Computer Network Lab

Semester Project

Topic:

University Network

Submitted To:

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Degree & Semester:

BSCS (6th Semester)

Department of Computer Science

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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: -

- At least two units will not be able to communicate with each other
- One unit must have two servers' web and email
- Restrict remaining units to access one or two servers
- 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.
- Should comprise of data centers with necessary security features and support.

IP Addressing Plan: -

Unit No 1

Computer Lab 1(128.168.0.0)	
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 ,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

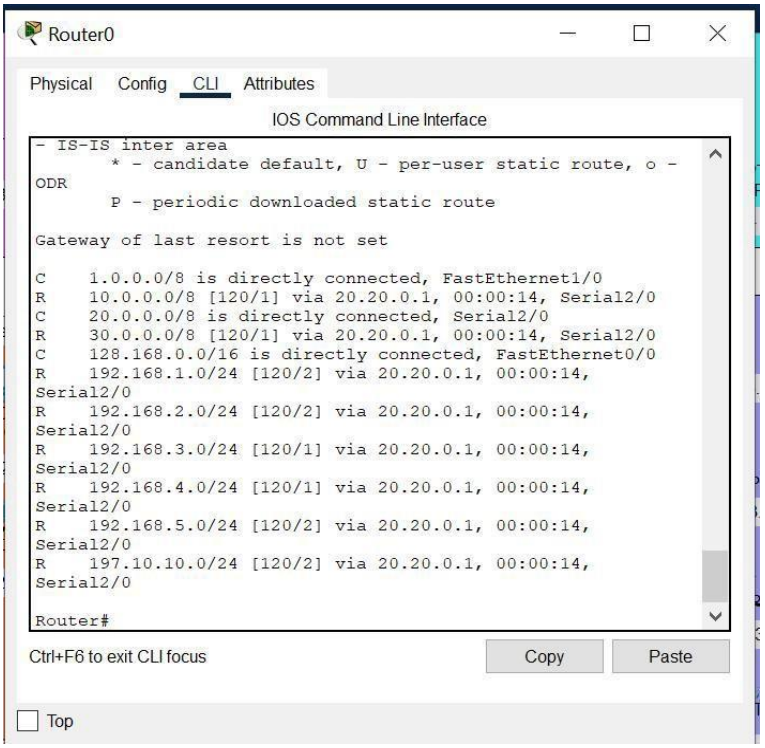
Unit No 7

IP=197.10.10.0

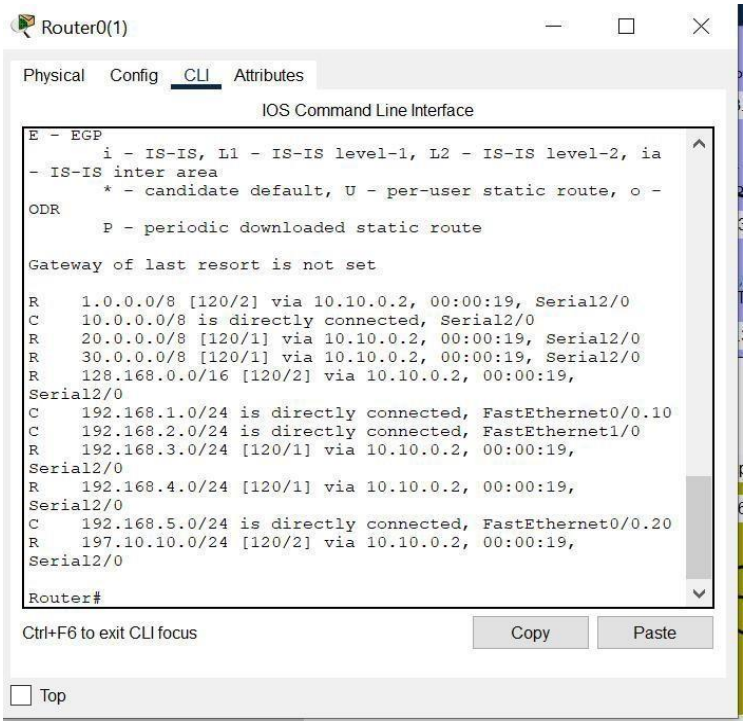
VLSM		Subnets	Starting IP	Broadcast Ip
197.10.10.2	30 hosts	255.255.255.224	197.10.10.0/27	197.10.10.31/27
197.10.10.34	20 hosts	255.255.255.224	197.10.10.32/27	197.10.10.63/27
197.10.10.64	10 hosts	255.255.255.240	197.10.10.64 /28	197.10.10.79 /28

Routing Protocol Plan: -

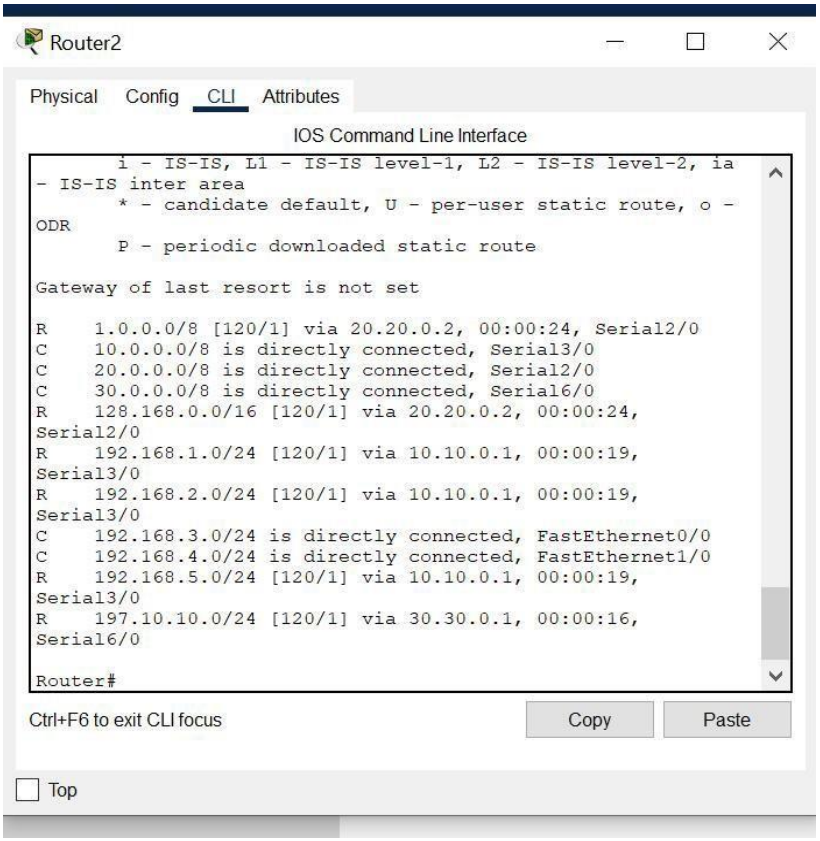
Routing Information Protocol (RIP) is a flexible route that uses hop counts as a transmission metric to find the best route between a source and a local network. It is a distance navigation protocol with an AD value of 120 and works on the OSI model application platform.



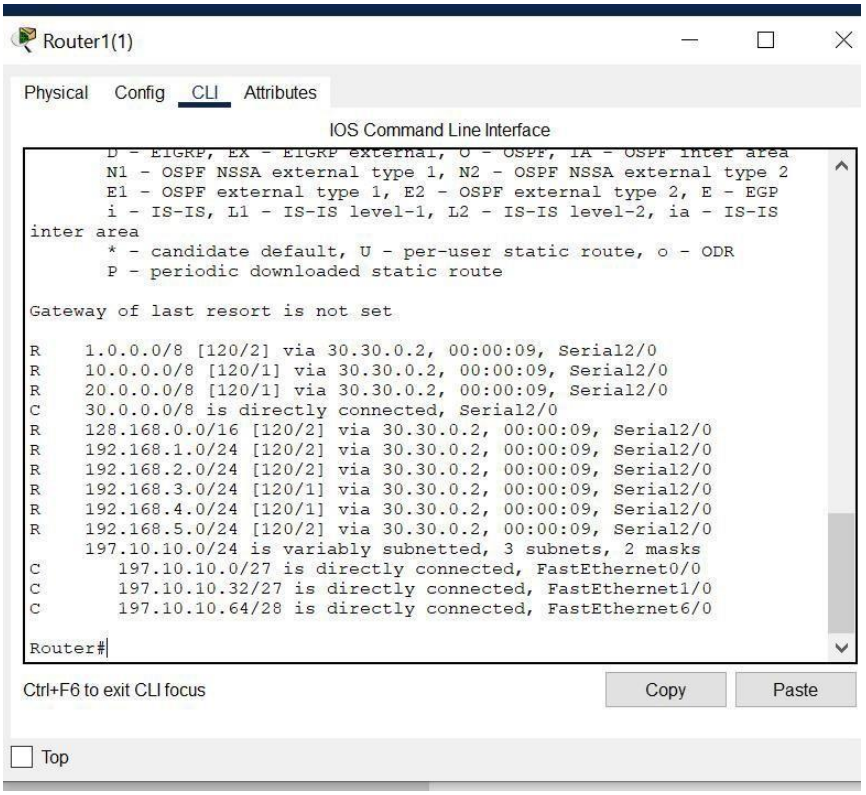
Routing Protocol Plan for Router0



Routing Protocol Plan for Router0(1)

