Project on
University Campus Network

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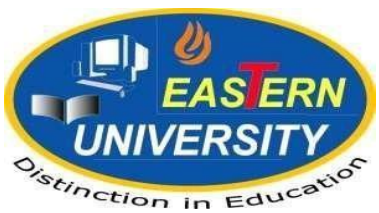

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Chapter 1
Introduction

1.1 Introduction

In today's digital age, robust and reliable network infrastructure is crucial for educational institutions like universities. As technology continues to evolve and become more integrated into every aspect of our lives, universities must strive to provide seamless connectivity and high-performance networking solutions to meet the growing demands of their diverse user base. The University Network Project aims to address these challenges by implementing a comprehensive and efficient network infrastructure that will revolutionize the way students, faculty, and staff interact, collaborate, and access information within the university ecosystem.

1.2 Objectives

The primary objective of the University Network Project is to establish a modern, scalable, and secure network infrastructure that supports the ever-increasing needs of the university community. By leveraging the latest networking technologies and best practices, this project will aim to enhance connectivity, improve network performance, and ensure a seamless user experience for all stakeholders. The project will also focus on optimizing network resource allocation, enabling greater flexibility and adaptability to future technological advancements.

1.3 Expected Outcome

After the successful implementation of the University Network Project is anticipated to have several positive outcomes, including:

1. **Enhanced User Experience:** Students, faculty, and staff will benefit from improved connectivity, faster network speeds, and reliable access to digital resources and applications. This possible for OSPF.

2. **Expanded Wireless Coverage:** The wireless network expansion will ensure that users can connect to the internet from any location on campus, including classrooms, libraries, outdoor spaces, and student dormitories. This possible through Access pointer of boosting the wireless connectivity.

3. **Proactive Network Monitoring and Management:** The establishment of a centralized network monitoring and management system will enable from IT office.

4. **Increased Operational Efficiency:** IT personnel will have better visibility and control over the network, enabling them to allocate resources effectively, address network bottlenecks promptly, and provide timely support to users. This will result in optimized network performance and improved user satisfaction.

Chapter 2
Methodology and Tools

2.1 Methodology

The methodology we used in our project is mentioned below:

1. Define Network Requirements:

Identify the specific requirements of the university campus network, such as the number of buildings, floors, and departments to be connected. After that, determine the number of network devices, such as switches, routers, and servers, required to meet the connectivity needs. Then consider the network scalability and future growth requirements of the university.

2. Network Topology Design:

When we create a network topology diagram that represents the physical layout of the campus network using Cisco Packet Tracer. To identify the placement of network devices, such as switches and routers, in different buildings and floors to ensure optimal connectivity.

3. Configure Router Interfaces:

When we configure the interfaces of routers in the campus network according to the network design. Then assign IP addresses to the router interfaces based on the IP addressing scheme. Finally enable the appropriate routing protocols, such as OSPF and RIP, on the routers.

4. Implement RIP Routing Protocol:

Firstly, configure RIP on the routers to support routing within smaller network segments. Then define RIP routing domains and enable RIP on the appropriate interfaces. Establish RIP neighbor relationships between adjacent routers.

5. Implement OSPF Routing Protocol:

Configure OSPF on the routers to enable dynamic routing and efficient path selection. That's define OSPF areas and assign routers to their respective areas, and establish OSPF neighbor relationships between adjacent routers.

6. Implement DHCP Server:

Configure a DHCP server on a designated server or router. Define DHCP pools and assign IP address ranges for different network segments.

7. Configure DNS Server:

When set up a DNS server to provide name resolution services, ensure that DNS server addresses are correctly configured on the network devices.

8. Set up Web Server:

We have to configure a web server on a designated server or network device. Then we test the web server by accessing it from different network segments.

9. Testing and Troubleshooting:

After configuring verify the connectivity and functionality of the entire campus network. Test routing protocols (OSPF and RIP) by pinging devices in different network segments. Then test DHCP functionality by connecting new devices to the network and verifying IP address assignment, and test DNS resolution by accessing websites using domain names.

