COLLEGE NETWORK

PROJECT REPORT

BAHRIA UNIVERSITY ISLAMABAD CAMPUS

DCN LAB FINAL PROJECT

Ayesha Naveed 01-134222-035

Manahil Bashir 01-134222-077

TABLE OF CONTENTS

01. INTRODUCTION

This College Network Scenario is about designing a topology of a network that is a LAN (Local Area Network) for a college in which various computers of different departments are set up so that they can interact and communicate with each other by interchanging data. To design a networking scenario for a college which connect various departments to each other's, it puts forward communication among different departments. CNS is used to design a systematic and well-planned topology, satisfying all the necessities of the college (i.e. client). CNS come up with a network with good performance.

02. OBJECTIVES

The main objective of the proposed network design for the college is to modernize the existing network infrastructure, enhancing its overall capabilities and increasing its flexibility to meet the evolving needs of the institution. By updating the network, the aim is to significantly improve performance, ensuring faster data transmission and reliable connectivity across various departments. This enhancement will support a higher volume of devices and applications, facilitating seamless communication and collaboration among students, faculty, and administrative staff.

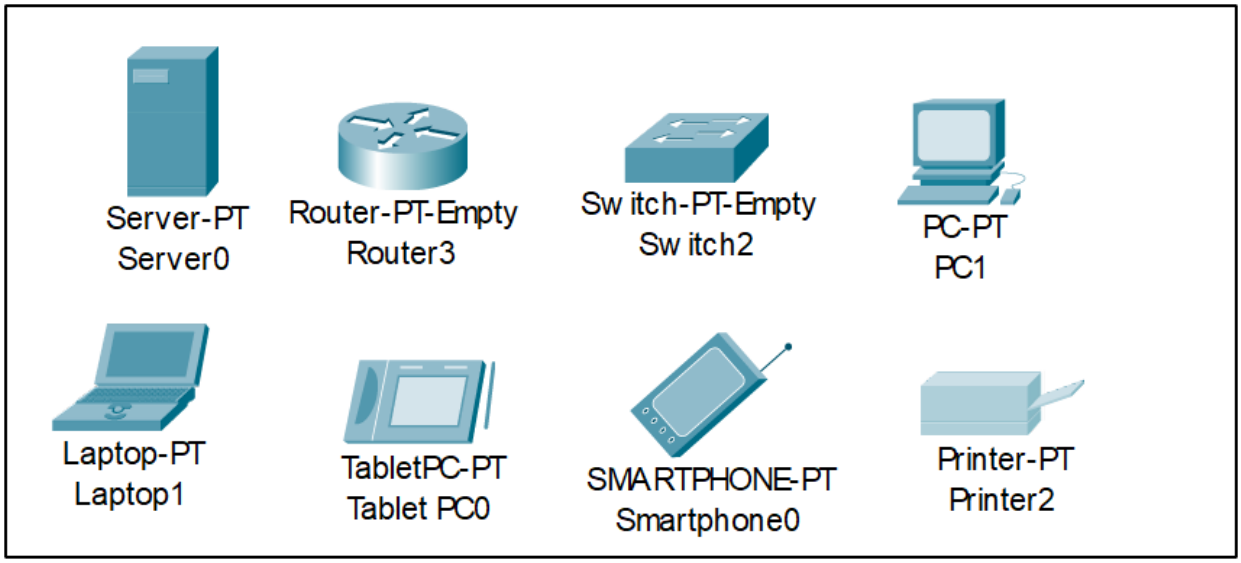
03. NETWORK REQUIREMENTS

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

04. NETWORK DEVICES

Devices Used in The Network

Devices	Quantity
Servers	3
Routers	3
Switches	5
PCs	15
Laptops	1
Tablets	1
Smart Phones	1
Printers	3



05. IP ADDRESSING PLAN

IT DEPARTMENT (192.168.1.0)	
IT INSTRUCTOR	192.168.1.2
IT LAB 1	192.168.1.3
IT LAB 2	192.168.1.4
IT LAB 3	192.168.1.5
IT LAB 4	192.168.1.6
PRINTER 0	192.168.1.7

CS DEPARTMENT (192.168.2.0)	
CS INSTRUCTOR	192.168.2.2
CS LAB 1	192.168.2.3
CS LAB 2	192.168.2.4
CS LAB 3	192.168.2.5
CS LAB 4	192.168.2.6
PRINTER 7	192.168.2.7

SERVER ROOM (1.0.0.0)	
FTP SERVER	1.0.0.4
DNS SERVER	1.0.0.2
WEB SERVER	1.0.0.3

INTERNET LAB (192.168.0.0)	
LAB PC2	128.168.0.2
LAB PC3	128.168.0.3
LAB PC4	128.168.0.4
LAB PCS5	128.168.0.5
PRINTER 5	128.168.0.6

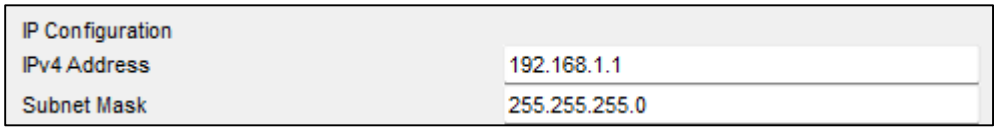
PRINCIPAL ROOM (192.168.4.0)	
PC 0	128.168.4.2
LAPTOP 0	128.168.4.3
SMARTPHONE1	128.168.100
TABLE PC 1	128.168.0.101

07. IP CONFIGURATION

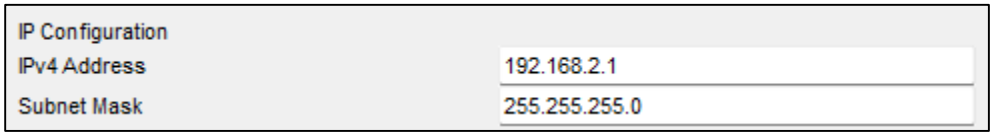
We have attached the screenshots of all the IP configuration below:

Router 0

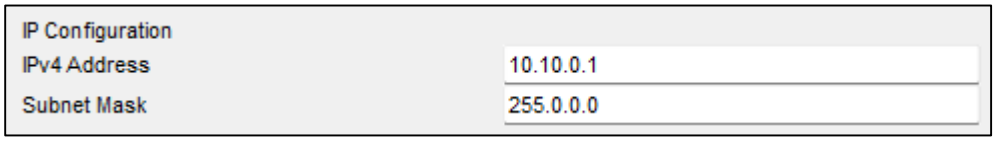
FastEthernet0/0



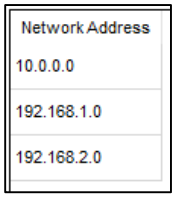
FastEthernet1/0



Serial2/0



RIP



Router 1

Display Name	Router1	
Hostname	Router	
NVRAM	Erase	Save
Startup Config	Load...	Export...
Running Config	Export...	Merge...

