# MEPCO NETWORK MANAGEMENT SYSTEM (MNMS) USING CISCO PACKET TRACER

**MINI PROJECT REPORT**

***Submitted by***


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**19AD551 – COMPUTER NETWORKING LABORATORY**


**DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**

**MEPCO SCHLENK ENGINEERING COLLEGE**

**SIVAKASI**


**NOVEMBER 2022**

# MEPCO SCHLENK ENGINEERING COLLEGE, SIVAKASI

# AUTONOMOUS

**DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**

## BONAFIDE CERTIFICATE

This is to certify that it is the bonafide work of **Aksshaya.B (Reg. No.: 202009003)** and **Bhuvana.S (Reg.No.:202009008)** for the mini project titled **"MEPCO Network Management System (MNMS) using Cisco Packet Tracer"** in 19AD551 – Computer Networking Laboratory during the fifth semester, July 2022 – November 2022 under my supervision.

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# ABSTRACT

Computer networks have a significant impact on the working of an organization. Universities depend on the proper functioning and analysis of their networks for education, administration, communication, e-library, automation, etc. An efficient network is essential to facilitate the systematic and cost-efficient transfer of information in an organization in the form of messages, files, and resources. The project provides insights into various concepts such as topology design, IP address configuration, and how to send information in the form of packets to the wireless networks of different areas of our MEPCO Schlenk Engineering Collge.

# CONTENTS

# CHAPTER 1

# INTRODUCTION

Campus networking via wireless connection becomes an important part of campus life and provides the main way for teachers and students to access educational resources, which gives an important platform to exchange information. As laptops and intelligent terminals are widely used, demand for access to information anytime and anywhere has become more and more urgent, but traditional cable networks cannot meet this requirement. Then wireless network construction becomes necessary and essential. The wireless network is one of the important components of a digital campus and wisdom campus. It provides an efficient way to explore the internet with a mobile terminal for teachers and students regardless of cables and places. This is an important mark of the modern campus as a supplement of a cable network. With the development of network and communication technology, cable networks on a college campus bring much convenience for teaching and research work. But for mobility and flexibility, it has obvious shortcomings. A wireless network can overcome these drawbacks and has been applied to the college campus. We aim at designing our College Network as MEPCO Network Management System.

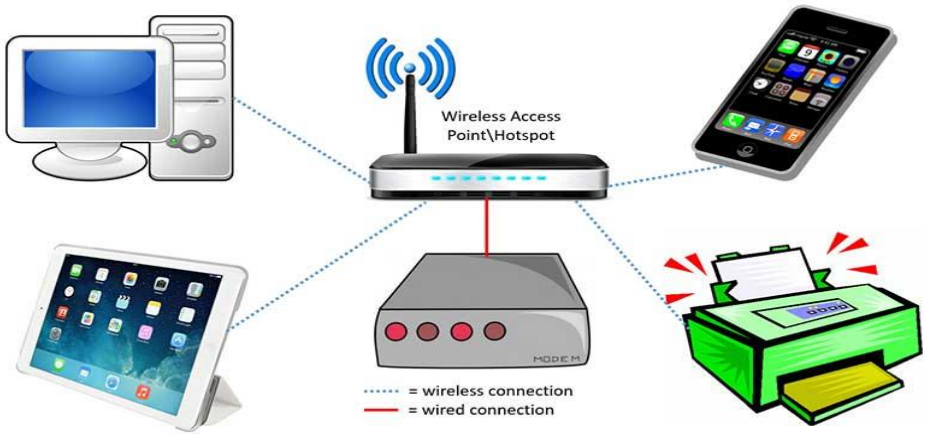


**Figure.1.1. Wireless connection access by various tool**

# CHAPTER 2

# PROBLEM STATEMENT

The main idea of this project is to develop a network for our college which includes all the departments such as AI&DS, IT, CSE, ECE, EEE, CIVIL, MECH, BT, BME and Girls hostel and Boys hostel. All the departments belong to one subnet and the hostels belong to another subnet. This project is done to show the wireless connectivity that is used in universities to make the network efficient and mobile at the same time. Mobility is the major concentration of this project. In order to provide equal functionality to all the users (college staff and students), we have added DNS, Email, and HTTP servers for the maximum utilization of resources. In this mini-project, we defined a simulation of campus networks based on wireless networking.

