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Institute of Computer Technology
B. Tech Computer Science and Engineering

Sub:CN
Practical 4

Aim: To implement access control list (ACL) in network of an organization containing different

departments.

Scenario:

There is an organization of the University having 3 different departments University, ICT and DCS. IPv4 addressing scheme is used for assigning the IP address to the device as shown in Table1. Each department has multiple employees, which have specific rights to communicate within the network.

The details of the rights are as mentioned below:

Access Rights:

- University can contact all employees.
- Only Principal can contact University office.
- All Principals should contact each other
- All head of departments can contact each other

Configure Access Control List (ACL) at each router according to the specified access rights.

Procedure:

1) Create network as given below

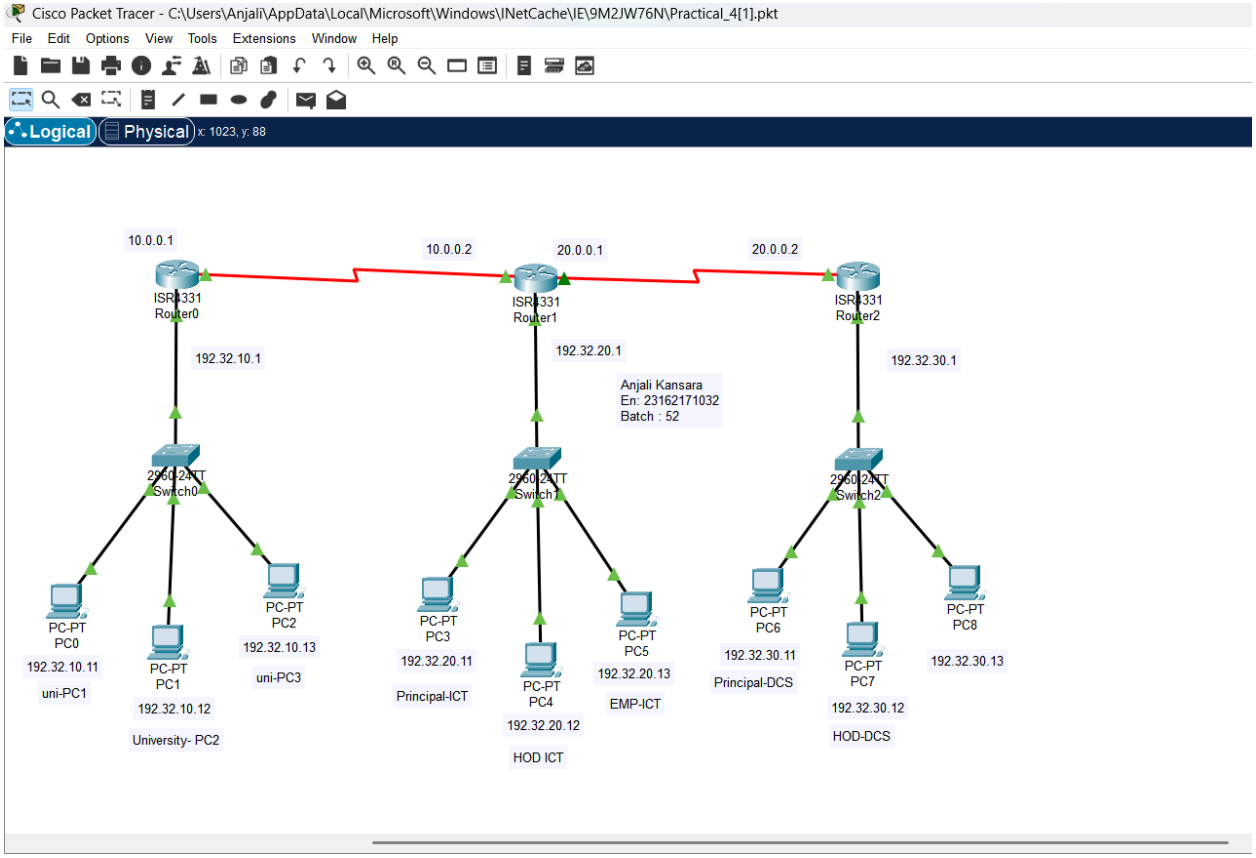
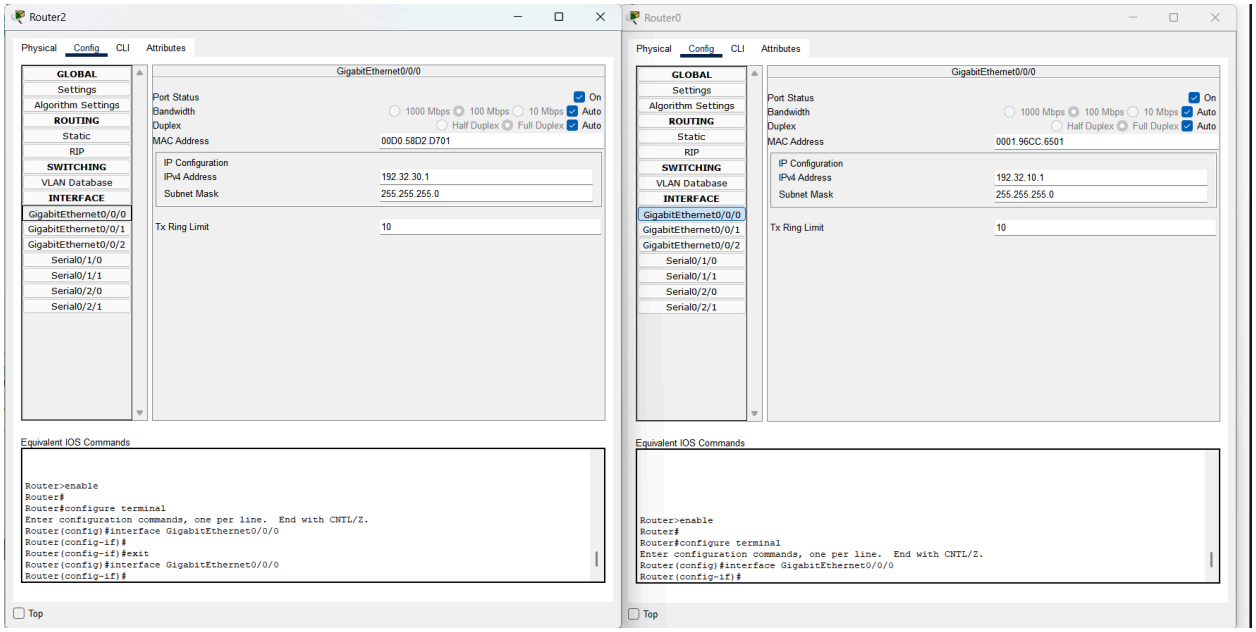
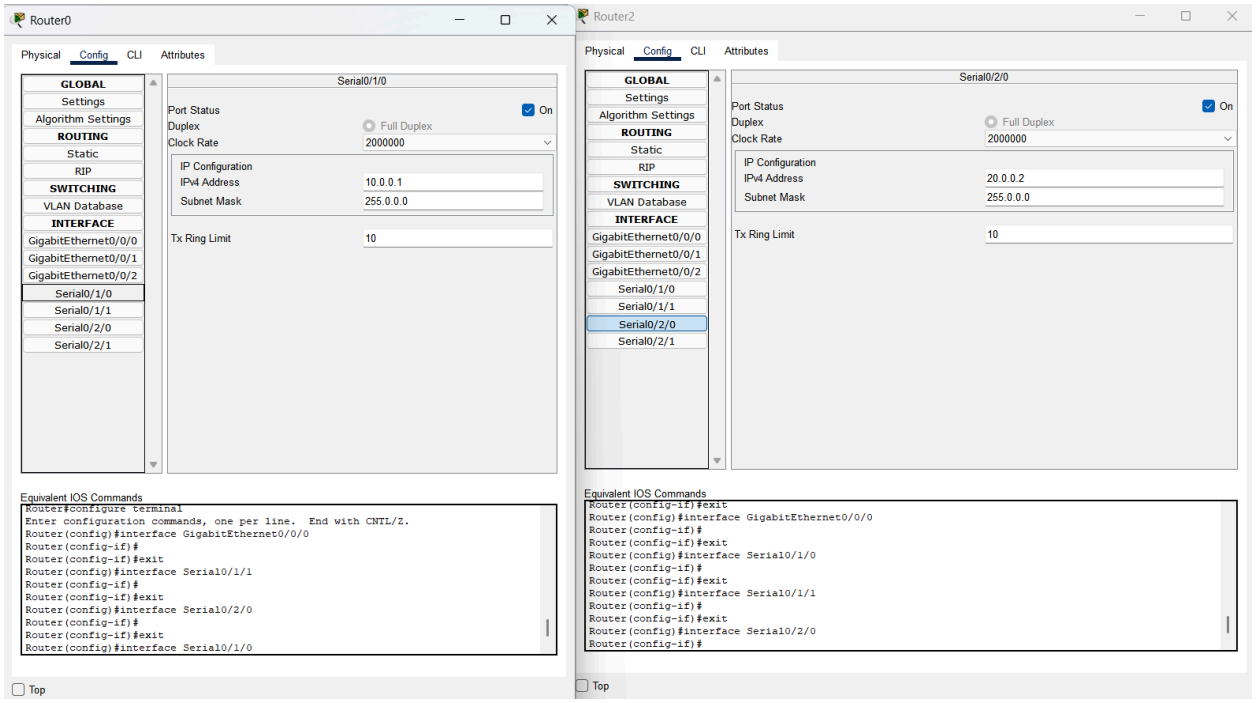