FastEthernet0/0

IP Configuration	
IPv4 Address	192.168.3.1
Subnet Mask	255.255.255.0

FastEthernet1/0

IP Configuration	
IPv4 Address	192.168.4.1
Subnet Mask	255.255.255.0

Seria2/0

IP Configuration	
IPv4 Address	10.10.0.2
Subnet Mask	255.0.0.0

Seria3/0

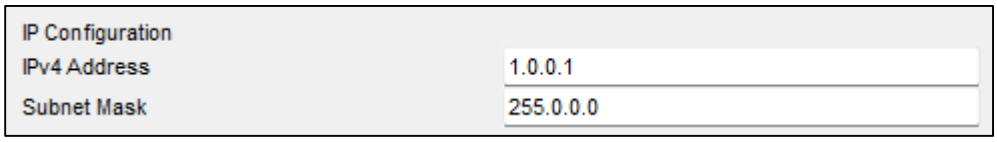
IP Configuration	
IPv4 Address	20.20.0.1
Subnet Mask	255.0.0.0

RIP

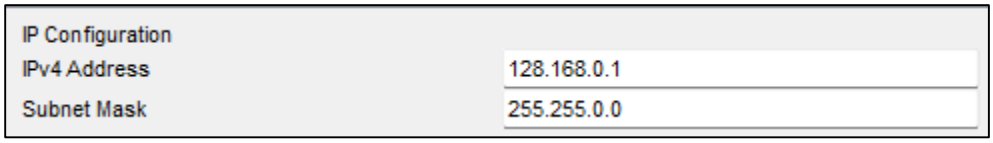
Network Address
10.0.0.0
20.0.0.0
192.168.3.0
192.168.4.0