The network is divided into two sets: one for the campus area and the other for the hostel area. The major aim of this project is to show the wireless connectivity that is used in universities to make the network efficient and mobile at the same time. Mobility is the major concentration of this project. In order to provide equal functionality to all the users (college staff and students), we have added DNS, Email, and HTTP servers for the maximum utilization of resources.

The aim of this project is to design the topology of the university network using the software Cisco Packet Tracer with the implementation of wireless networking systems. Our college network should consist of the following devices:

Router (1941)
Switches (2960-24TT)
Email server
DNS server
WEB server (HTTP)
Wireless Device (Access Point)
PCs
Laptops

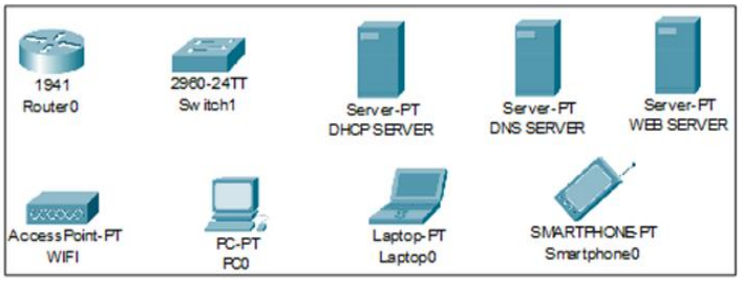


**Figure.2.1. Components to be used**

# CHAPTER 3

# DESIGN AND DIAGRAM

## MEPCO Network Management Network (MNMS)

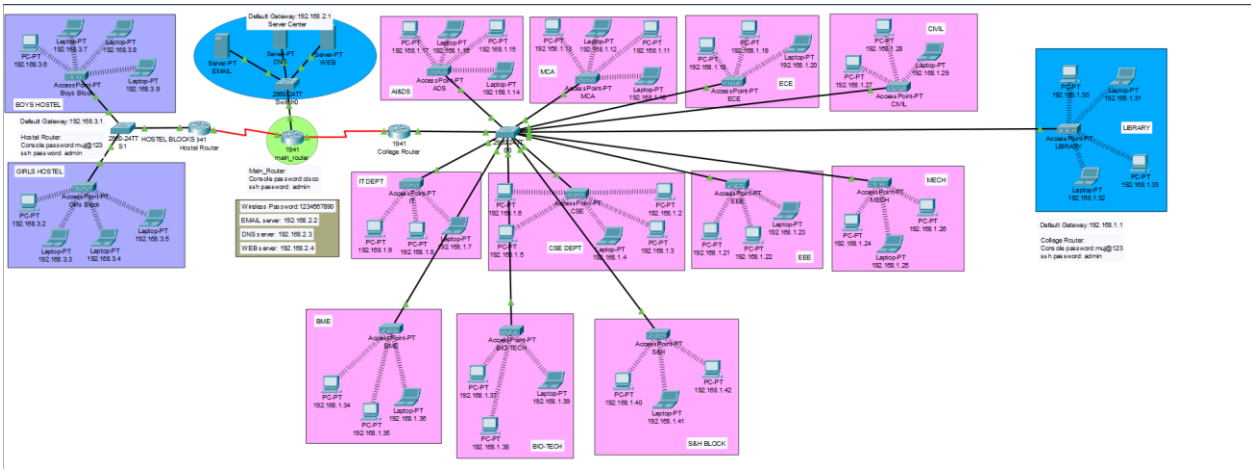

**Figure 3.1. MEPCO Network System**

## Campus Area

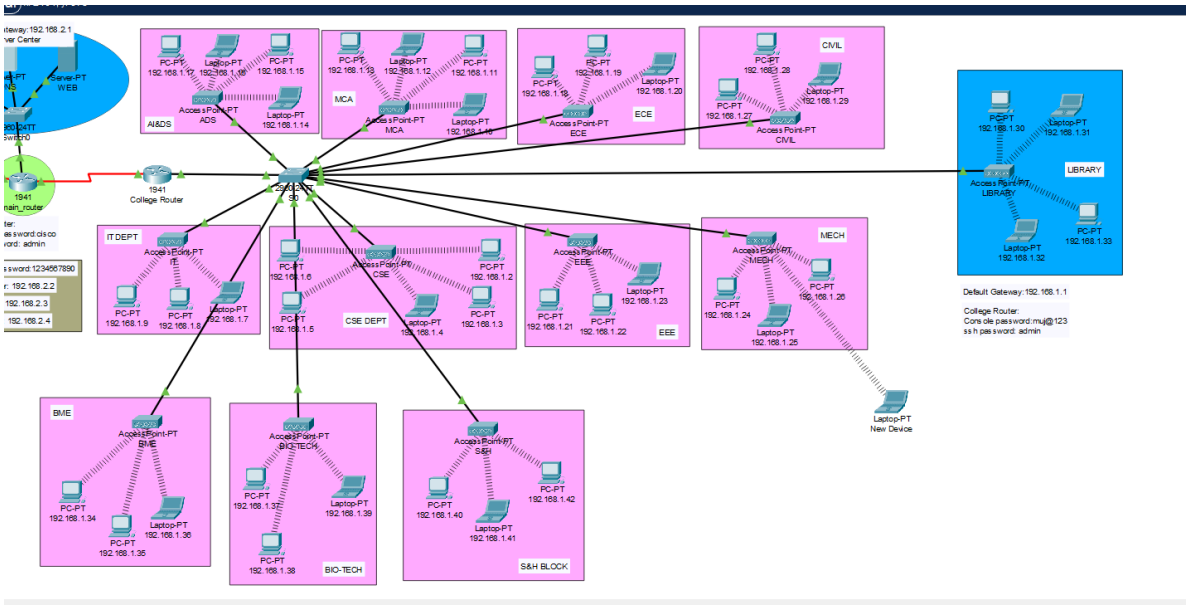

**Figure 3.2. Campus Area with 12 Departments**

## Hostel Area

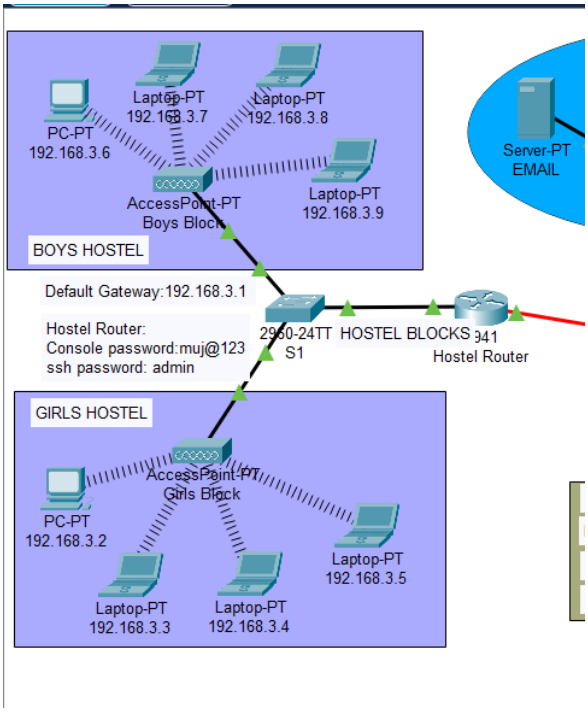


**Figure 3.3.Hostel Blocks**

## Server Room

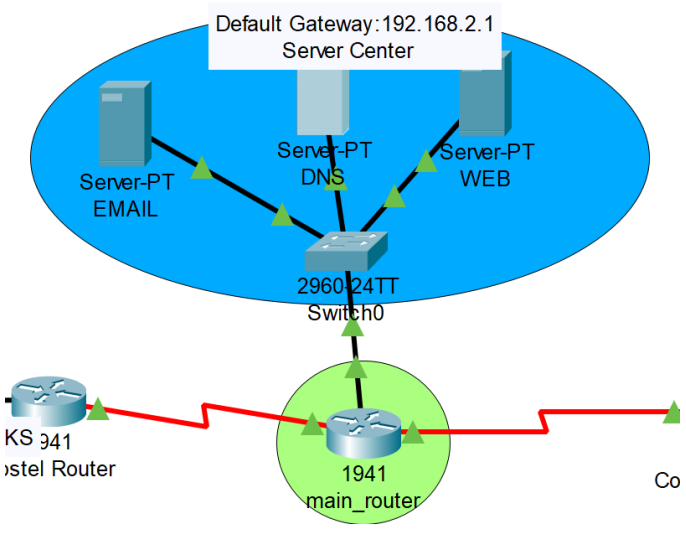


**Figure 3.4. Server Room**

## 3.1. COMPONENTS USED

### 3.1.1. ROUTER

A router is a device like a switch that routes data packets based on their IP addresses. The router is mainly a Network Layer device. There are 3 routers are used for MEPCO management network. Main Router is connected to the Server Room and to the Campus Router and Hostel Router each of these connected to the switches.