Table 1: IP Address of devices

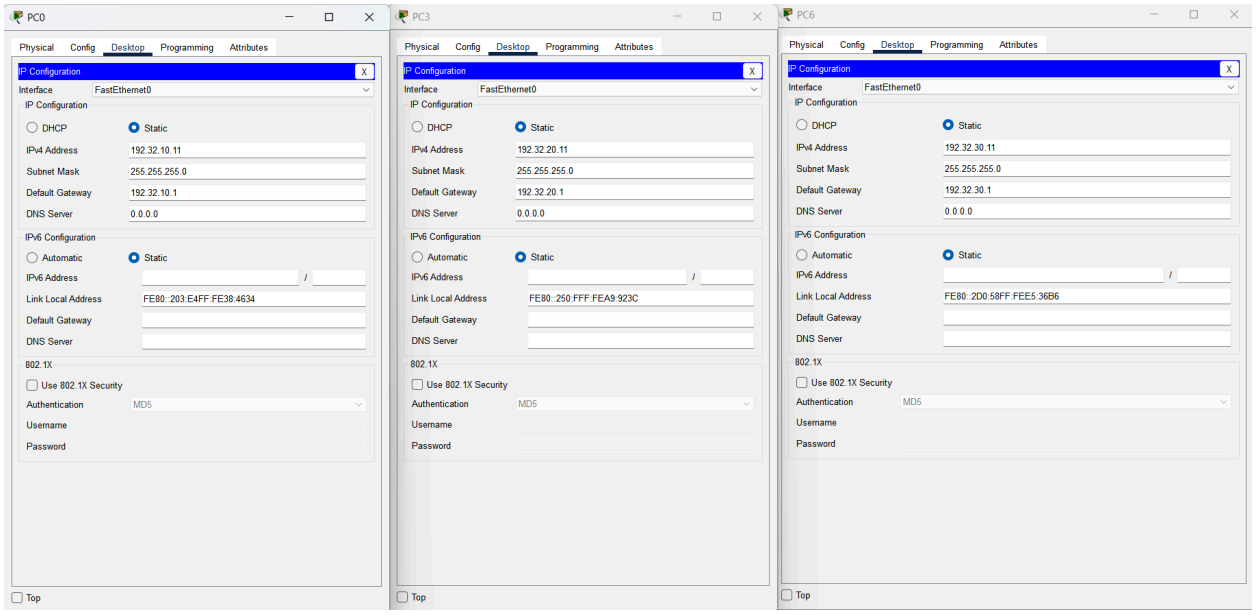
Department	Device	IP Address	Subnet Mask	Default Gateway
University	Uni. PC1	192.XX.10.11	255.255.255.0	192.XX.10.1
	Uni. PC2	192.XX.10.12	255.255.255.0	192.XX.10.1
	Uni. PC3	192.XX.10.13	255.255.255.0	192.XX.10.1
ICT	Principal-ICT	192.XX.20.11	255.255.255.0	192.XX.20.1
	HoD-ICT	192.XX.20.12	255.255.255.0	192.XX.20.1
	EMP1-ICT	192.XX.20.13	255.255.255.0	192.XX.20.1
DCS	Principal-DCS	192.XX.30.11	255.255.255.0	192.XX.30.1
	HoD-DCS	192.XX.30.12	255.255.255.0	192.XX.30.1
	EMP2-DCS	192.XX.30.13	255.255.255.0	192.XX.30.1