Router 2

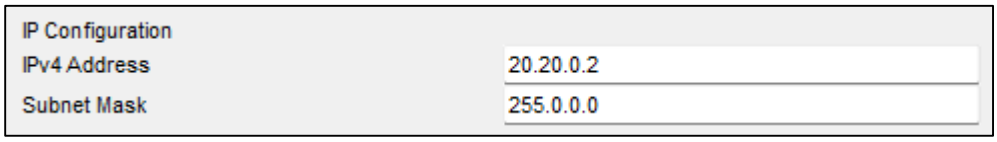
FastEthernet0/0



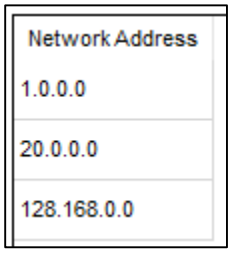
FastEthernet1/0



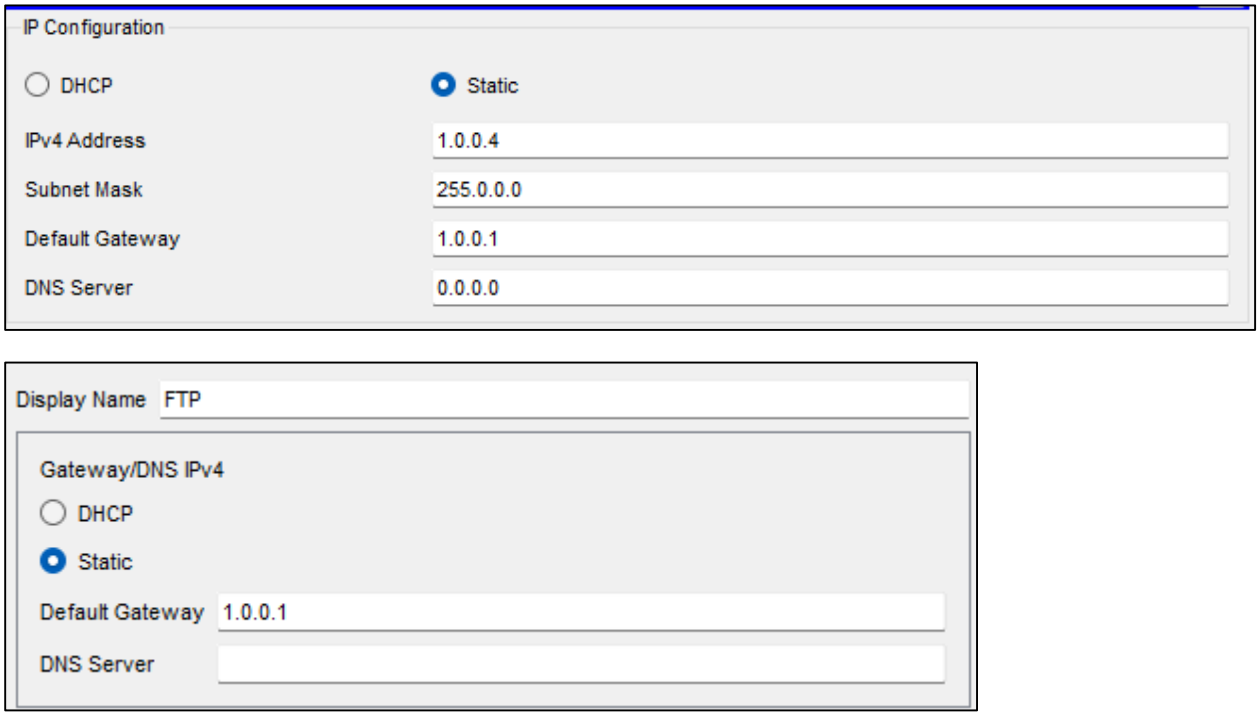
Serial2/0



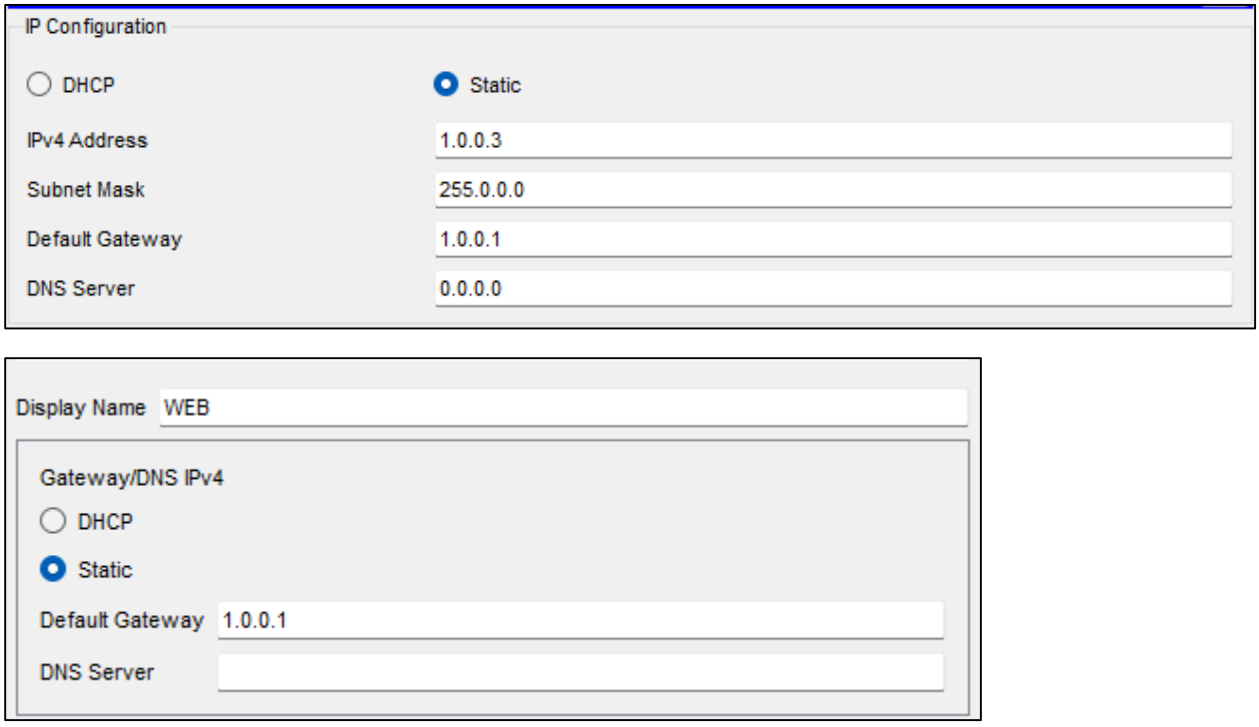
RIP



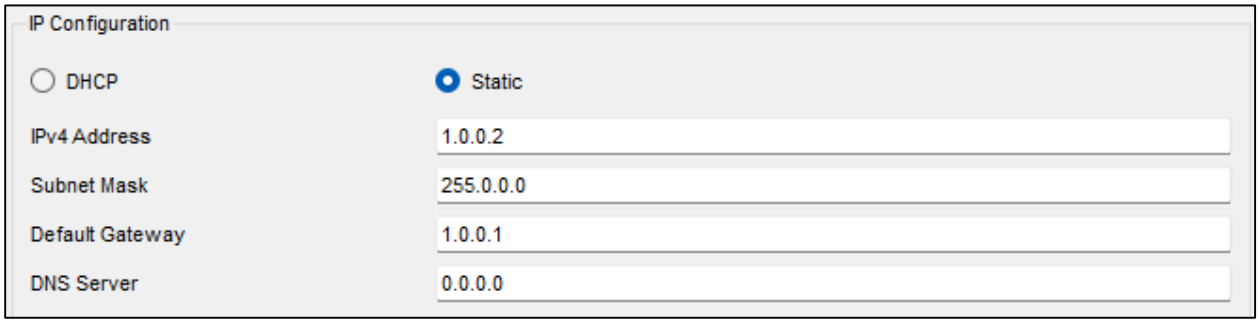
FTP Server

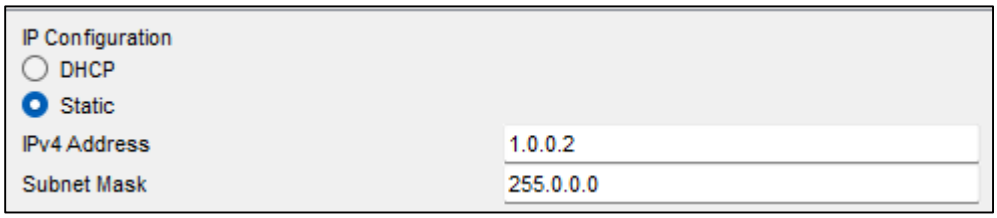


WEB Server



DNS Server


IP Configuration
DHCP
Static
IPv4 Address
1.0.0.2
Subnet Mask
255.0.0.0
Default Gateway
1.0.0.1
DNS Server
0.0.0.0