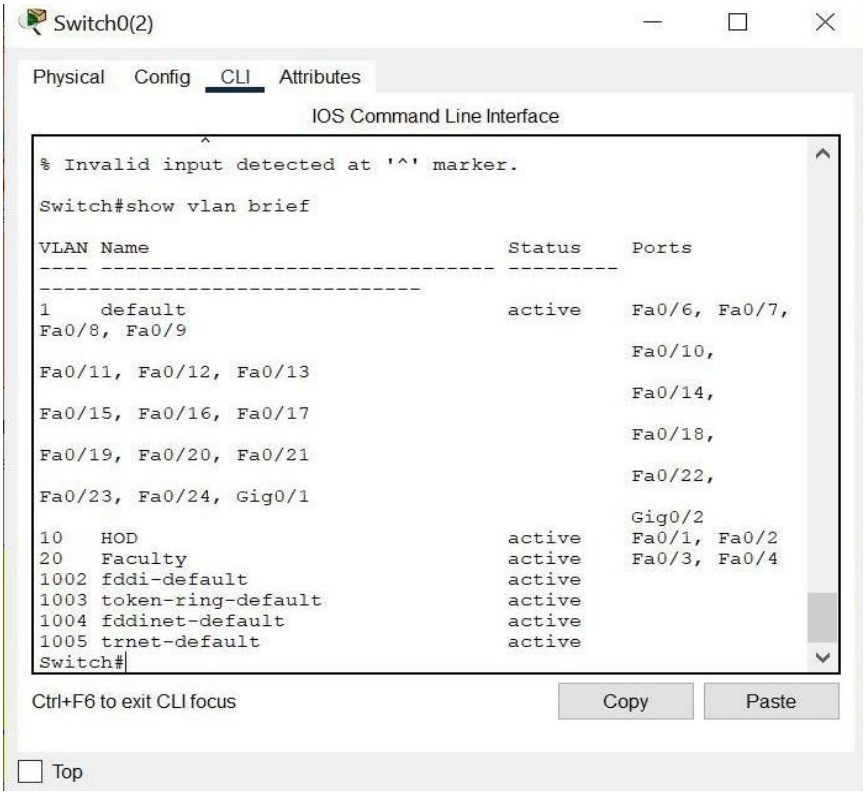


Routing Protocol Plan for Router2



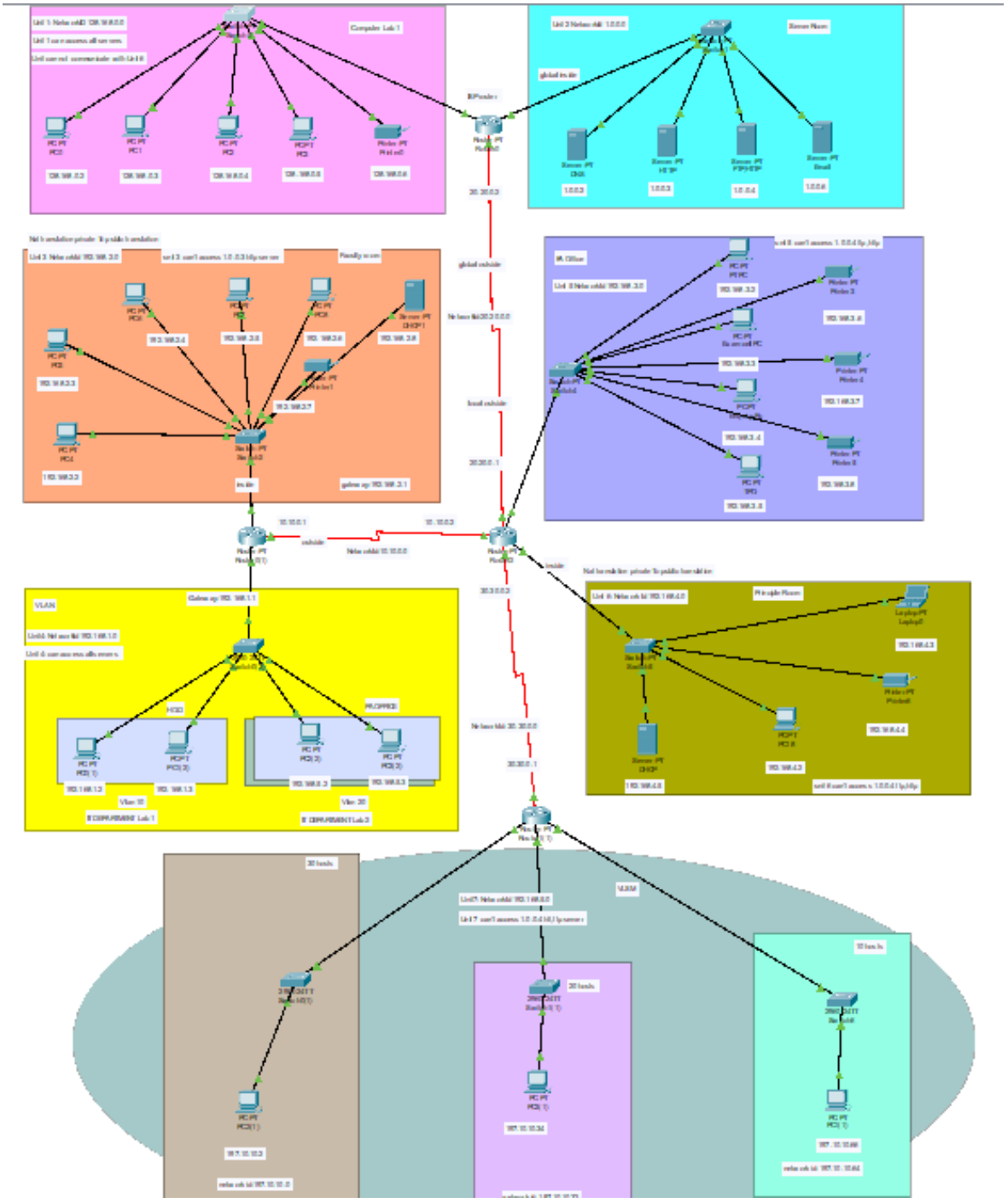
Routing Protocol Plan for Router1(1)

Switch Configuration for VLAN: -



Switch configuration for virtual LAN UNIT 4

Topology: -

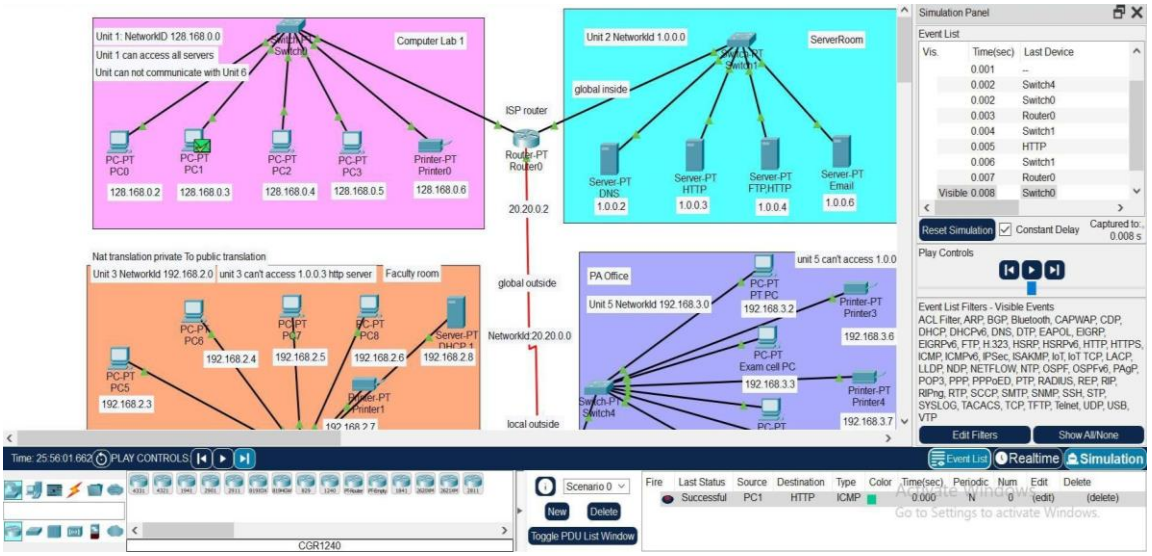


The prototype of the proposed network is implemented on cisco packet treaser

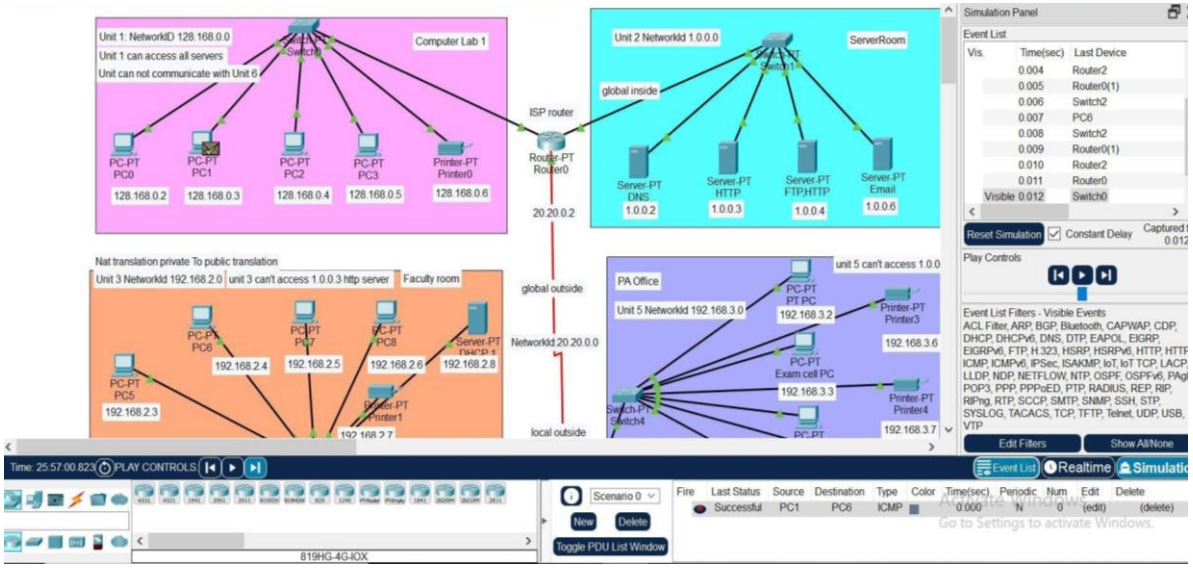
Testing Network: -

Test 1: Communication b/w Units.