### 3.1.2. SWITCH

A network switch is a multiport network bridge that uses MAC addresses to forward data at the data link layer. There are 3 switches are used. One for Server Room, other two connected with Campus Router and Hostel Router. Each switches are connected to Access Point.

### 3.1.3. ACCESS POINTS

Access point (AP), is a networking hardware device that allows other Wi-Fi devices to connect to a wired network. As a standalone device, the AP may have a wired connection to a router, but, in a wireless router, it can also be an integral component of the router itself. An AP is differentiated from a hotspot which is a physical location where Wi-Fi access is available. There are 14 Access Points are used. Each Department and each Hostel has its separate Access Point.

### 3.1.4. WI-FI

We used Wi-Fi technology for wireless connection. A wireless network broadcasts an access signal to the workstations or PCs. This enables mobility among laptops, tablets, and PCs from room to room while maintaining a firm network connection continuously. A wireless network also presents additional security requirements.

### 3.1.5. SERVER

We have 3 servers, namely Email, DNS and Web Server. An E-mail server is a server that handles and delivers e-mail over a network, using standard email protocols. The DNS system is a widely distributed database of names and other DNS servers, each of which can be used to request an otherwise unknown computer name. A web server is a special kind of application server that hosts programs and data requested by users across the Internet or an intranet. Web servers respond to requests from browsers running on client computers for web pages, or other web-based services.

## 3.2. PROTOCOLS USED

### 3.2.1. INTERNET PROTOCOL

This network set IP Address for each and every department PC of each area. Subnetting can be visualized here. Our Network is divided into 3 subnets.