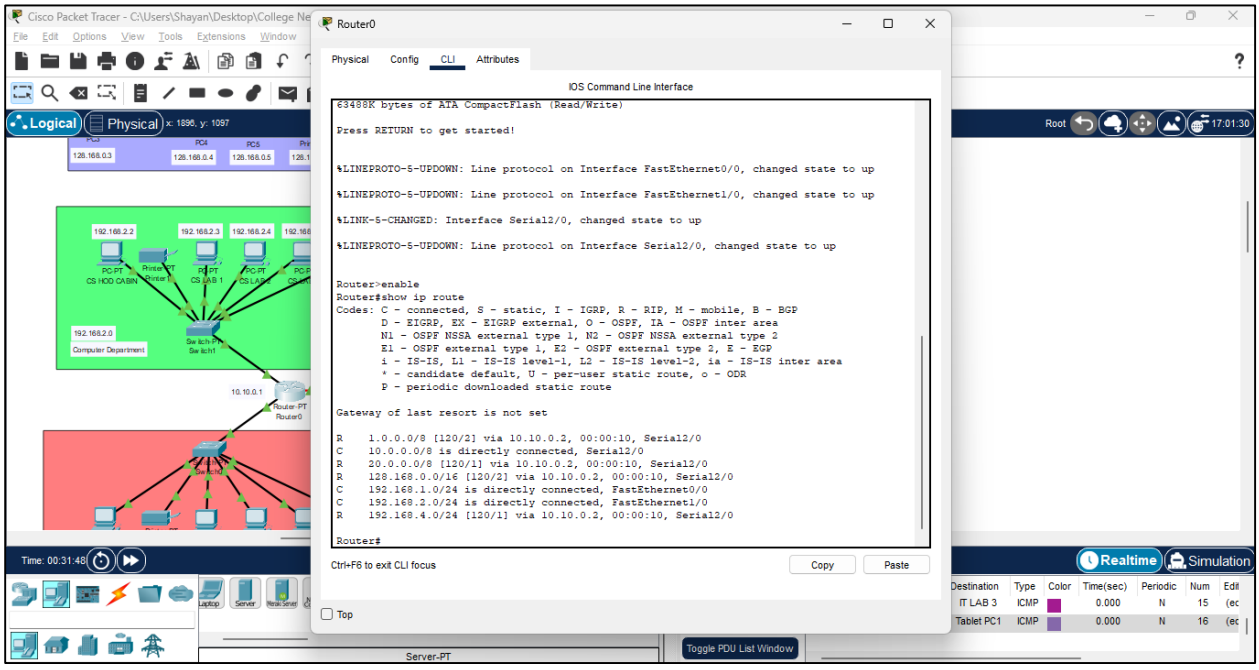

IP Configuration
DHCP
Static
IPv4 Address
1.0.0.2
Subnet Mask
255.0.0.0

06. ROUTING PROTOCOL

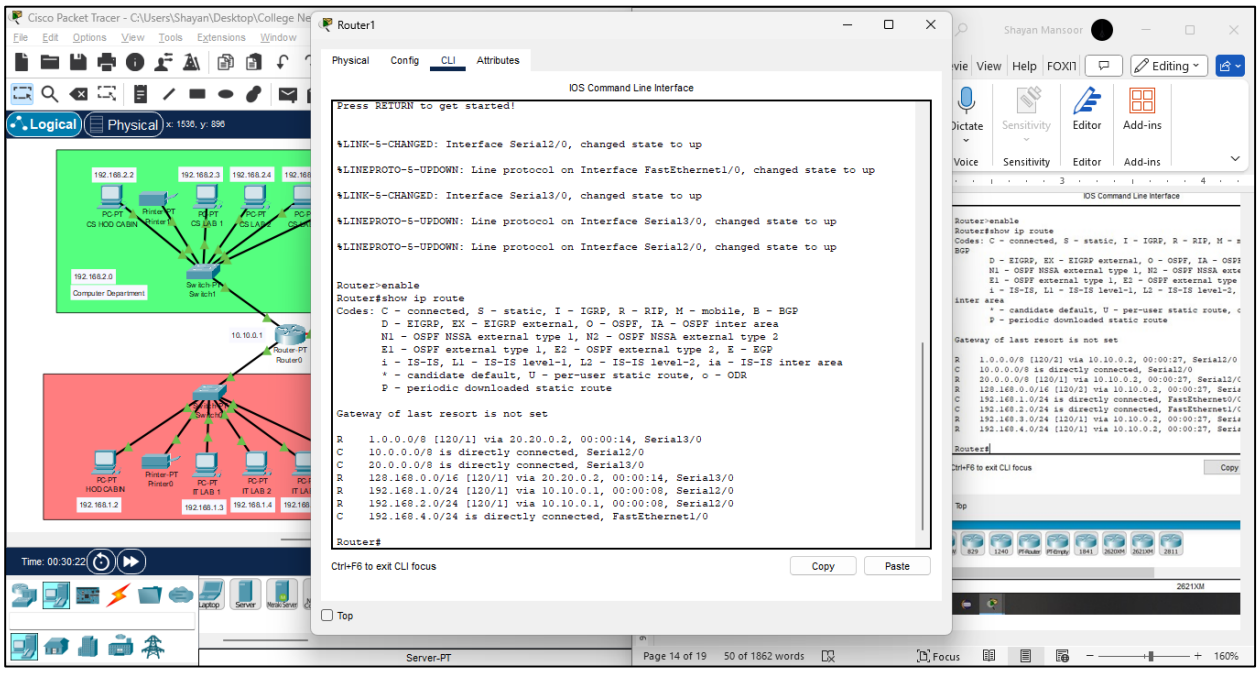
PLAN

Routing Information Protocol (RIP) is a dynamic routing protocol which uses hop count as a routing metric to find the best path between the source and the destination network. It is a distance vector routing protocol which has AD value 120 and works on the application layer of OSI model.

