

# A Project Report On University Network Scenario



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Submitted to:-

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## **Introduction: -**

This University Network Scenario is about designing the topology of the University LAN network where various computers are set up in different departments so that they can communicate and communicate through data exchange. Designing a university communication environment that connects different departments with each other, prioritizes communication between different departments. CNS is used to design a structured and well-organized topology, satisfying all college needs (e.g. client). The CNS comes with an efficient network.

## **Objectives: -**

The main objective of the proposed network is to update the network and also enhance capabilities and increase the flexibility of the network which will eventually provide good security.

## **Network Requirements: -**

- The new system should be able to reduce internet downtime.
- Download and upload links should be maintained above 5 Mbps speed requirement.
- Network will be scalable.
- The system should support remote access.
- Should comprise of data centers with necessary security features and support.

## **IP Addressing Plan: -Unit**

No 1

<b>Computer Lab 1(128.168.0.0)</b>	
PC 0	128.168.0.2
PC 1	128.168.0.3
PC 2	128.168.0.4
PC 3	128.168.0.5
Printer0	128.168.0.6

## Unit No 2

SERVER ROOM (1.0.0.0)	
FTP SERVER,HTTP server	1.0.0.4
Email	1.0.0.6
DNS SERVER	1.0.0.2
HTTP SERVER	1.0.0.3

## Unit No 3

Faculty Room (192.168.2.0)	
PC(4)	192.168.2.2
PC(5)	192.168.2.3
PC(6)	192.168.2.4
PC(7)	192.168.2.5
PC(8)	192.168.2.6
DHCP server	192.168.2.8

## Unit No 4

IT DEPARTMENT Lab 1(Vlan 10)(192.168.1.0)+IT DEPARTMENT Lab 2 (192.168.1.0) VLAN (Vlan 20)(192.168.5.0)	
HOD vlan10	
PC0(1)	192.168.1.2
PC0(2)	192.168.1.3
PA Office vlan 20	
PC2(2)	192.168.5.2
PC3(2)	192.168.5.3

## UNIT No 5

PA Office (192.168.3.0)	
PT PC	192.168.3.2
EXAM CELL	192.168.3.3
Enquiry PC	192.168.3.4
TPO	192.168.3.5
Printer 3	192.168.3.6
Printer 4	192.168.3.7
Printer 5	192.168.3.8

## Unit No 6

PRINCIPLE ROOM (192.168.4.0)	
PC 18	192.168.4.2
Printer 6	192.168.4.4
Laptop0	192.168.4.3
DHCP Server	192.168.4.5

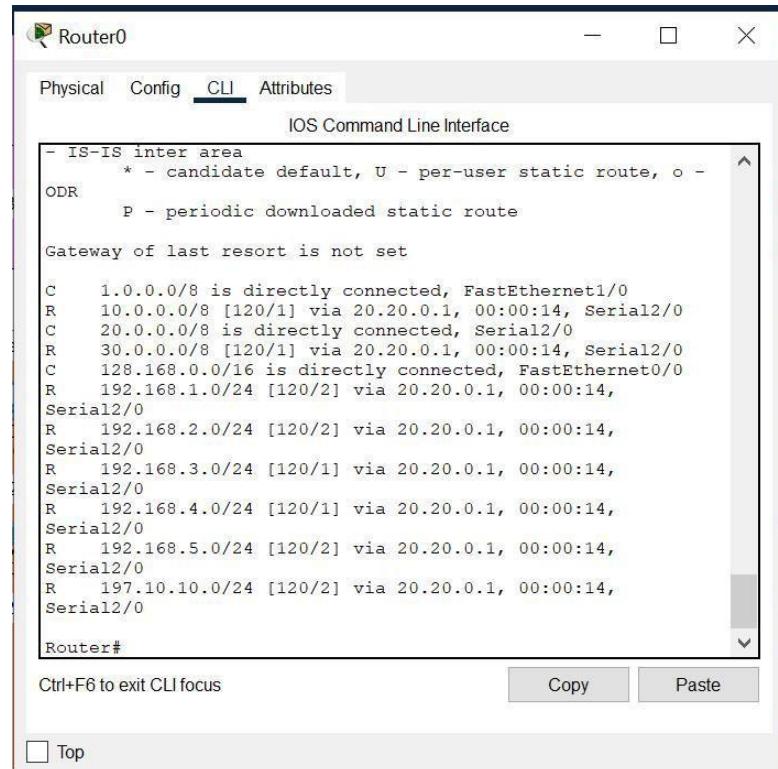
## Unit No 7

Ip=197.10.10.0

VLSM		Subnets	Starting IP	Broadcast IP
197.10.10.2	30 hosts	255.255.255.224	197.10.10.0/27	197.10.10.31/27
197.10.10.34	20 hosts	255.255.255.224	197.10.10.32/27	197.10.10.63/27
197.10.10.64	10 hosts	255.255.255.240	197.10.10.64/28	197.10.10.79/28

## Routing Protocol Plan: -

Routing Information Protocol (RIP) is a flexible route that uses hop counts as a transmission metric to find the best route between a source and a local network. It is a distance navigation protocol with an AD value of 120 and works on the OSI model application platform.



The screenshot shows the Router0 CLI interface with the 'CLI' tab selected. The window title is 'Router0'. The main area displays the output of the 'show ip route' command:

```
- IS-IS inter area
  * - candidate default, U - per-user static route, o -
ODR
  P - periodic downloaded static route

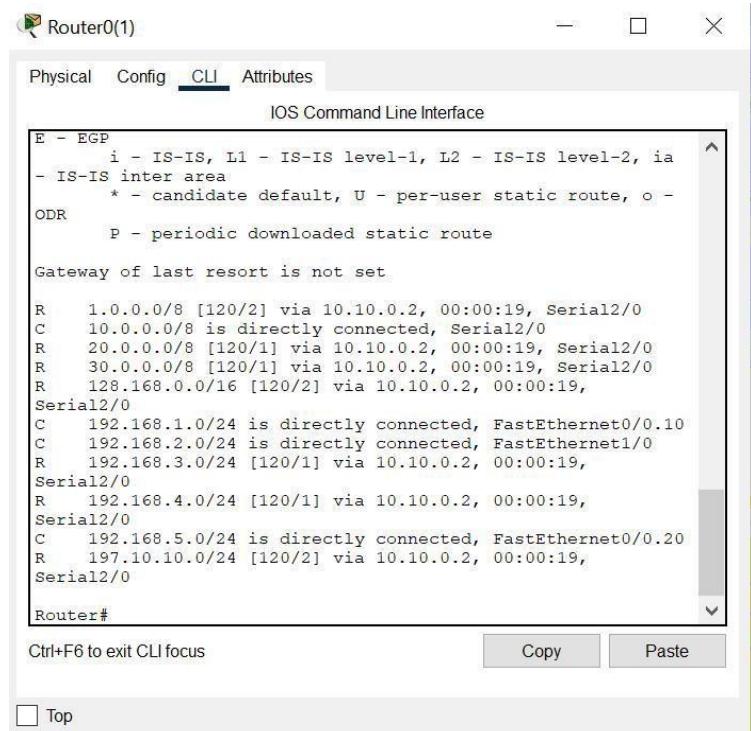
Gateway of last resort is not set

C 1.0.0.0/8 is directly connected, FastEthernet1/0
R 10.0.0.0/8 [120/1] via 20.20.0.1, 00:00:14, Serial2/0
C 20.0.0.0/8 is directly connected, Serial2/0
R 30.0.0.0/8 [120/1] via 20.20.0.1, 00:00:14, Serial2/0
C 128.168.0.0/16 is directly connected, FastEthernet0/0
R 192.168.1.0/24 [120/2] via 20.20.0.1, 00:00:14,
Serial2/0
R 192.168.2.0/24 [120/2] via 20.20.0.1, 00:00:14,
Serial2/0
R 192.168.3.0/24 [120/1] via 20.20.0.1, 00:00:14,
Serial2/0
R 192.168.4.0/24 [120/1] via 20.20.0.1, 00:00:14,
Serial2/0
R 192.168.5.0/24 [120/2] via 20.20.0.1, 00:00:14,
Serial2/0
R 197.10.10.0/24 [120/2] via 20.20.0.1, 00:00:14,
Serial2/0

Router#
```

At the bottom of the CLI window, there are buttons for 'Copy' and 'Paste', and a checkbox labeled 'Top'.

*Routing Protocol Plan for  
Router0*



Router0(1)

Physical Config **CLI** Attributes

IOS Command Line Interface

```
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

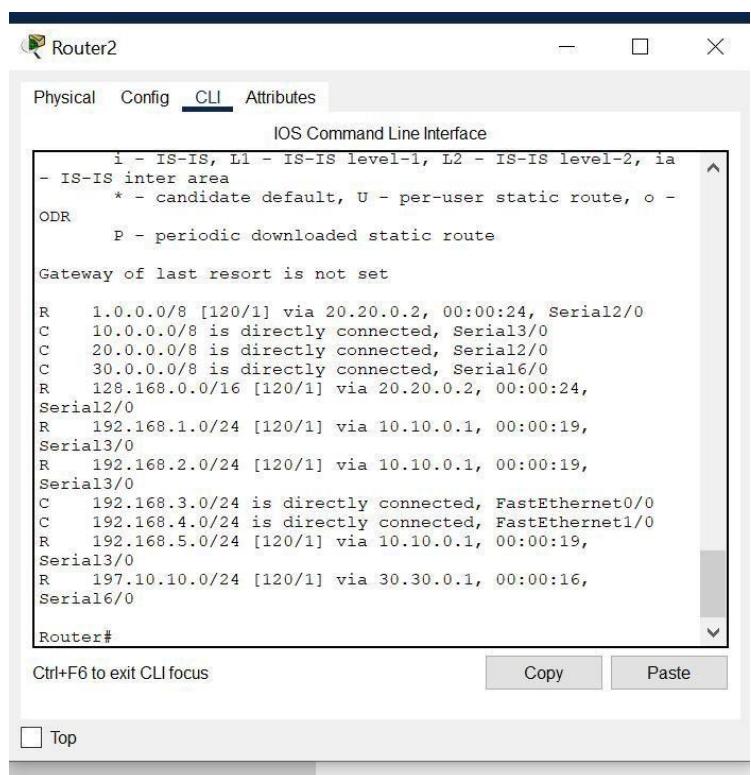
R   1.0.0.0/8 [120/2] via 10.10.0.2, 00:00:19, Serial2/0
C   10.0.0.0/8 is directly connected, Serial2/0
R   20.0.0.0/8 [120/1] via 10.10.0.2, 00:00:19, Serial2/0
R   30.0.0.0/8 [120/1] via 10.10.0.2, 00:00:19, Serial2/0
R   128.168.0.0/16 [120/2] via 10.10.0.2, 00:00:19,
Serial2/0
C   192.168.1.0/24 is directly connected, FastEthernet0/0.10
C   192.168.2.0/24 is directly connected, FastEthernet1/0
R   192.168.3.0/24 [120/1] via 10.10.0.2, 00:00:19,
Serial2/0
R   192.168.4.0/24 [120/1] via 10.10.0.2, 00:00:19,
Serial2/0
C   192.168.5.0/24 is directly connected, FastEthernet0/0.20
R   197.10.10.0/24 [120/2] via 10.10.0.2, 00:00:19,
Serial2/0

Router#
```

Ctrl+F6 to exit CLI focus     

Top

## Routing Protocol Plan for Router0(1)



Router2

Physical Config **CLI** Attributes

IOS Command Line Interface

```
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

R   1.0.0.0/8 [120/1] via 20.20.0.2, 00:00:24, Serial2/0
C   10.0.0.0/8 is directly connected, Serial3/0
C   20.0.0.0/8 is directly connected, Serial2/0
C   30.0.0.0/8 is directly connected, Serial6/0
R   128.168.0.0/16 [120/1] via 20.20.0.2, 00:00:24,
Serial2/0
R   192.168.1.0/24 [120/1] via 10.10.0.1, 00:00:19,
Serial3/0
R   192.168.2.0/24 [120/1] via 10.10.0.1, 00:00:19,
Serial3/0
C   192.168.3.0/24 is directly connected, FastEthernet0/0
C   192.168.4.0/24 is directly connected, FastEthernet1/0
R   192.168.5.0/24 [120/1] via 10.10.0.1, 00:00:19,
Serial3/0
R   197.10.10.0/24 [120/1] via 30.30.0.1, 00:00:16,
Serial6/0

Router#
```

Ctrl+F6 to exit CLI focus     

Top

## Routing Protocol Plan for Router2

Router1(1)