2) Configure IP address (All Devices, Routers)

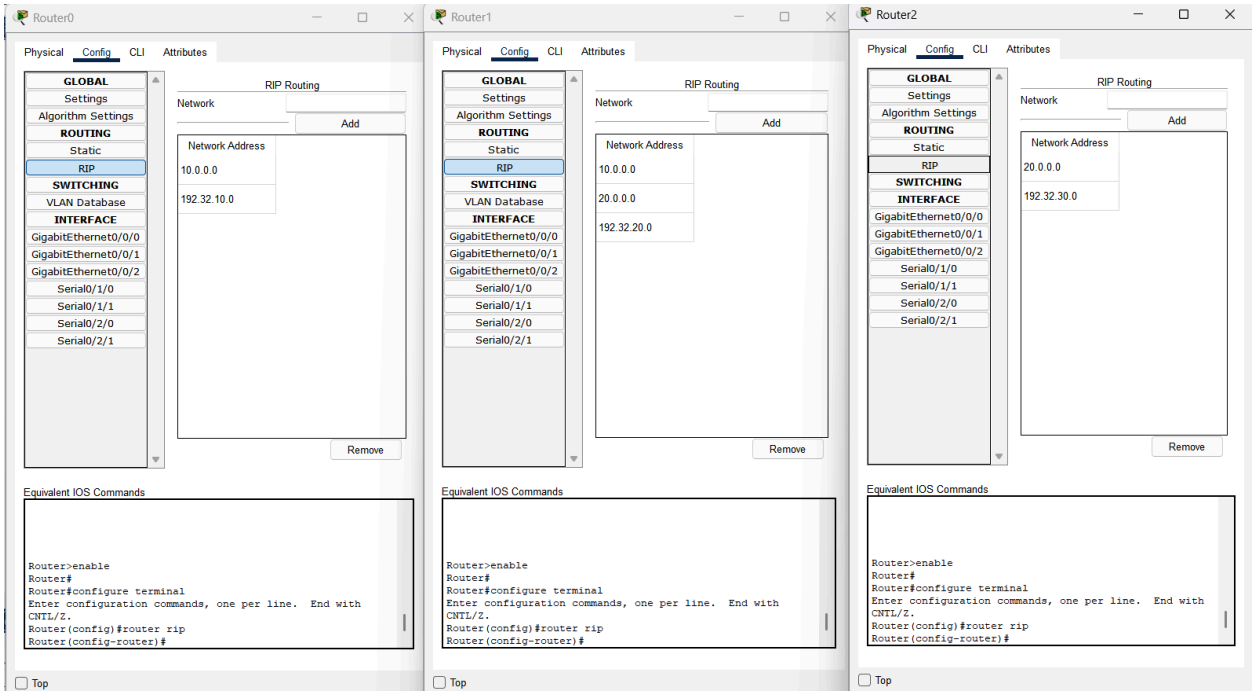

Router2
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0/0
GigabitEthernet0/0/1
GigabitEthernet0/0/2
Serial0/1/0
Serial0/1/1
Serial0/2/0
Serial0/2/1
GigabitEthernet0/0/0
Port Status
On
Bandwidth
1000 Mbps
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
00D0.58D2.D701
IP Configuration
IPv4 Address
192.32.30.1
Subnet Mask
255.255.255.0
Tx Ring Limit
10
Equivalent IOS Commands
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0/0
Router(config-if)#
Top
Router0
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0/0
GigabitEthernet0/0/1
GigabitEthernet0/0/2
Serial0/1/0
Serial0/1/1
Serial0/2/0
Serial0/2/1
GigabitEthernet0/0/0
Port Status
On
Bandwidth
1000 Mbps
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
0001.96CC.6501
IP Configuration
IPv4 Address
192.32.10.1
Subnet Mask
255.255.255.0
Tx Ring Limit
10
Equivalent IOS Commands
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0/0
Router(config-if)#
Top


Router0
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0/0
GigabitEthernet0/0/1
GigabitEthernet0/0/2
Serial0/1/0
Serial0/1/1
Serial0/2/0
Serial0/2/1
Serial0/1/0
Port Status
On
Duplex
Full Duplex
Clock Rate
2000000
IP Configuration
IPv4 Address
10.0.0.1
Subnet Mask
255.0.0.0
Tx Ring Limit
10
Equivalent IOS Commands
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/2/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Top
Router2
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0/0
GigabitEthernet0/0/1
GigabitEthernet0/0/2
Serial0/1/0
Serial0/1/1
Serial0/2/0
Serial0/2/1
Serial0/2/0
Port Status
On
Duplex
Full Duplex
Clock Rate
2000000
IP Configuration
IPv4 Address
20.0.0.2
Subnet Mask
255.0.0.0
Tx Ring Limit
10
Equivalent IOS Commands
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/2/0
Router(config-if)#
Top

PC 0, PC 3, PC 6 :



