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EXP: 11   **Date:13/10/25**

EXAMINNING NETWORK ADDRESS TRANSLATION (NAT) USING CISCO PACKET TRACER

Aim:

The aim of Cisco NAT is to allow devices inside a private network to communicate with external networks using a single or limited number of public IP addresses, and to provide a layer of security by hiding internal IP addresses from outside networks.

Algorithm:

1. Identify packets originating from inside the private network.

2. Translate the source IP address from private (inside local) to a public IP address (inside global).

3. Track each translation in a NAT table to allow return traffic to be correctly mapped back to the internal device.

4. For incoming packets, translate the destination public IP address back to the corresponding private IP address.

5. the translated packet to the correct device.
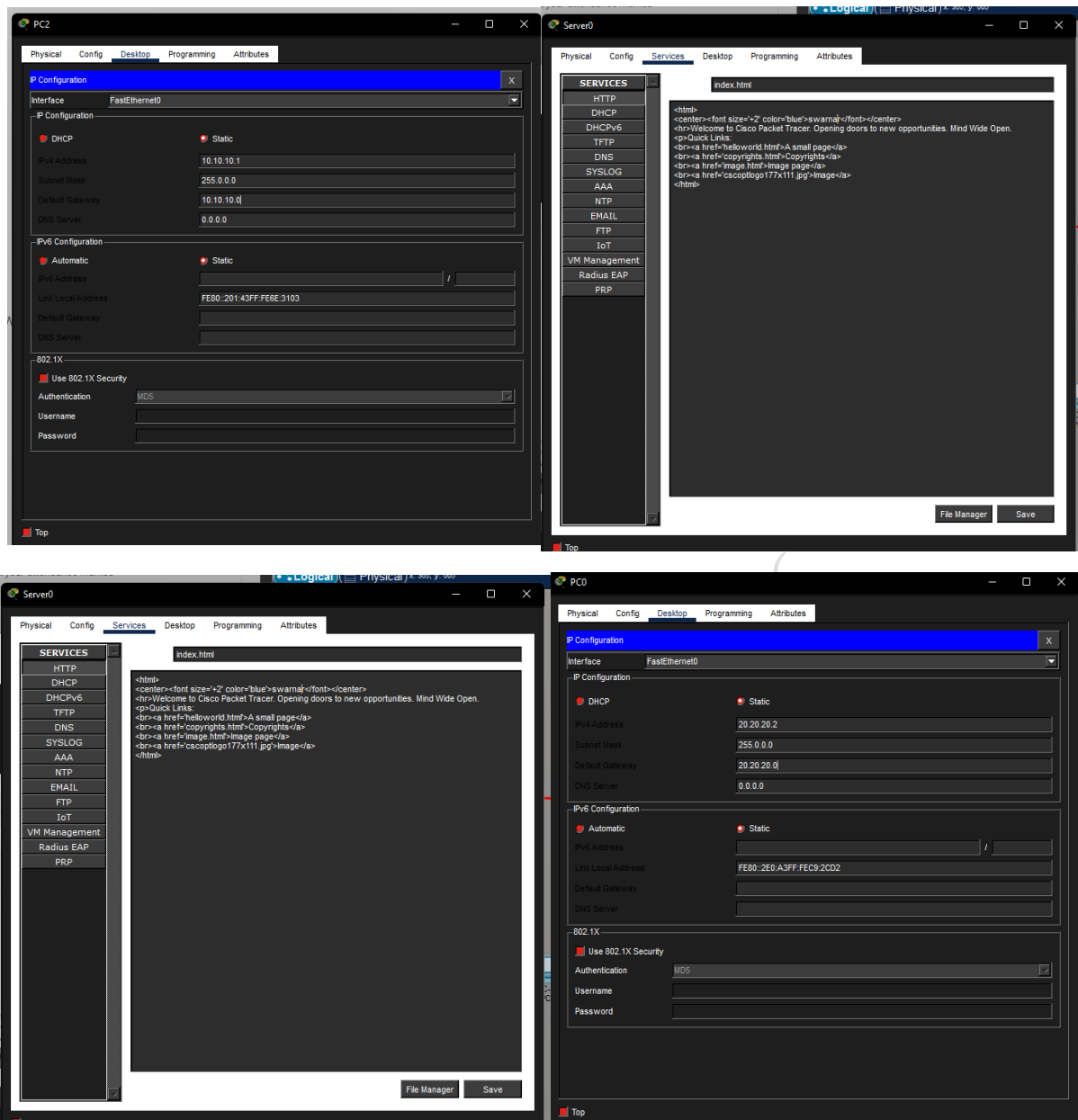
Setting up the network topology

