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Batch : N9

## Assignment 1

Assignment No. 2  
(CML)

Name - Sainath Pichad  
Roll - 33160  
Batch - N9 (TEG)

Assignment 1  
\_\_\_\_\_ OX \_\_\_\_\_

I Problem statements

(a) configure a router using router commands  
& configure routing information protocol

(b) configure ACL, standard & extended.

(c) Network Address Translation: static, dynamic  
& PAT.

\_\_\_\_\_ OX \_\_\_\_\_

\* Theory

Steps to configure routers

1 Assign IP address to each pc in a network from the ip configuration setting in the desktop menu.

2 Assign ip to interface of routers this can be done via the interface mode.

enable → configure terminal

Enter the interface mode & configure it

- interface fastethernet 0/0 : used to enter interface name
- no shutdown : brings the interface up
- exit

Serial interface needs two additional parameters clock rate & bandwidth which is used to control the data flow betw serial links.



Shotby Sai

We know how need to implement RIP config which will insist routers to share the information about networks that they have on their interface with each other

— or —

\* commands to setup RIP \*

- router rip : tell router to enable RIP
- network < network-id > specify network
- network < network-id >

The Network & router setup are done, once RIP routing is set all routers in network, ping command used to test connectivity betw 2 devices.



## \* ACL

"It's a set of Rules defined for controlling network traffic & reducing network attacks, it filter traffic based on rules"

### \* Features :-

① The set of rules defined are matched serially (top to bottom)

② Packets are matched only until it matches a rule, no further comparison

③ There is an implicit deny at the end of every ACL.

once the ACL is built, it should be applied to inbound or outbound of the interface

### Types of ACL

1. Standard ACL : They are made using source IP only, they don't distinguish between IP traffic like TCP, UDP. Identified by using number 1-99 or 1300-1999

### ③ Port Address Translation (PAT)

This is also known as NAT overload. Many IP addresses can be translated to a single IP address. Port numbers are used to distinguish the traffic.

Configuration steps are same as dynamic NAT except.

- ① pool of IP address has only 1 IP i.e. global IP
- ② ip nat inside source list 1 pool pool 1 overload.

————— oX —————

### \* Conclusion :-

Thus we have successfully learned how to configure router, RIP protocol, configure all its types of network address translation, PAT.

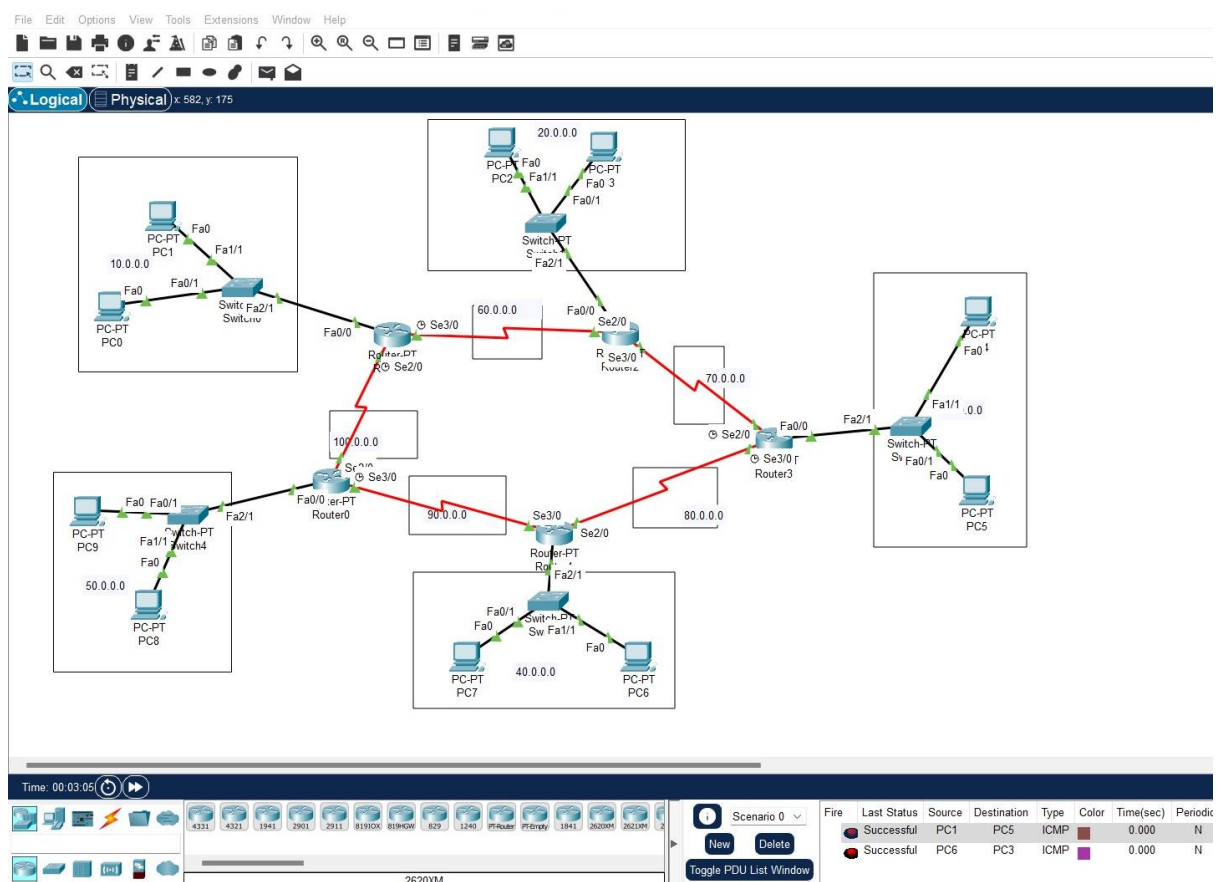
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Shobhy Sai