Physical Config **CLI** Attributes

IOS Command Line Interface

```
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

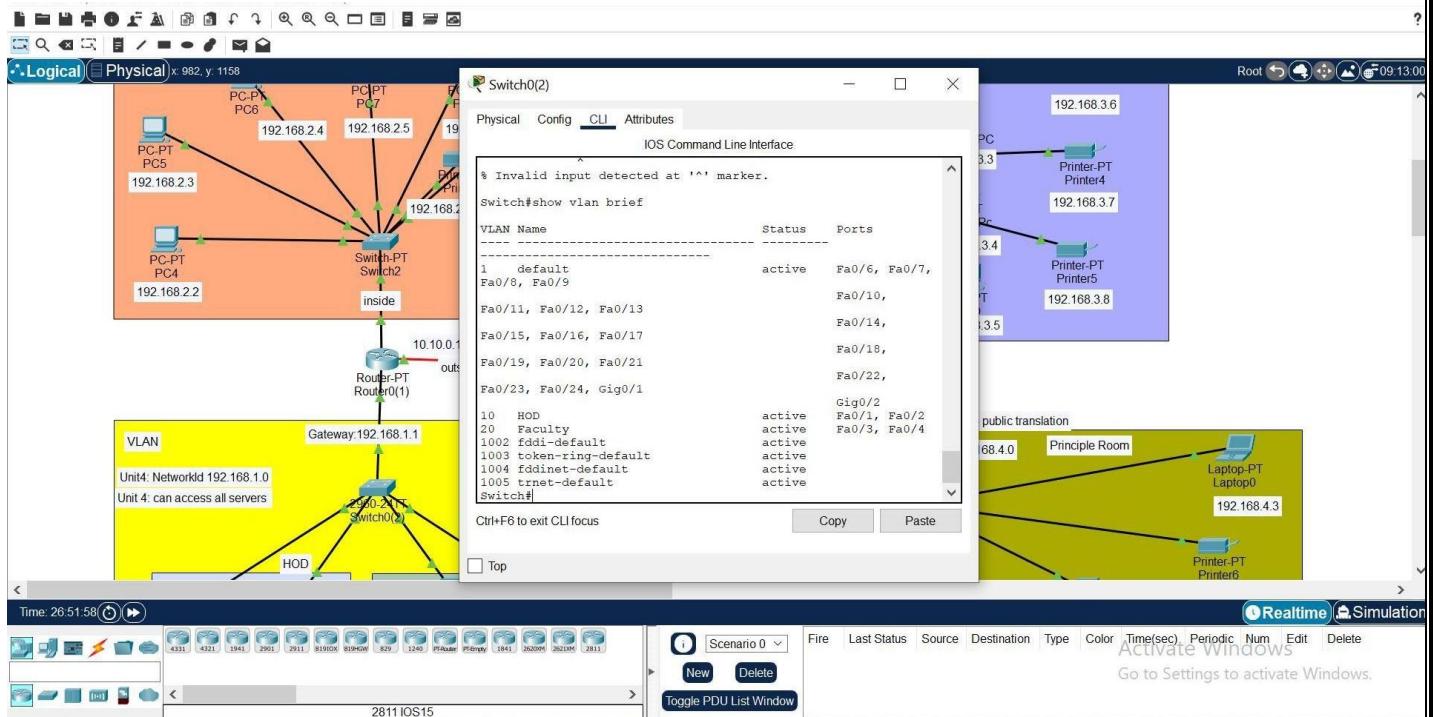
R 1.0.0.0/8 [120/2] via 30.30.0.2, 00:00:09, Serial2/0
R 10.0.0.0/8 [120/1] via 30.30.0.2, 00:00:09, Serial2/0
R 20.0.0.0/8 [120/1] via 30.30.0.2, 00:00:09, Serial2/0
C 30.0.0.0/8 is directly connected, Serial2/0
R 128.168.0.0/16 [120/2] via 30.30.0.2, 00:00:09, serial2/0
R 192.168.1.0/24 [120/2] via 30.30.0.2, 00:00:09, serial2/0
R 192.168.2.0/24 [120/2] via 30.30.0.2, 00:00:09, serial2/0
R 192.168.3.0/24 [120/1] via 30.30.0.2, 00:00:09, serial2/0
R 192.168.4.0/24 [120/1] via 30.30.0.2, 00:00:09, serial2/0
R 192.168.5.0/24 [120/2] via 30.30.0.2, 00:00:09, serial2/0
197.10.10.0/24 is variably subnetted, 3 subnets, 2 masks
C 197.10.10.0/27 is directly connected, FastEthernet0/0
C 197.10.10.32/27 is directly connected, FastEthernet1/0
C 197.10.10.64/28 is directly connected, FastEthernet6/0

Router#

Ctrl+F6 to exit CLI focus

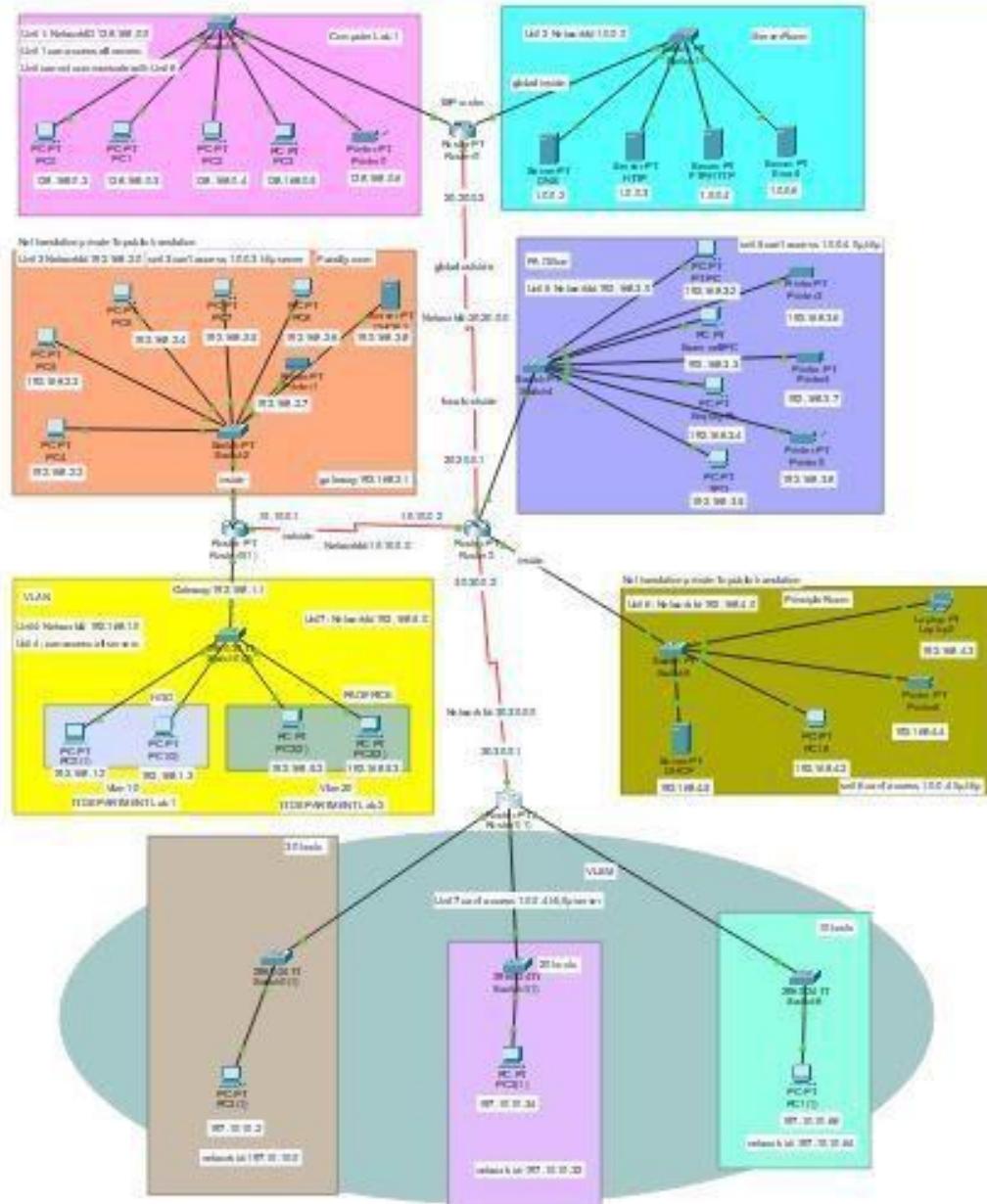
Top

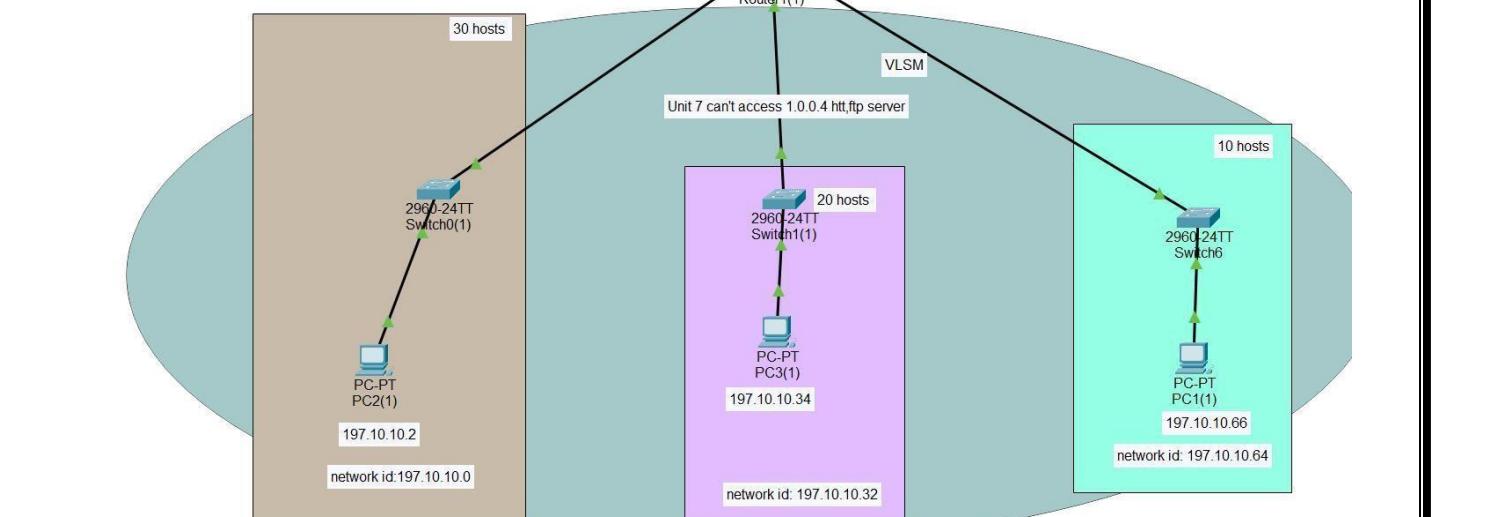
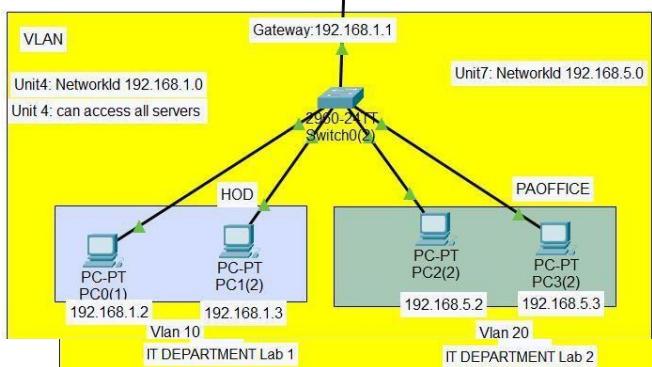
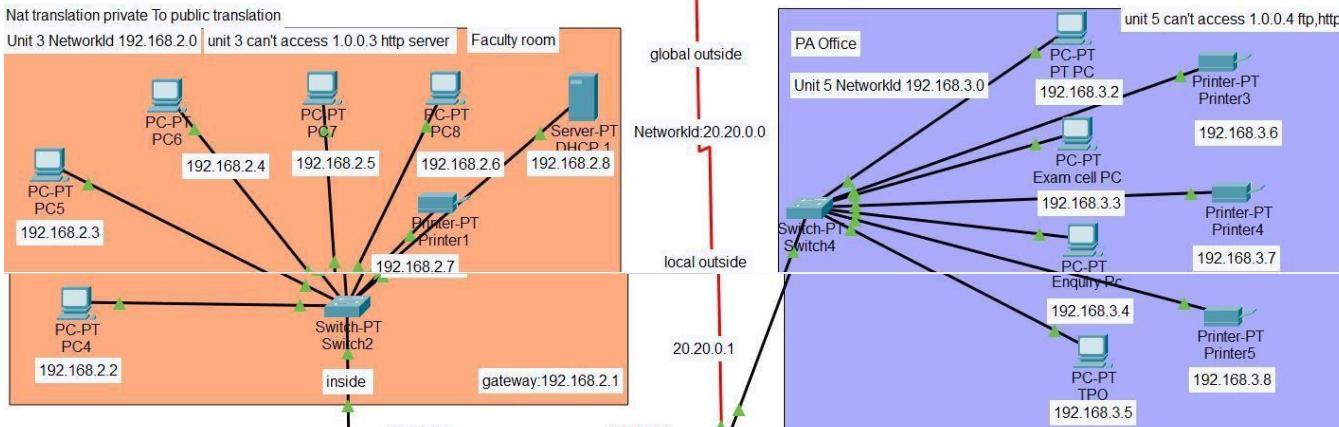
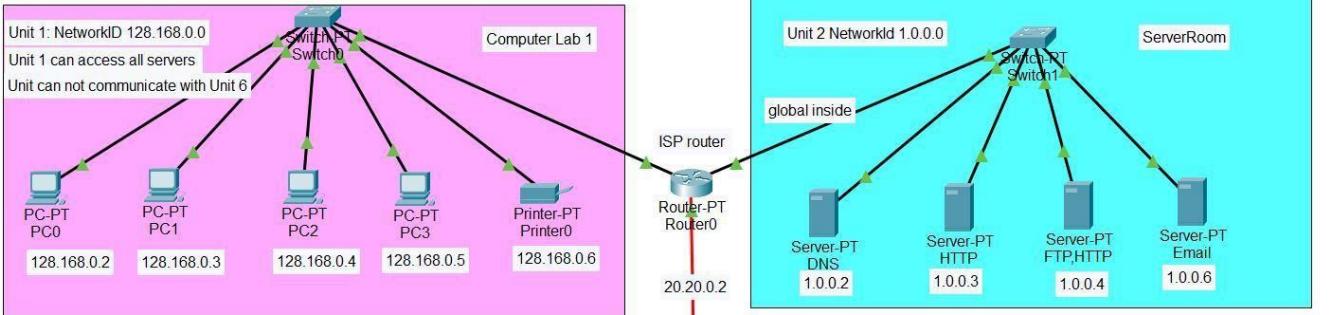
## Routing Protocol Plan for Router1(1)



## Switch configuration for virtual LAN UNIT 4

## Network Design:-

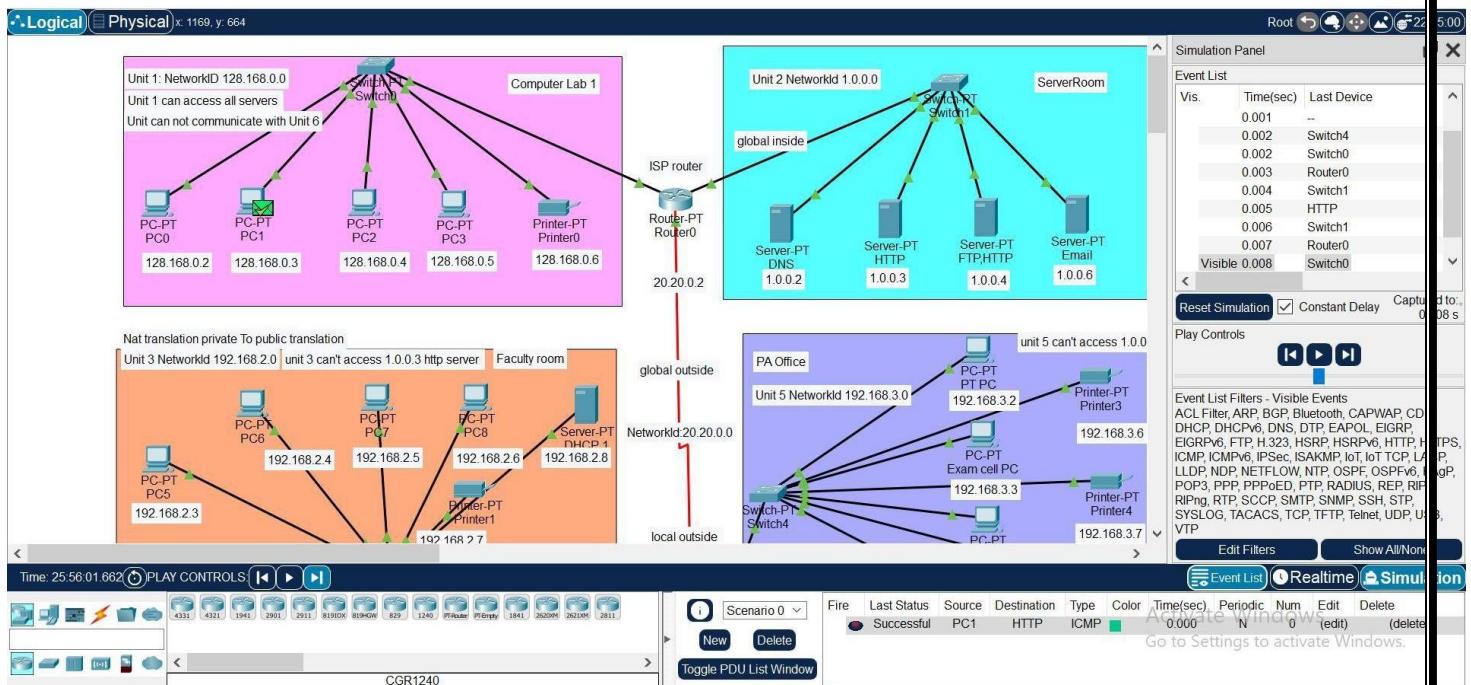




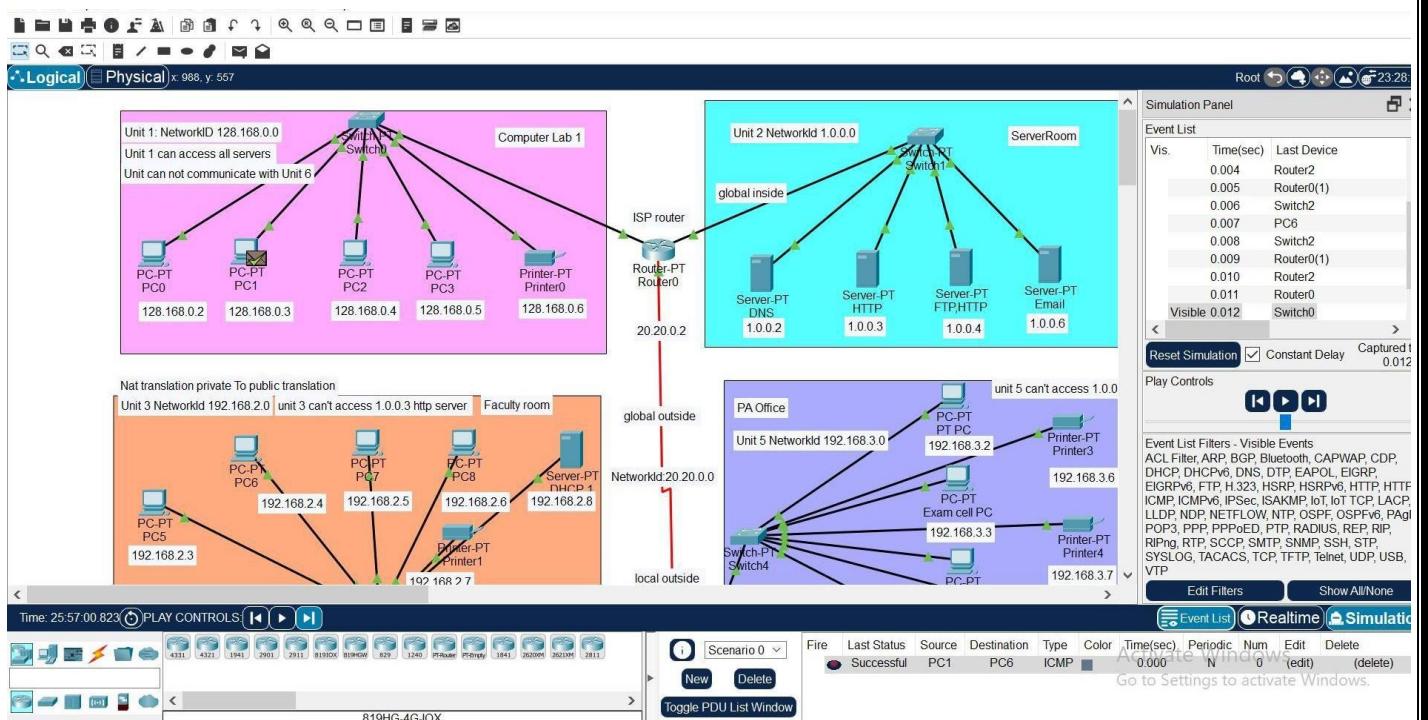
The prototype of the proposed network is implemented on cisco packet tracer

# Testing Network: -

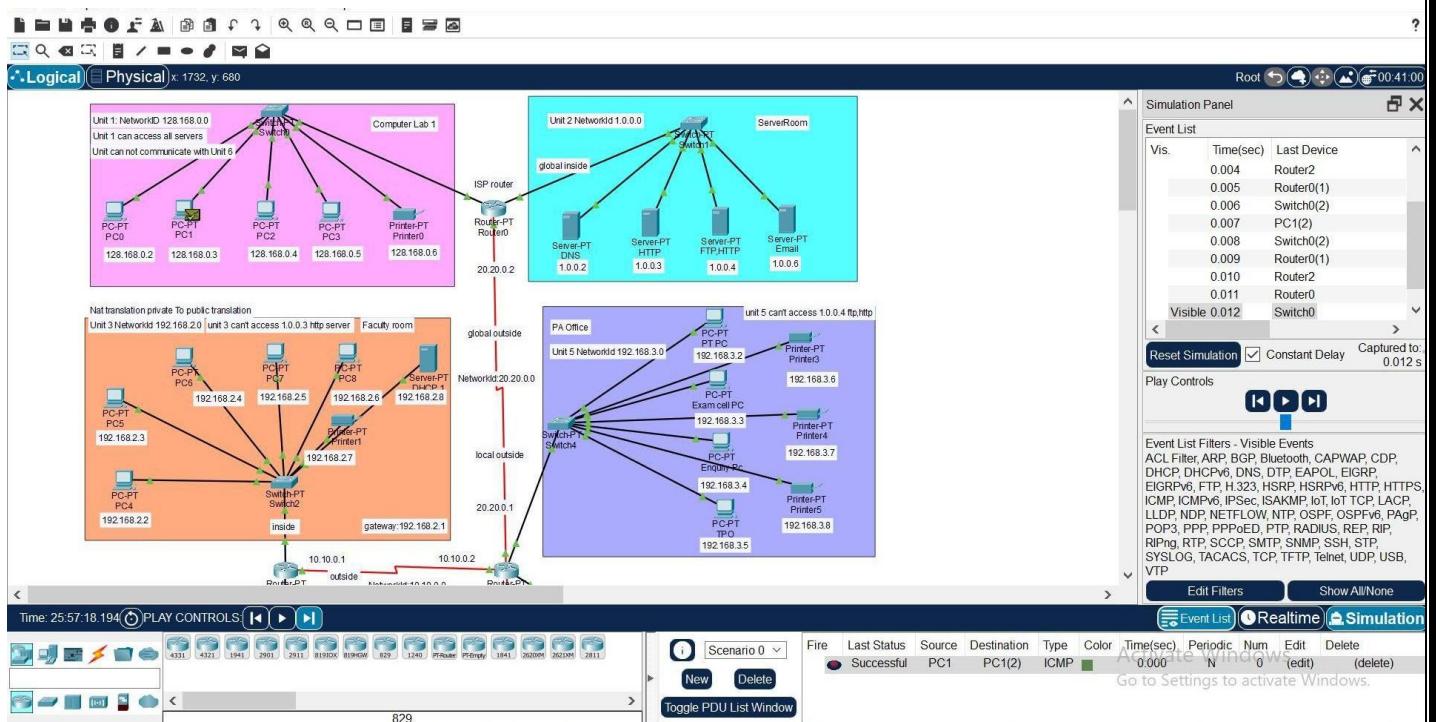
## Unit No 1 communication with Unit 2



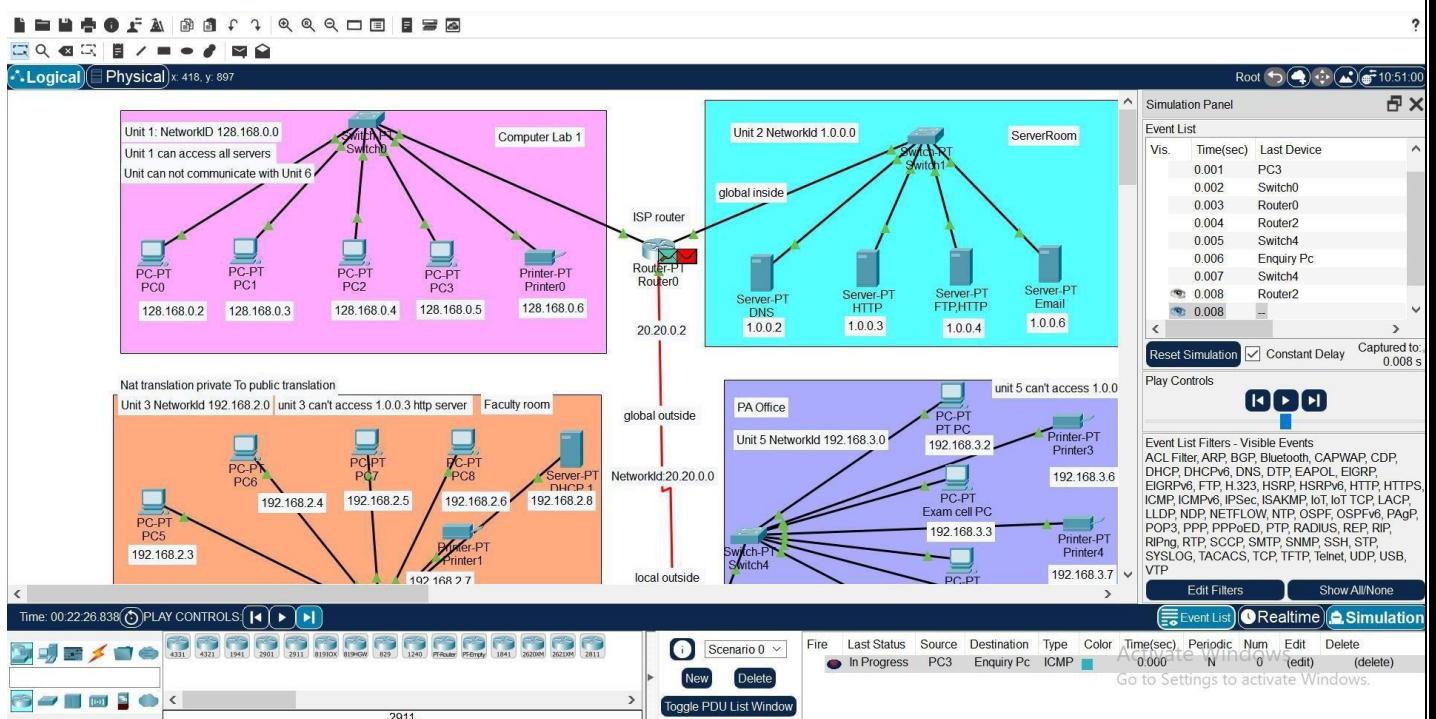
## Unit No 1 communication with unit 3



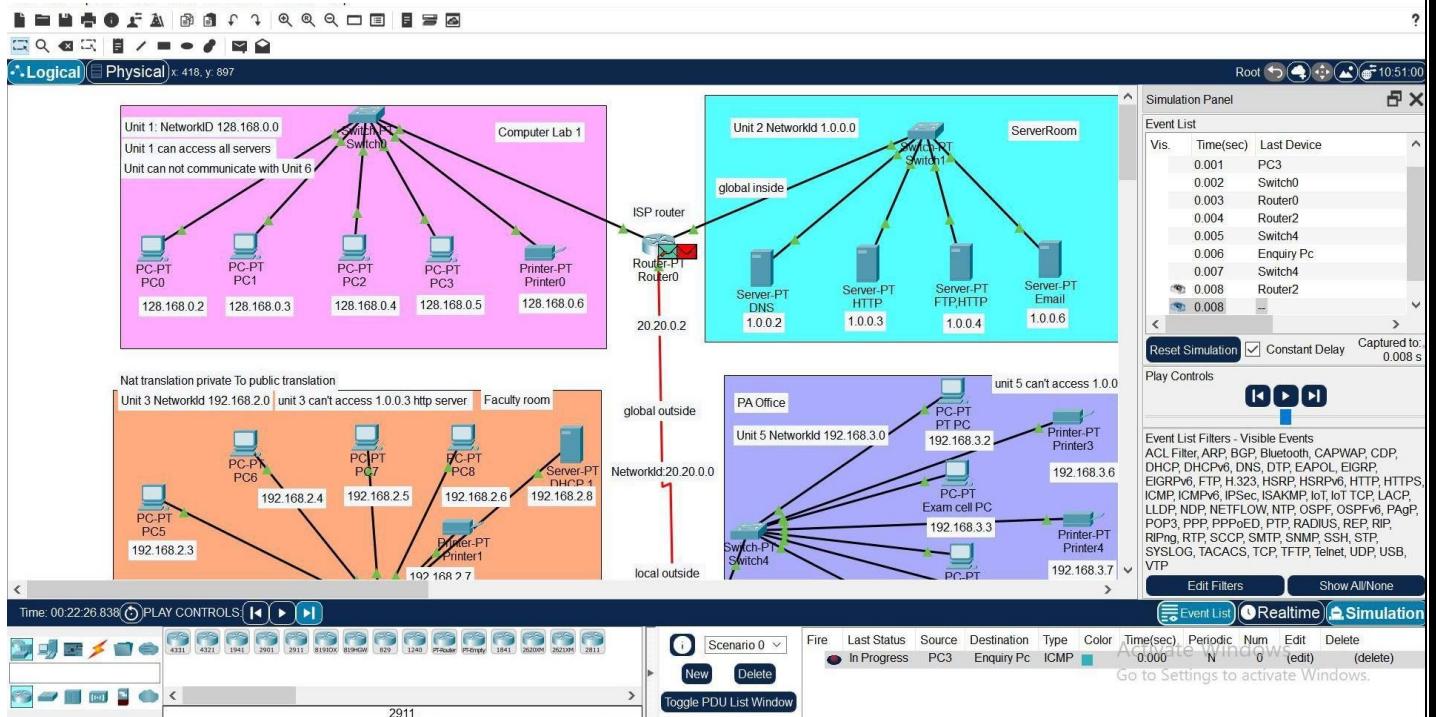
## Unit No 1 communication with unit 4 HOD



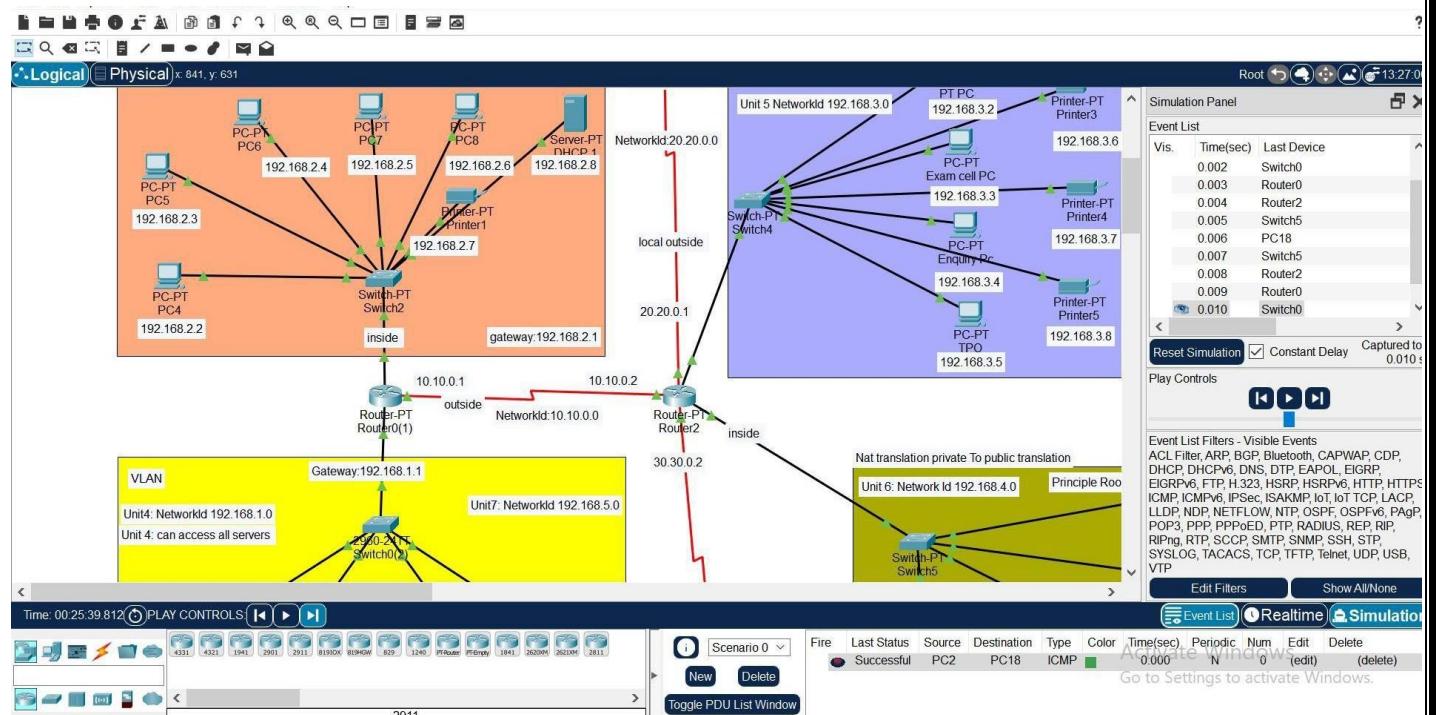