1. 2 routers
2. 2 switches
3. 3 PCs
4. 1 server
5. Serial and ethernet cabels
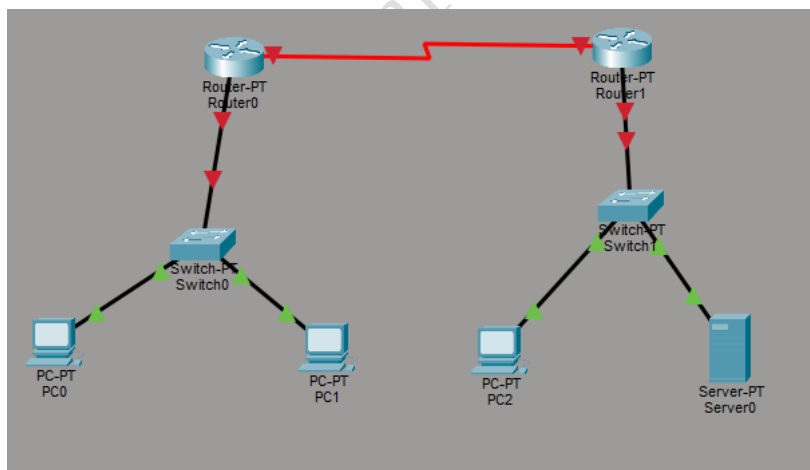
Assing IP addressees to PC and servers

Open pc and server and go to desktop -> IP configuration and enter the details

PC2 — IP Configuration

Physical | Config | Desktop | Programming | Attributes

IP Configuration

Interface: FastEthernet0

IP Configuration
- DHCP / ● Static
- IPv4 Address: 10.10.10.1
- Subnet Mask: 255.0.0.0
- Default Gateway: 10.10.10.0
- DNS Server: 0.0.0.0

IPv6 Configuration
- Automatic / ● Static
- IPv6 Address: /
- Link Local Address: FE80::201:43FF:FE6E:3103
- Default Gateway:
- DNS Server:

802.1X
- Use 802.1X Security
- Authentication: MD5
- Username:
- Password:

Top

Server0 — Services

Physical | Config | Services | Desktop | Programming | Attributes

SERVICES
HTTP
DHCP
DHCPv6
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP
IoT
VM Management
Radius EAP
PRP

index.html

```
<html>
<center><font size='+2' color='blue'>swarna</font></center>
<hr>Welcome to Cisco Packet Tracer. Opening doors to new opportunities. Mind Wide Open.
<p>Quick Links:
<br><a href='helloworld.html'>A small page</a>
<br><a href='copyrights.html'>Copyrights</a>
<br><a href='image.html'>Image page</a>
<br><a href='cscoptlogo177x111.jpg'>Image</a>
</html>
```