### Implementation:

### A. Configure a router using router commands and Configure Routing Information Protocol(RIP).

## 1. Network topology



## 2. RIP configuration for Router 1

The screenshot shows the configuration window for Router1, specifically the 'Config' tab. The left sidebar contains a tree view with categories: GLOBAL (Settings, Algorithm Settings), ROUTING (Static, RIP), and INTERFACE (FastEthernet0/0, FastEthernet1/0, Serial2/0, Serial3/0, FastEthernet4/0, FastEthernet5/0). The 'RIP' option under the ROUTING category is selected. The main area is titled 'RIP Routing' and features a 'Network' input field, an 'Add' button, and a table of configured networks. The table has a header 'Network Address' and lists three entries: 10.0.0.0, 60.0.0.0, and 100.0.0.0. A 'Remove' button is located at the bottom right of the table. Below the table, the 'Equivalent IOS Commands' section displays a terminal window with the following text:

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

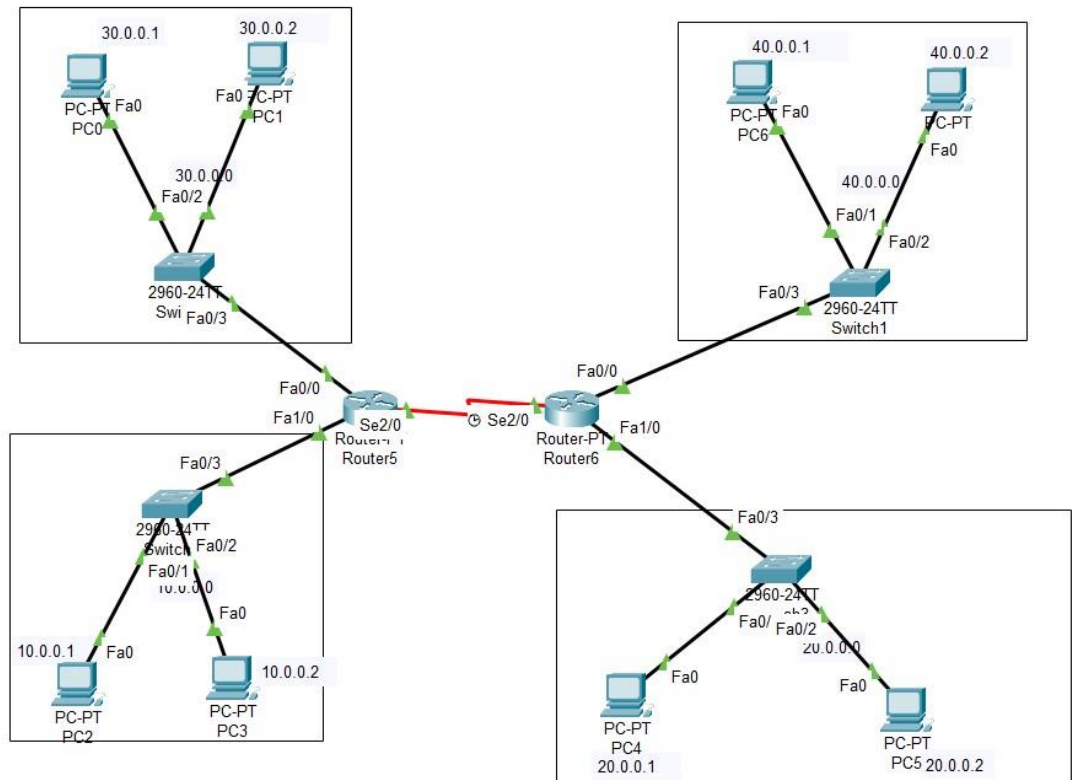
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router rip
Router(config-router)#
```

At the bottom left of the window, there is a checkbox labeled 'Top'.



## B. Configure Access Control lists – Standard & Extended.

### 1. Network Topology



### 2. Standard ACL to deny access of host 10.0.0.2 to the network.

Logical Physical x 556, y: 128 Root 02:00:00

Router2

Physical Config CLI Attributes

IOS Command Line Interface

