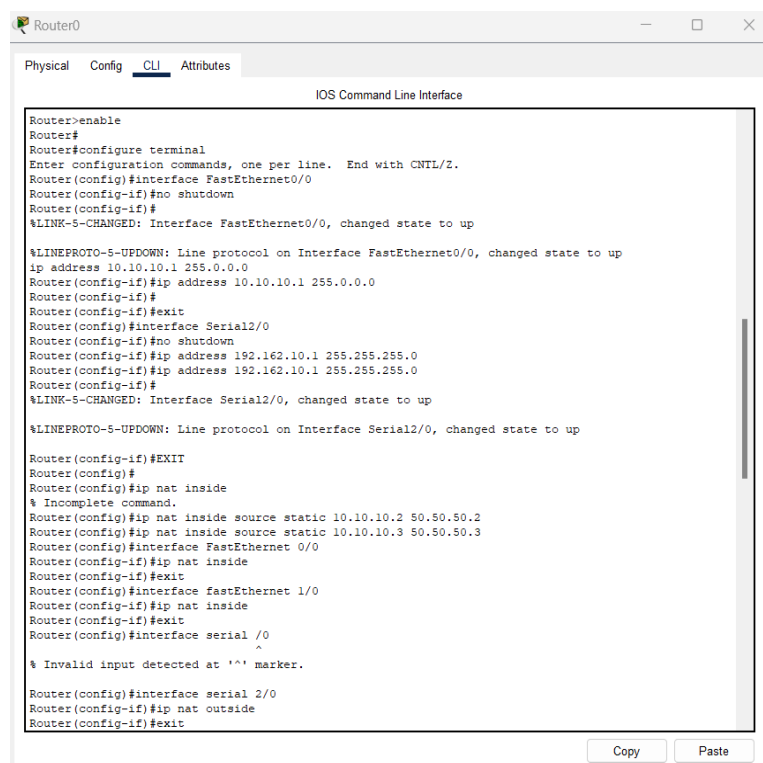
☐ Use 802.1X Security

Authentication MD5

Username

Password

## Router configurations :



The screenshot shows the configuration window for Router0. The 'CLI' tab is selected, displaying the IOS Command Line Interface. The configuration commands entered are as follows:

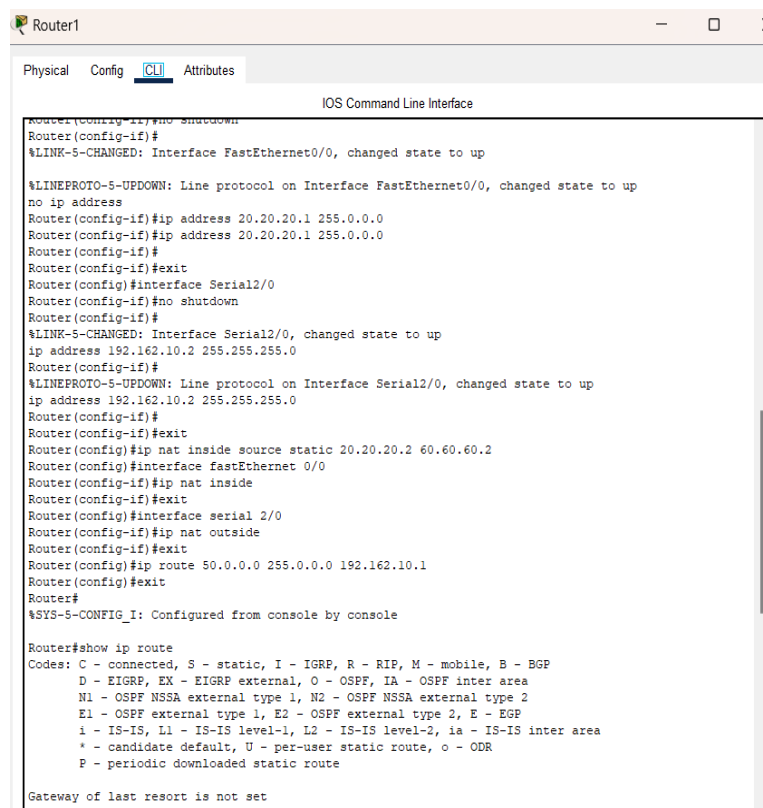
```
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
ip address 10.10.10.1 255.0.0.0
Router(config-if)#ip address 10.10.10.1 255.0.0.0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial2/0
Router(config-if)#no shutdown
Router(config-if)#ip address 192.162.10.1 255.255.255.0
Router(config-if)#ip address 192.162.10.1 255.255.255.0
Router(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up

Router(config-if)#EXIT
Router(config)#
Router(config)#ip nat inside
% Incomplete command.
Router(config)#ip nat inside source static 10.10.10.2 50.50.50.2
Router(config)#ip nat inside source static 10.10.10.3 50.50.50.3
Router(config)#interface FastEthernet 0/0
Router(config-if)#ip nat inside
Router(config-if)#exit
Router(config)#interface fastEthernet 1/0
Router(config-if)#ip nat inside
Router(config-if)#exit
Router(config)#interface serial /0
% Invalid input detected at '^' marker.
Router(config)#interface serial 2/0
Router(config-if)#ip nat outside
Router(config-if)#exit
```

Buttons for 'Copy' and 'Paste' are visible at the bottom right of the CLI window.