File Manager | Save

Top

Server0 — Services

Physical | Config | Services | Desktop | Programming | Attributes

SERVICES
HTTP
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</html>
```

File Manager | Save

Top

PC0 — IP Configuration

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: 20.20.20.0
- DNS Server: 0.0.0.0

IPv6 Configuration
- Automatic / ● Static
- IPv6 Address: /
- Link Local Address: FE80::2E0:A3FF:FEC9:2CD2
- Default Gateway:
- DNS Server:

802.1X
- Use 802.1X Security
- Authentication: MD5
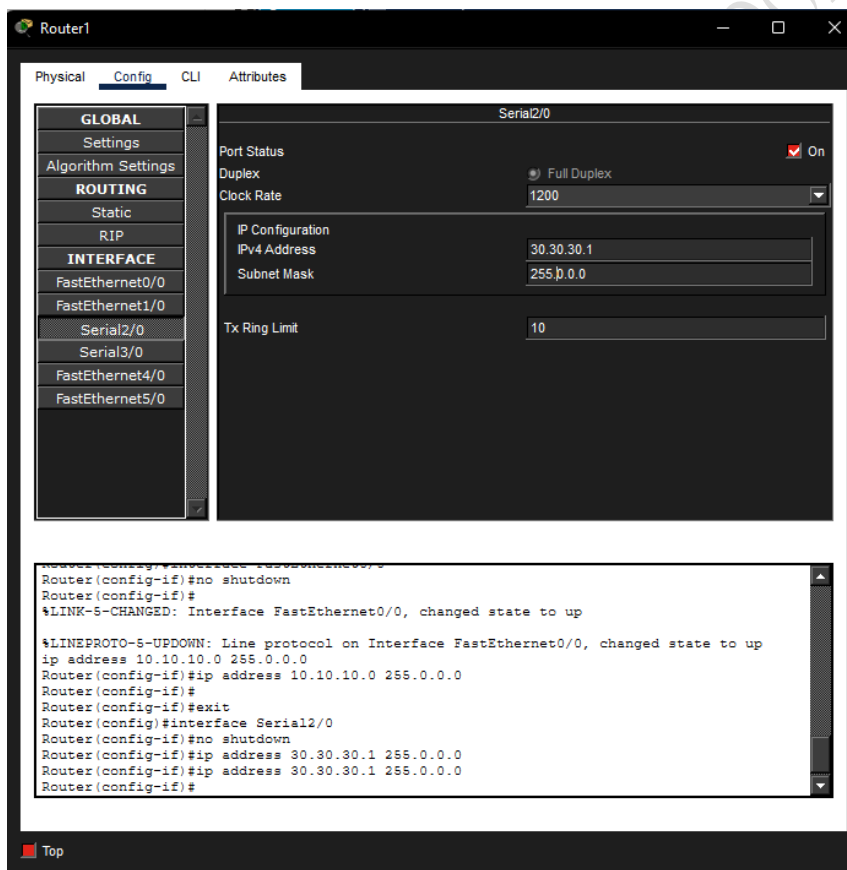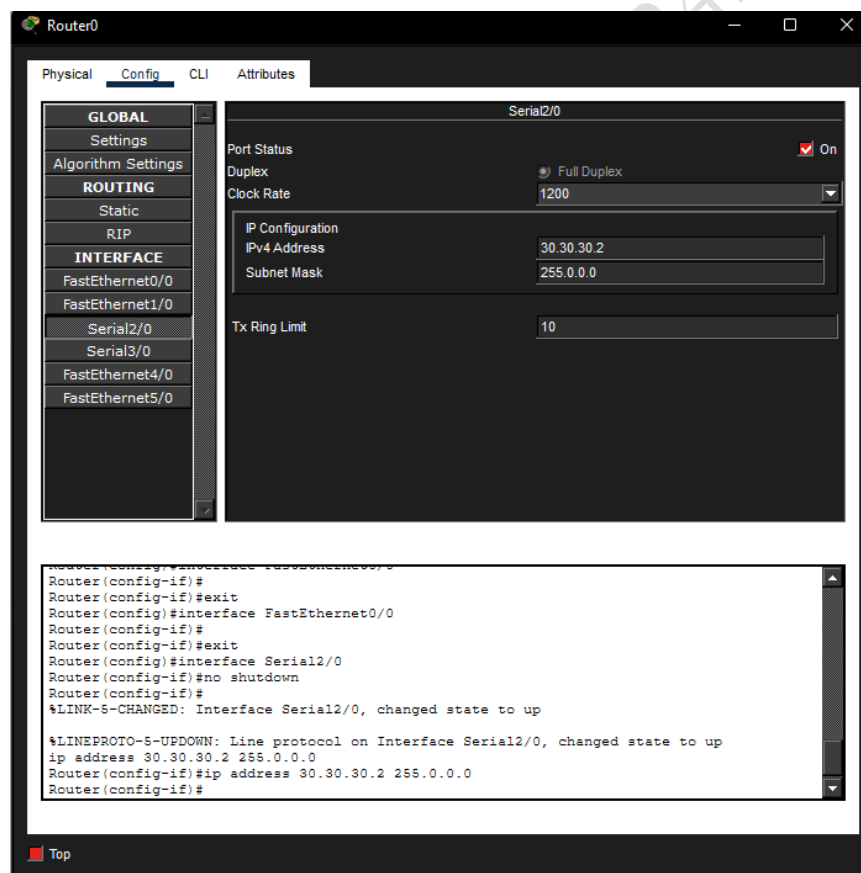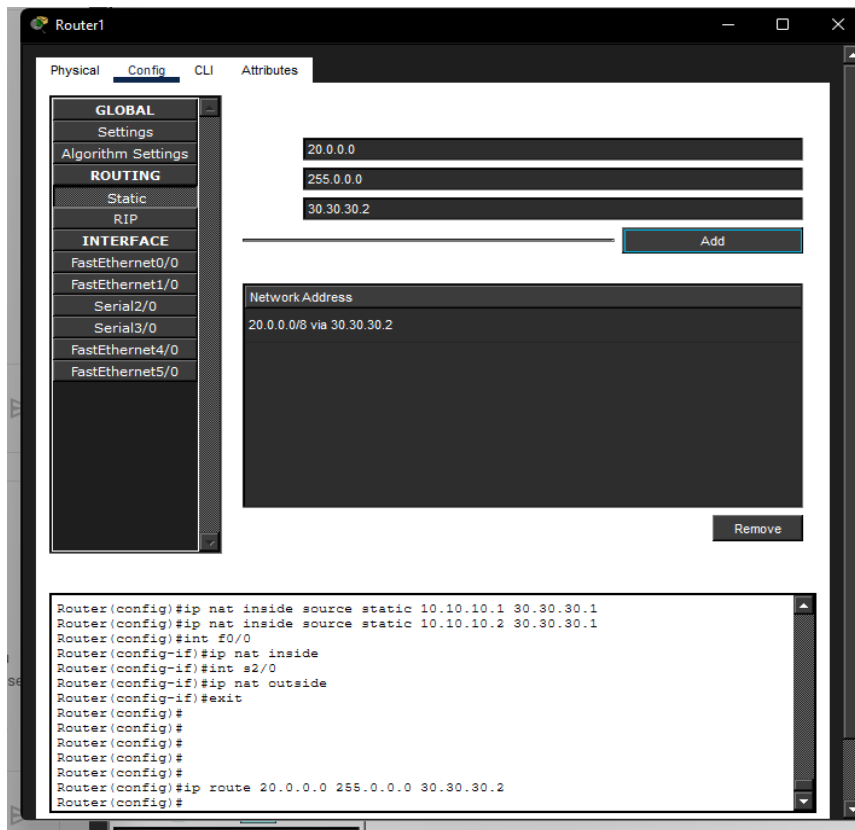- Username:
- Password:

Top

Go to service tabe in server 1 ,edit index.html.change the heading in it.now open rowser in PC2 and type the following url.You will notice the change in heading.
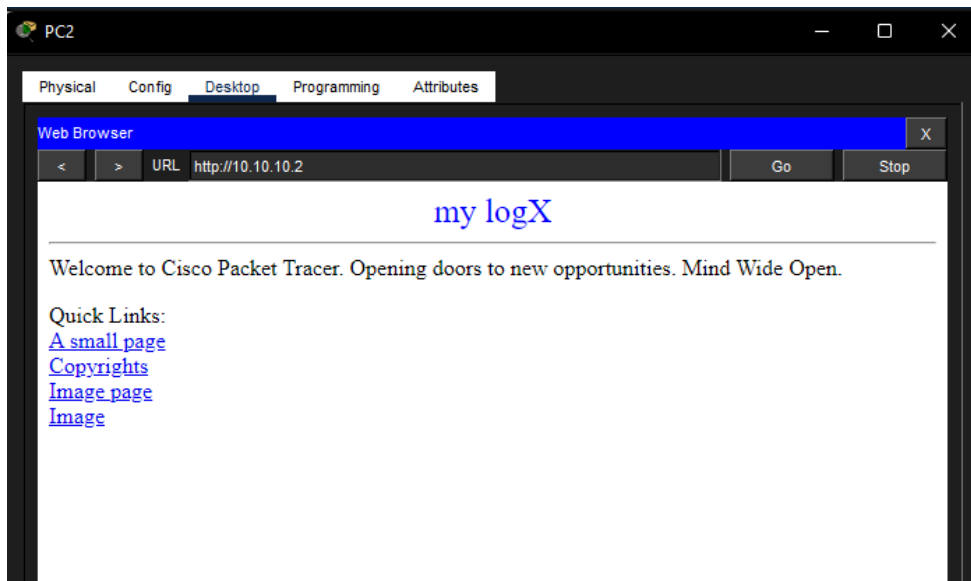
Configure the routers

Clice on the router ,go to config tab.under interface select the port connect.mark the tick box "on".fill the ip address and subnet mask.repeat this for allthe portss in the 2 routers.

Router window — Router1 (Config tab):