```
X.25 software, Version 3.0.0.
4 FastEthernet/IEEE 802.3 interface(s)
2 Low-speed serial(sync/async) network interface(s)
32K bytes of non-volatile configuration memory.
63488K bytes of ATA CompactFlash (Read/Write)
Press RETURN to get started!

%LINK-5-CHANGED: Interface Serial2/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up

Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#access-list 1 deny host 10.0.0.2
Router(config)#access-list 1 permit any
Router(config)#interface fastEthernet 0/0
Router(config-if)#ip access-group 1 out
Router(config-if)#exit
Router(config)#
```

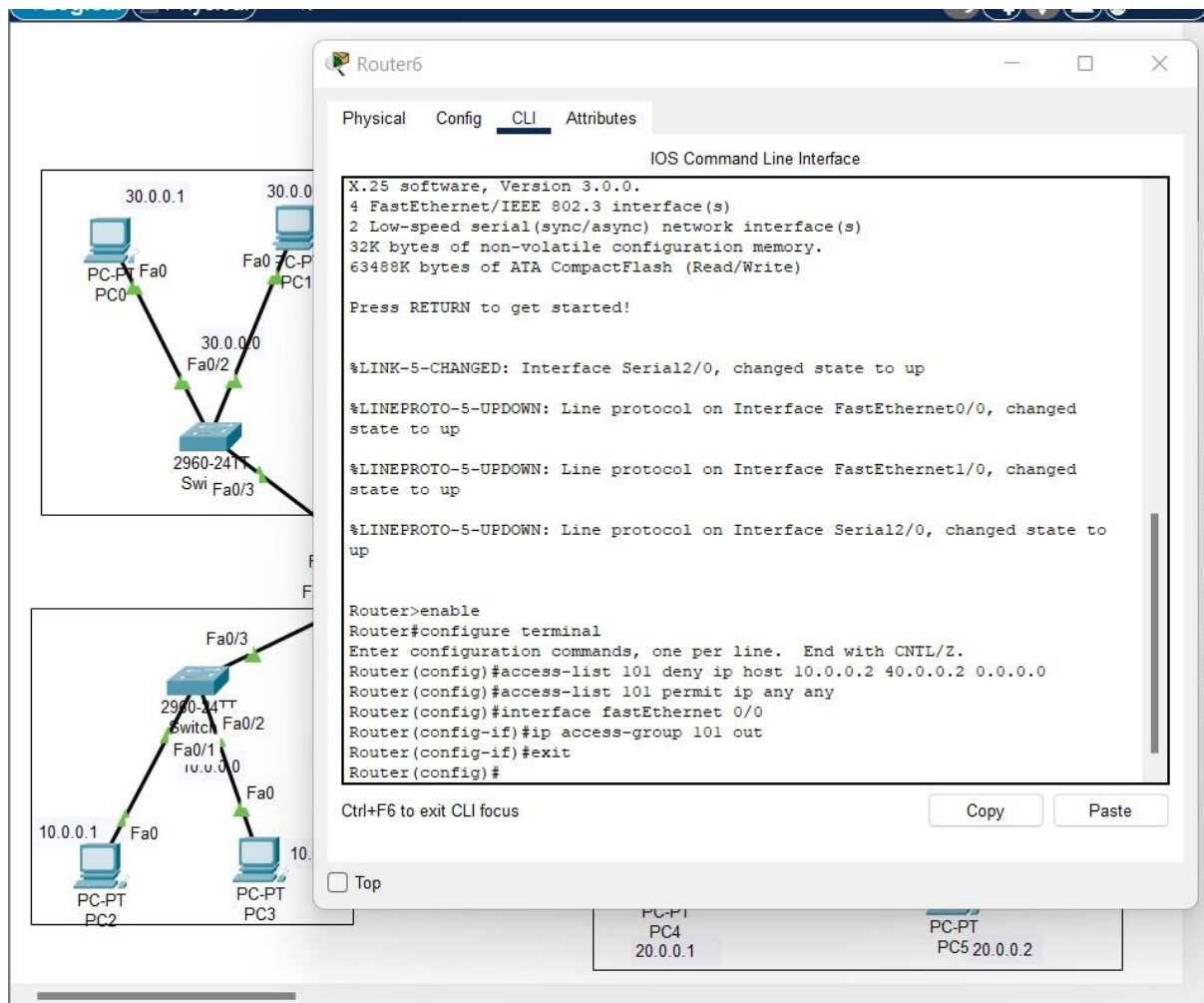
Ctrl+F6 to exit CLI focus

Copy Paste

Top

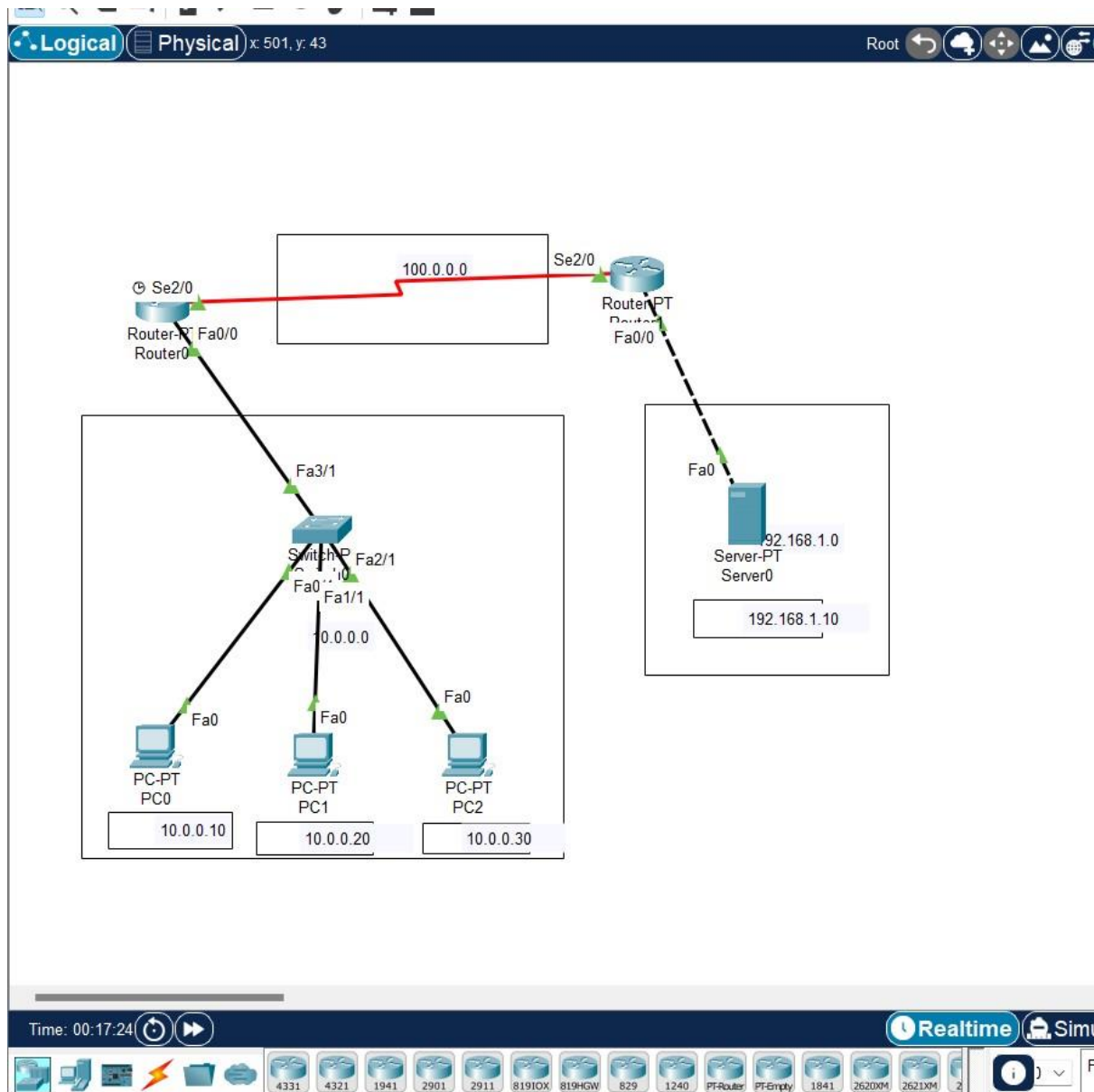
3. Extended ACL to deny access of ip host 10.0.0.2 to host with ip 40.0.0.2