| | |
|---|---|
| **Campus Area** | 192.168.1.0/24 |
| **Server Room** | 192.168.2.0/24 |
| **Hostel Area** | 192.168.3.0/24 |

### 3.2.2. SMTP

The Simple Mail Transfer Protocol (SMTP) is an Internet standard communication protocol for electronic mail transmission. Mail servers and other message transfer agents use SMTP to send and receive mail messages.

### 3.2.3. POP3

Post Office Protocol 3, or POP3, is the most commonly used protocol for receiving email over the internet. This standard protocol, which most email servers and their clients support, is used to receive emails from a remote server and send to a local client. POP3 is a one-way client-server protocol in which email is received and held on the email server. The "3" refers to the third version of the original POP protocol. A recipient or their email client can download mail periodically from the server using POP3. Thus, POP3 offers a means of downloading email from a server to the client so the recipient can view the email offline. POP3 can be thought of as a "store-and-forward" service.

### 3.2.4. SSH

Secure Shell enables a user to access a remote device and manage it remotely. However, with SSH, all data transmitted over a network (including usernames and passwords) is encrypted

and secure from eavesdropping. SSH is a client-server protocol, with an SSH client and an SSH server. The client machine (such as a PC) establishes a connection to an SSH server running on a remote device (such as a router). Once the connection has been established, a network admin can execute commands on the remote device. SSH is used to connect all 3 Area Network. Using SSH each system directly connected to another router easily. SSH configured in all the routers for remote login.