```
20.0.0.0
255.0.0.0
30.30.30.2                          Add

Network Address
20.0.0.0/8 via 30.30.30.2

                                    Remove
```

```
Router(config)#ip nat inside source static 10.10.10.1 30.30.30.1
Router(config)#ip nat inside source static 10.10.10.2 30.30.30.1
Router(config)#int f0/0
Router(config-if)#ip nat inside
Router(config-if)#int s2/0
Router(config-if)#ip nat outside
Router(config-if)#exit
Router(config)#
Router(config)#
Router(config)#
Router(config)#
Router(config)#
Router(config)#ip route 20.0.0.0 255.0.0.0 30.30.30.2
Router(config)#
```


Router window — Router0 (Config tab, Serial2/0):

```
                    Serial2/0
Port Status                                         ☑ On
Duplex                          ⦿ Full Duplex
Clock Rate                      1200
    IP Configuration
    IPv4 Address                30.30.30.2
    Subnet Mask                 255.0.0.0

Tx Ring Limit                   10
```

```
Router(config-if)#
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
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

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up
ip address 30.30.30.2 255.0.0.0
Router(config-if)#ip address 30.30.30.2 255.0.0.0
Router(config-if)#
```

Top

Static NAT Mapping on router1:

Open R1 ->CLI

Enter the following code:

```
Router(config)#ip nat inside source static 10.10.10.1 30.30.30.1
Router(config)#ip nat inside source static 10.10.10.2 30.30.30.1
Router(config)#int f0/0
Router(config-if)#ip nat inside
Router(config-if)#int s2/0
Router(config-if)#ip nat outside
Router(config-if)#exit
Router(config)#
```

Here is the test procedure in clear, error-free text form suitable for your experiment documentation:
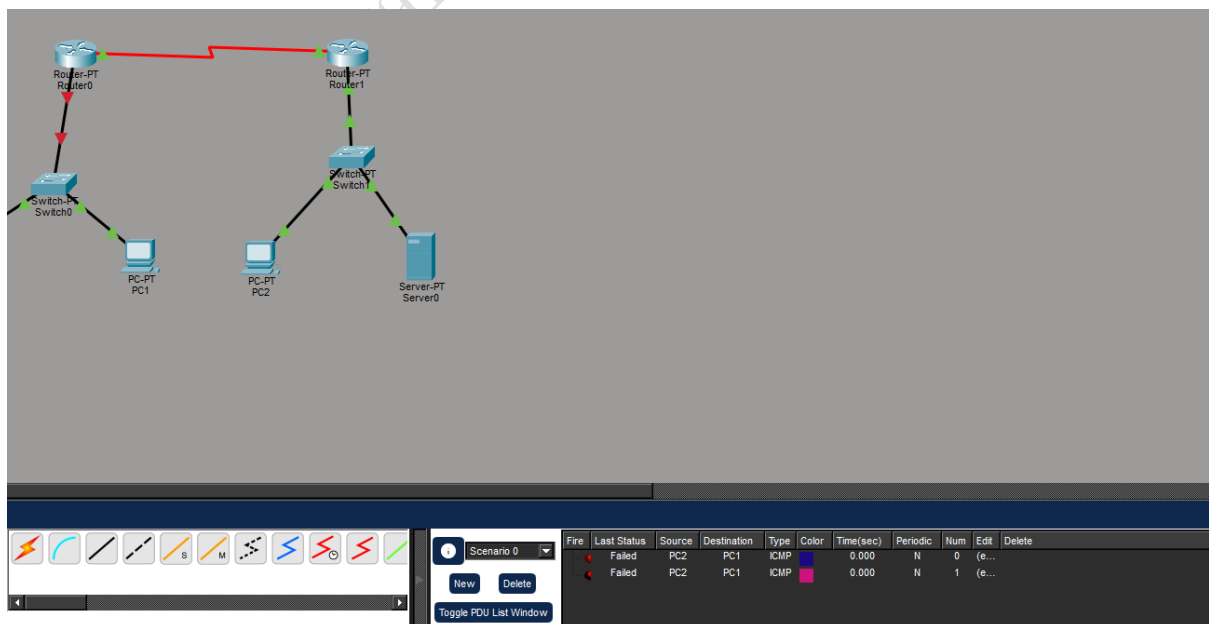

PDU Test Procedure

Test 1: Private to Public Network

- Select the Add Simple PDU tool from the main toolbar.

- Set the source as PC1 and the destination as PC2.

- Send the PDU.

- The PDU succeeds because the private IP is able to traverse the public network.

Test 2: Public to Private Network

- Select the Add Simple PDU tool from the main toolbar.

- Set the source as PC2 and the destination as PC1.

- Send the PDU.

- The PDU fails because the public IP cannot traverse the private network.

---

ping Test Procedure

- Open the command prompt or terminal on the source device.

- Ping the destination device by typing the ping command followed by the destination IP address.

- Verify the ping response.

- A successful ping indicates that the devices are reachable and the network connection is working.

- A failed ping indicates there is no network connectivity between the source and destination devices.