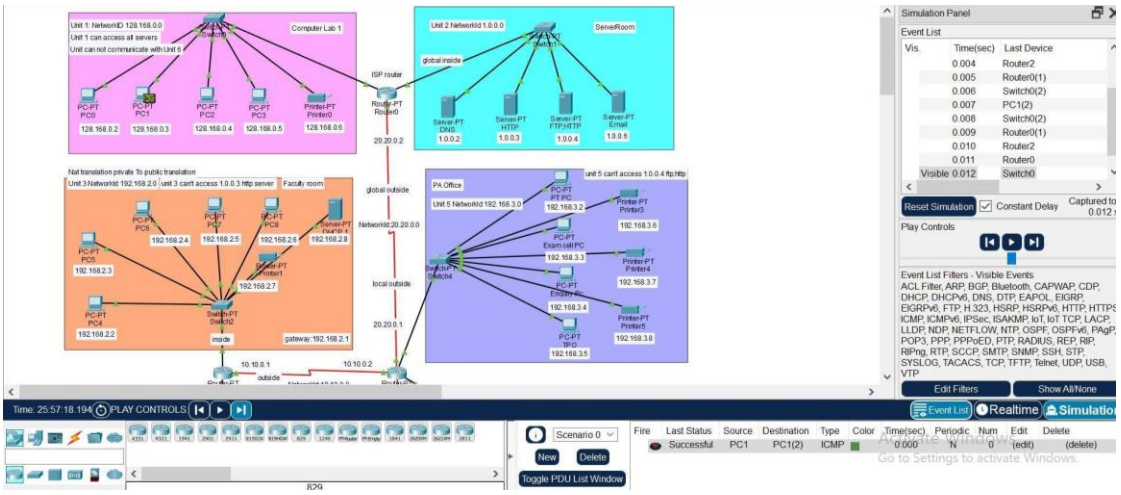
Unit No 1 communication with Unit 2



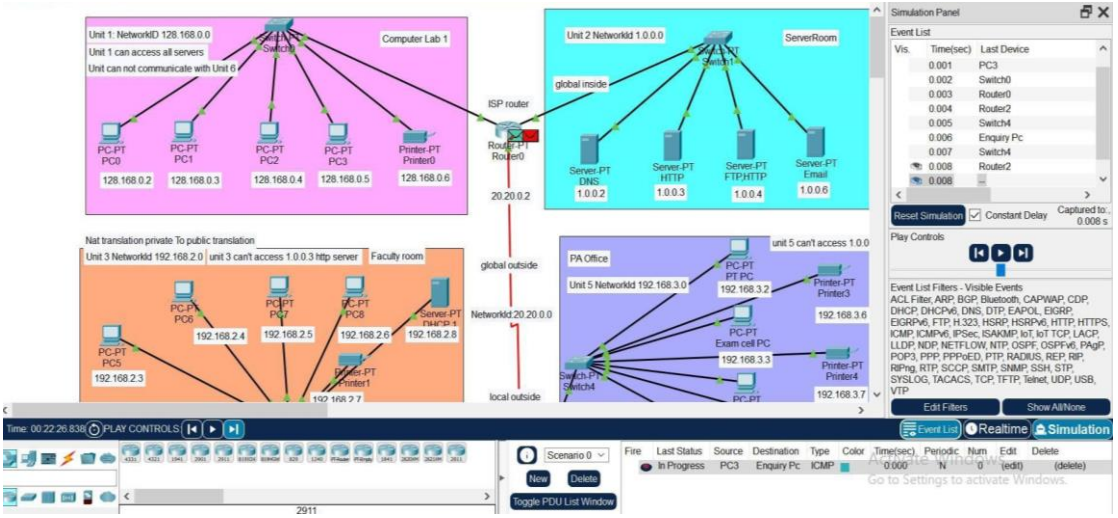
Unit No 1 communication with unit 3



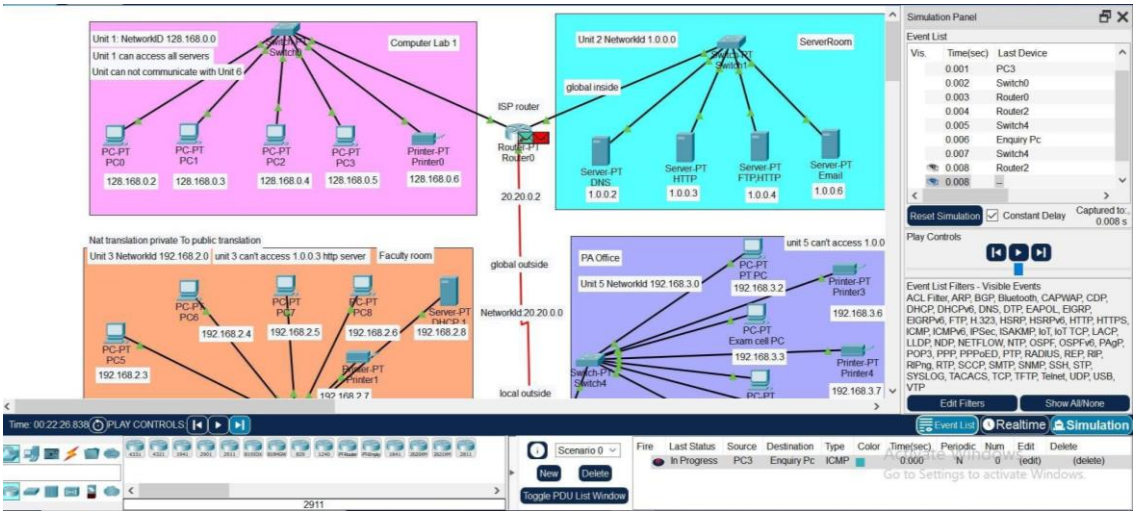
Unit No 1 communication with unit 4 HOD



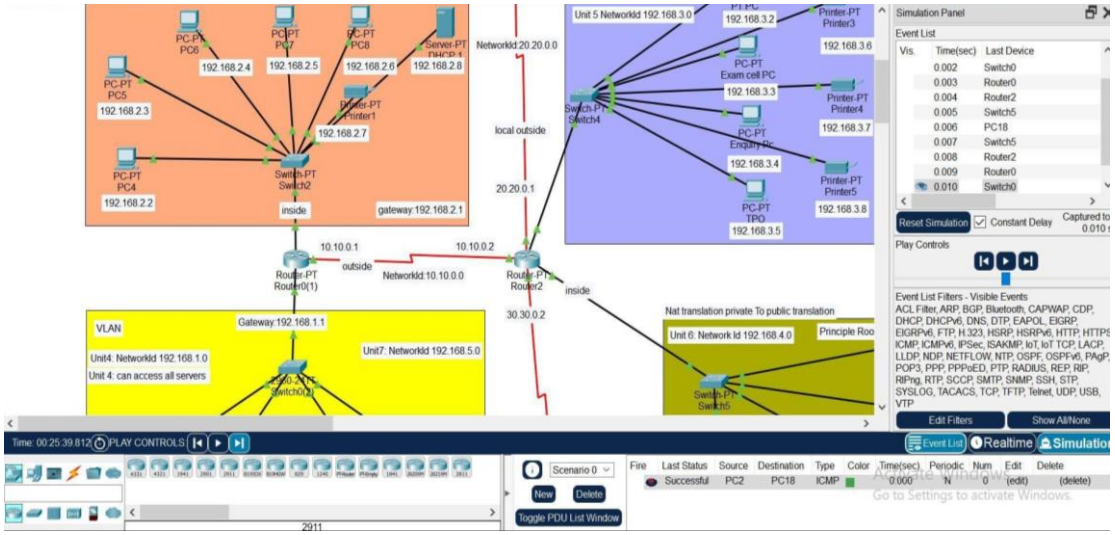
Unit No 1 communication with unit 4 PA office