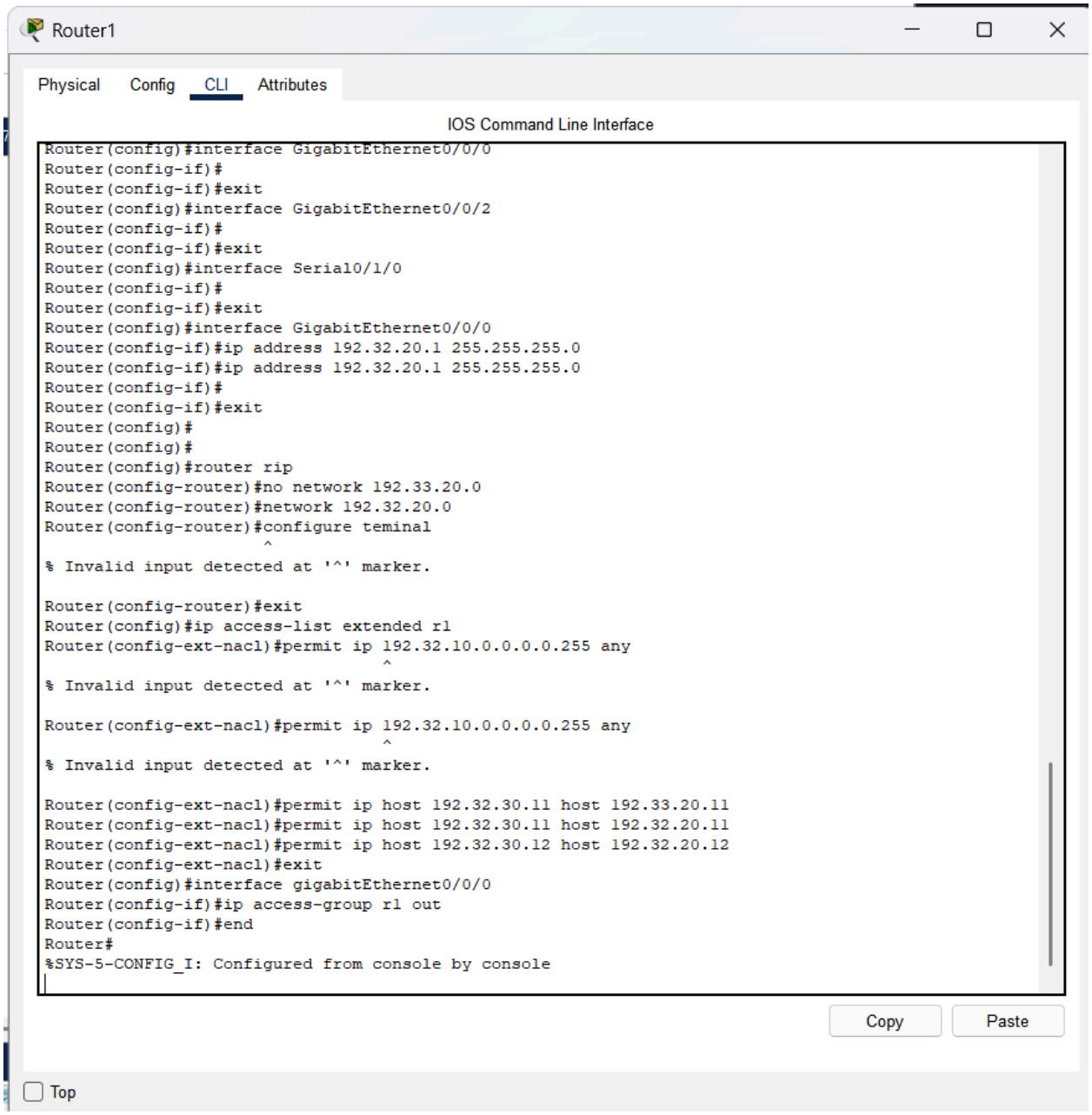
3) Configure dynamic routing table

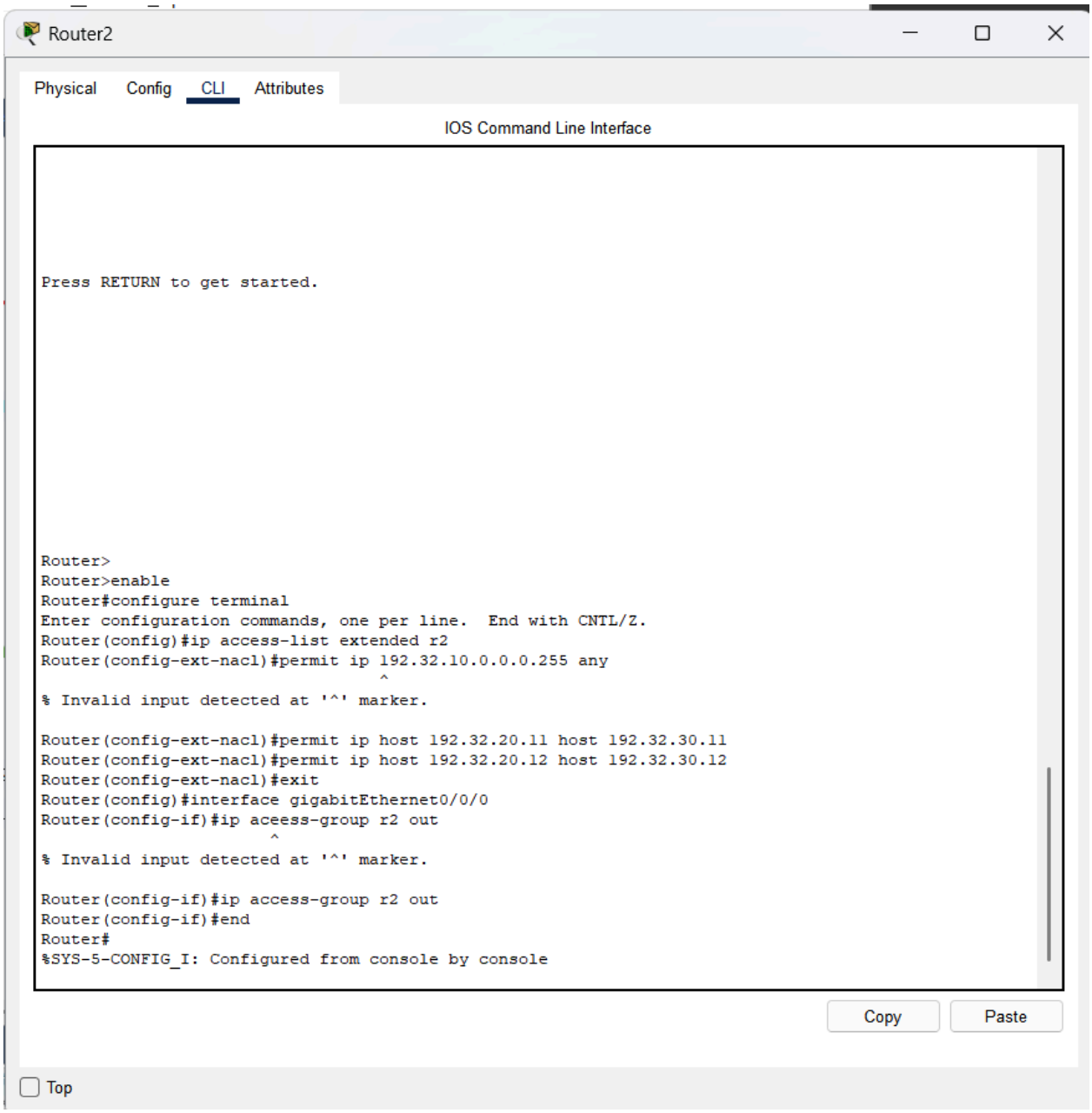


4) Configure ACL on Router0

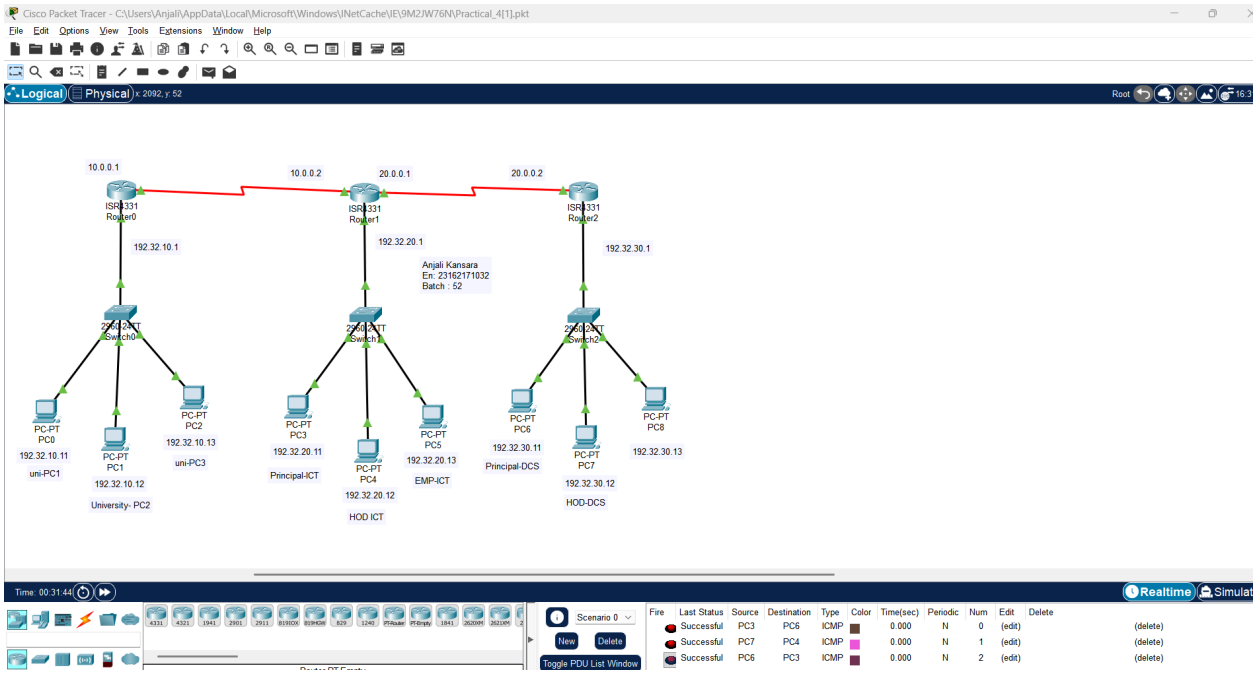
```
Router(config)#router rip
Router(config-router)#no network 192.33.10.0
Router(config-router)#network 192.32.10.0
Router(config-router)#enable
                     ^
% Invalid input detected at '^' marker.

Router(config-router)#configure terminal
                     ^
% Invalid input detected at '^' marker.

Router(config-router)#ip access-list standard r0
Router(config-std-nacl)#remark acl R0
Router(config-std-nacl)#permit host 192.15.20.11
Router(config-std-nacl)#permit host 192.32.30.11
Router(config-std-nacl)#permit host 192.32.20.11
Router(config-std-nacl)#exit
Router(config)#interface gigabitEthernet0/0/0
Router(config-if)#ip access-group r0 out