## C. Network Address Translation: Static, Dynamic & PAT (Port Address Translation)

### 1. Network Topology



## 2. Static NAT

- i. Router 1 configuration to map local ip 10.0.0.10 to 50.0.0.10

Logical Physical x 122, y: 278 Root 01:07:30

Router1

Physical Config CLI Attributes

IOS Command Line Interface

X.25 software, version 3.0.0.  
4 FastEthernet/IEEE 802.3 interface(s)  
2 Low-speed serial(sync/async) network interface(s)  
32K bytes of non-volatile configuration memory.  
63488K bytes of ATA CompactFlash (Read/Write)

Press RETURN to get started!

%LINK-5-CHANGED: Interface Serial2/0, changed state to up  
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up  
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up

R1>enable  
R1#configure terminal  
Enter configuration commands, one per line. End with CNTL/Z.  
R1(config)#ip nat inside source static 10.0.0.10 50.0.0.10  
R1(config)#interface FastEthernet 0/0  
R1(config-if)#ip nat inside  
R1(config-if)#exit  
R1(config)#interface Serial 2/0  
R1(config-if)#ip nat outside  
R1(config-if)#exit  
R1(config)#ip route 200.0.0.0 255.255.255.0 100.0.0.2  
R1(config)#

Ctrl+F6 to exit CLI focus

Copy Paste

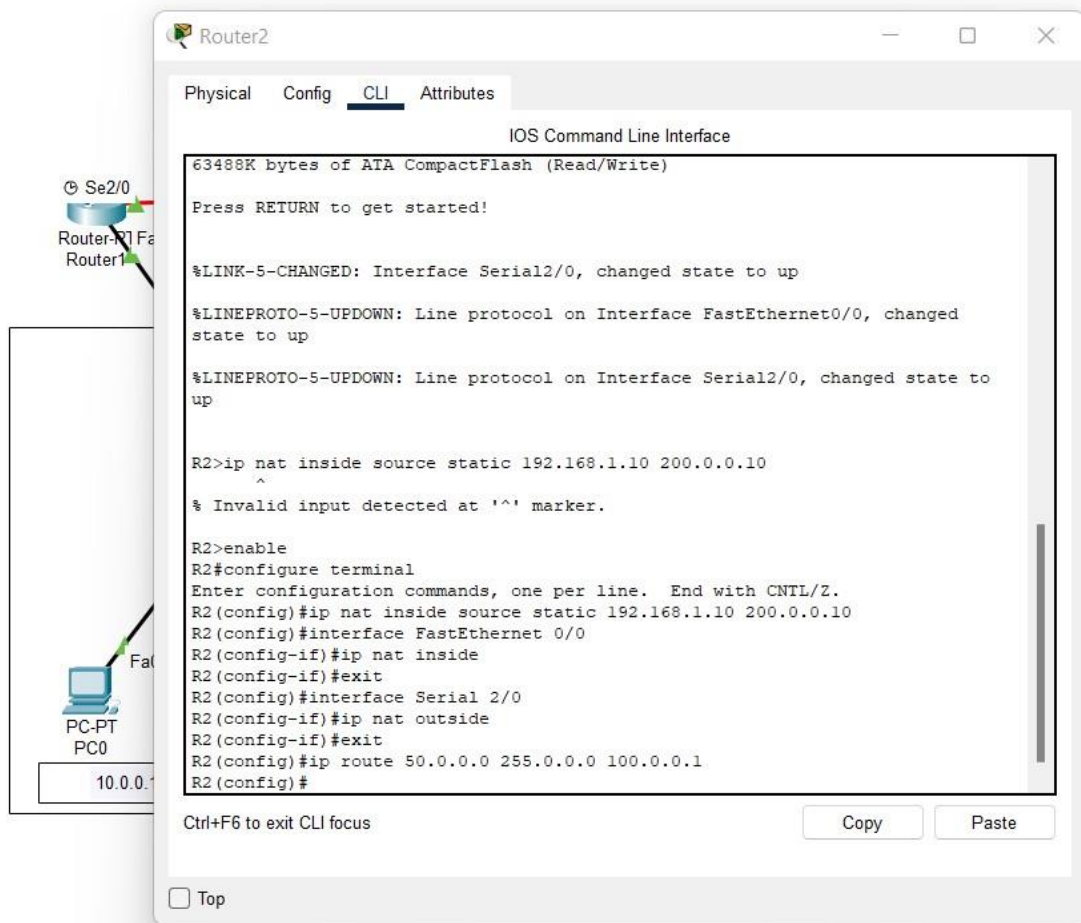
Top

Se2/0  
Router1 Fa0/0  
Router1

Fa0  
PC-PT  
PC0  
10.0.0.10

Time: 00:02:12 Realtime Simulation

ii. Router 2 configuration to map ip 192.168.1.10 to 200.0.0.10



The screenshot shows a network simulation environment. On the left, a network diagram includes a router labeled 'Router1' with a 'Se2/0' interface connected to a 'PC-PT PC0' with IP '10.0.0.1'. The main window is titled 'Router2' and has tabs for 'Physical', 'Config', 'CLI', and 'Attributes'. The 'CLI' tab is active, displaying the 'IOS Command Line Interface'. The interface shows the following text:

```

63488K bytes of ATA CompactFlash (Read/Write)
Press RETURN to get started!

%LINK-5-CHANGED: Interface Serial2/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed
state to up

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

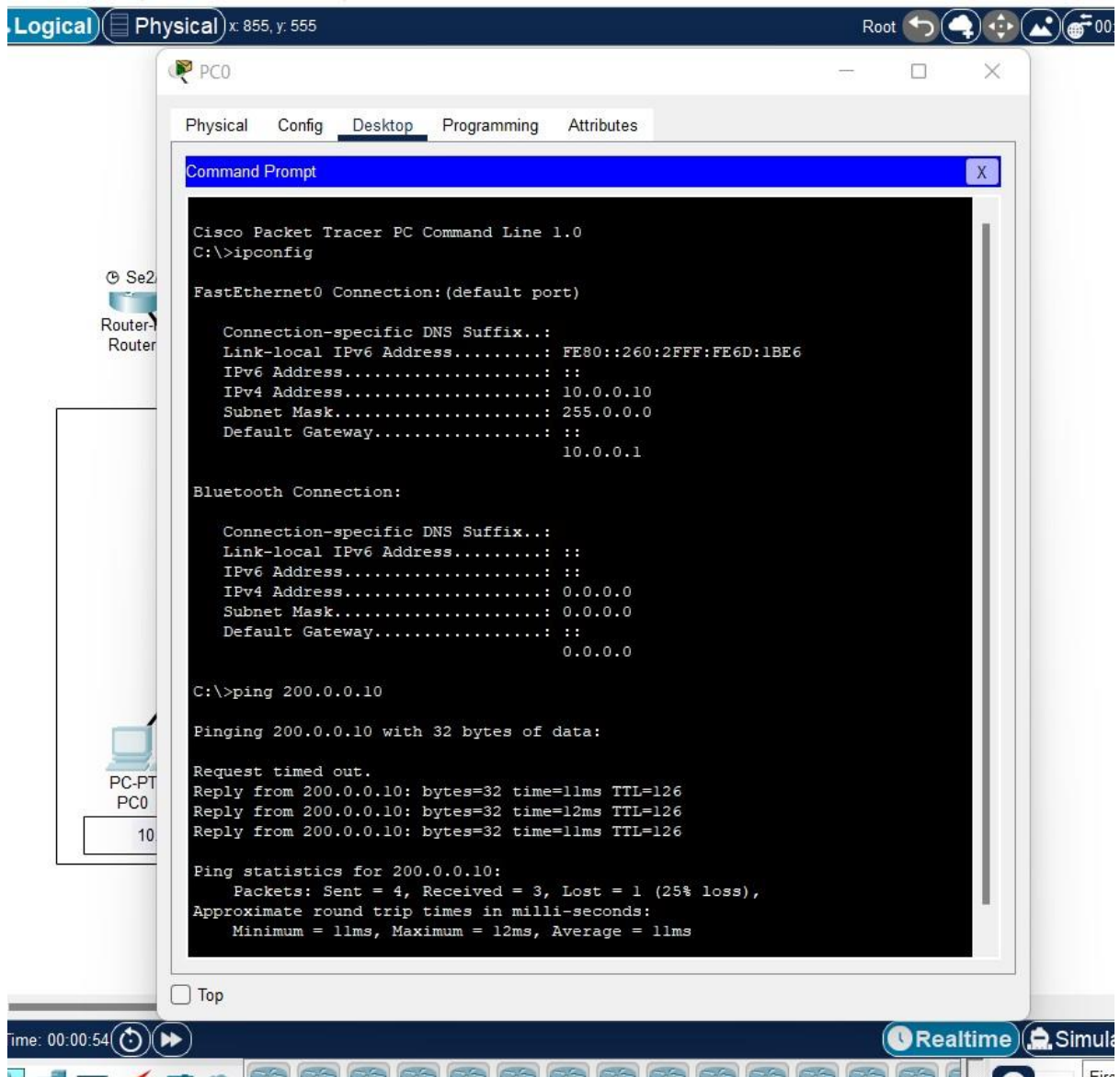
R2>ip nat inside source static 192.168.1.10 200.0.0.10
^
% Invalid input detected at '^' marker.