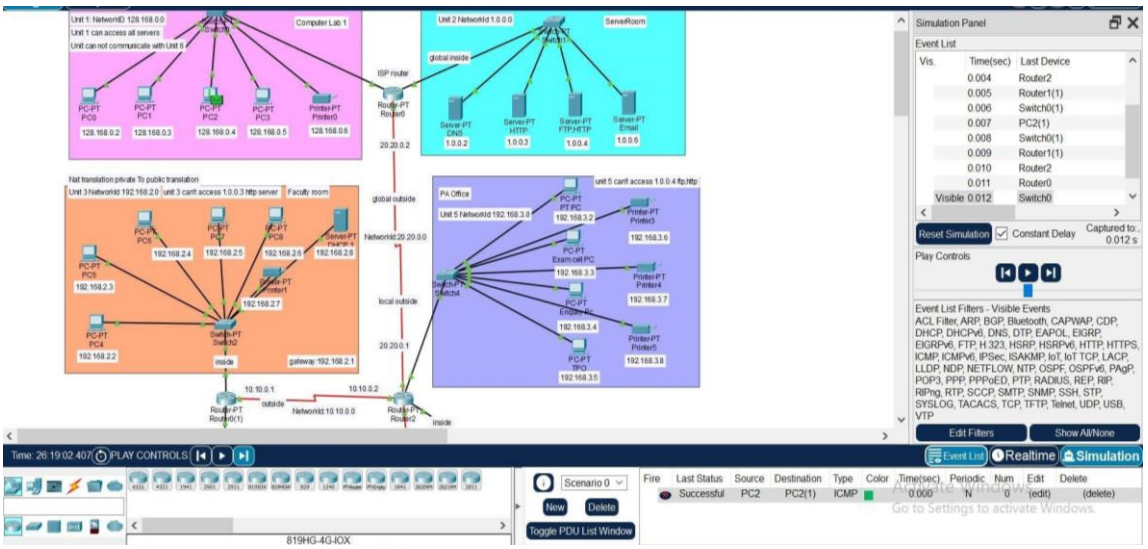
Unit No 1 Access control deny to communication with unit 5



