



**Academic Year: 2023-24**

**Class/Branch: TE/DS**

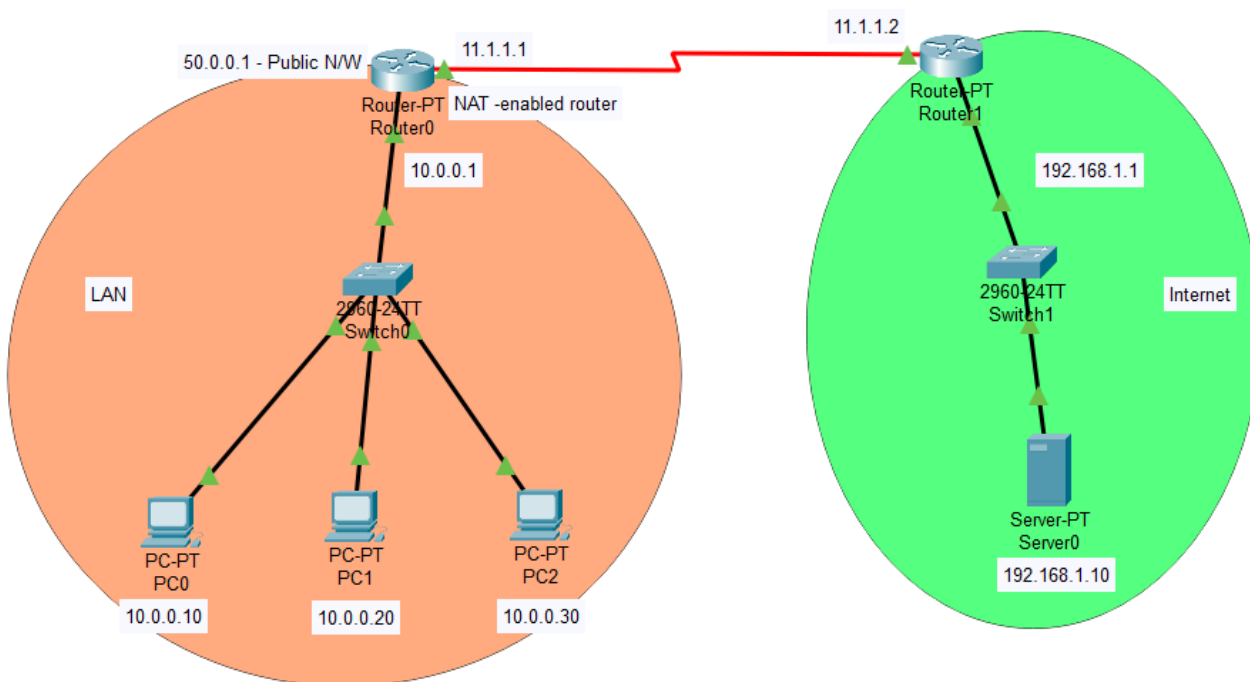
**Semester: V**

**Subject: WCN**

## Experiment No. 09

1. **Aim:** To design and simulate NAT on router using Cisco packet tracer/ GNS3.

### Procedure:



### **STEP 1: NETWORK CONFIGURATION**

### **STEP 2: ROUTER CONFIGURATION**

#### Router 0

Device Name: Router0				
Device Model: Router-PT				
Hostname: Router				
Port	Link	IP Address	IPv6 Address	MAC Address
FastEthernet0/0	Up	10.0.0.1/8	<not set>	0010.116A.AD61
FastEthernet1/0	Down	<not set>	<not set>	0003.E4D8.50D9
Serial2/0	Up	11.1.1.1/8	<not set>	<not set>
Serial3/0	Down	<not set>	<not set>	<not set>
FastEthernet4/0	Down	<not set>	<not set>	0007.ECE0.48C8
FastEthernet5/0	Down	<not set>	<not set>	0005.5EB7.7946
Physical Location: Intercity > Home City > Corporate Office > Main Wiring Closet > Rack > Router0				