```
PC2                                                         —    □    ✕

  Physical   Config   Desktop   Programming   Attributes

  Command Prompt                                                    X

    Cisco Packet Tracer PC Command Line 1.0
    C:\>ping 20.20.20.1

    Pinging 20.20.20.1 with 32 bytes of data:

    Reply from 30.30.30.2: Destination host unreachable.
    Reply from 30.30.30.2: Destination host unreachable.
    Reply from 30.30.30.2: Destination host unreachable.
    Reply from 30.30.30.2: Destination host unreachable.

    Ping statistics for 20.20.20.1:
        Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

    C:\>
```

```
ping 10.10.10.1

Pinging 10.10.10.1 with 32 bytes of data:

Request timed out.
Request timed out.
Reply from 20.20.20.0: Destination host unreachable.
Reply from 20.20.20.0: Destination host unreachable.

Ping statistics for 10.10.10.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 30.30.30.1

Pinging 30.30.30.1 with 32 bytes of data:

Request timed out.
Reply from 30.30.30.1: bytes=32 time=7ms TTL=126
Reply from 30.30.30.1: bytes=32 time=1ms TTL=126
Reply from 30.30.30.1: bytes=32 time=7ms TTL=126

Ping statistics for 30.30.30.1:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 7ms, Average = 5ms

C:\>
```
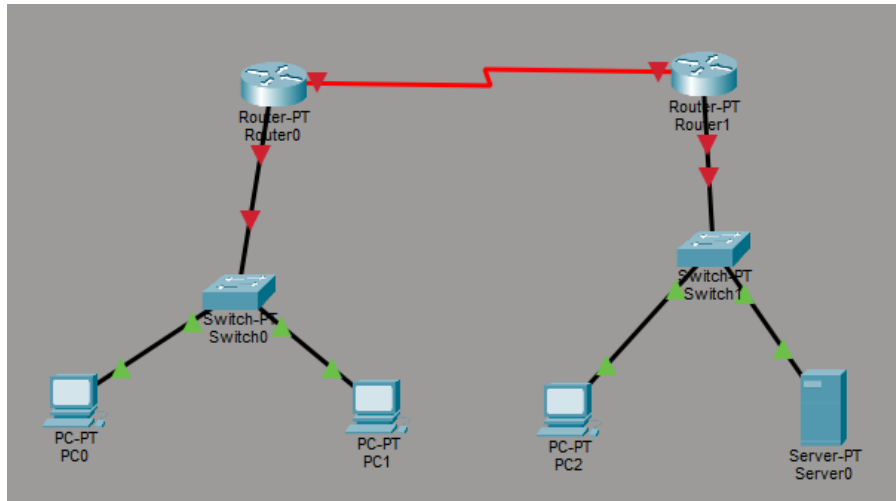
Result

Thus network address translation (NAT) was examined using cisco packet tracer.