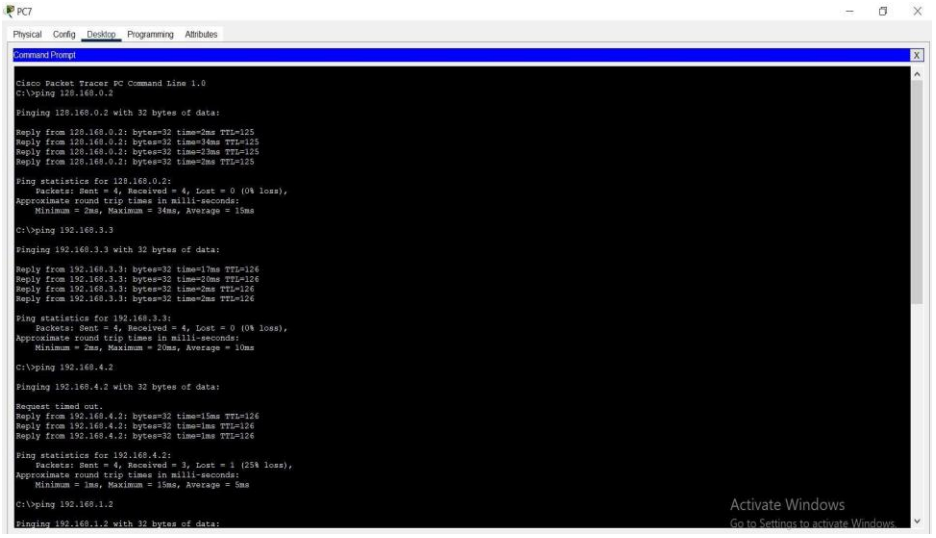
Unit No 1 communication with Unit 6

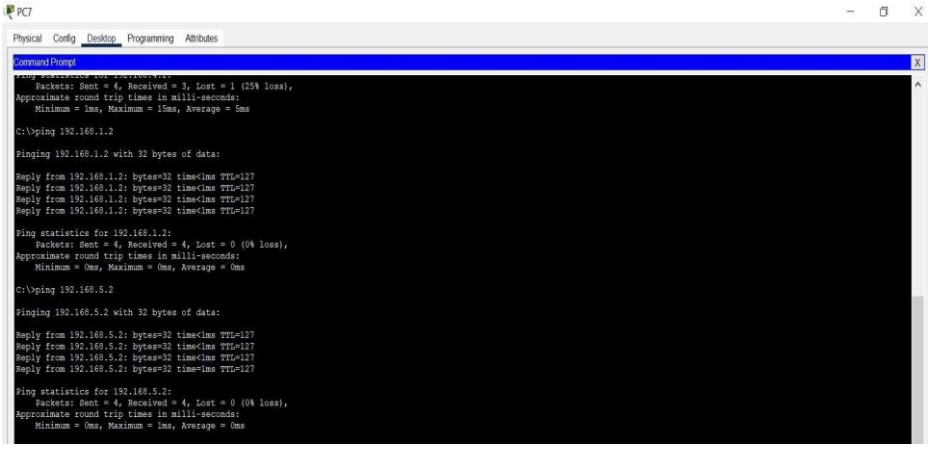


Unit No 1 communication with unit 7

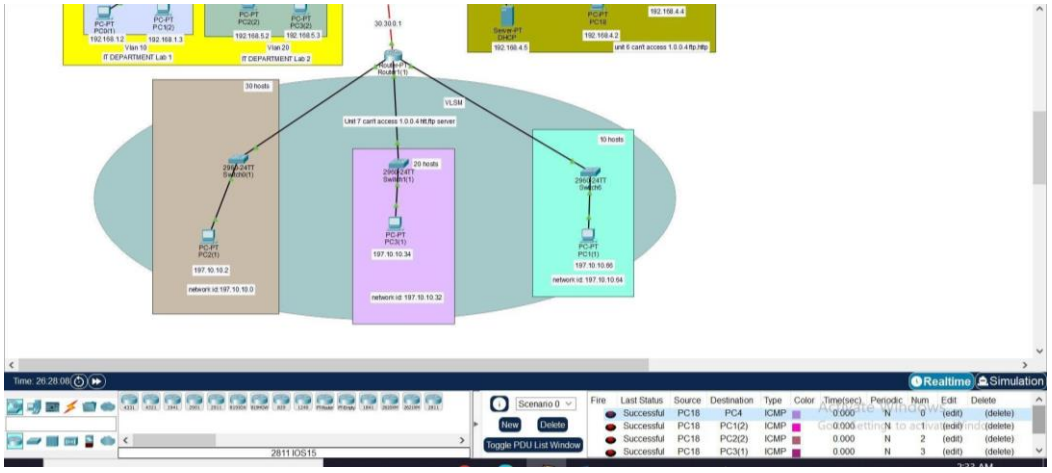


Unit 2 Communication with all units Ping

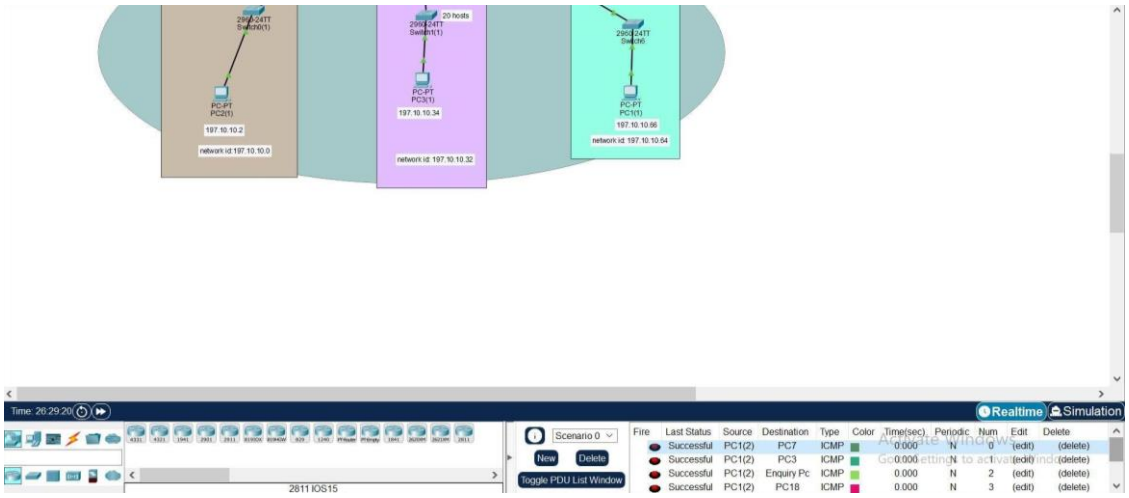




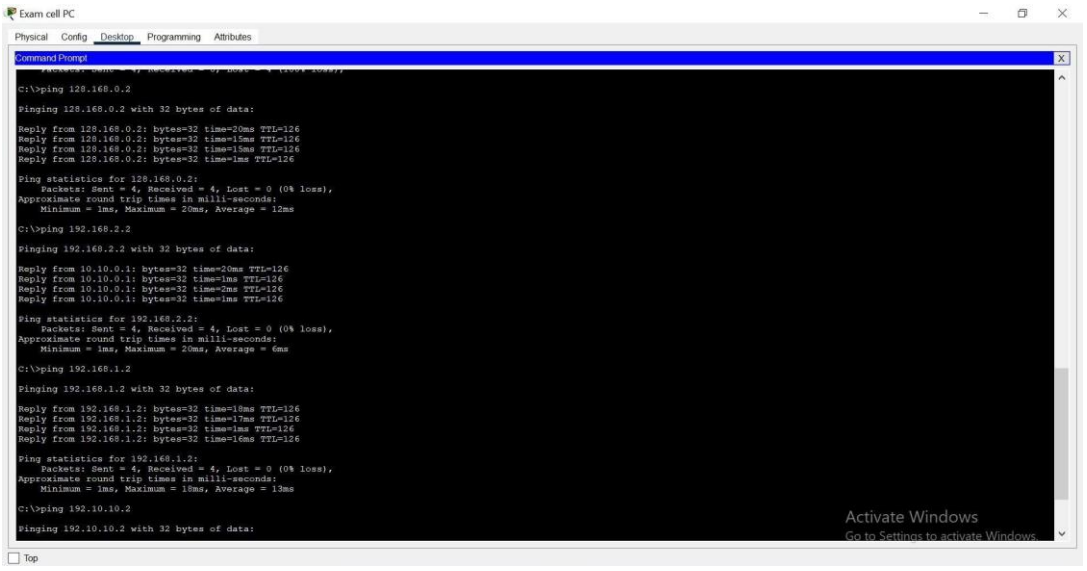
Unit 3 Commuication with all units



Unit 4 Commuication with all units

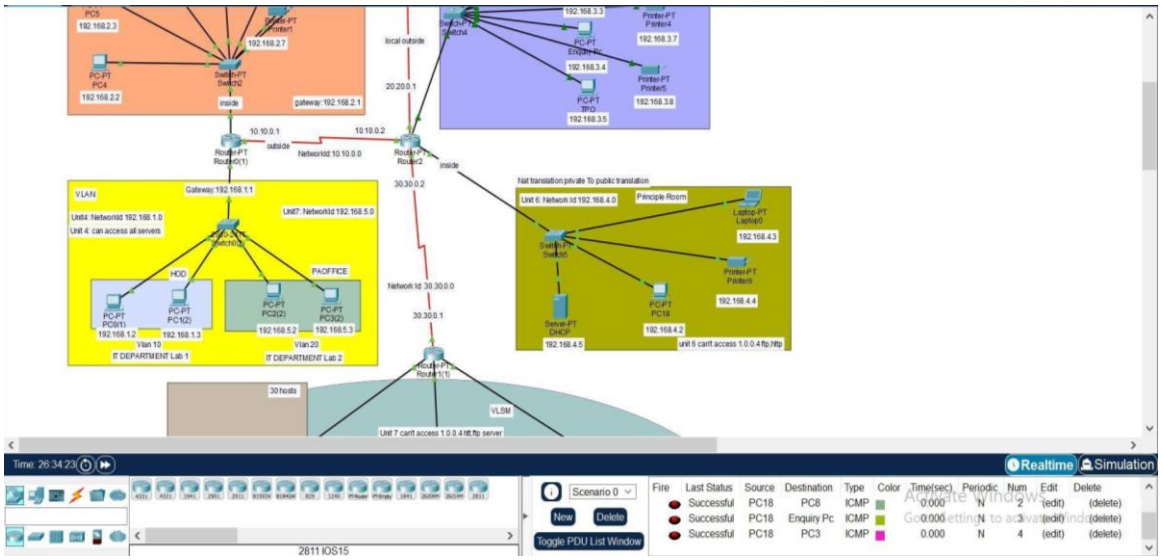


Unit 5 Commuication with all units

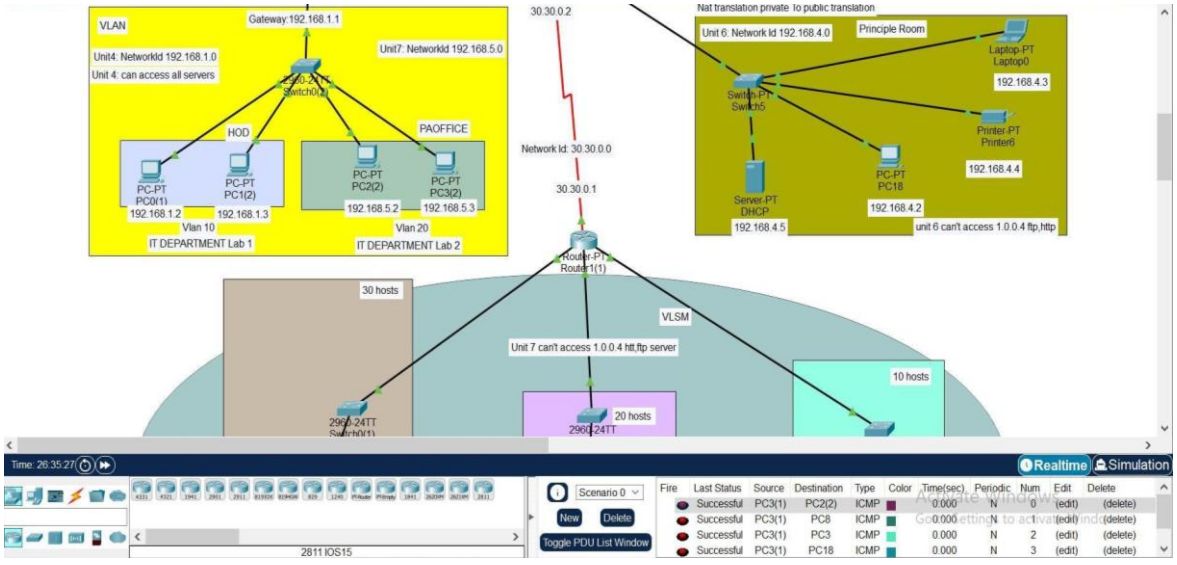


But with Unit no 2 communication not possible due to access control list provided at Unit 1