Router0

Physical **Config** CLI Attributes

**GLOBAL**

Settings

Algorithm Settings

**ROUTING**

Static

RIP

**INTERFACE**

FastEthernet0/0

FastEthernet1/0

Serial2/0

Serial3/0

FastEthernet4/0

FastEthernet5/0

FastEthernet0/0

Port Status ☒ On

Bandwidth ☐ 100 Mbps ☐ 10 Mbps ☒ Auto

Duplex ☐ Half Duplex ☒ Full Duplex ☒ Auto

MAC Address 0010.116A.AD61

IP Configuration

IPv4 Address 10.0.0.1

Subnet Mask 255.0.0.0

Tx Ring Limit 10

Router0

Physical **Config** CLI Attributes

**GLOBAL**

Settings

Algorithm Settings

**ROUTING**

Static

RIP

**INTERFACE**

FastEthernet0/0

FastEthernet1/0

Serial2/0

Serial3/0

FastEthernet4/0

FastEthernet5/0

Serial2/0

Port Status ☒ On

Duplex ☒ Full Duplex

Clock Rate 2000000

IP Configuration

IPv4 Address 11.1.1.1

Subnet Mask 255.0.0.0

Tx Ring Limit 10

## Router 1

```
Device Name: Router1
Device Model: Router-PT
Hostname: Router

Port          Link   IP Address      IPv6 Address      MAC Address
FastEthernet0/0 Up     192.168.1.1/24  <not set>         000C.CF1E.7EC0
FastEthernet1/0 Down   <not set>       <not set>         0003.E453.8D69
Serial2/0     Up     11.1.1.2/8      <not set>         <not set>
Serial3/0     Down   <not set>       <not set>         <not set>
FastEthernet4/0 Down   <not set>       <not set>         0002.1724.5179
FastEthernet5/0 Down   <not set>       <not set>         0001.C921.40C9

Physical Location: Intercity > Home City > Corporate Office > Main Wiring Closet > Rack > Router1
```



Router1

Physical **Config** CLI Attributes

**GLOBAL**

- Settings
- Algorithm Settings
- ROUTING**
- Static
- RIP
- INTERFACE**
- FastEthernet0/0
- FastEthernet1/0
- Serial2/0
- Serial3/0
- FastEthernet4/0
- FastEthernet5/0

**FastEthernet0/0**

Port Status ☒ On

Bandwidth ☐ 100 Mbps ☐ 10 Mbps ☒ Auto

Duplex ☐ Half Duplex ☒ Full Duplex ☒ Auto

MAC Address 000C.CF1E.7EC0

IP Configuration

IPv4 Address 192.168.1.1

Subnet Mask 255.255.255.0

Tx Ring Limit 10

Router1

Physical **Config** CLI Attributes

**GLOBAL**

- Settings
- Algorithm Settings
- ROUTING**
- Static
- RIP
- INTERFACE**
- FastEthernet0/0
- FastEthernet1/0
- Serial2/0**
- Serial3/0
- FastEthernet4/0
- FastEthernet5/0

**Serial2/0**

Port Status ☒ On

Duplex ☒ Full Duplex

Clock Rate 2000000

IP Configuration

IPv4 Address 11.1.1.2

Subnet Mask 255.0.0.0

Tx Ring Limit 10

### **STEP 3: IP ROUTING-CONFIGURING DEFAULT ROUTE TO INTERNET**

Router0

```
Router>
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial2/0
Router(config-if)#
Router(config-if)#ip route 0.0.0.0 0.0.0.0 11.1.1.2
Router(config)#
```

Copy Paste

### **STEP 4: IP ROUTING-CONFIGURING STATIC ROUTE TO PRIVATE NETWORK ROUTER**



Router1

Physical Config CLI Attributes

**GLOBAL**

Settings

Algorithm Settings

**ROUTING**

Static

RIP

**INTERFACE**

FastEthernet0/0

FastEthernet1/0

Serial2/0

Serial3/0

FastEthernet4/0

FastEthernet5/0

Static Routes

Network 50.0.0.0

Mask 255.0.0.0

Next Hop 11.1.1.1

Add

Network Address

50.0.0.0/8 via 11.1.1.1

### 1. Create an access list of IP addresses which need translation

```
Router(config)# access-list ACL_Identifier_number permit/deny matching-parameters
```

Router0

Physical Config CLI Attributes

IOS Command Line Interface

```
Router#enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#access-list 1 permit 10.0.0.10 0.0.0.0
Router(config)#access-list 1 permit 10.0.0.20 0.0.0.0
Router(config)#access-list 1 deny any
```