## Unit No 1 communication with unit 4 PA office



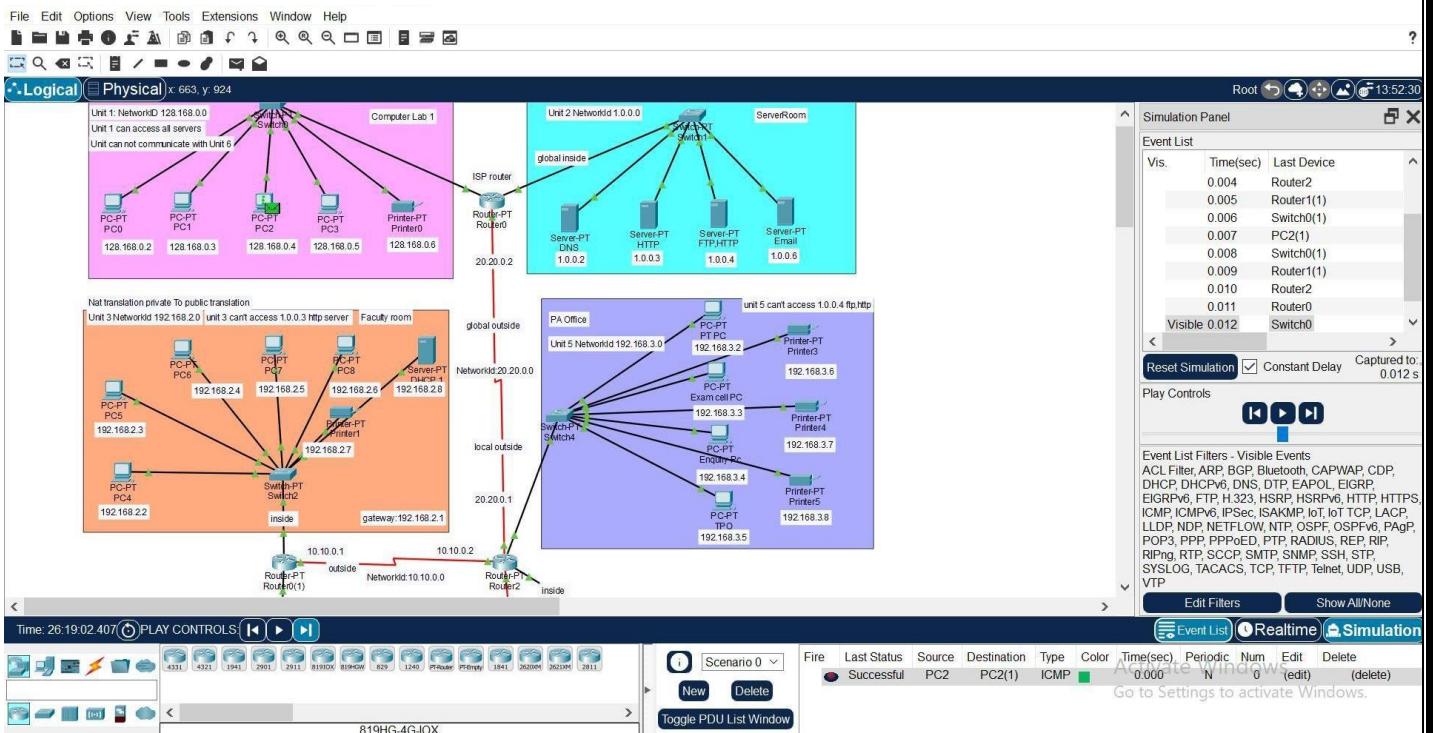
## Unit No 1 Access control deny to communication with unit 5



## Unit No 1 communication with Unit 6



## Unit No 1 communication with unit 7



## Unit 2 Communication with all units Ping

PC

Physical Config Desktop Programming Attributes

Command Prompt

Cisco Packet Tracer PC Command Line 1.0

C:>ping 128.168.0.2

Pinging 128.168.0.2 with 32 bytes of data:

Reply from 128.168.0.2: bytes=32 time=2ms TTL=125  
Reply from 128.168.0.2: bytes=32 time=34ms TTL=125  
Reply from 128.168.0.2: bytes=32 time=23ms TTL=125  
Reply from 128.168.0.2: bytes=32 time=2ms TTL=125

Ping statistics for 128.168.0.2:  
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
Approximate round trip times in milli-seconds:  
Minimum = 2ms, Maximum = 34ms, Average = 15ms

C:>ping 192.168.3.3

Pinging 192.168.3.3 with 32 bytes of data:

Reply from 192.168.3.3: bytes=32 time=17ms TTL=126  
Reply from 192.168.3.3: bytes=32 time=20ms TTL=126  
Reply from 192.168.3.3: bytes=32 time=2ms TTL=126  
Reply from 192.168.3.3: bytes=32 time=2ms TTL=126

Ping statistics for 192.168.3.3:  
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
Approximate round trip times in milli-seconds:  
Minimum = 2ms, Maximum = 20ms, Average = 10ms

C:>ping 192.168.4.2

Pinging 192.168.4.2 with 32 bytes of data:

Request timed out.  
Reply from 192.168.4.2: bytes=32 time=15ms TTL=126  
Reply from 192.168.4.2: bytes=32 time=1ms TTL=126  
Reply from 192.168.4.2: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.4.2:  
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),  
Approximate round trip times in milli-seconds:  
Minimum = 1ms, Maximum = 15ms, Average = 5ms

C:>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

PC7

Physical Config Desktop Programming Attributes

Command Prompt