Unit 6 Commuication with all units



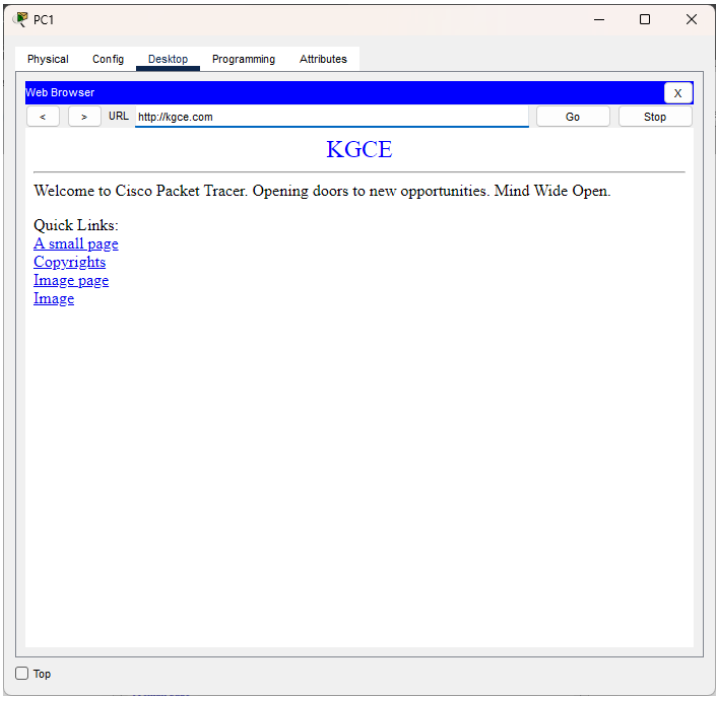
Unit 7 Commuication with all units



Test 2: Access to Servers

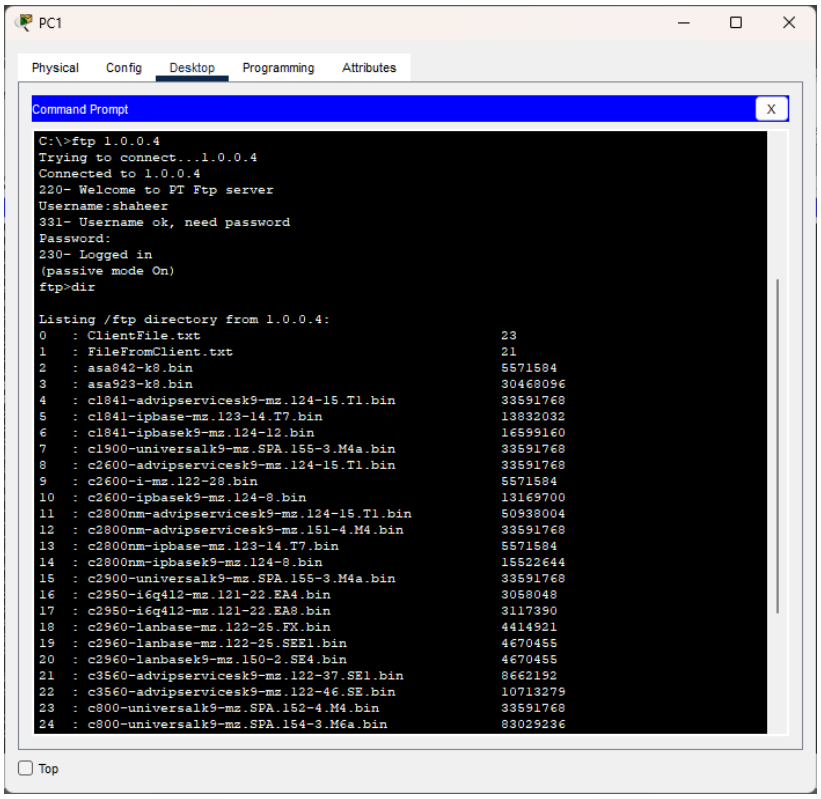
Unit 1 can access all servers

HTTP 1.0.0.4

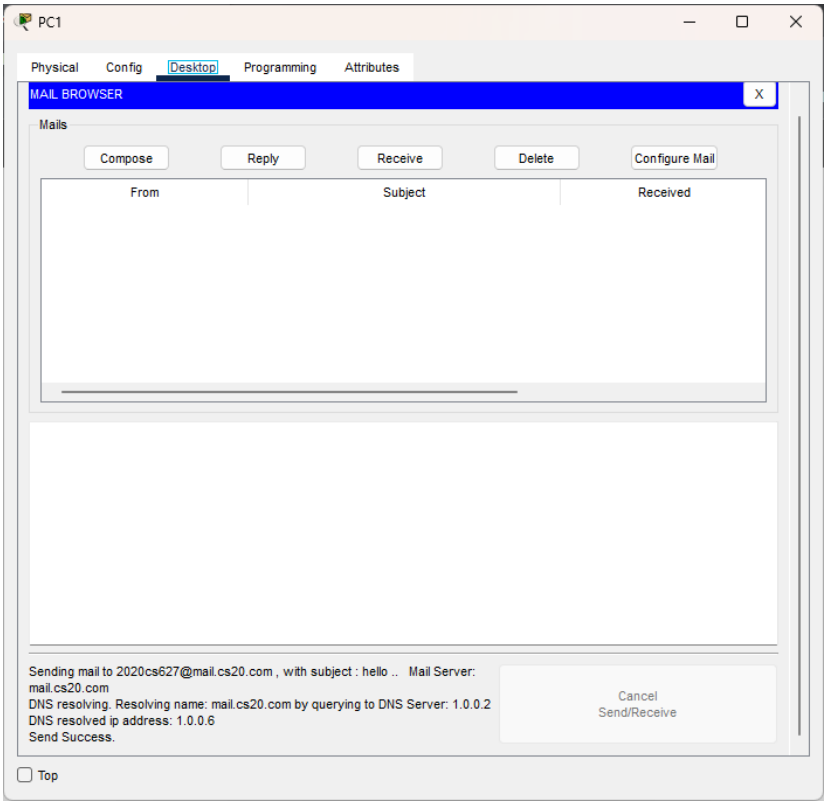


HTTP ,FTP Server 1.0.0.3

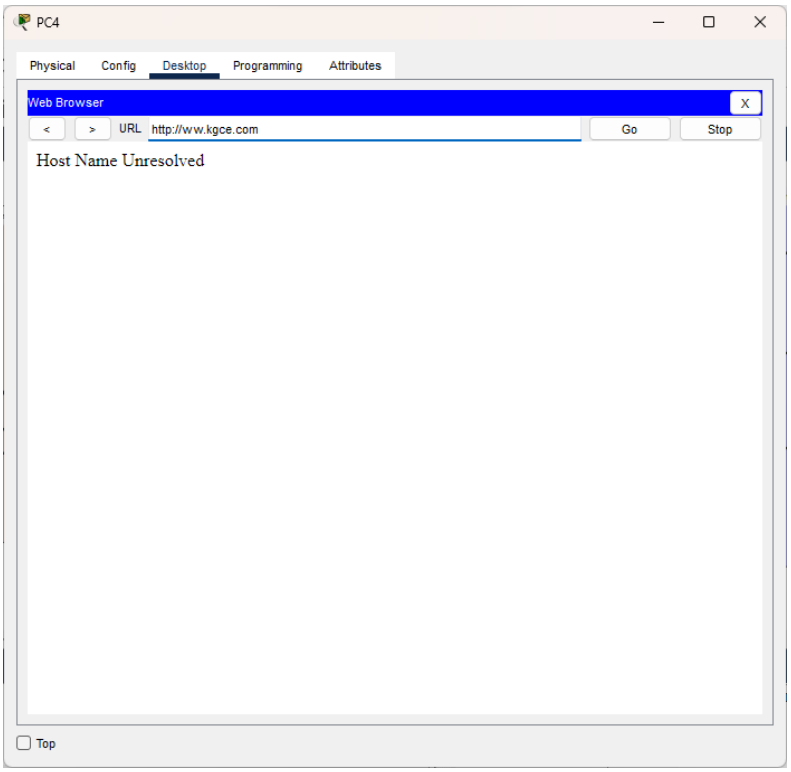
HTTP ,FTP Server 1.0.0.4



Email 1.0.0.6

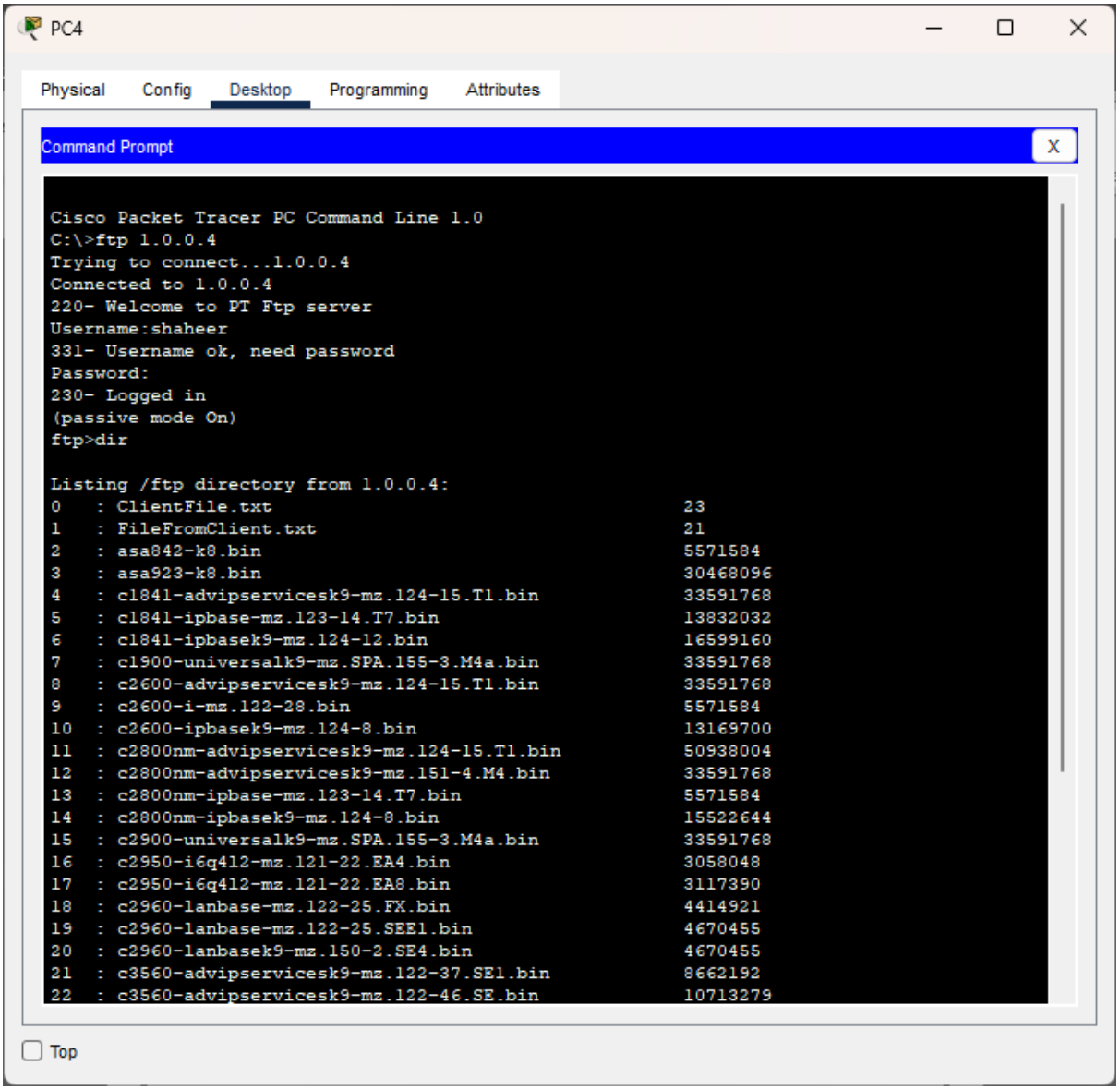


Unit 3 can Access all server except 1.0.0.3 HTTP Access control for server 1.0.0.3