### 2. Create a pool of all IP address which are available for translation

```
Router(config)#ip nat pool [Pool Name] [Start IP address] [End IP address] netmask [Subnet mask]
```

Router0

```
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip nat pool nair 50.0.0.1 50.0.0.2 netmask 255.0.0.0
Router(config)#
```

Copy Paste

### 3. Map access list with pool

```
Router(config)#ip nat inside source list [access list name or number] pool [pool name]
```

```
Router(config)#ip nat inside source list 1 pool nair
```



```
Router0
Router(config)#ip nat inside source list 1 pool nair
Router(config)#
```

Copy Paste

#### 4. Define inside and outside interfaces

```
Router0
Router#enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
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)#
```

### **STEP 6: DATA TRANSMISSION**

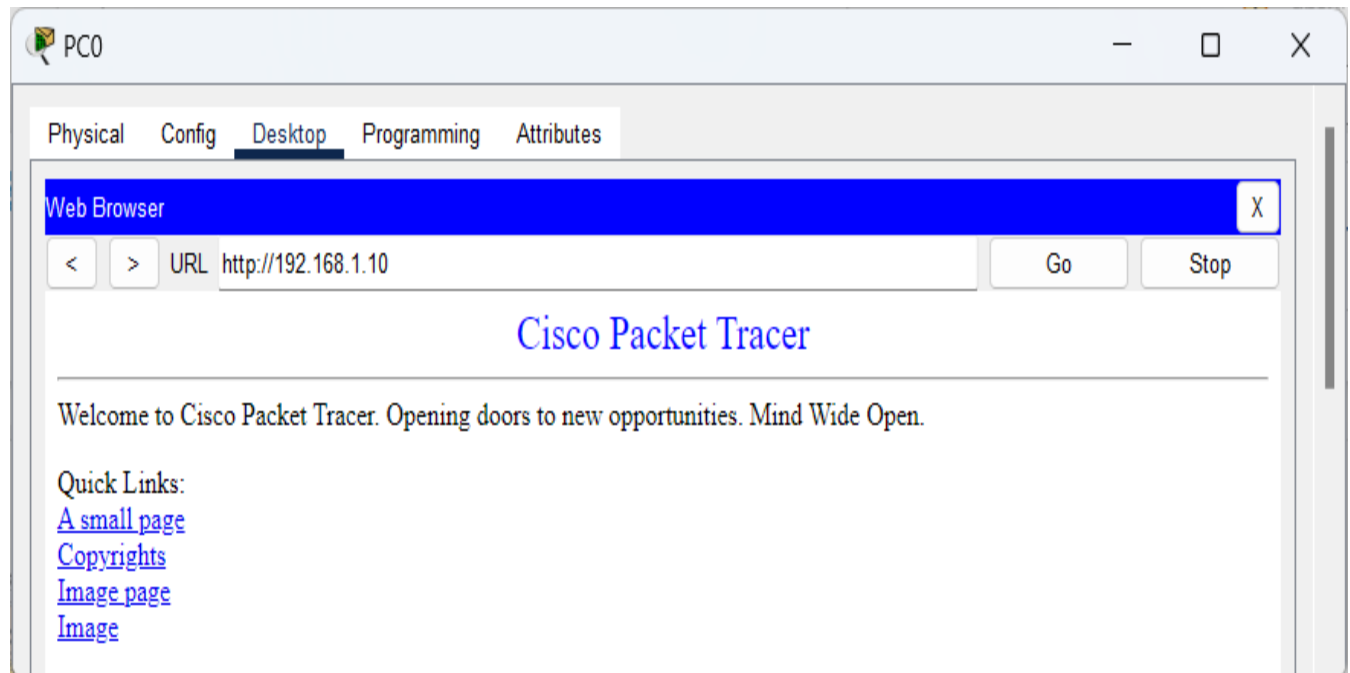
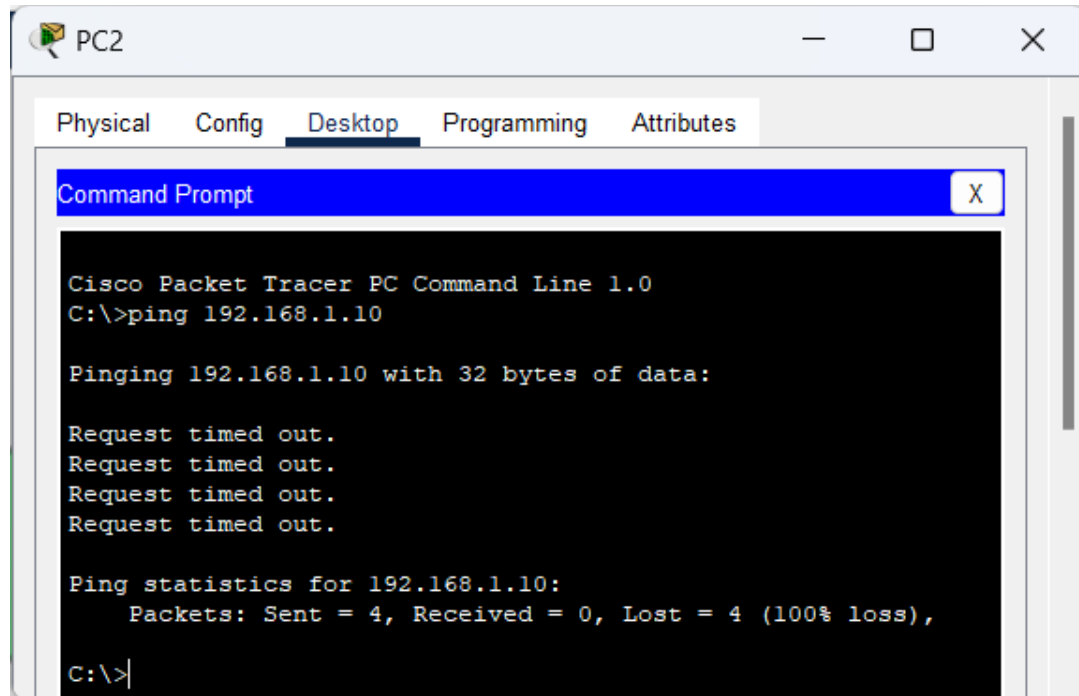
```
PC1
Physical Config Desktop Programming Attributes
Command Prompt X