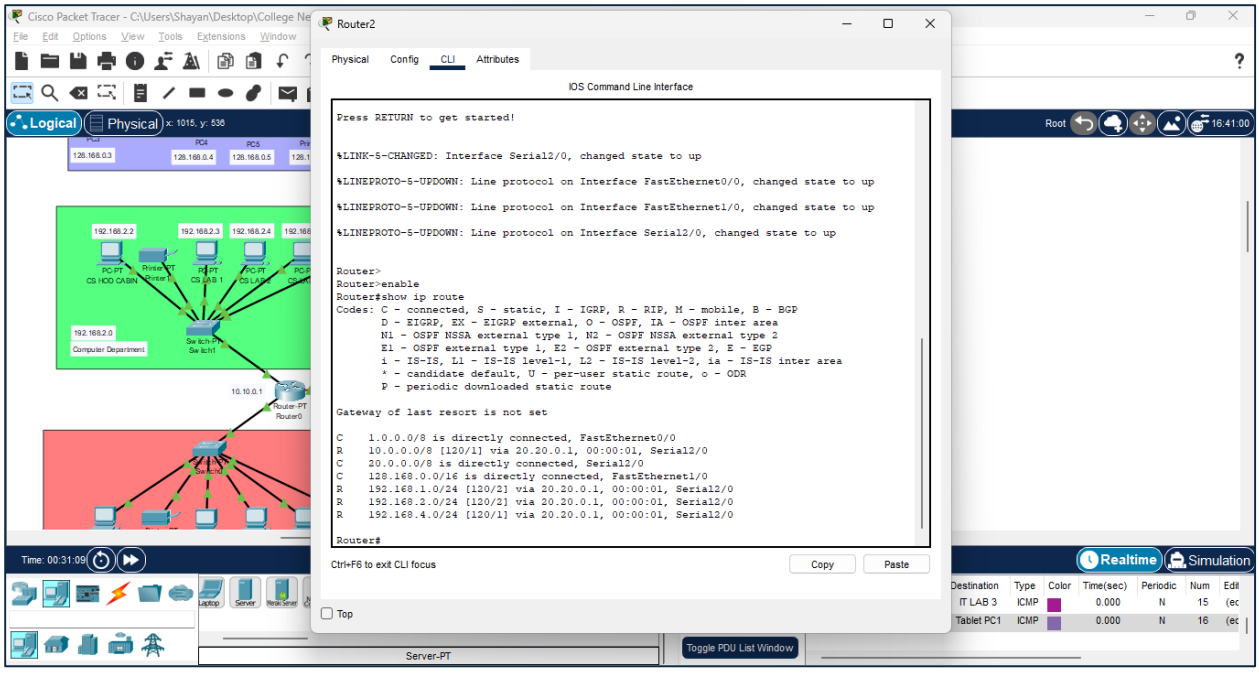
Router 0:



Router 1



Router 2

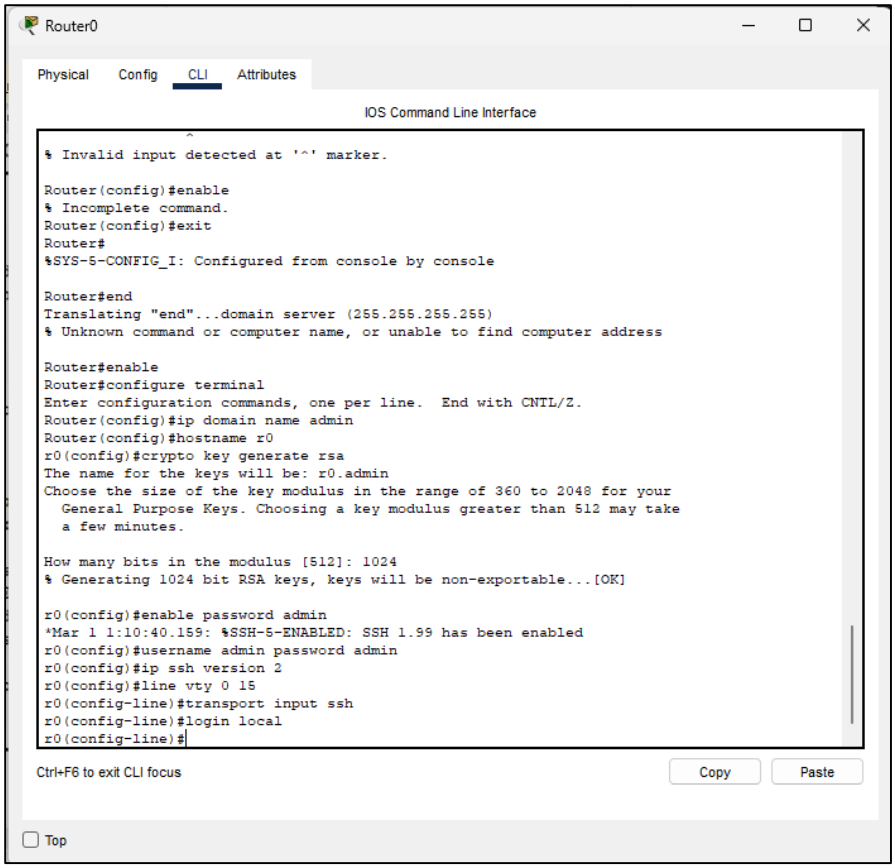


07. SECURING ROUTERS

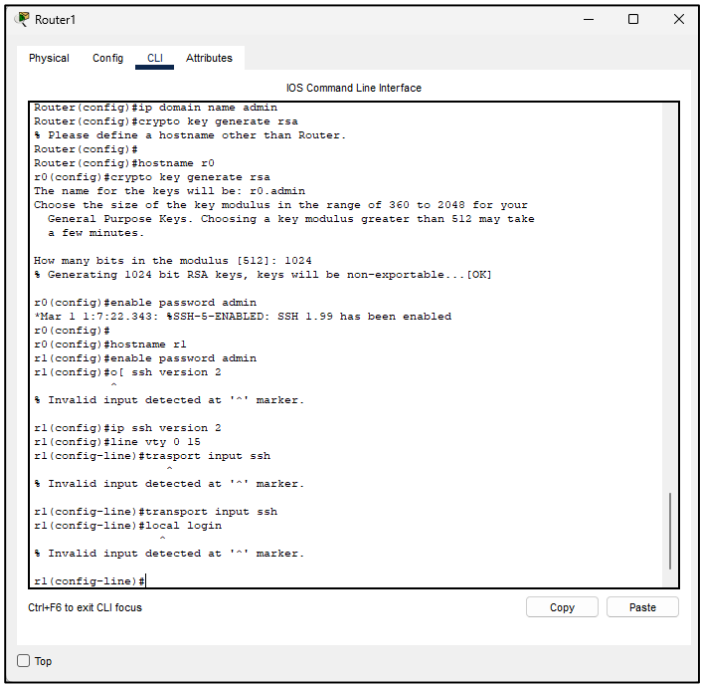
Routers are also secured with ssh (Secure Shell). Routers and their assigned passwords are mentioned below:

Routers Name	Passwords
Router 0	SSH (admin)
Router 1	SSH (admin)
Router 2	SSH (admin)

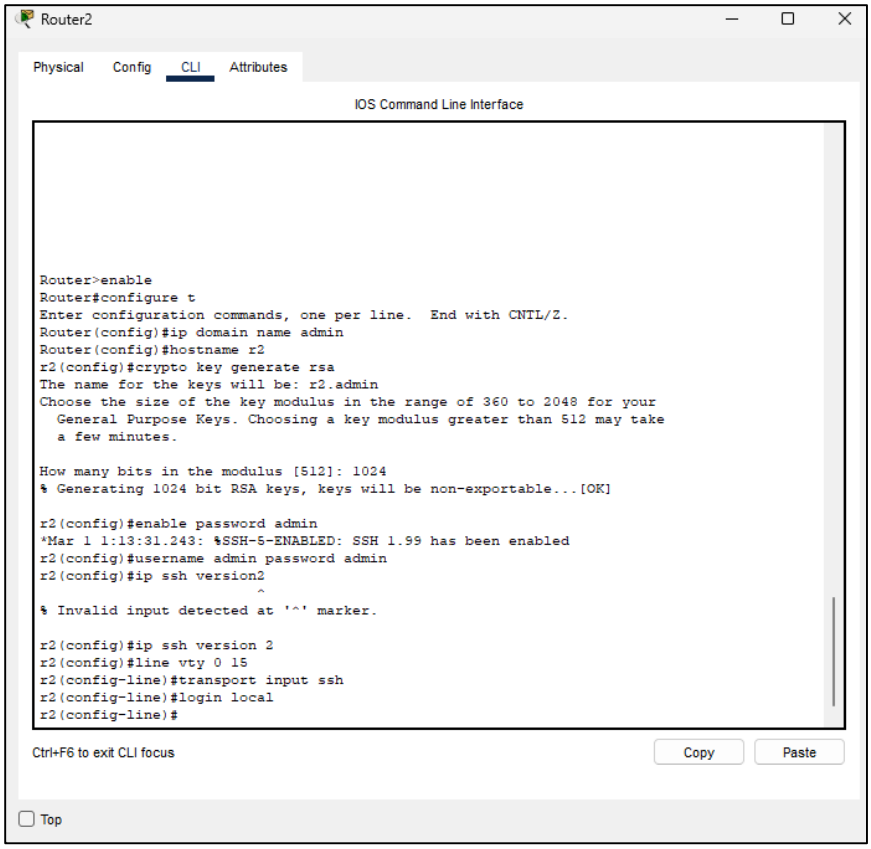
Router 0



Router 1

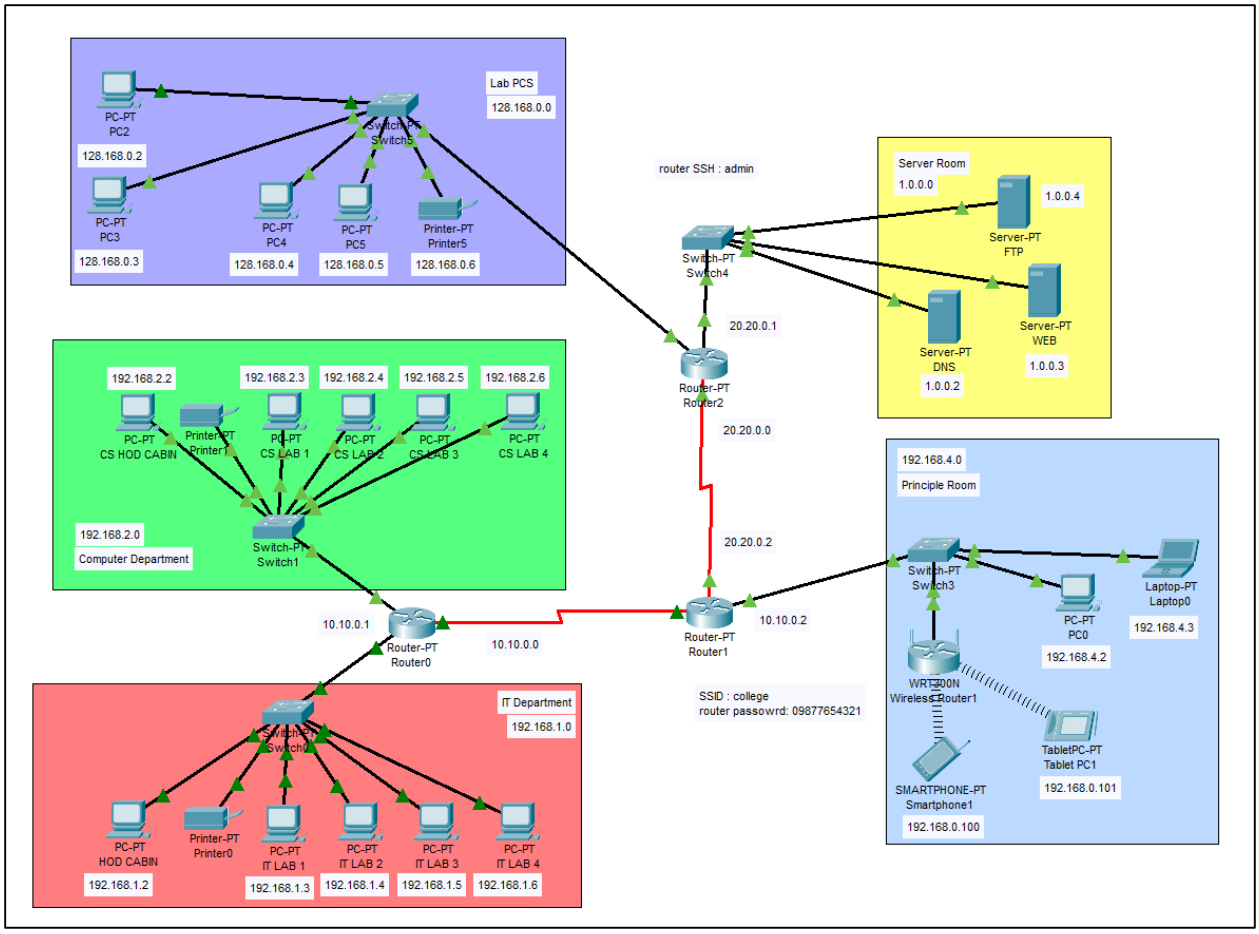


Router 2

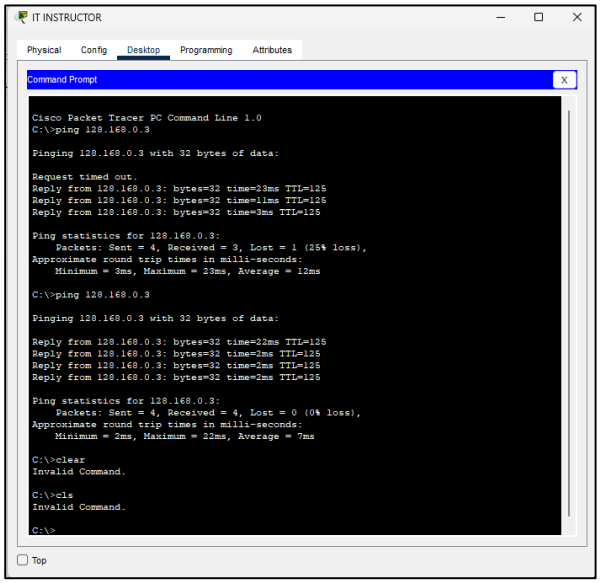


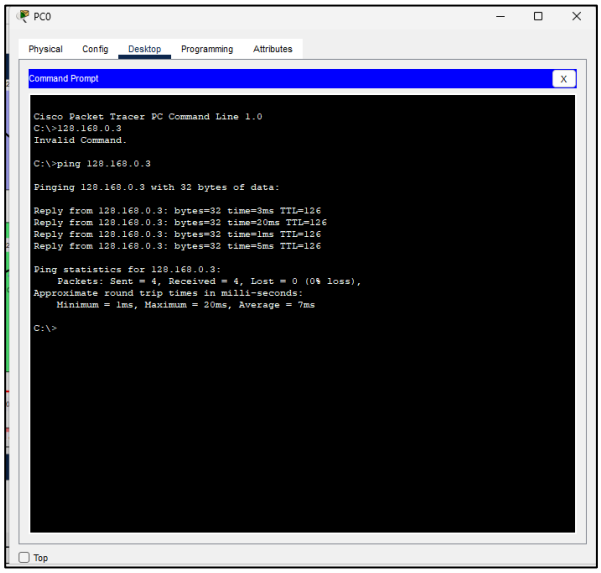
08. DESIGN, PING TEST, SIMMULATION

Network Design

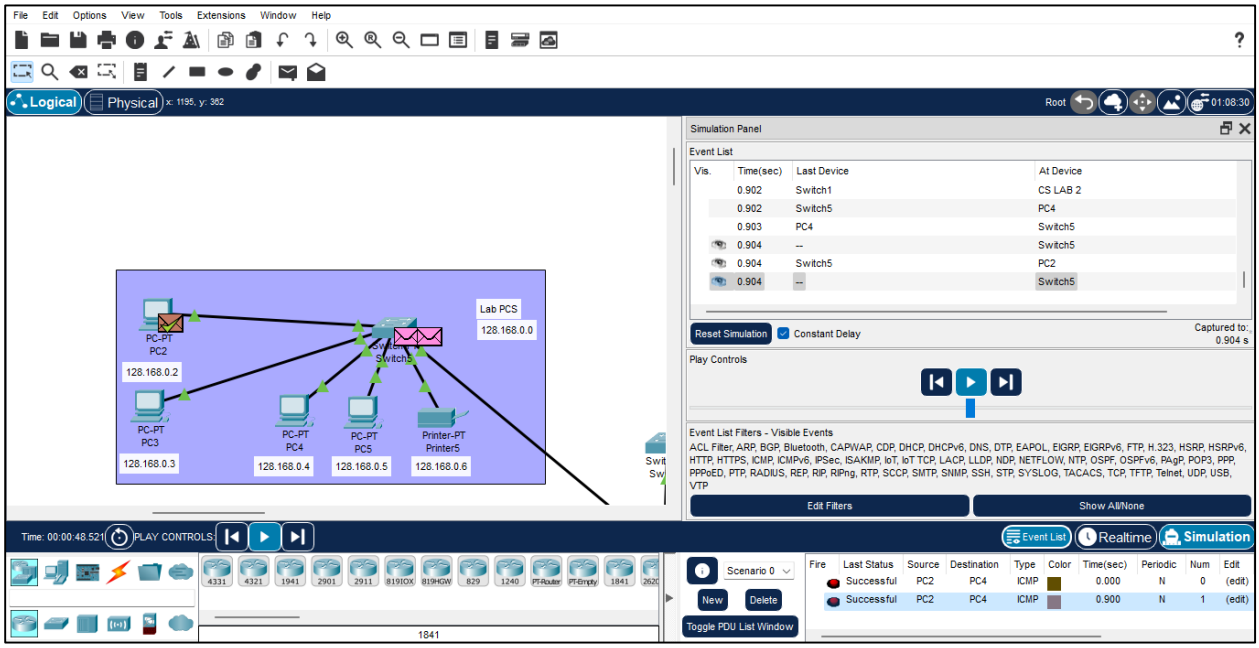

Lab PCS
128.168.0.0
PC-PT PC2
128.168.0.2
PC-PT PC3
128.168.0.3
PC-PT PC4
128.168.0.4
PC-PT PC5
128.168.0.5
Printer-PT Printer5
128.168.0.6
Switch-PT Switch5
router SSH : admin
Server Room
1.0.0.0
Server-PT FTP
1.0.0.4
Server-PT DNS
1.0.0.2
Server-PT WEB
1.0.0.3
Switch-PT Switch4
20.20.0.1
Router-PT Router2
20.20.0.0
20.20.0.2
192.168.2.2
192.168.2.3
192.168.2.4
192.168.2.5
192.168.2.6
PC-PT CS HOD CABIN
Printer-PT Printer1
PC-PT CS LAB 1
PC-PT CS LAB 2
PC-PT CS LAB 3
PC-PT CS LAB 4
192.168.2.0
Computer Department
Switch-PT Switch1
10.10.0.1
Router-PT Router0
10.10.0.0
10.10.0.2
Router-PT Router1
192.168.4.0
Principle Room
Switch-PT Switch3
Laptop-PT Laptop0
192.168.4.3
PC-PT PC0
192.168.4.2
WRT300N Wireless Router1
TabletPC-PT Tablet PC1
192.168.0.101
SMARTPHONE-PT Smartphone1
192.168.0.100
SSID : college
router passowrd: 09877654321
IT Department
192.168.1.0
Switch-PT Switch2
PC-PT HOD CABIN
192.168.1.2
Printer-PT Printer0
PC-PT IT LAB 1
192.168.1.3
PC-PT IT LAB 2
192.168.1.4
PC-PT IT LAB 3
192.168.1.5
PC-PT IT LAB 4
192.168.1.6

Ping test


IT INSTRUCTOR
Physical
Config
Desktop
Programming
Attributes
Command Prompt
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 128.168.0.3
Pinging 128.168.0.3 with 32 bytes of data:
Request timed out.
Reply from 128.168.0.3: bytes=32 time=23ms TTL=125
Reply from 128.168.0.3: bytes=32 time=11ms TTL=125
Reply from 128.168.0.3: bytes=32 time=3ms TTL=125