```
ping statistics for 192.168.1.2:
  Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
  Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 15ms, Average = 5ms

C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:
Reply from 192.168.1.2: bytes=32 time<1ms TTL=127

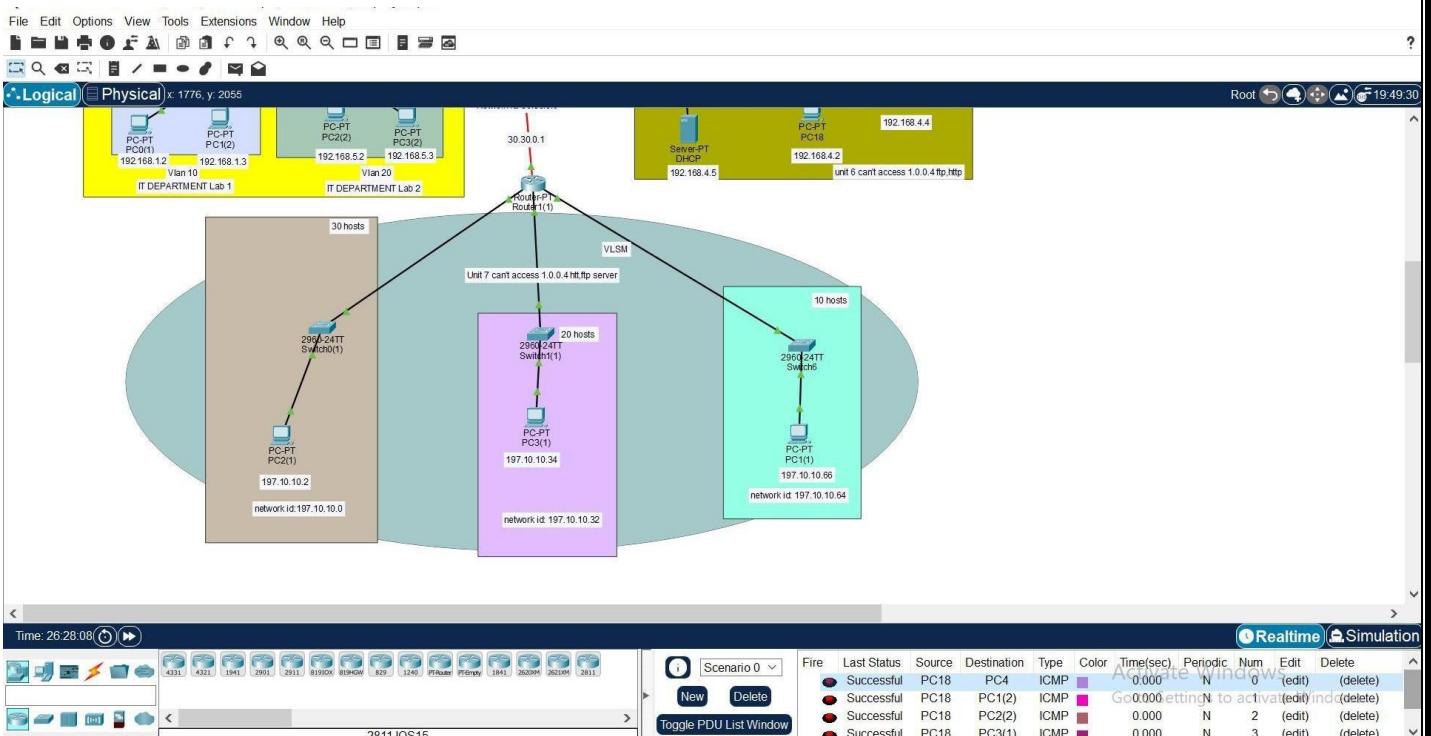
Ping statistics for 192.168.1.2:
  Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
  Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

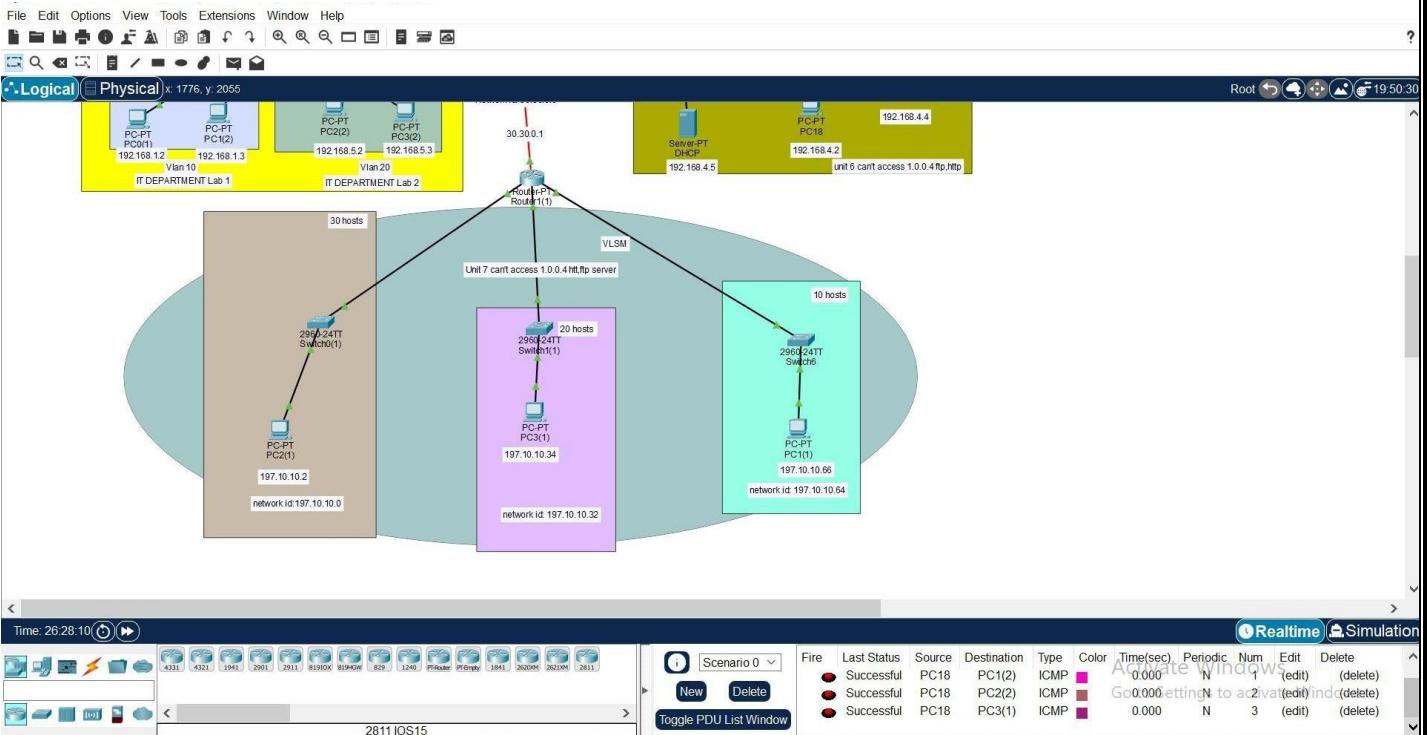
C:\>ping 192.168.5.2

Pinging 192.168.5.2 with 32 bytes of data:
Reply from 192.168.5.2: bytes=32 time<1ms TTL=127

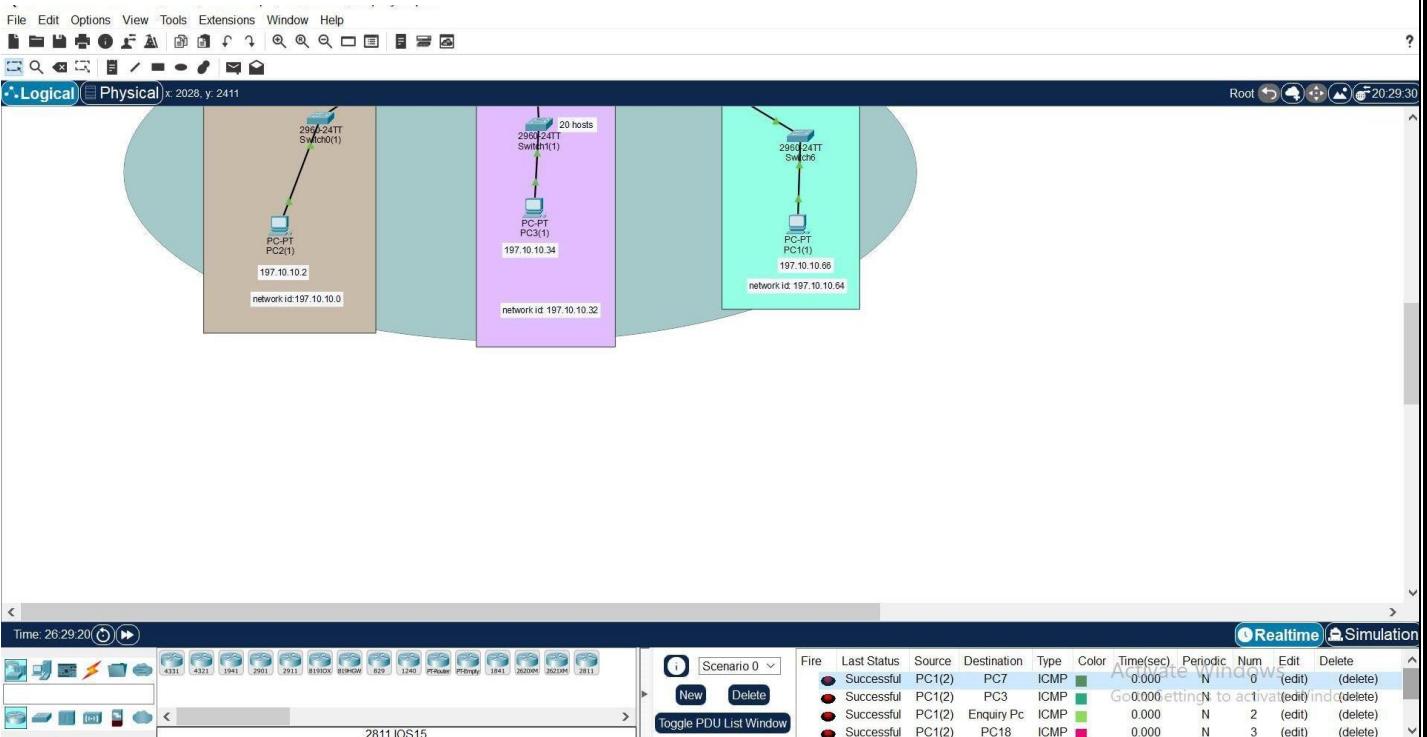
Ping statistics for 192.168.5.2:
  Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
  Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