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.10

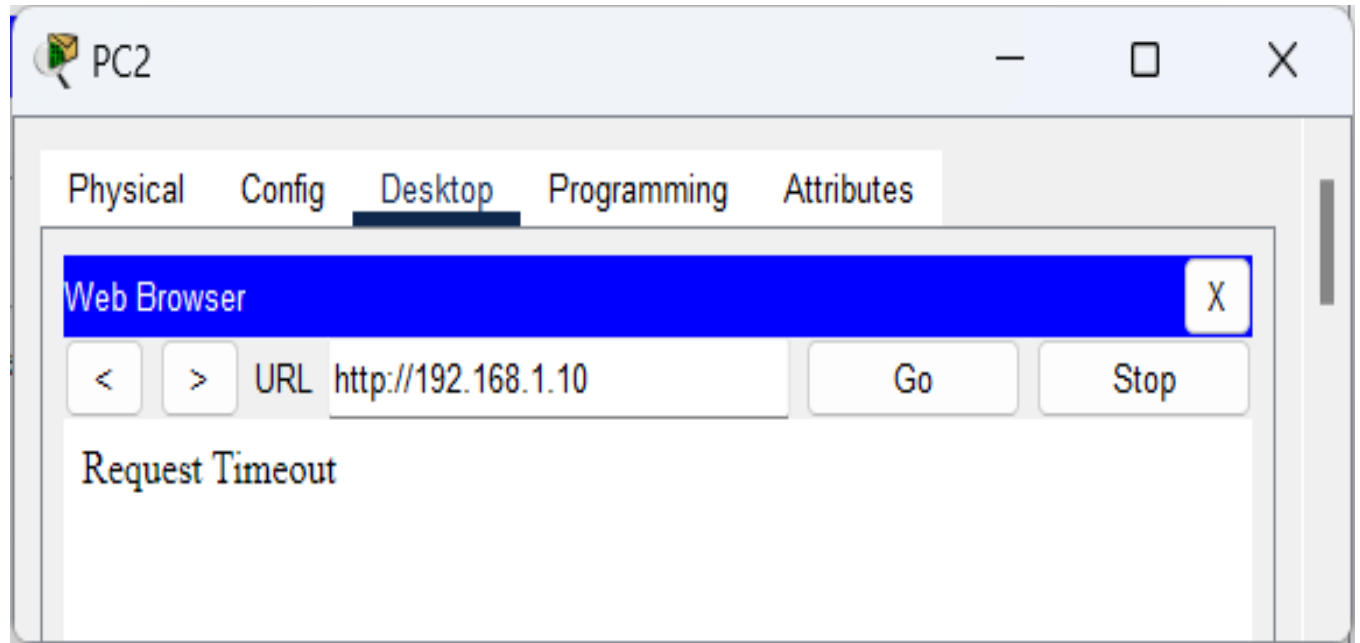
Pinging 192.168.1.10 with 32 bytes of data:

Reply from 192.168.1.10: bytes=32 time=1ms TTL=126
Reply from 192.168.1.10: bytes=32 time=1ms TTL=126
Reply from 192.168.1.10: bytes=32 time=1ms TTL=126
Reply from 192.168.1.10: bytes=32 time=11ms TTL=126

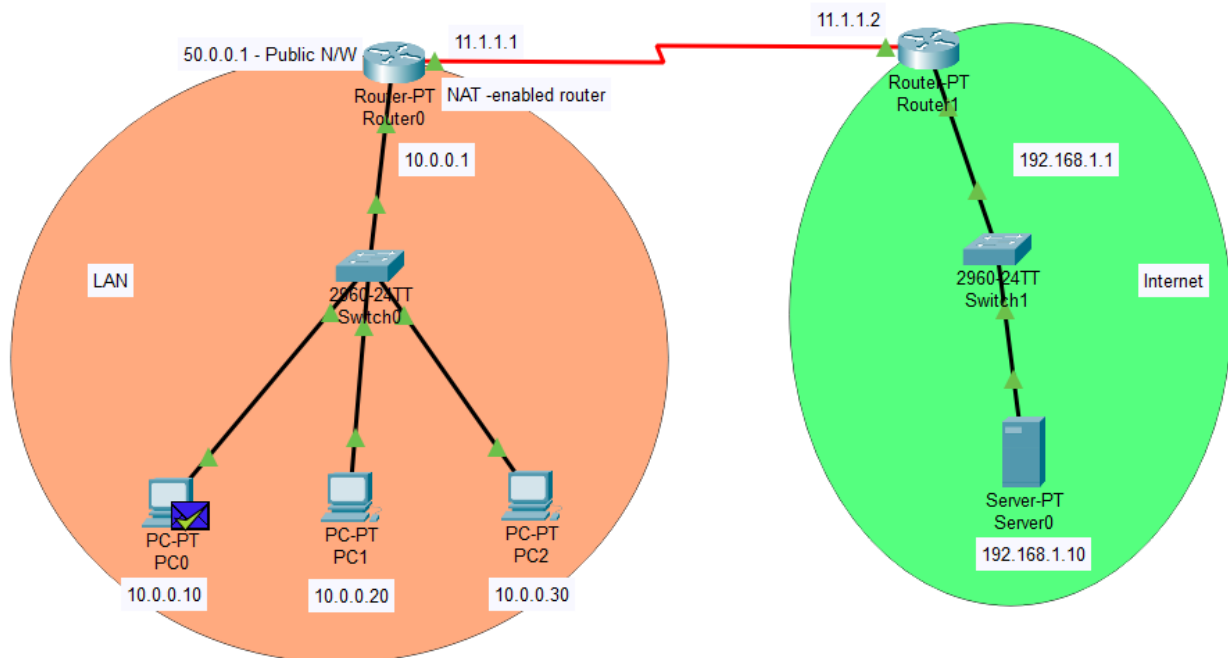
Ping statistics for 192.168.1.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 11ms, Average = 3ms

C:\>
```