Ping statistics for 128.168.0.3:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 3ms, Maximum = 23ms, Average = 12ms
C:\>ping 128.168.0.3
Pinging 128.168.0.3 with 32 bytes of data:
Reply from 128.168.0.3: bytes=32 time=22ms TTL=125
Reply from 128.168.0.3: bytes=32 time=2ms TTL=125
Reply from 128.168.0.3: bytes=32 time=2ms TTL=125
Reply from 128.168.0.3: bytes=32 time=2ms TTL=125
Ping statistics for 128.168.0.3:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 23ms, Average = 7ms
C:\>clear
Invalid Command.
C:\>cls
Invalid Command.
C:\>
Top


PC0
Physical
Config
Desktop
Programming
Attributes
Command Prompt
Cisco Packet Tracer PC Command Line 1.0
C:\>128.168.0.3
Invalid Command.
C:\>ping 128.168.0.3
Pinging 128.168.0.3 with 32 bytes of data:
Reply from 128.168.0.3: bytes=32 time=3ms TTL=126
Reply from 128.168.0.3: bytes=32 time=20ms TTL=126
Reply from 128.168.0.3: bytes=32 time=1ms TTL=126
Reply from 128.168.0.3: bytes=32 time=5ms TTL=126
Ping statistics for 128.168.0.3:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 20ms, Average = 7ms
C:\>
Top

Simulation


File Edit Options View Tools Extensions Window Help
Logical
Physical
Root
01:08:30
Simulation Panel
Event List
Vis. Time(sec) Last Device At Device
0.902 Switch1 CS LAB 2
0.902 Switch5 PC4
0.903 PC4 Switch5
0.904 -- Switch5
0.904 Switch5 PC2
0.904 -- Switch5
Reset Simulation
Constant Delay
Captured to:
0.904 s
Play Controls
Event List Filters - Visible Events
ACL Filter, ARP, BGP, Bluetooth, CAPWAP, CDP, DHCP, DHCPv6, DNS, DTP, EAPOL, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, IoT, IoT TCP, LACP, LLDP, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, PPP, PPPoED, PTP, RADIUS, REP, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP
Edit Filters
Show All/None
Lab PCS
128.168.0.0
PC-PT PC2