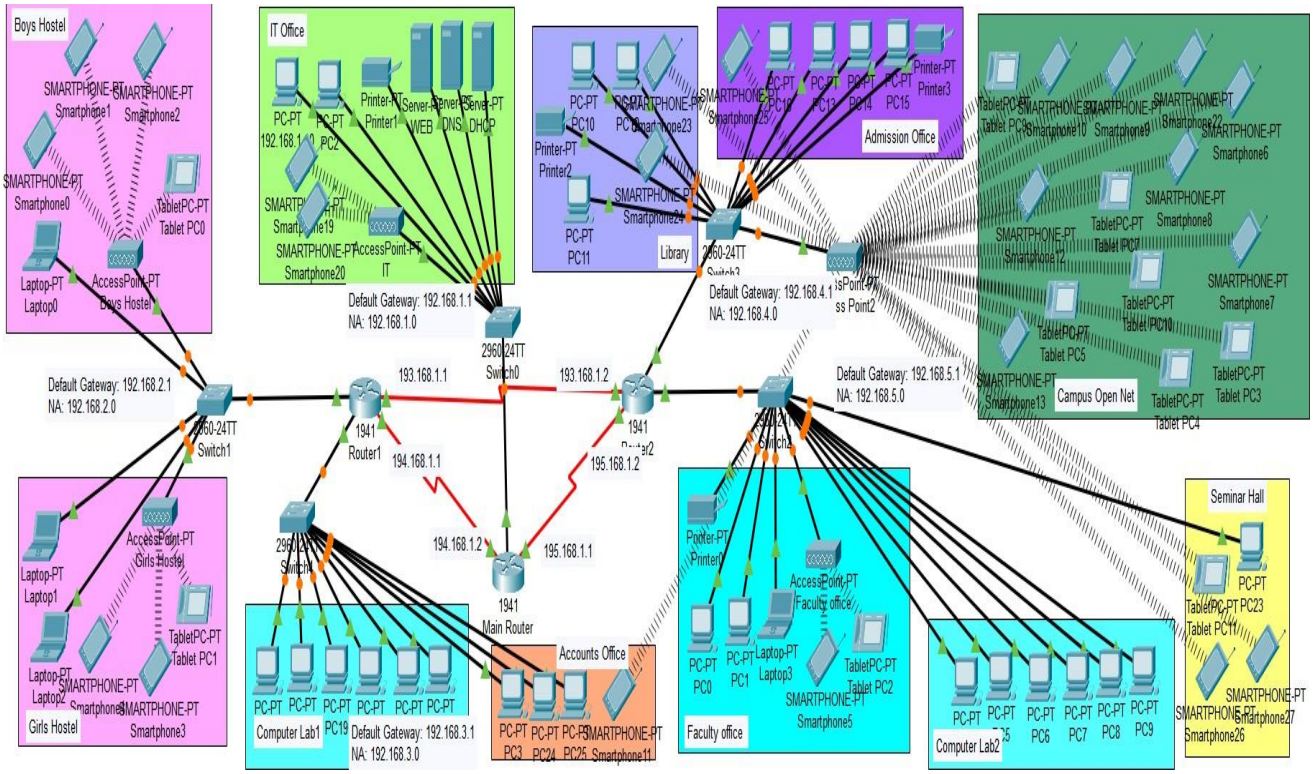
2.2 Tools

- DHCP Server
- DNS Server
- WEB Server
- 1941 Router
- 2960-24TT Switch
- AccessPoint-PT
- PC-PT
- Printer-PT
- Smartphone-PT
- Laptop-PT
- TabletPC-PT

Chapter 3
Design and Implementation

3.1 Use Case/ Block Diagram of the System

The block diagram of the system can be represented as follows:



3.2 Implementation

The implementation of the network setup involves configuring each device with the provided code. The configuration commands provided in the code are executed on each device following the order specified.

The code we used in our project is mentioned below:

- Router#1

```
 interface GigabitEthernet0/0
  ip address 192.168.2.1 255.255.255.0
  ip helper-address 192.168.1.2
  duplex auto
  speed auto
!
interface GigabitEthernet0/1
 ip address 192.168.3.1 255.255.255.0
```

```
 ip helper-address 192.168.1.2
 duplex auto
 speed auto
!
interface Serial0/1/0
 ip address 193.168.1.1 255.255.255.0
 ip helper-address 192.168.1.2
 clock rate 2000000
!
interface Serial0/1/1
 ip address 194.168.1.1 255.255.255.0
 ip helper-address 192.168.1.2
 ip ospf cost 20
 clock rate 2000000
!
interface Vlan1
 no ip address
 shutdown
!
router ospf 100
 log-adjacency-changes
 network 192.168.2.0 0.0.0.255 area 1
 network 192.168.3.0 0.0.0.255 area 1
 network 193.168.1.0 0.0.0.255 area 1
 network 194.168.1.0 0.0.0.255 area 1
!
router rip
 network 192.168.2.0
 network 192.168.3.0
 network 193.168.1.0
 network 194.168.1.0
!
```