### OUTPUT:



**Fig:** Simulation output from PC0 to Server



Simulation Panel

Event List

Vis.	Time(sec)	Last Device	At Device	Type
	0.000	--	PC0	ICMP
	0.001	PC0	Switch0	ICMP
	0.002	Switch0	Router0	ICMP
	0.003	Router0	Router1	ICMP
	0.004	Router1	Switch1	ICMP
	0.005	Switch1	Server0	ICMP
	0.006	Server0	Switch1	ICMP
	0.007	Switch1	Router1	ICMP
	0.008	Router1	Router0	ICMP
	0.009	Router0	Switch0	ICMP
	0.010	Switch0	PC0	ICMP

Reset Simulation

☒ Constant Delay

Captured to: 0.010 s

Play Controls

Event List Filters - Visible Events

ICMP

Edit Filters

Show All/None

PDU Information at Device: Router0

OSI Model

Inbound PDU Details

Outbound PDU Details

At Device: Router0  
Source: PC0  
Destination: Server0

In Layers

Layer7

Layer6

Layer5

Layer4

Layer 3: IP Header Src. IP: 10.0.0.10, Dest. IP: 192.168.1.10 ICMP Message Type: 8

Layer 2: Ethernet II Header 0001.C76C.3E78 >> 0010.116A.AD61

Layer 1: Port FastEthernet0/0

Out Layers

Layer7

Layer6

Layer5

Layer4

Layer 3: IP Header Src. IP: 50.0.0.2, Dest. IP: 192.168.1.10 ICMP Message Type: 8

Layer 2: HDLC Frame HDLC

Layer 1: Port(s): Serial2/0

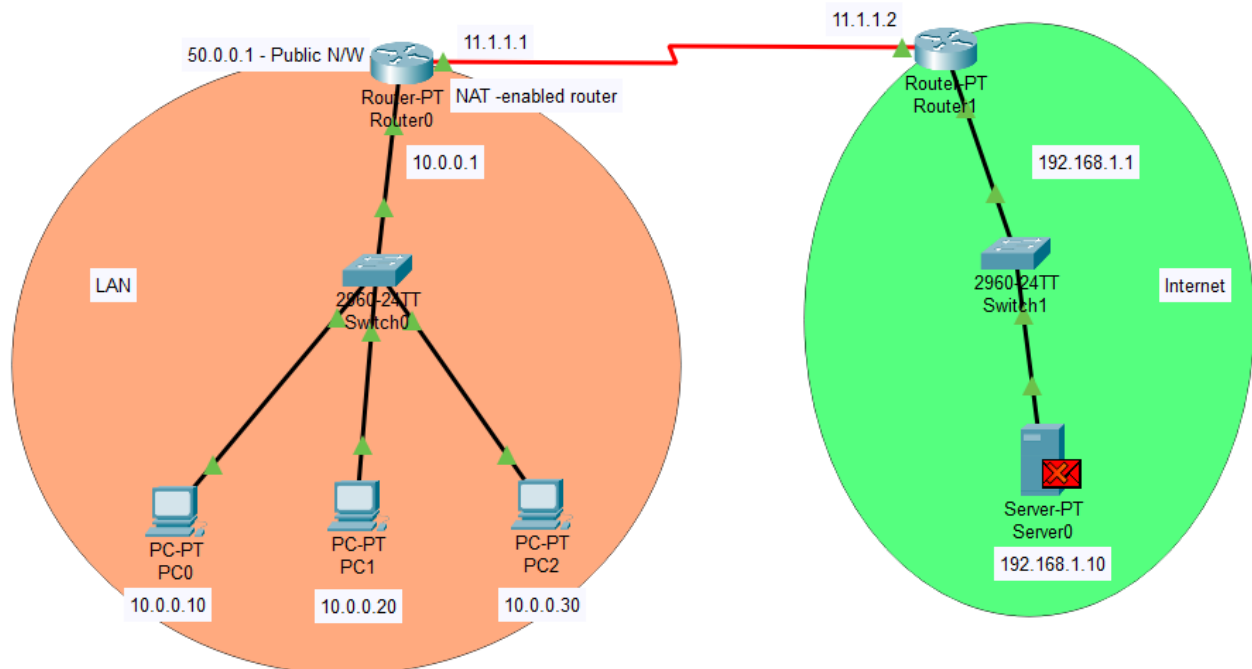
1. The routing table finds a routing entry to the destination IP address.  
2. The device decrements the TTL on the packet.

Challenge Me

<< Previous Layer

Next Layer >>





**Fig:** Simulation output from PC2 to Server