## Unit 3 Communication with all units





## Unit 4 Communication with all units



## Unit 5 Communication with all units

Exam cell PC

Physical Config Desktop Programming Attributes

```
C:\>ping 128.168.0.2
Pinging 128.168.0.2 with 32 bytes of data:
Reply from 128.168.0.2: bytes=32 time=20ms TTL=126
Reply from 128.168.0.2: bytes=32 time=15ms TTL=126
Reply from 128.168.0.2: bytes=32 time=15ms TTL=126
Reply from 128.168.0.2: bytes=32 time=1ms TTL=126

Ping statistics for 128.168.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 20ms, Average = 12ms

C:\>ping 192.168.2.2
Pinging 192.168.2.2 with 32 bytes of data:
Reply from 10.10.0.1: bytes=32 time=20ms TTL=126
Reply from 10.10.0.1: bytes=32 time=1ms TTL=126
Reply from 10.10.0.1: bytes=32 time=2ms TTL=126
Reply from 10.10.0.1: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.2.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 20ms, Average = 6ms

C:\>ping 192.168.1.2
Pinging 192.168.1.2 with 32 bytes of data:
Reply from 192.168.1.2: bytes=32 time=18ms TTL=126
Reply from 192.168.1.2: bytes=32 time=17ms TTL=126
Reply from 192.168.1.2: bytes=32 time=1ms TTL=126
Reply from 192.168.1.2: bytes=32 time=16ms TTL=126

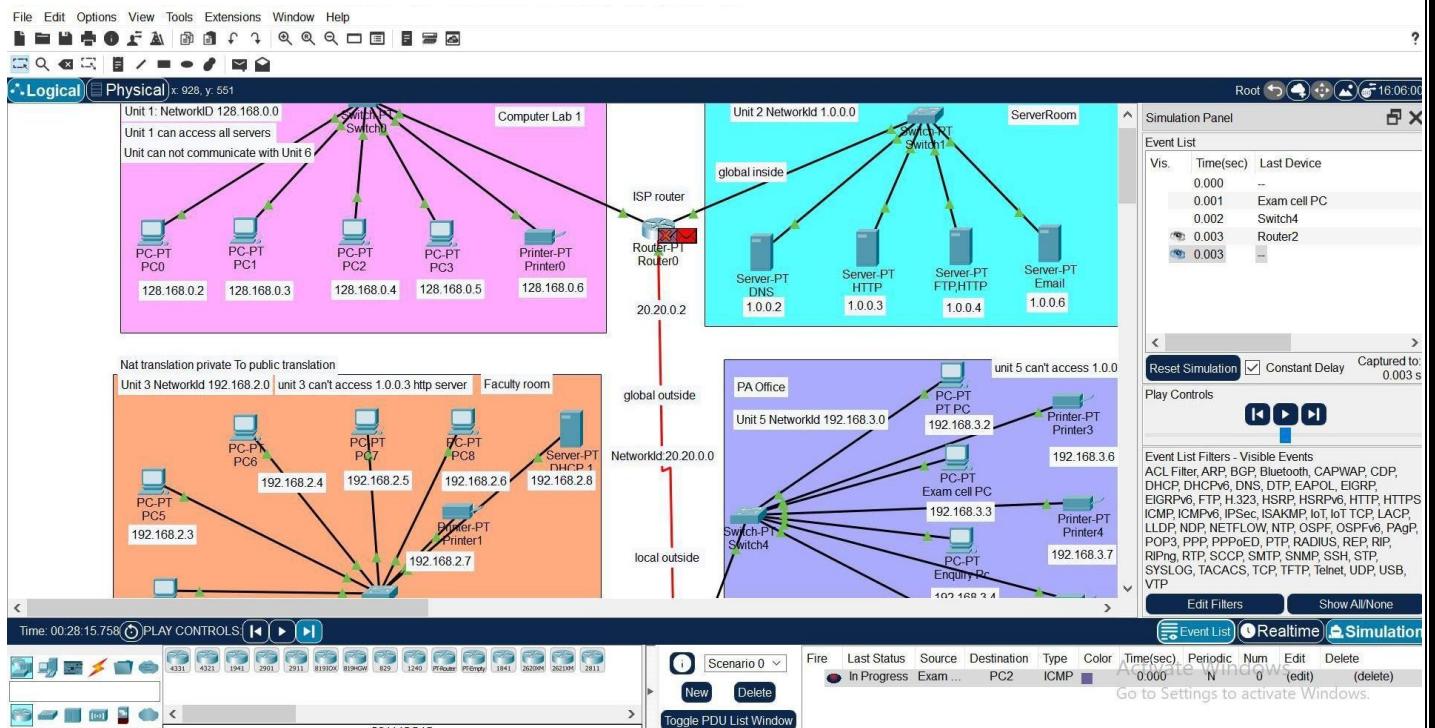
Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 18ms, Average = 13ms

C:\>ping 192.10.10.2
Pinging 192.10.10.2 with 32 bytes of data:
```

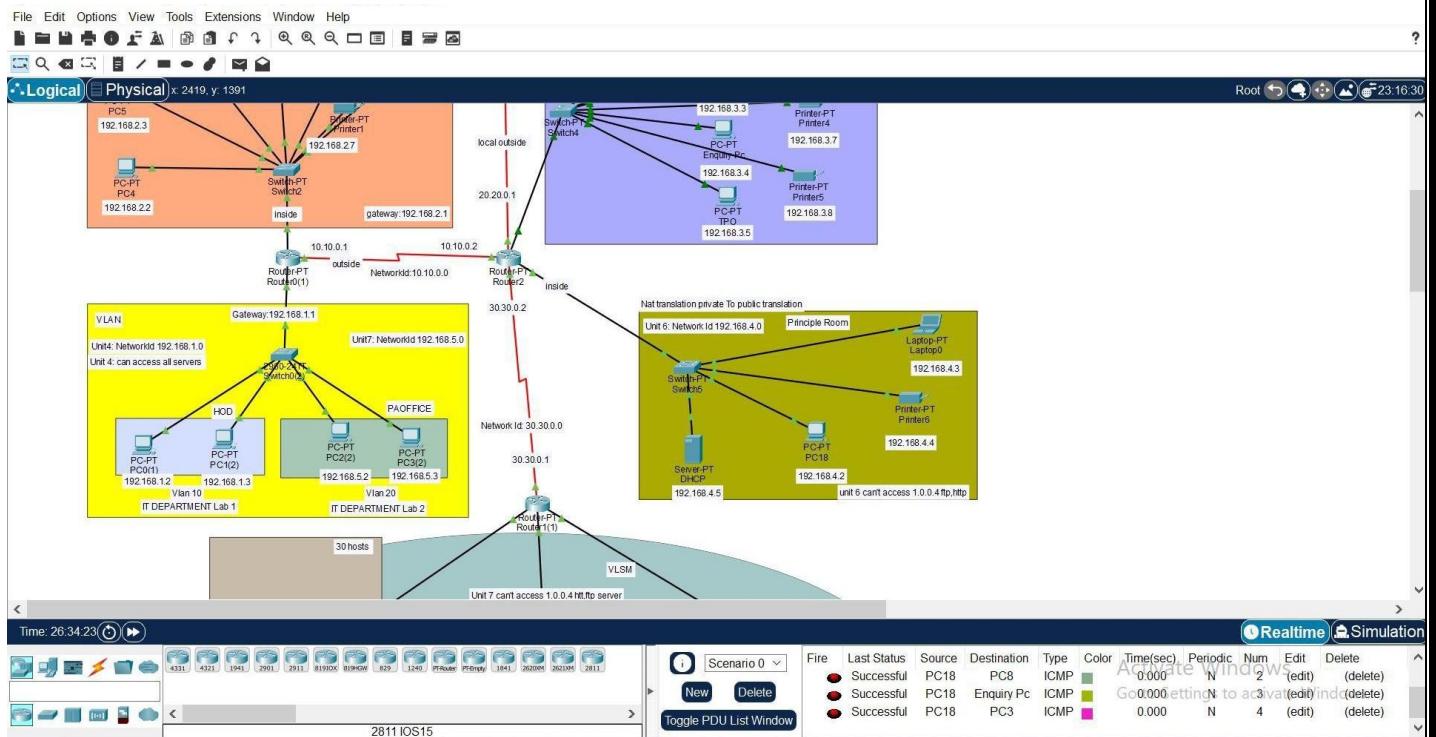
Activate Windows  
Go to Settings to activate Windows.

Top

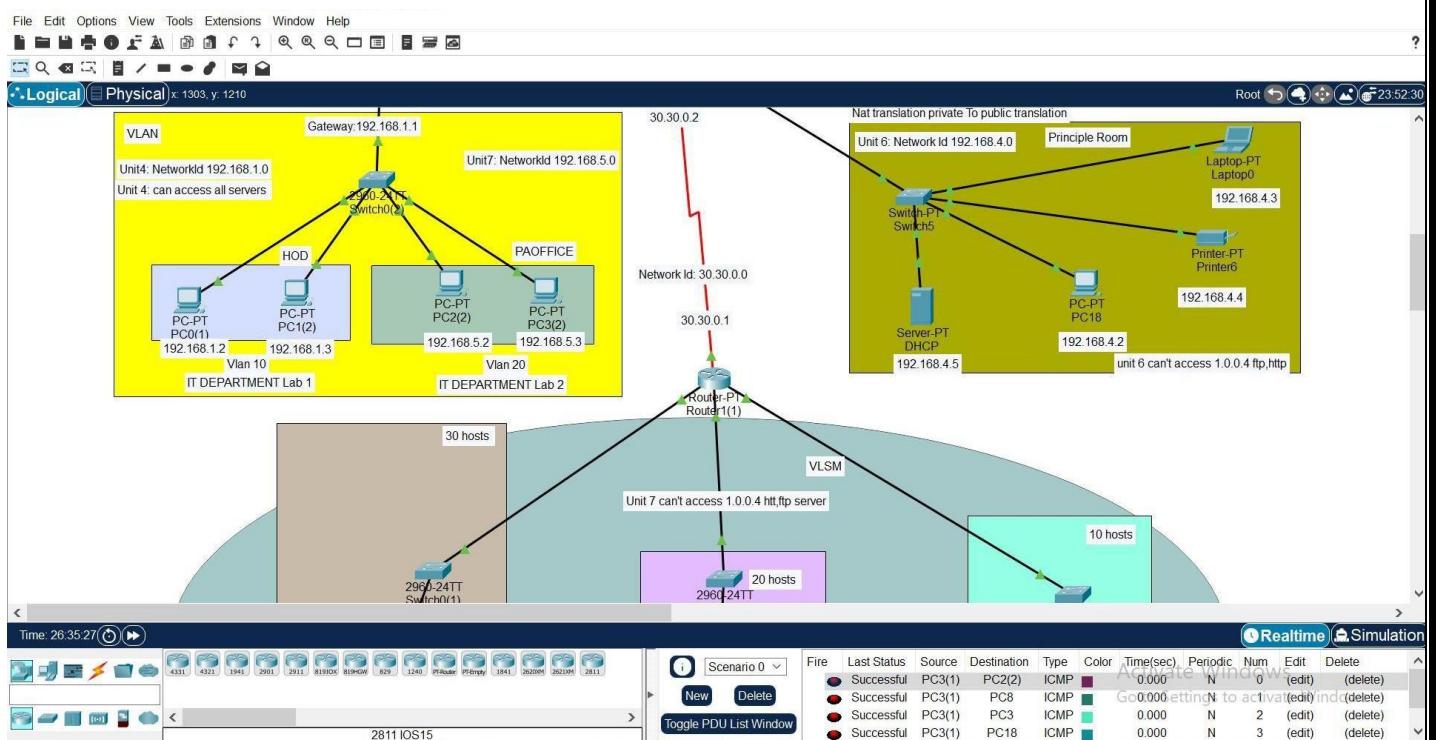
But with Unit no 2 communication not possible due to access control list provided at Unit 1