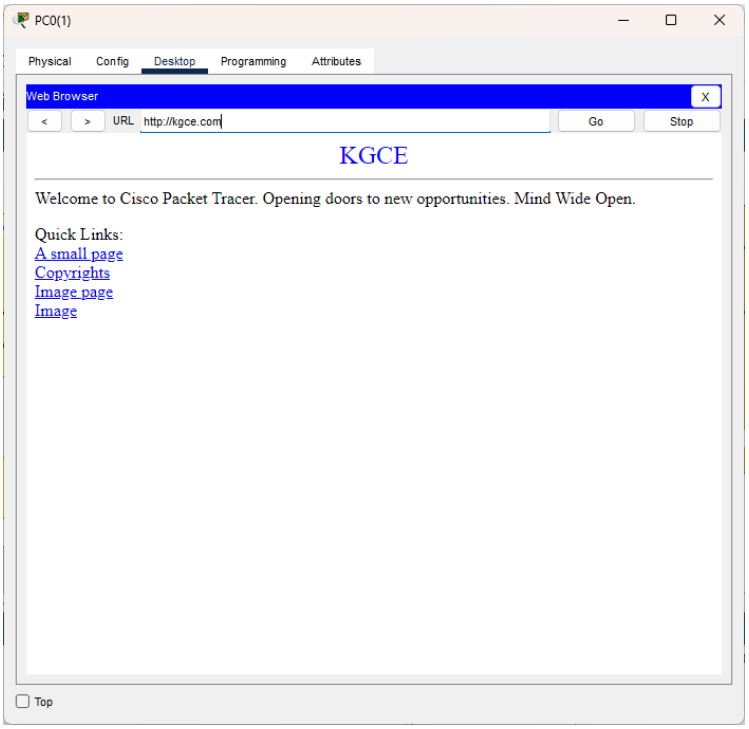
HTTP ,FTP Sever 1.0.0.4

FTP Server 1.0.0.4

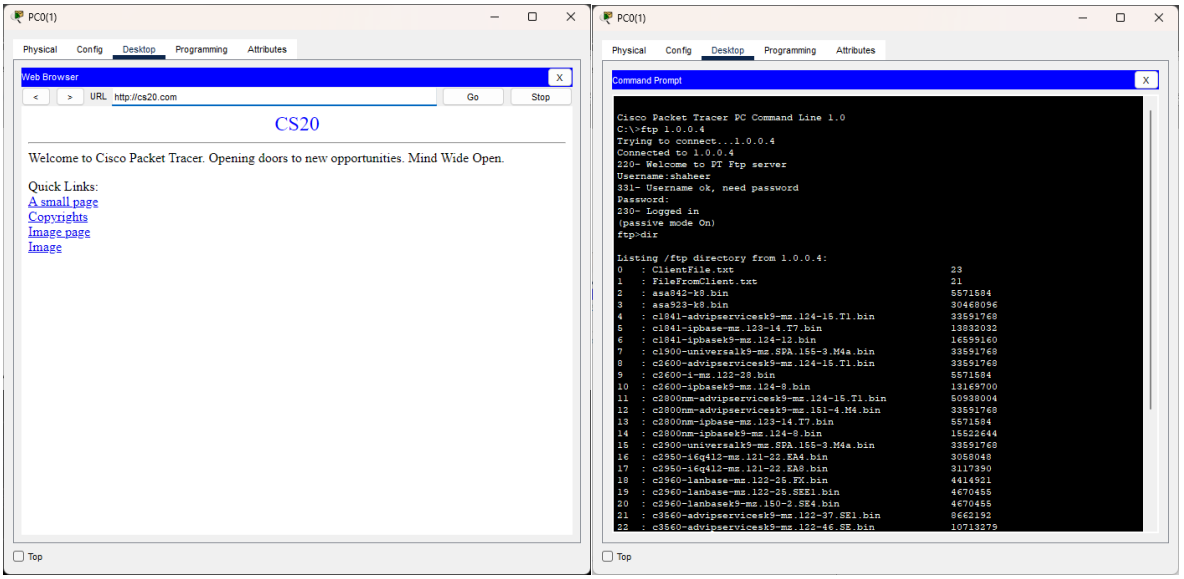


Unit 4 can access all servers

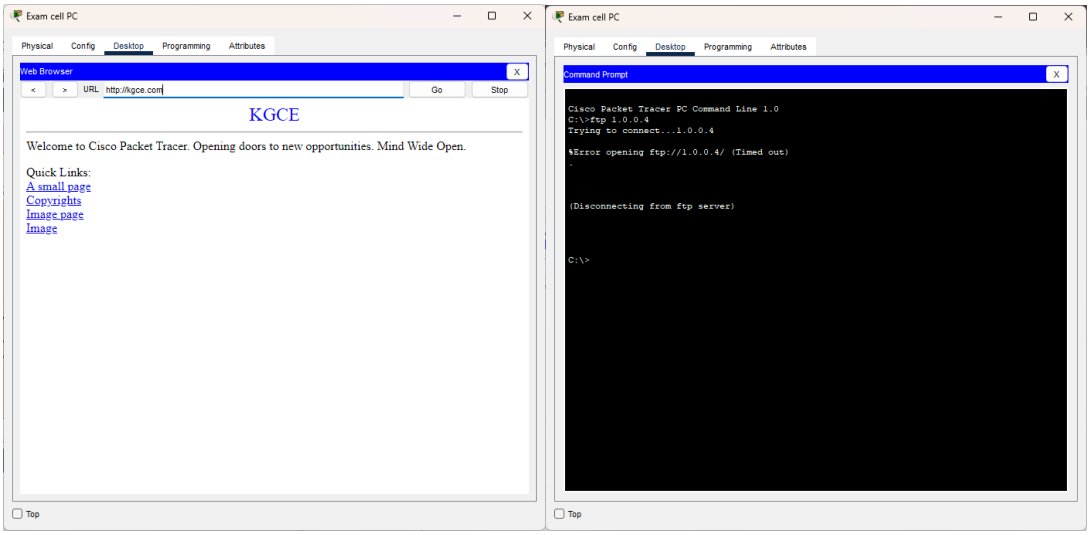
HTTP Server 1.0.0.3



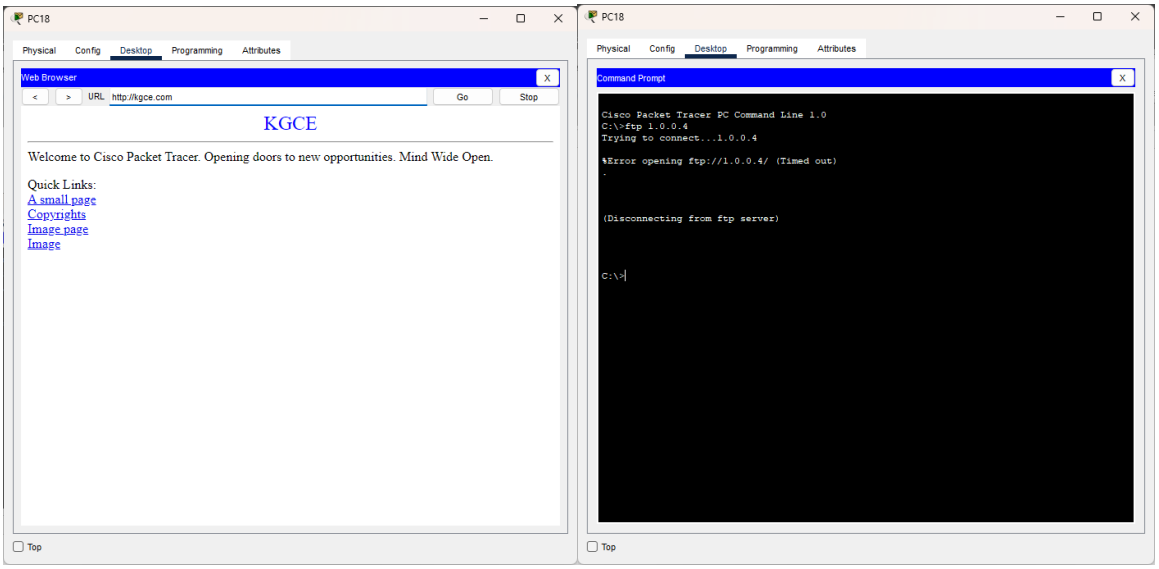
HTTP, FTP Server 1.0.0.4



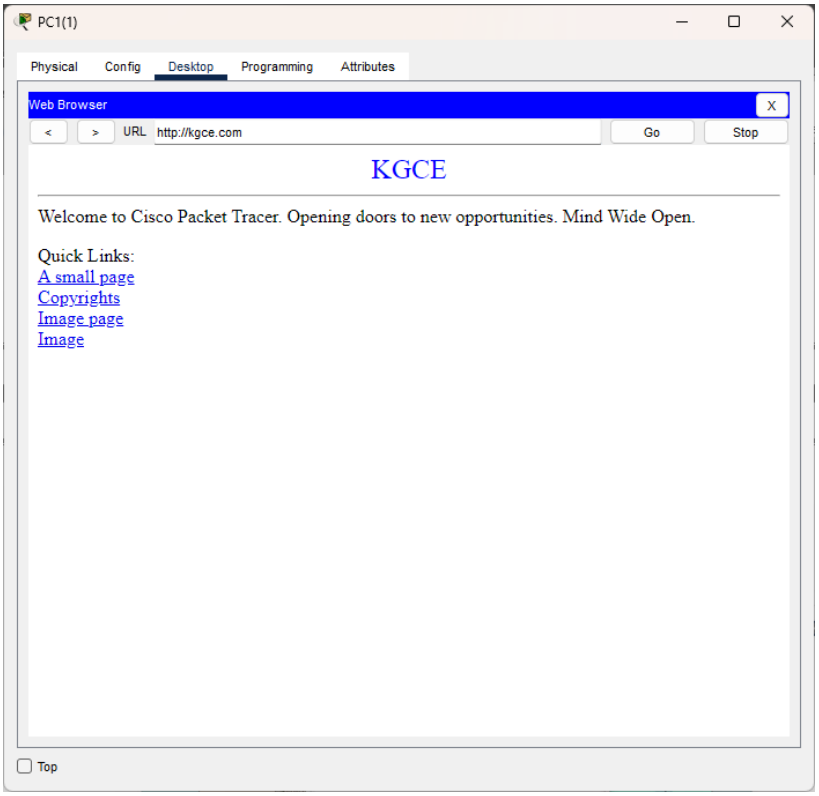
Unit 5 can Access all server except 1.0.0.4 ftp, http