R2>enable
R2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#ip nat inside source static 192.168.1.10 200.0.0.10
R2(config)#interface FastEthernet 0/0
R2(config-if)#ip nat inside
R2(config-if)#exit
R2(config)#interface Serial 2/0
R2(config-if)#ip nat outside
R2(config-if)#exit
R2(config)#ip route 50.0.0.0 255.0.0.0 100.0.0.1
R2(config)#
    
```

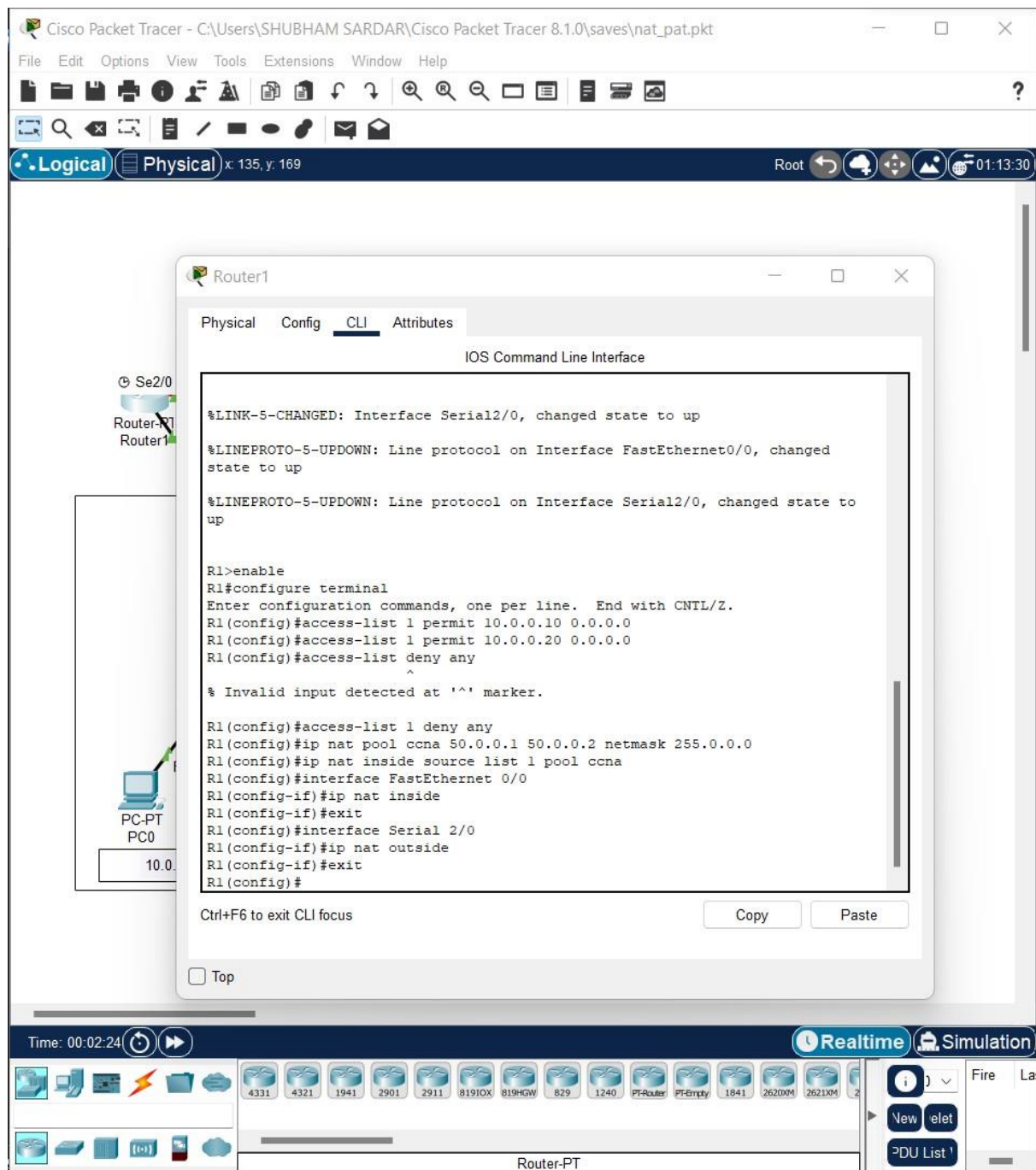