## Unit 6 Communication with all units

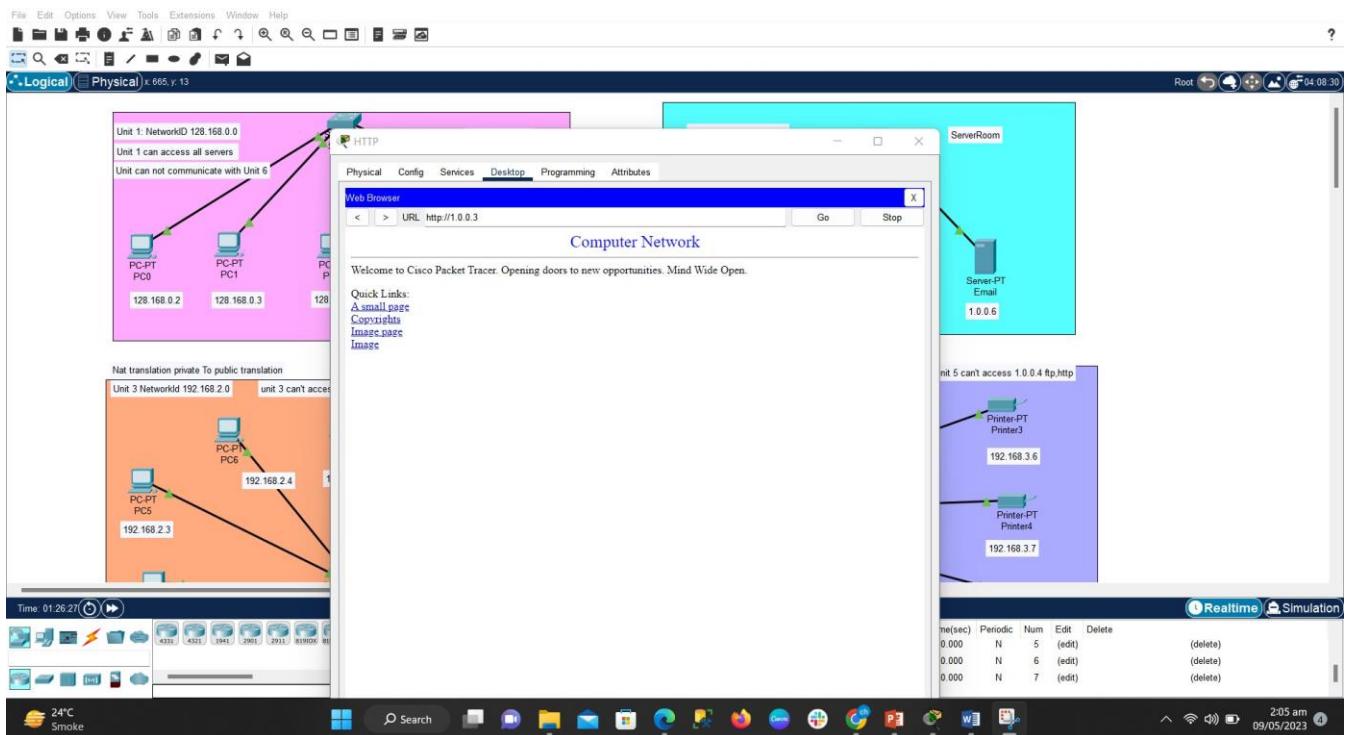


## Unit 7 Communication with all units

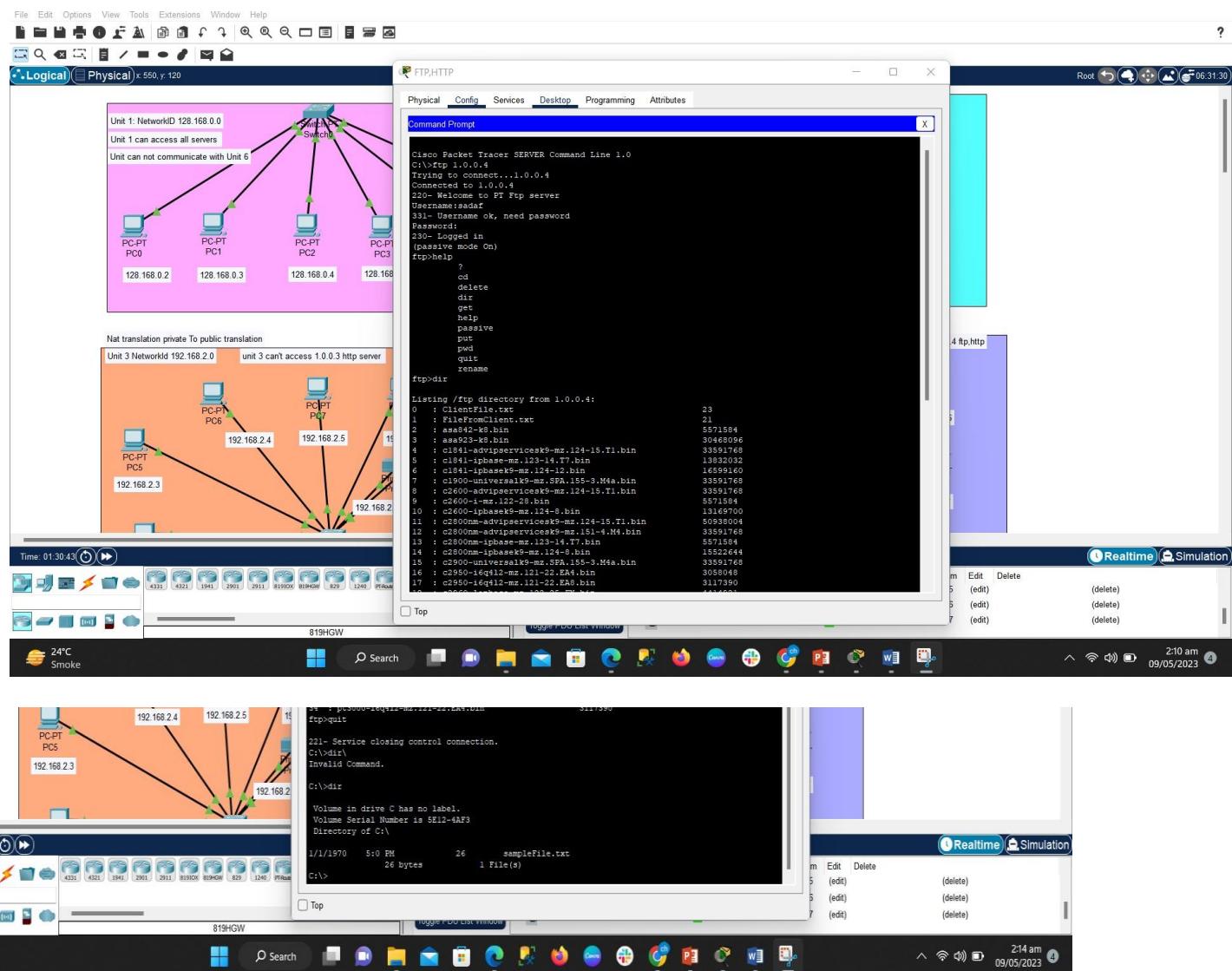


# Unit 1 can access all servers HTTP

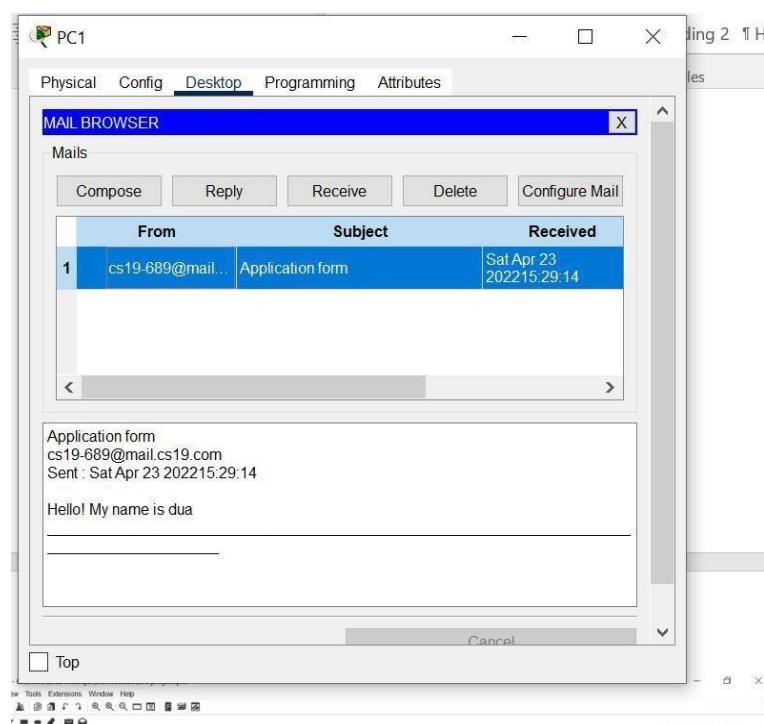
## 1.0.0.4



# HTTP, FTP Server 1.0.0.4



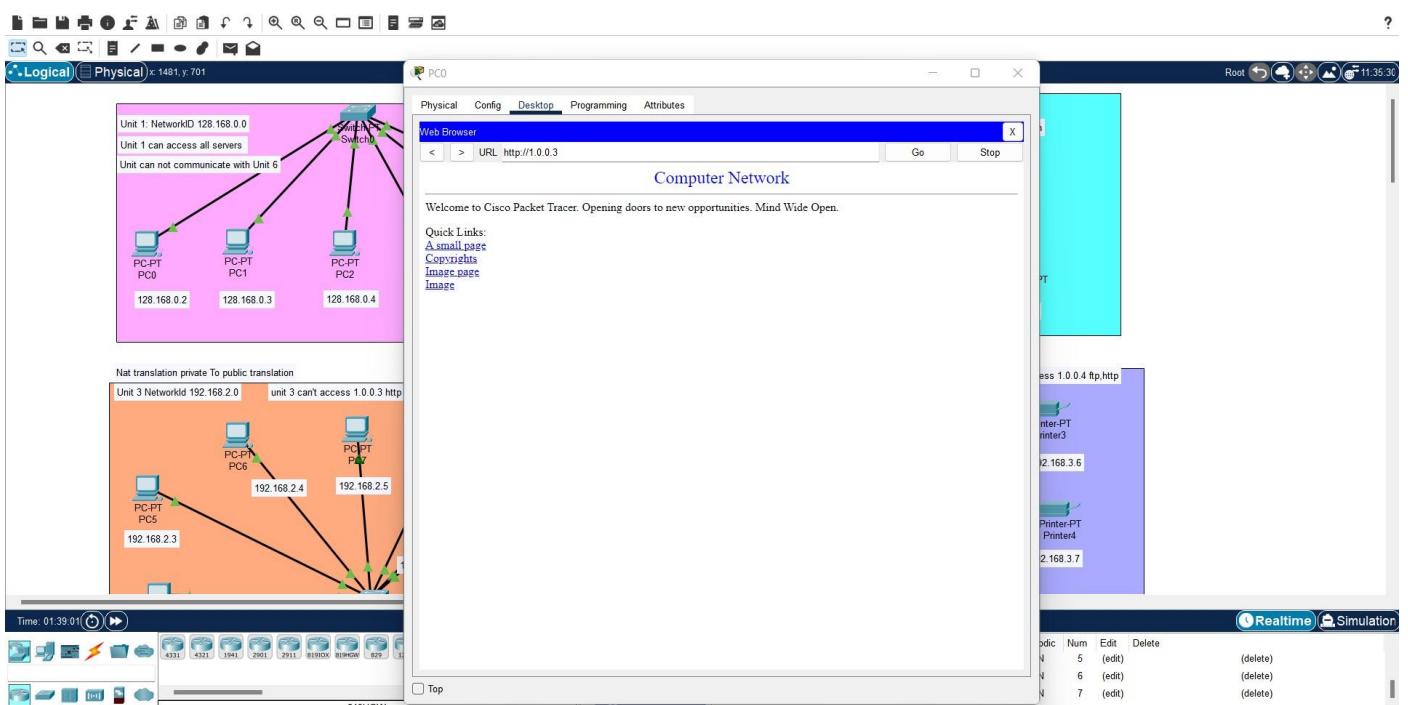
# Email 1.0.0.6



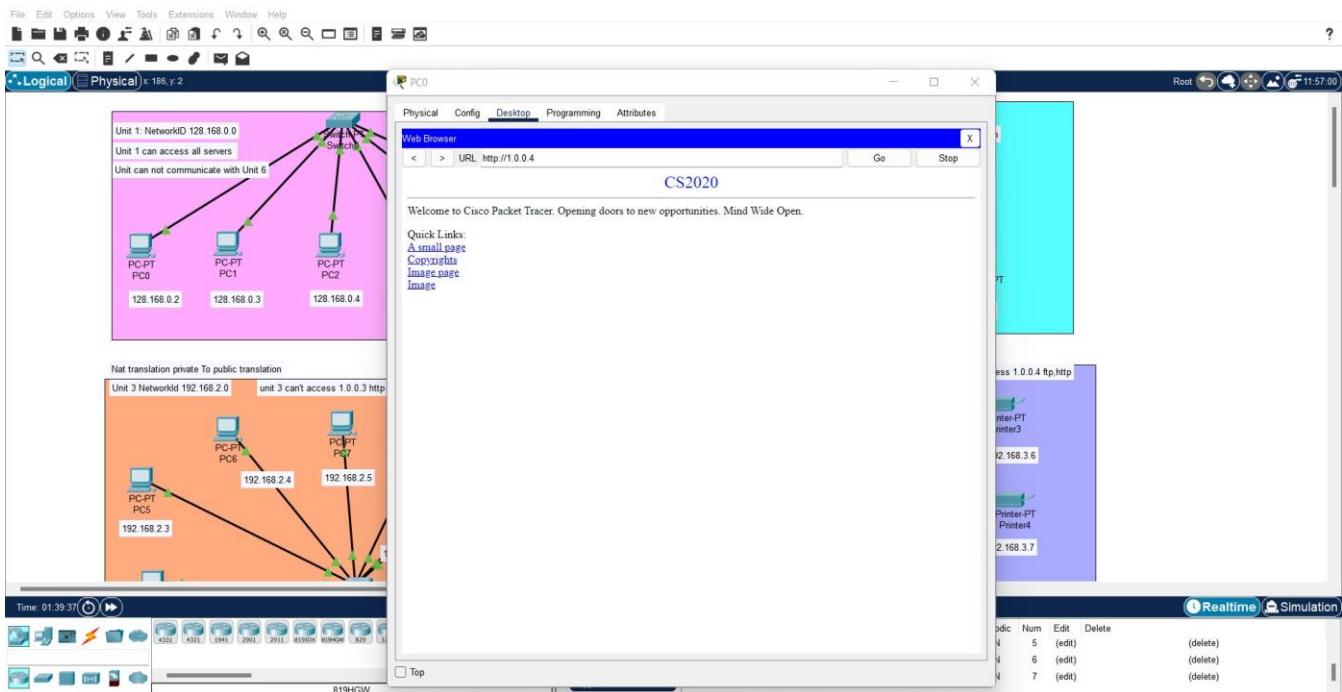
## Email Testing

Unit 3 can Access all server except 1.0.0.3 HTTP

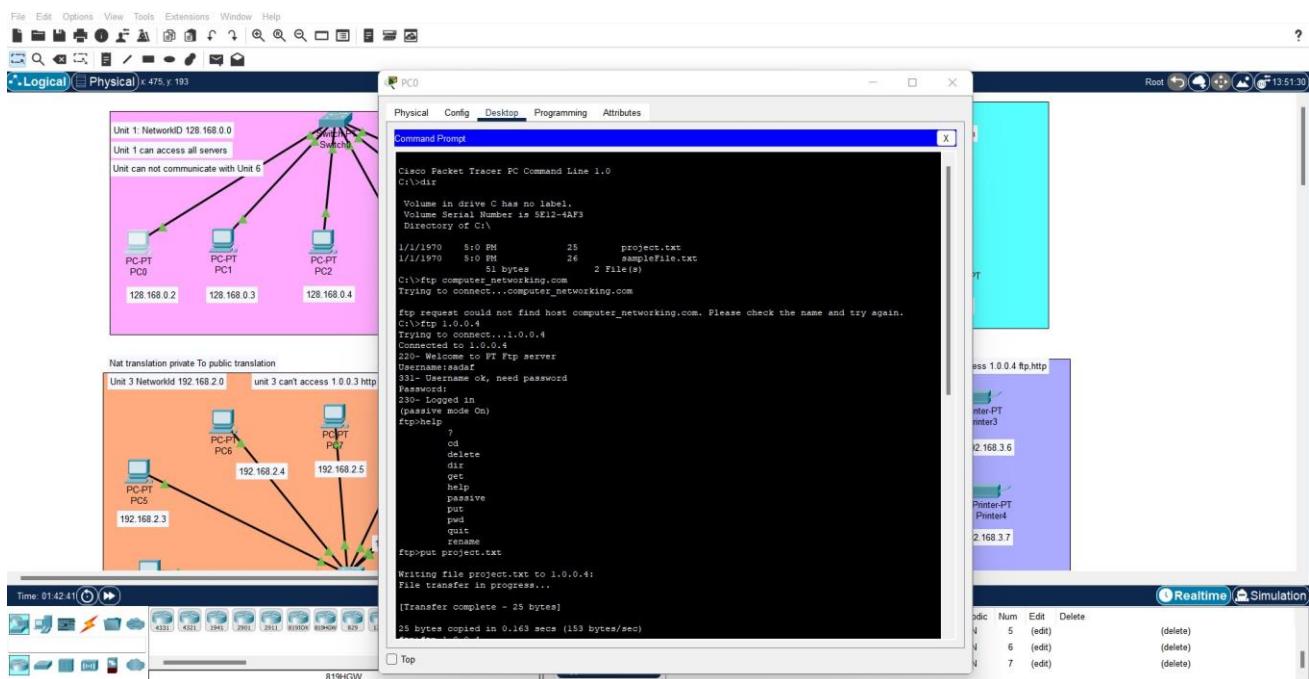
Access control for server 1.0.0.3



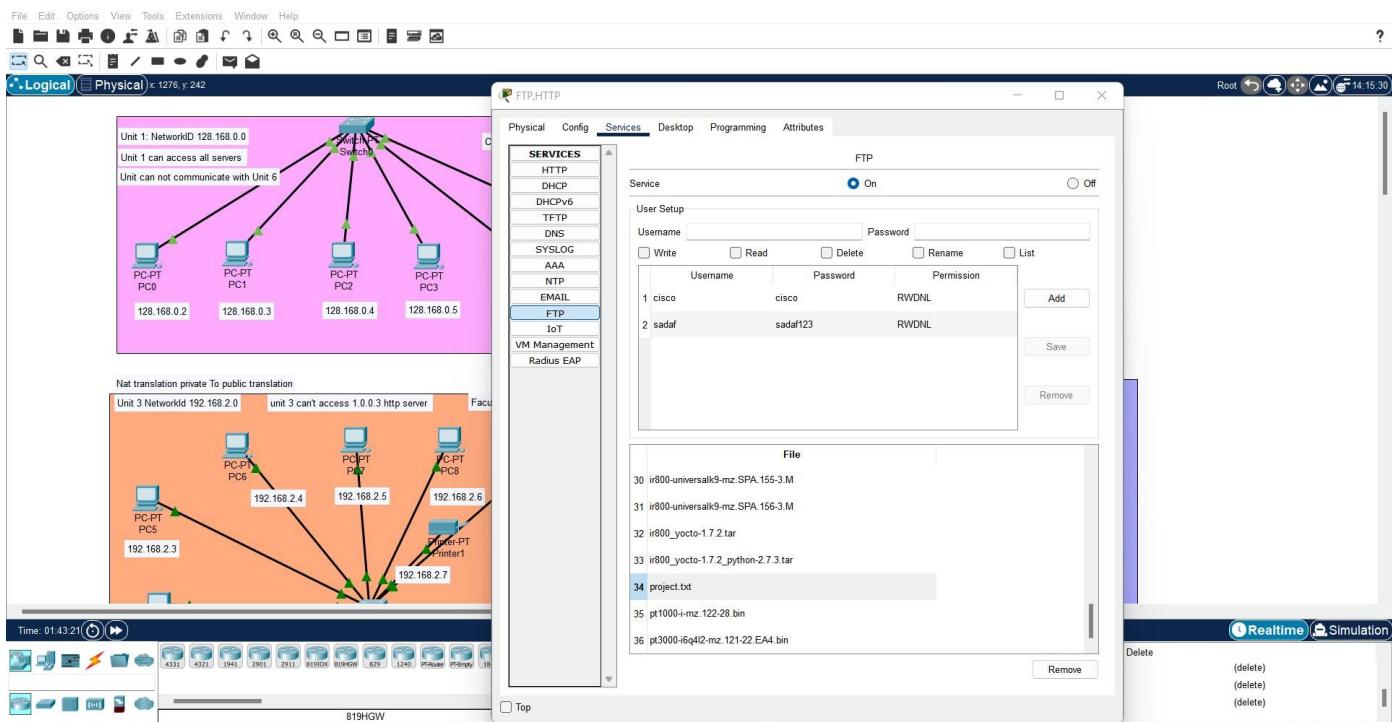
# HTTP, FTP Sever 1.0.0.4



## GETTING FILE



# PUTTING FILE TO FTP SERVER



## Unit 4 can Access all server

C:\>ping 1.0.0.3  
Pinging 1.0.0.3 with 32 bytes of data:  
Reply from 1.0.0.3: bytes=32 time=37ms TTL=125  
Reply from 1.0.0.3: bytes=32 time=2ms TTL=125  
Reply from 1.0.0.3: bytes=32 time=2ms TTL=125  
Reply from 1.0.0.3: bytes=32 time=33ms TTL=125  
Ping statistics for 1.0.0.3:  
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
Approximate round trip times in milli-seconds:  
Minimum = 2ms, Maximum = 37ms, Average = 18ms  
C:\>ping 1.0.0.4  
Pinging 1.0.0.4 with 32 bytes of data:  
Reply from 1.0.0.4: bytes=32 time=32ms TTL=125  
Reply from 1.0.0.4: bytes=32 time=28ms TTL=125  
Reply from 1.0.0.4: bytes=32 time=28ms TTL=125  
Reply from 1.0.0.4: bytes=32 time=28ms TTL=125  
Ping statistics for 1.0.0.4:  
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
Approximate round trip times in milli-seconds:  
Minimum = 28ms, Maximum = 32ms, Average = 29ms  
C:\>