- Router#Main

```
interface GigabitEthernet0/0
 ip address 192.168.1.1 255.255.255.0
 ip helper-address 192.168.1.2
 duplex auto
 speed auto
!
interface GigabitEthernet0/1
 no ip address
 duplex auto
```

```
 speed auto
 shutdown
!
interface Serial0/1/0
 ip address 195.168.1.1 255.255.255.0
 ip helper-address 192.168.1.2
 ip ospf cost 20
 clock rate 2000000
!
interface Serial0/1/1
 ip address 194.168.1.2 255.255.255.0
 ip helper-address 192.168.1.2
!
interface Vlan1
 no ip address
 shutdown
!
router ospf 100
log-adjacency-changes
 network 192.168.1.0 0.0.0.255 area 1
 network 194.168.1.0 0.0.0.255 area 1
 network 195.168.1.0 0.0.0.255 area 1
!
router rip
 network 192.168.1.0
 network 194.168.1.0
 network 195.168.1.0
```

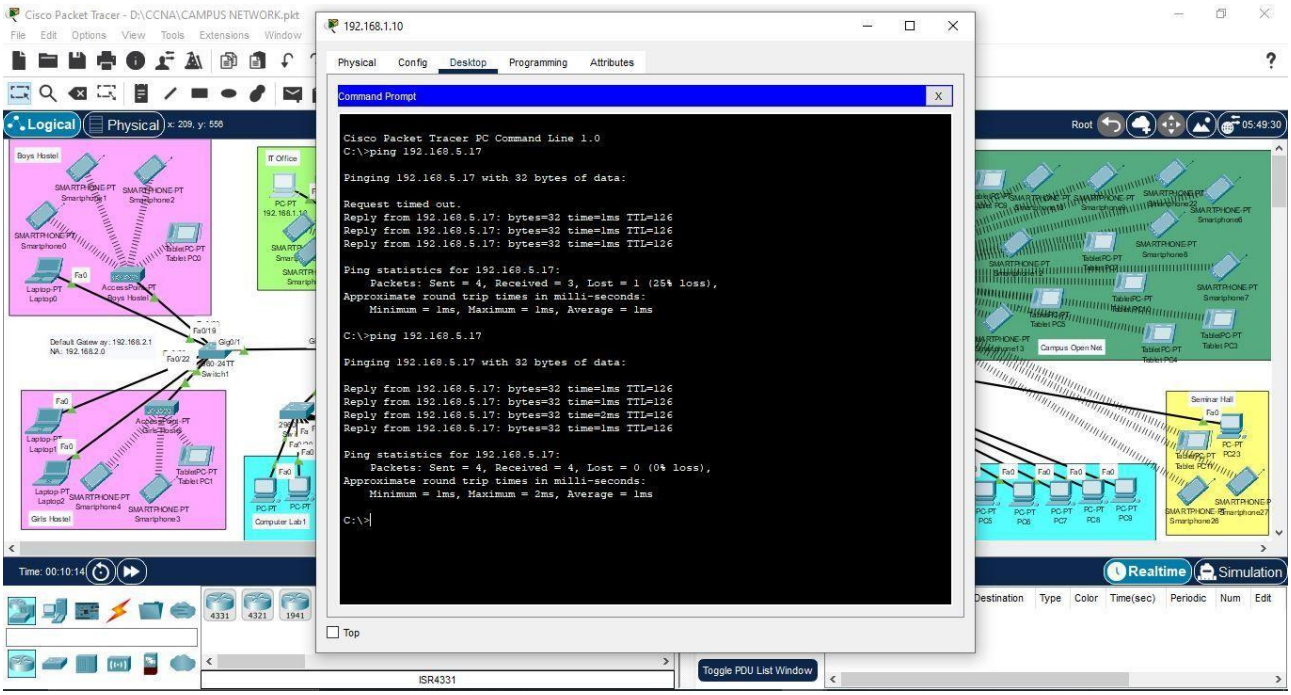
- Router#2

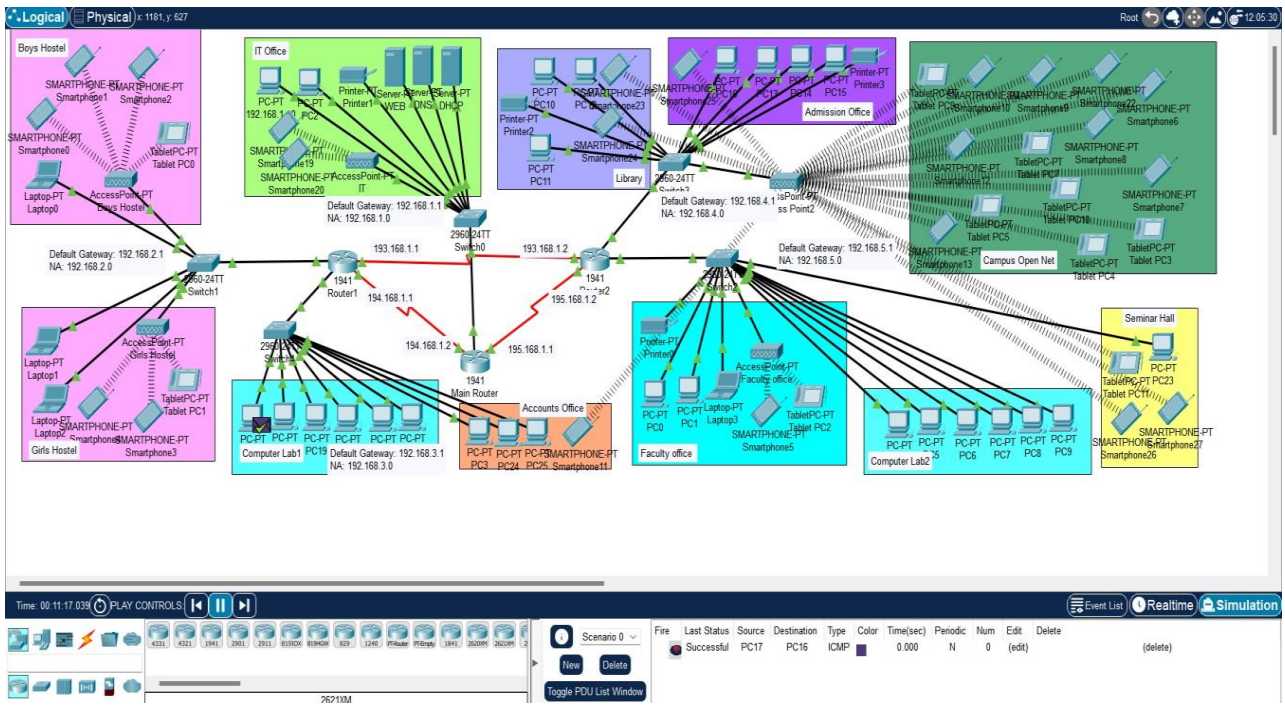
```
interface GigabitEthernet0/0
 ip address 192.168.5.1 255.255.255.0
 ip helper-address 192.168.1.2
 duplex auto
 speed auto
!
interface GigabitEthernet0/1
 ip address 192.168.4.1 255.255.255.0
 ip helper-address 192.168.1.2
 duplex auto
 speed auto
!
interface Serial0/1/0
```

```
 ip address 193.168.1.2 255.255.255.0
 ip helper-address 192.168.1.2
!
interface Serial0/1/1
 ip address 195.168.1.2 255.255.255.0
 ip helper-address 192.168.1.2
!
interface Vlan1
 no ip address
 shutdown
!
router ospf 100
 log-adjacency-changes
 network 192.168.4.0 0.0.0.255 area 1
 network 192.168.5.0 0.0.0.255 area 1
 network 193.168.1.0 0.0.0.255 area 1
 network 195.168.1.0 0.0.0.255 area 1
!
router rip
 network 192.168.4.0
 network 192.168.5.0
 network 193.168.1.0
 network 195.168.1.0
```

Chapter 4
Result and Conclusion

4.1 Result





4.2 Conclusion

The University Network Project represents a significant undertaking aimed at transforming the network infrastructure of the university. By enhancing connectivity, optimizing performance, and implementing robust security measures, this project will pave the way for a more efficient and technologically advanced educational environment. Through continuous monitoring, maintenance, and future-proofing, the university will be well-positioned to meet the evolving demands of its students, faculty, and staff, empowering them to excel in their academic pursuits and collaborative endeavors.