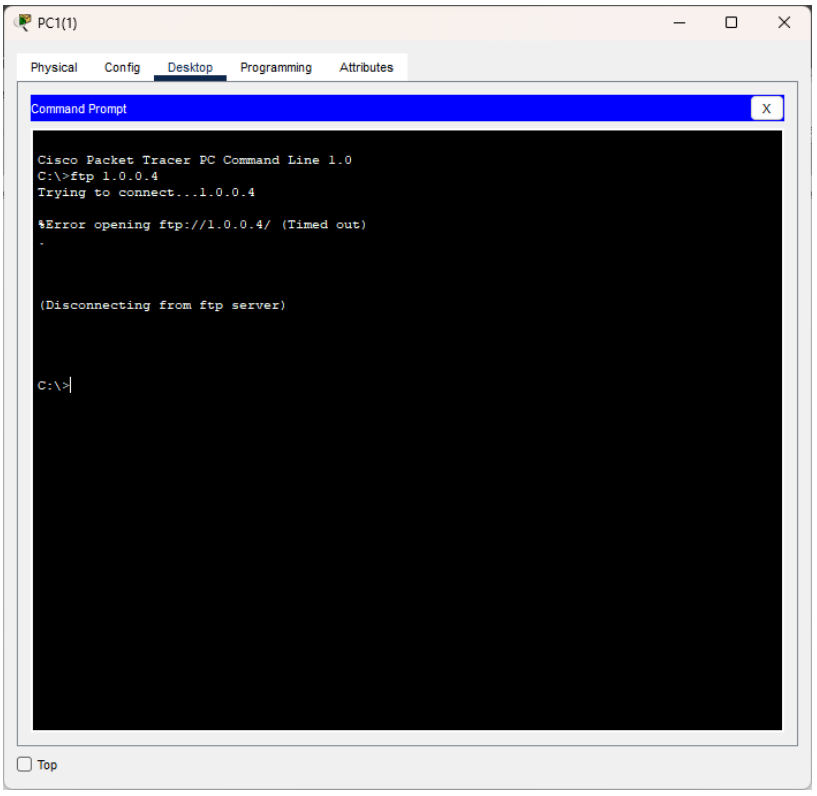


Unit 6 can Access all server except 1.0.0.4 ftp, http

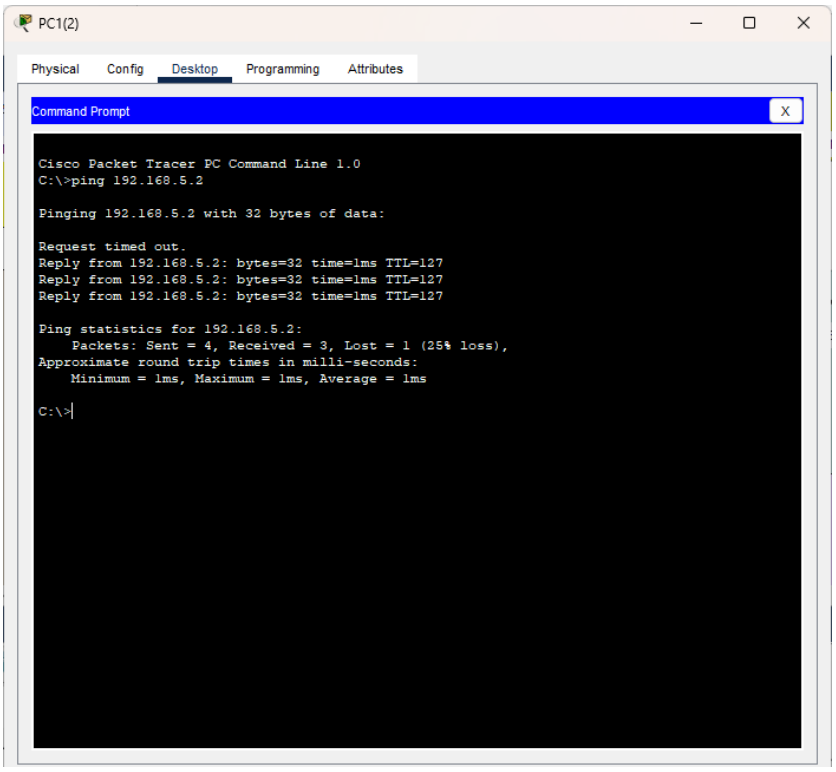


Unit 7 can access all servers except 1.0.0.4 ftp, http





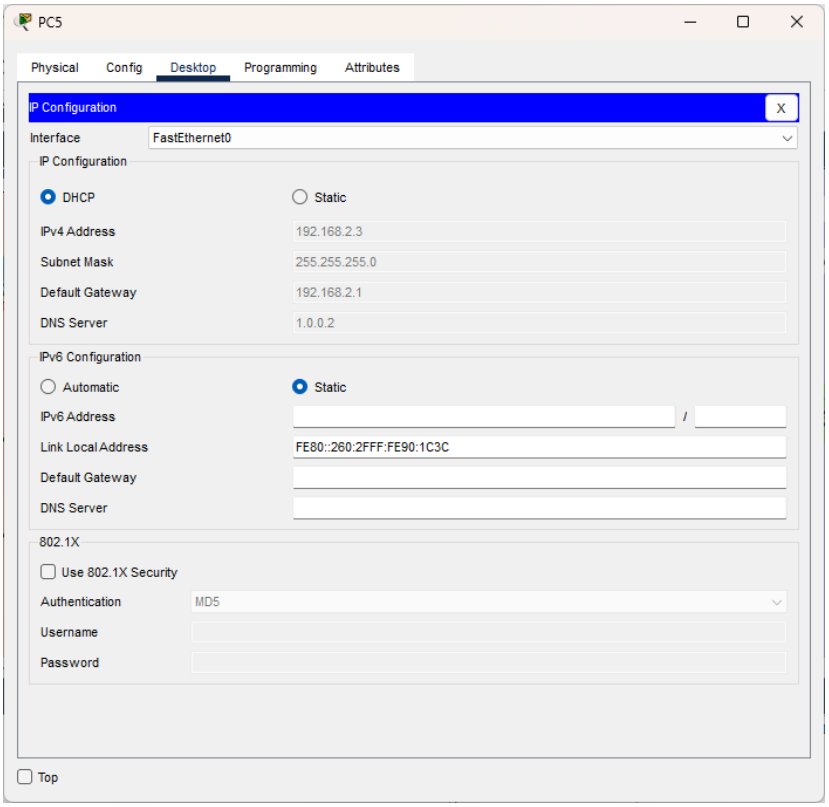
Testing VLAN communications from HOD to PA office



Test 3: Testing VLAN

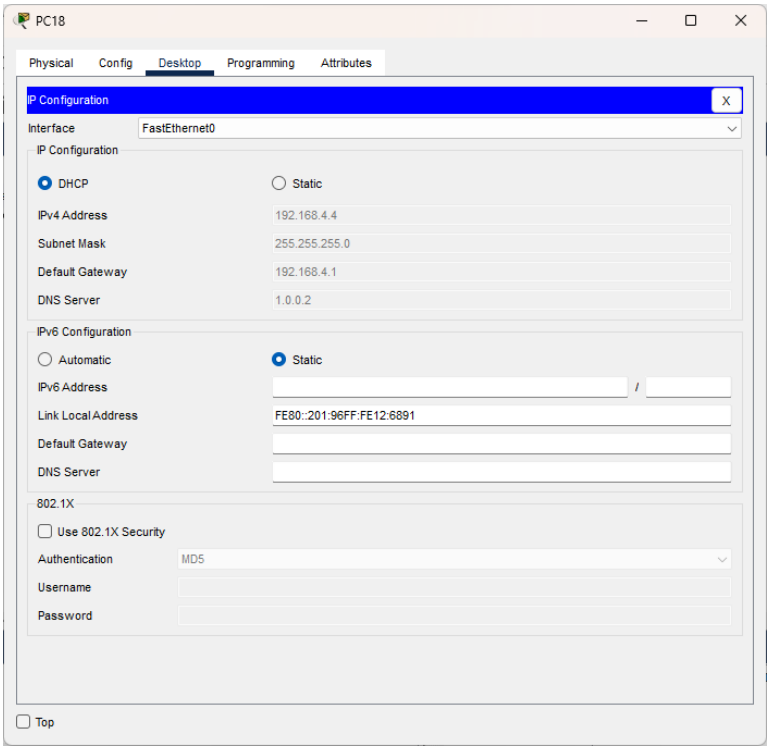
Unit 3 Allocated address By DHCP

Private IP 192.168/



Unit 6 Allocated address By DHCP

Private IP 192.168/



Test 4: NAT (Private addresses allocated translated to public when accessing the Internet)

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

```
C:\>ping 192.168.2.3

Pinging 192.168.2.3 with 32 bytes of data:

Request timed out.
Reply from 10.10.0.1: bytes=32 time=10ms TTL=125
Reply from 10.10.0.1: bytes=32 time=12ms TTL=125
Reply from 10.10.0.1: bytes=32 time=12ms TTL=125

Ping statistics for 192.168.2.3:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 10ms, Maximum = 12ms, Average = 11ms
```

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

```
C:\>ping 192.168.4.2

Pinging 192.168.4.2 with 32 bytes of data:

Request timed out.
Reply from 20.20.0.1: bytes=32 time=2ms TTL=126
Reply from 20.20.0.1: bytes=32 time=21ms TTL=126
Reply from 20.20.0.1: bytes=32 time=11ms 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 = 2ms, Maximum = 21ms, Average = 11ms
```