The screenshot shows the configuration window for Router1. The 'CLI' tab is selected, displaying the IOS Command Line Interface. The configuration commands entered are as follows:

```
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

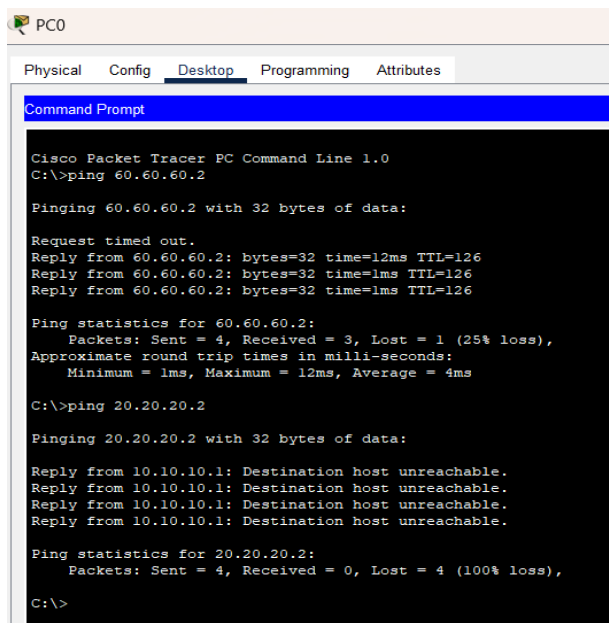
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
no ip address
Router(config-if)#ip address 20.20.20.1 255.0.0.0
Router(config-if)#ip address 20.20.20.1 255.0.0.0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial2/0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up
ip address 192.162.10.2 255.255.255.0
Router(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up
ip address 192.162.10.2 255.255.255.0
Router(config-if)#
Router(config-if)#exit
Router(config)#ip nat inside source static 20.20.20.2 60.60.60.2
Router(config)#interface fastEthernet 0/0
Router(config-if)#ip nat inside
Router(config-if)#exit
Router(config)#interface serial 2/0
Router(config-if)#ip nat outside
Router(config-if)#exit
Router(config)#ip route 50.0.0.0 255.0.0.0 192.162.10.1
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

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
```

In the above I configured the routers with the ip address of devices connected to the router and then Did NAT by mapping public ip address to private ip address of the devices.

## Pinging from pc0 to pc1



```
PC0
Physical Config Desktop Programming Attributes
Command Prompt
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=12ms TTL=126
Reply from 60.60.60.2: bytes=32 time=1ms TTL=126
Reply from 60.60.60.2: bytes=32 time=1ms 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 = 12ms, 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:\>
```

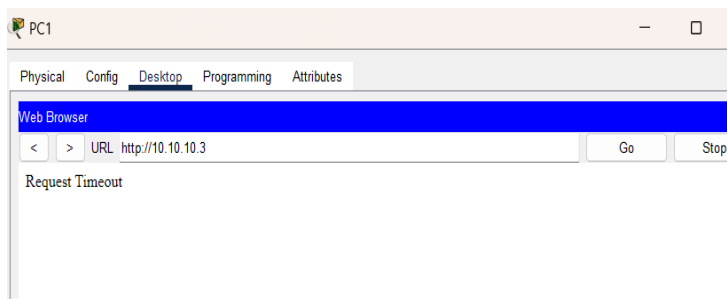
In the above when I ping from pc0 to pc1 with public ip address the packet are sent to the pc1 .

But when I ping using private ip address of pc 1 it shows that the host is not reachable this is because of NAT.

## Accessing the internet from pc1 : using server public ip address



## Using private ip address to access



Unable to access this is because of nat .

## NAT TABLE:

```
Router#show ip nat translations
Pro  Inside global      Inside local      Outside local      Outside global
---  50.50.50.2          10.10.10.2        ---                ---
---  50.50.50.3          10.10.10.3        ---                ---
tcp  50.50.50.3:80      10.10.10.3:80     60.60.60.2:1025    60.60.60.2:1025
tcp  50.50.50.3:80      10.10.10.3:80     60.60.60.2:1026    60.60.60.2:1026
```

Here we understand that every local address is mapped with global address whenever any device wants to connect to a pc from outside of the network the pc ip address is taken as public ip address and cannot connect with private ip address this is because nat hides the private address .