128.168.0.2
PC-PT PC3
128.168.0.3
PC-PT PC4
128.168.0.4
PC-PT PC5
128.168.0.5
Printer-PT Printer5
128.168.0.6
Time: 00:00:48.521
PLAY CONTROLS:
Event List
Realtime
Simulation
Scenario 0
New
Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit
Successful PC2 PC4 ICMP 0.000 N 0 (edit)
Successful PC2 PC4 ICMP 0.900 N 1 (edit)
1841

09. SUMMARY

The outcome of the proposed system will be a fail-safe backbone network infrastructure which meets the requirements for readily available access to information and security of the private network and ensures optimized productivity when telecommunication services are accessed. The installed equipment allowed to organize high-speed wired and wireless Internet access throughout the whole complex of hospital buildings as well as providing transfer of all types of data throughout the single optimized network.

10. REFERENCES

1. Sun, L., Wu, J., Zhang, Y., & Yin, H. (2013, April). “Comparison between physical devices and simulator software for Cisco network technology teaching”. In Computer Science &Education (ICCSE), 2013 8th International Conference on (pp. 1357-1360). IEEE

2. Roberto Minerva Abiy Biru, "Towards a Definition of the Internet of Things” IEEE IOT Initiative white paper.

3. “Design and Simulation of Local Area Network Using Cisco Packet Tracer”. The International Journal of Engineering and Science (IJES) || Volume || 6 || Issue || 10 || Pages || PP 63- 77 || 2017 || ISSN (e): 2319 – 1813 ISSN (p): 2319 – 1805.

4. Qin, X. U. E. "Simulation Experimental Teaching of Computer Network Based on Packet Tracer [J]." Research and Exploration in Laboratory 2 (2010): 57-59.

5. Current, John R., Charles S. ReVelle, and Jared L. Cohon. "The hierarchical network design problem." European Journal of Operational Research 27.1 (1986): 57-66.