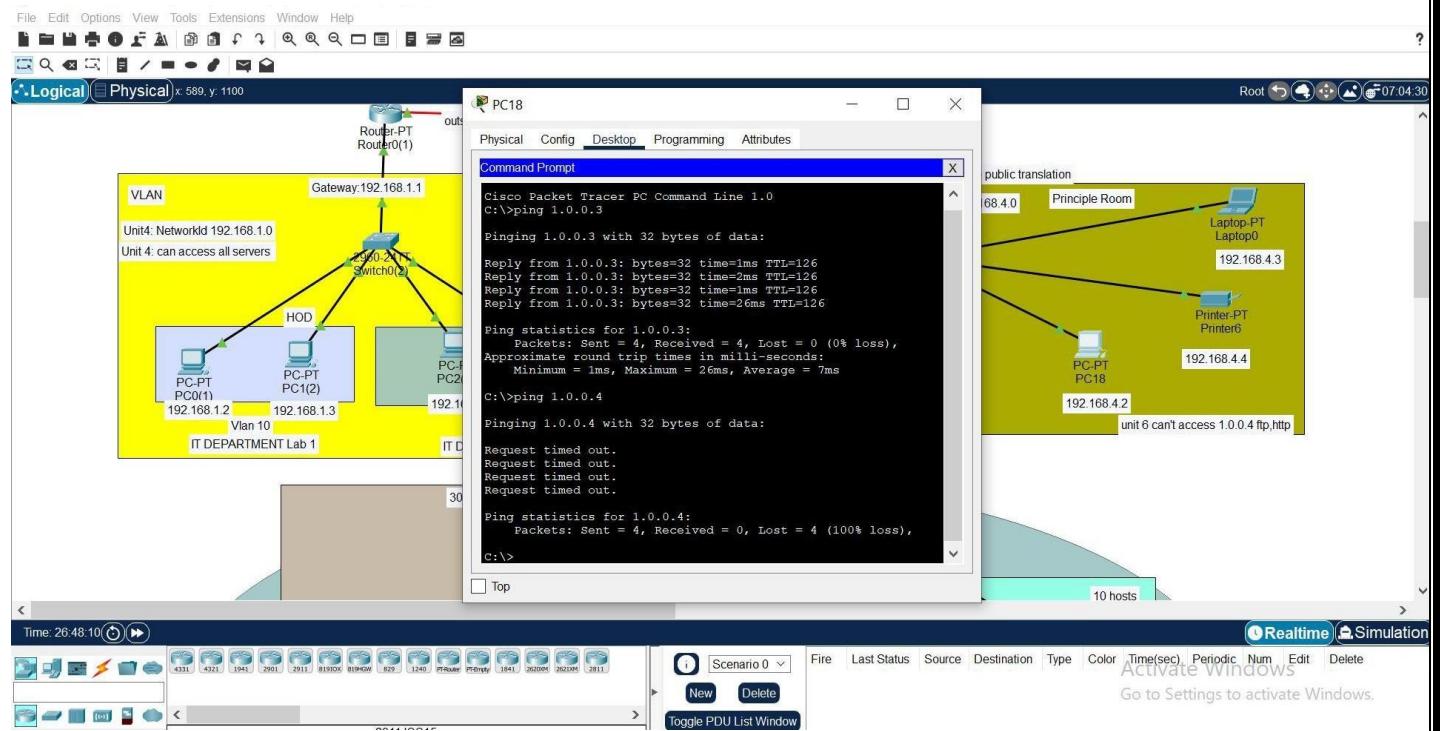
Activate Windows  
Go to Settings to activate Windows

## Unit 5 can Access all server except 1.0.0.4 ftp, http

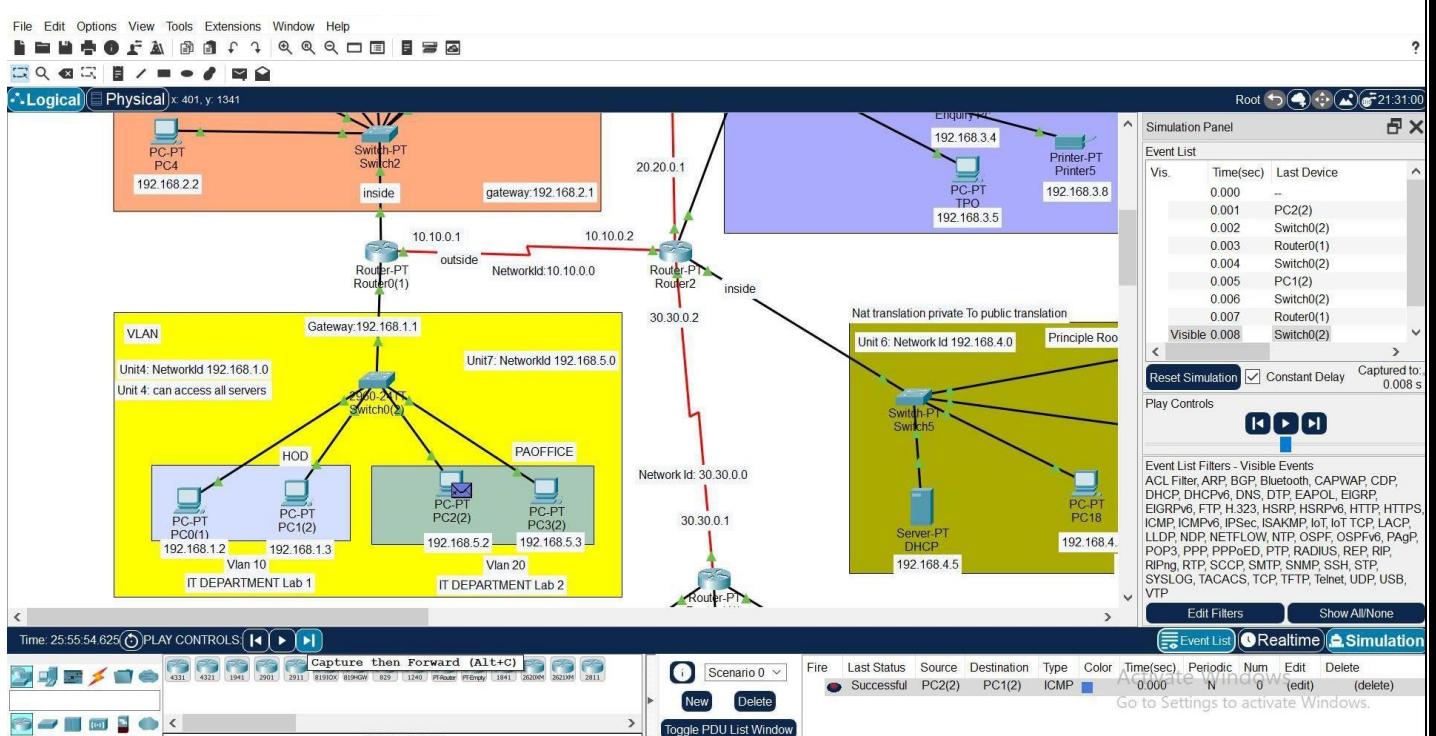
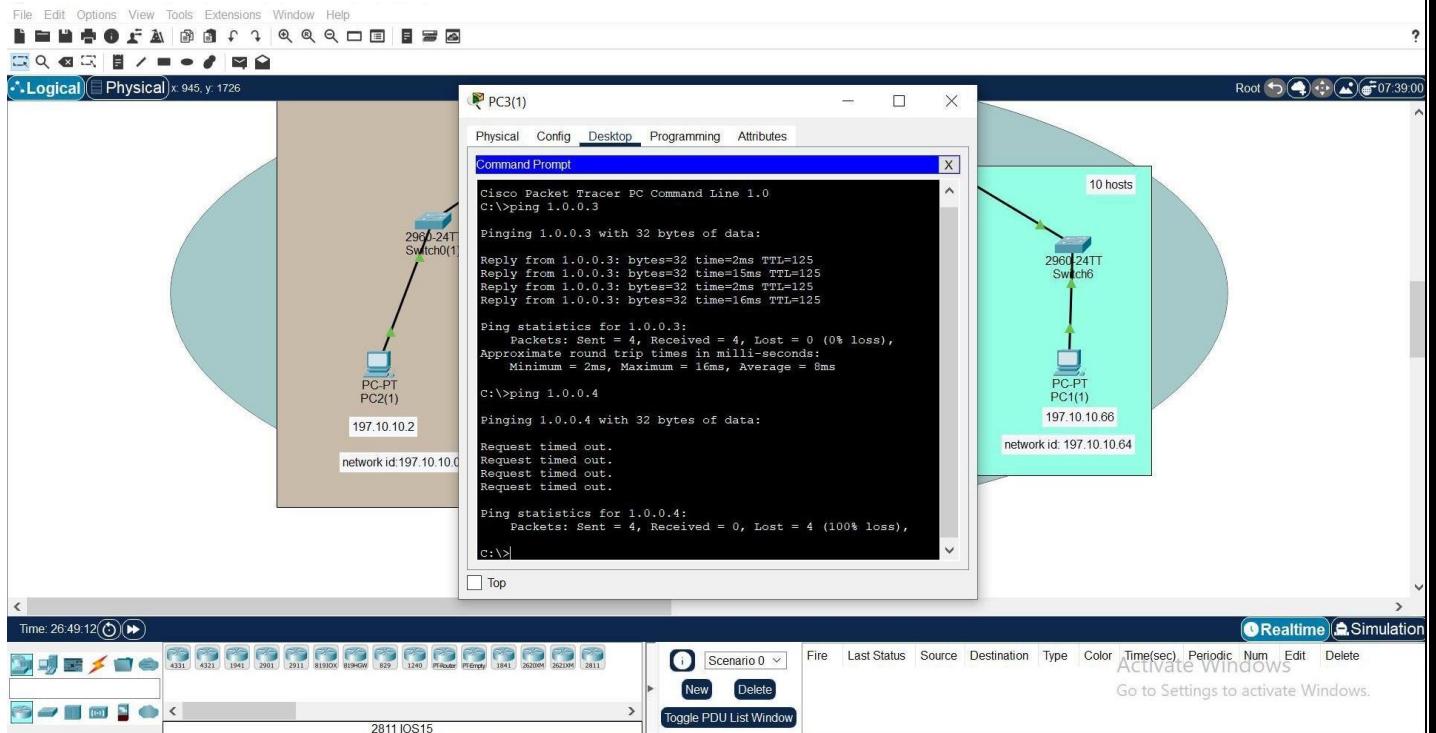
C:\>  
C:\>ping 1.0.0.3  
Pinging 1.0.0.3 with 32 bytes of data:  
Reply from 1.0.0.3: bytes=32 time=22ms TTL=126  
Reply from 1.0.0.3: bytes=32 time=1ms TTL=126  
Reply from 1.0.0.3: bytes=32 time=16ms TTL=126  
Reply from 1.0.0.3: bytes=32 time=16ms TTL=126  
Ping statistics for 1.0.0.3:  
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
Approximate round trip times in milli-seconds:  
Minimum = 1ms, Maximum = 22ms, Average = 13ms  
C:\>ping 1.0.0.4  
Pinging 1.0.0.4 with 32 bytes of data:  
Request timed out.  
Request timed out.  
Request timed out.  
Request timed out.  
Ping statistics for 1.0.0.4:  
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),  
C:\>