Router(config-if)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console
```

5) Configure ACL on Router1


Router1
Physical
Config
CLI
Attributes
IOS Command Line Interface
Router(config)#interface GigabitEthernet0/0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0/2
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0/0
Router(config-if)#ip address 192.32.20.1 255.255.255.0
Router(config-if)#ip address 192.32.20.1 255.255.255.0
Router(config-if)#
Router(config-if)#exit
Router(config)#
Router(config)#
Router(config)#router rip
Router(config-router)#no network 192.33.20.0
Router(config-router)#network 192.32.20.0
Router(config-router)#configure teminal
^
% Invalid input detected at '^' marker.
Router(config-router)#exit
Router(config)#ip access-list extended rl
Router(config-ext-nacl)#permit ip 192.32.10.0.0.0.0.255 any
^
% Invalid input detected at '^' marker.
Router(config-ext-nacl)#permit ip 192.32.10.0.0.0.0.255 any
^
% Invalid input detected at '^' marker.
Router(config-ext-nacl)#permit ip host 192.32.30.11 host 192.33.20.11
Router(config-ext-nacl)#permit ip host 192.32.30.11 host 192.32.20.11
Router(config-ext-nacl)#permit ip host 192.32.30.12 host 192.32.20.12
Router(config-ext-nacl)#exit
Router(config)#interface gigabitEthernet0/0/0
Router(config-if)#ip access-group rl out
Router(config-if)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console
Copy
Paste
Top



6) Configuration:



Conclusion:

The implementation of an Access Control List (ACL) in an organization's network successfully ensures controlled access between different departments. By defining rules to permit or deny traffic, ACL enhances network security, data confidentiality, and efficient resource utilization.