At the bottom of the CLI window, there is a 'Ctrl+F6 to exit CLI focus' message and 'Copy' and 'Paste' buttons. A 'Top' button is also visible at the bottom left of the window.

iii. Output upon ping to 200.0.0.10 from pc 10.0.0.10

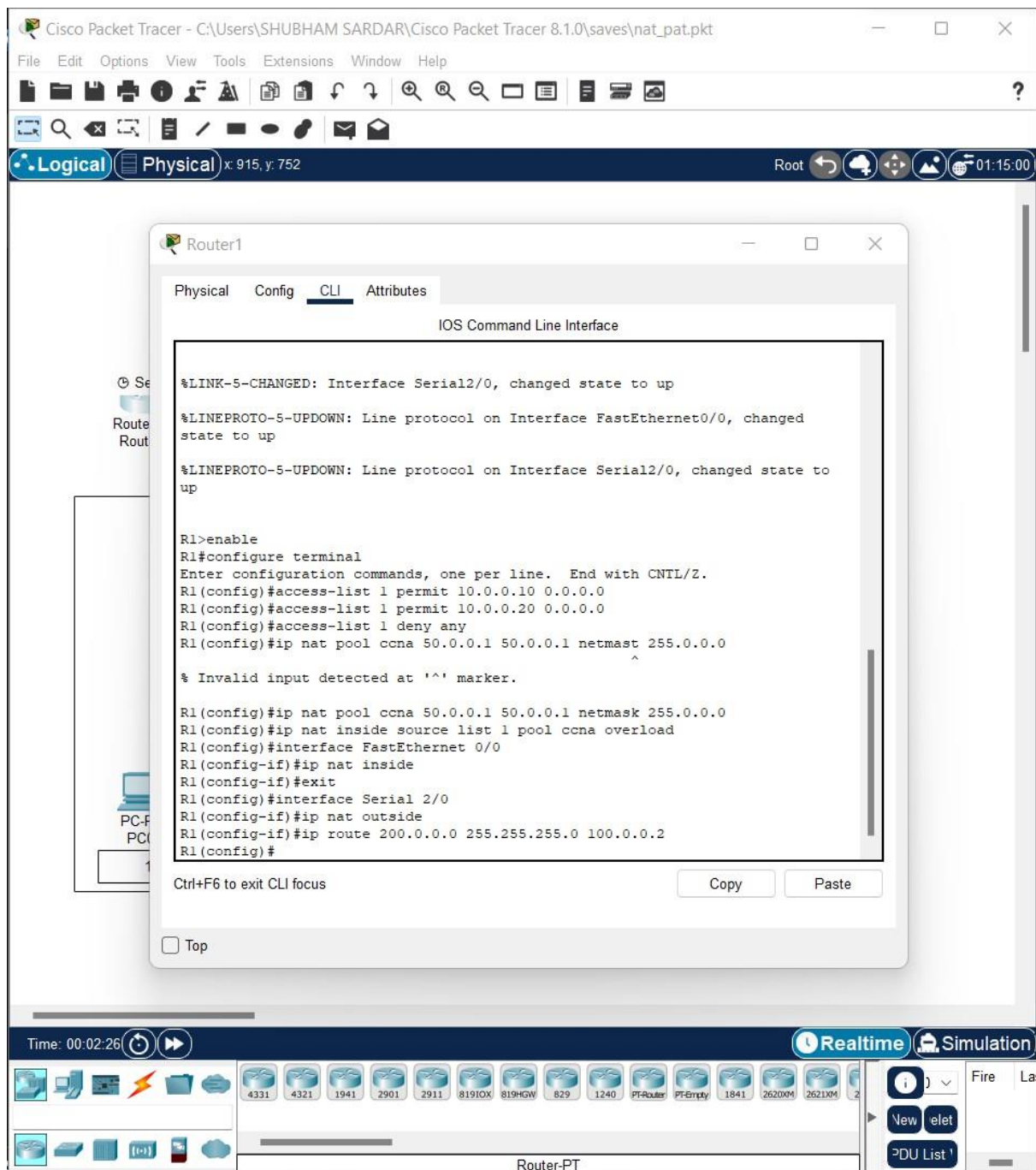




### 3. Dynamic NAT configuration for router 1



#### 4. PAT configuration for Router 1



Similar configuration to be done for router 2.