Activate Windows  
Go to Settings to activate Windows

# Unit 6 can Access all server except 1.0.0.4 ftp, http

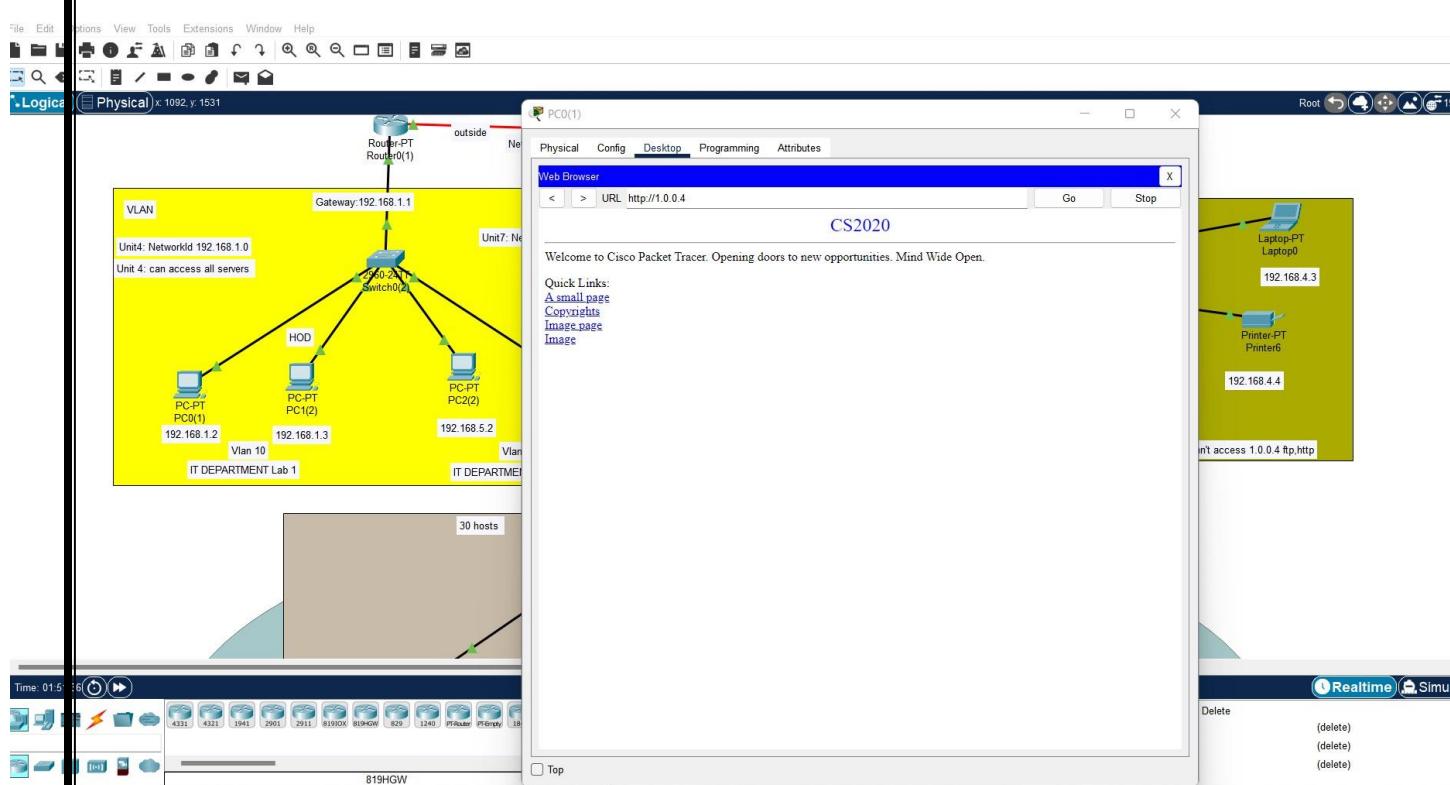


# Unit 7 can Access all server except 1.0.0.4 ftp, http

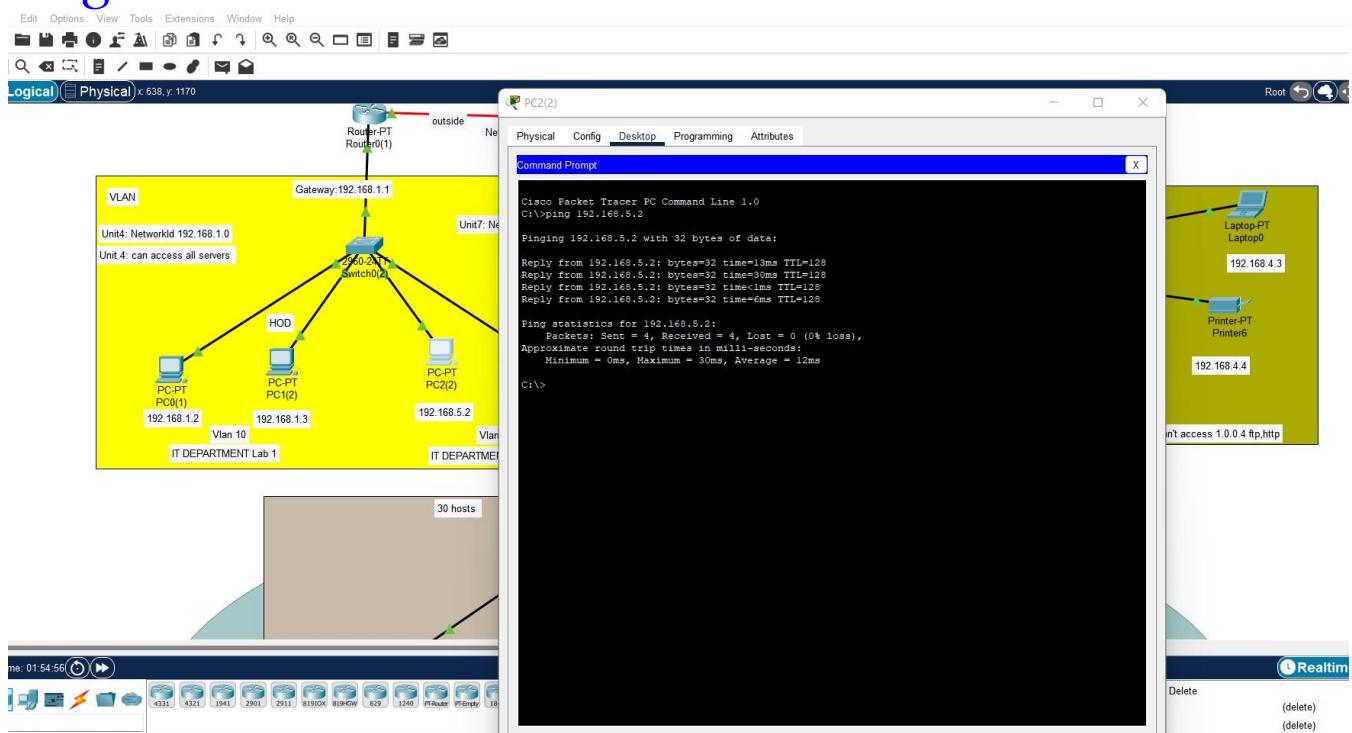


# Testing VLAN communications from HOD to PA office

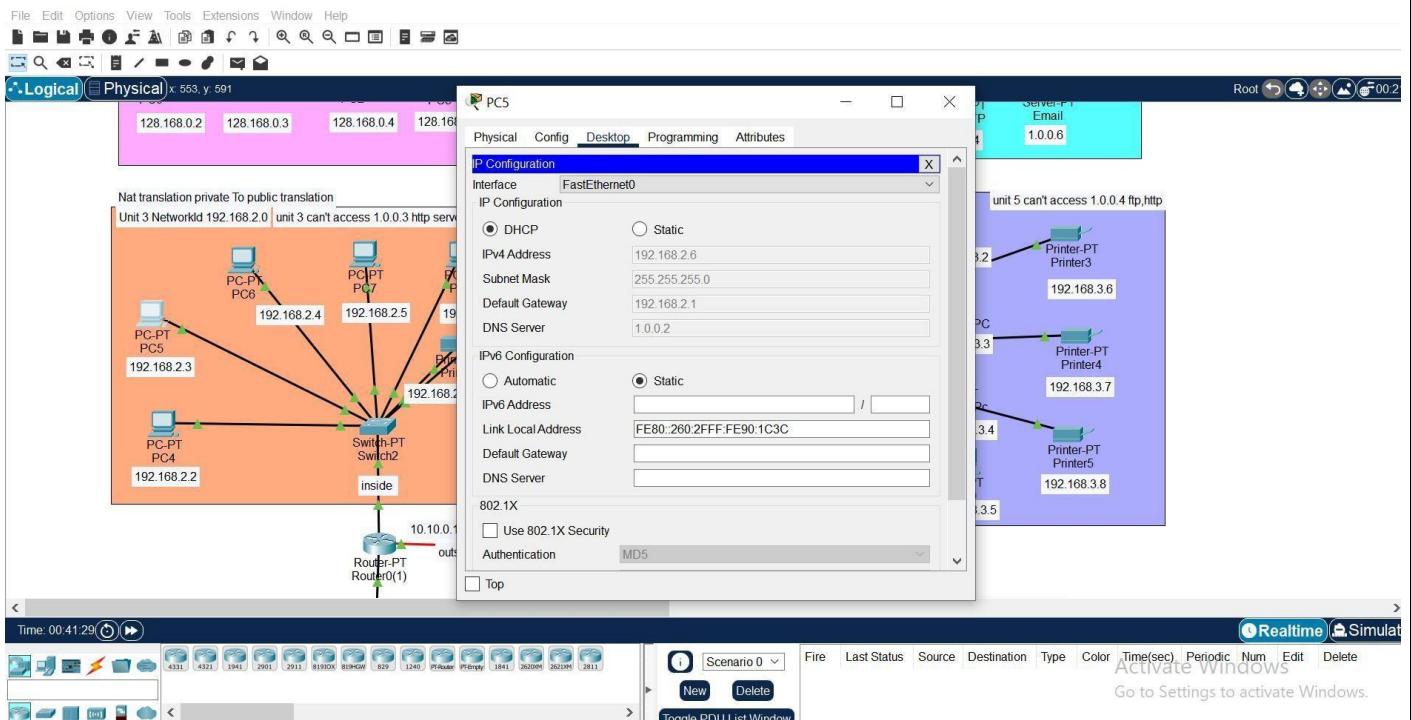
## Testing Web Hosting



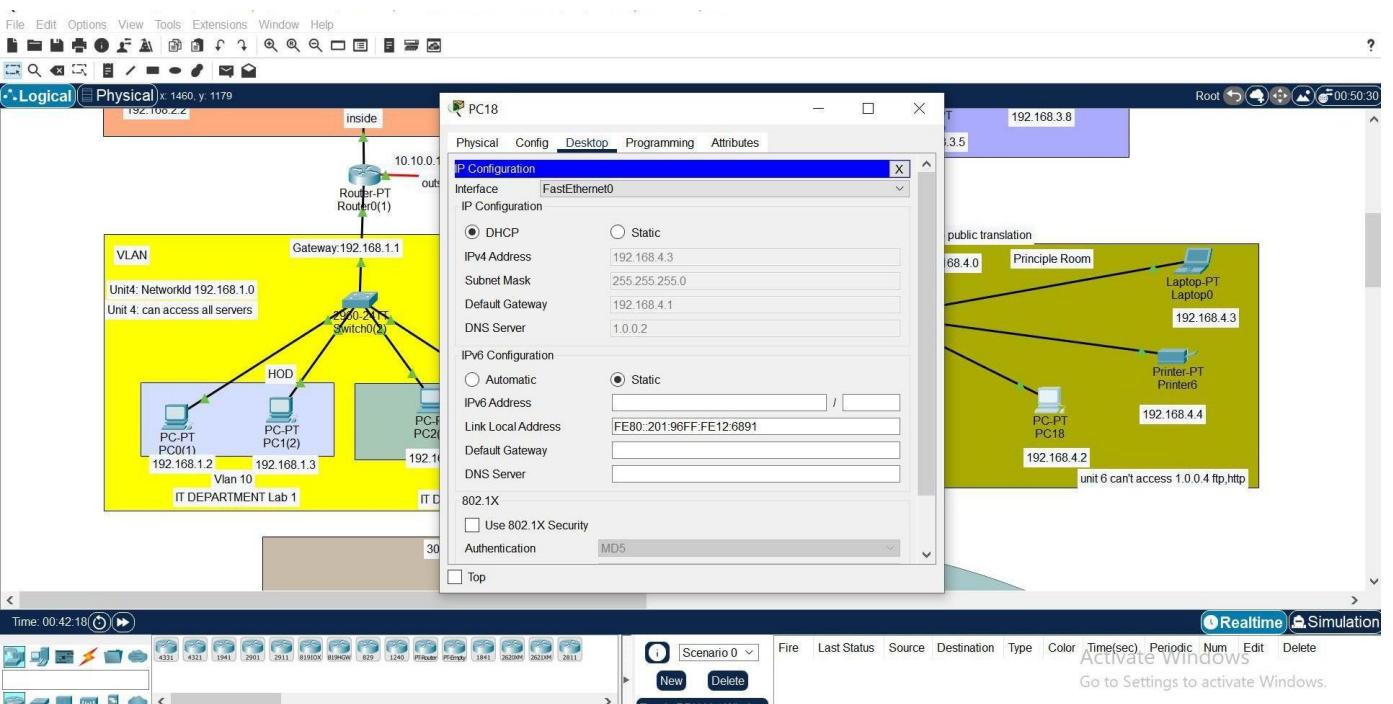
## Testing VLAN



# Unit 3 Allocated address by DHCP Private IP 192.168/

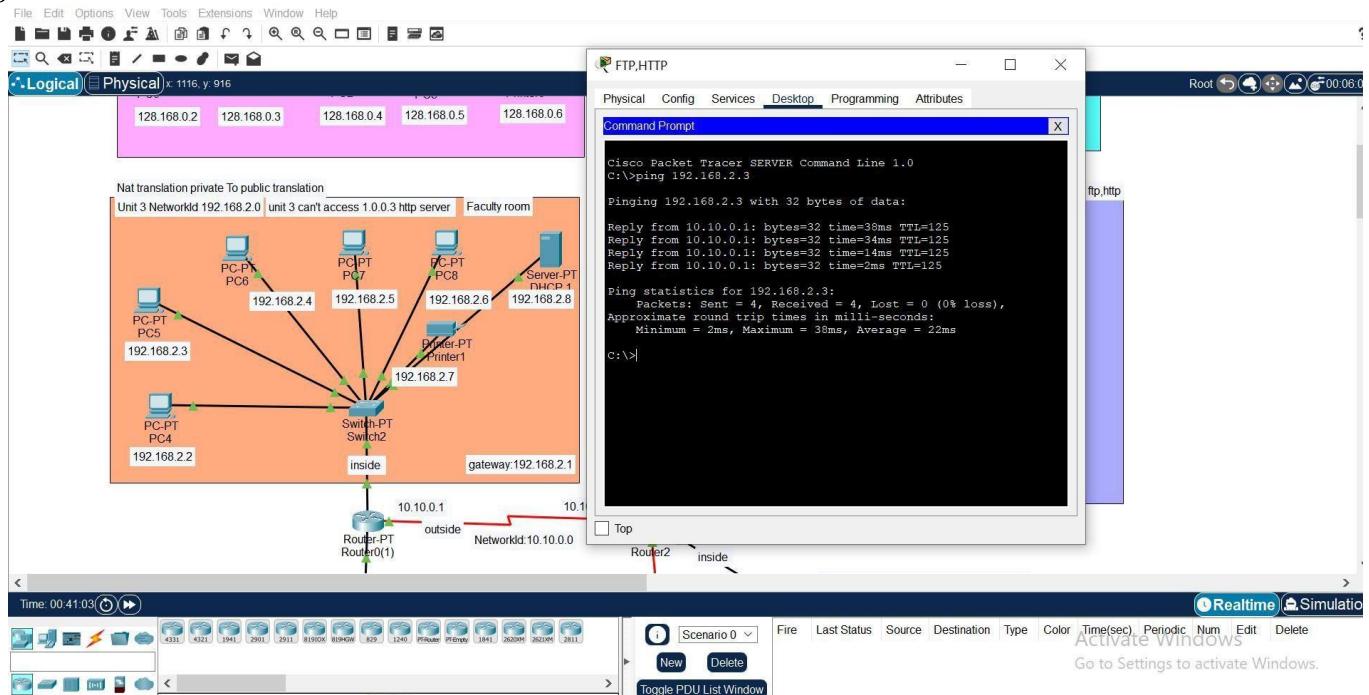


# Unit 6 Allocated address By DHCP Private IP 192.168/

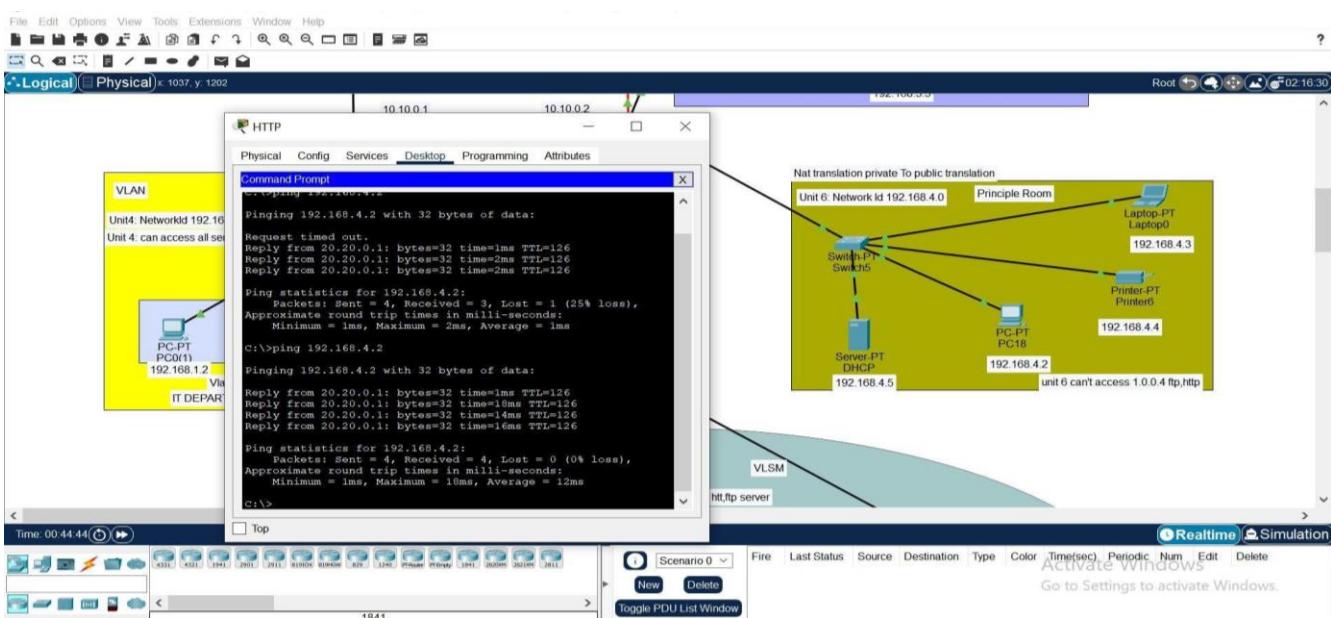


# Private addresses allocated translated to public when accessing the Internet

NAT TRANSLATION(reply from public IP 10.10.0.1)when pinging from HTTP server



NAT TRANSLATION(reply from public IP 20.20.0.1)when pinging from HTTP server



## Conclusion:-

The result of the proposed plan will be an unsustainable backbone network infrastructure that meets the requirements for easy access to information and security of the private network, and also ensures efficient productivity when telecommunications services are accessed. The installed equipment is enabled to configure high-speed and wireless internet access throughout the complex of hospital facilities and to provide the transfer of all types of data across a single configured network.