### 3.2.5. DNS

The Domain Name System (DNS) is the phonebook of the Internet. When users type domain names such as ‘google.com’ or ‘nytimes.com’ into web browsers, DNS is responsible for finding the correct IP address for those sites. Browsers then use those addresses to communicate with origin servers or CDN edge servers to access website information.

### 3.2.6. FTP

File Transfer Protocol(FTP) is an application layer protocol that moves files between local and remote file systems. It runs on the top of TCP, like HTTP. To transfer a file, 2 TCP connections are used by FTP in parallel: control connection and data connection.

### 3.2.7. HTTP

HTTP is abbreviated as Hypertext Transfer Protocol, an application layer protocol used primarily with the WWW (World Wide Web) in the client-server model where a web browser is a client communicating with the webserver which is hosting the website. HTTP is a communication protocol which is employed for delivering data (usually HTML files, multimedia files, etc.) on the World Wide Web through its default TCP port 80. The HTTP is meant for request/response depending on a client-server architecture where the user requests information through a web browser to the web server, which then responds to the requested data.

### 3.2.8. HTTPS

Hypertext Transfer Protocol Secure is an extension of the Hypertext Transfer Protocol. It is used for secure communication over a computer network and is widely used on the Internet.

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### 3.2.9. DHCP

The Dynamic Host Configuration Protocol (DHCP) is a network management protocol used on UDP/IP networks whereby a DHCP server dynamically assigns an IP address and other network configuration parameters to each device on a network so they can communicate with other IP networks.

### 3.2.10. TELNET

Telnet is a network protocol used to virtually access a computer and to provide a two-way, collaborative and text-based communication channel between two machines. Telnet can be used for a variety of activities on a server, including editing files, running various programs and checking email.

## 3.3. RESULTS AND DISCUSSIONS

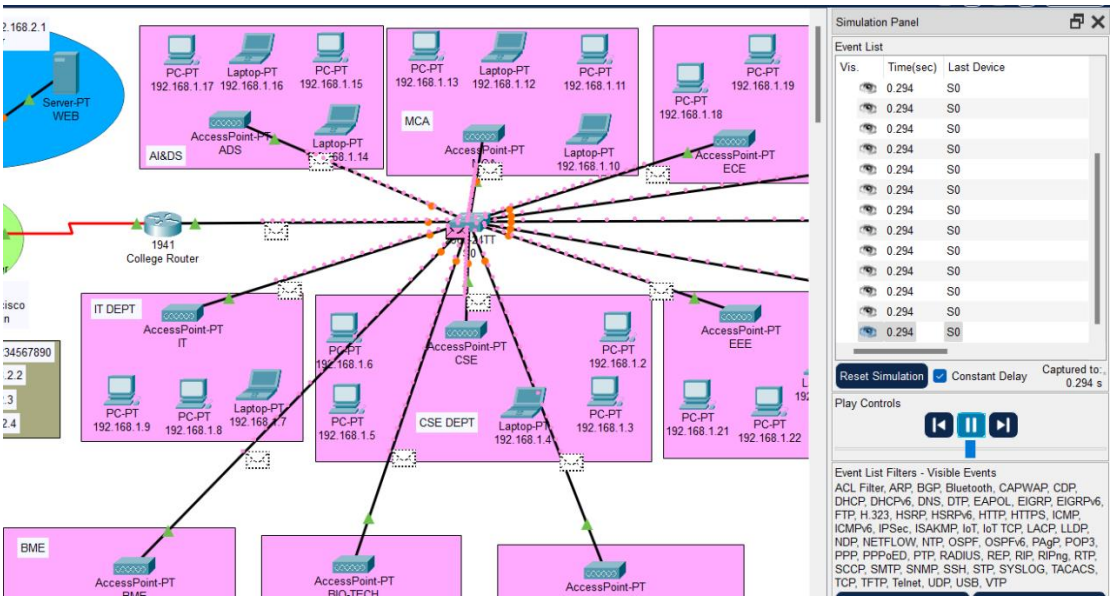


**Figure 3.3.1. S0-Switch transfers the data packet to all departments**

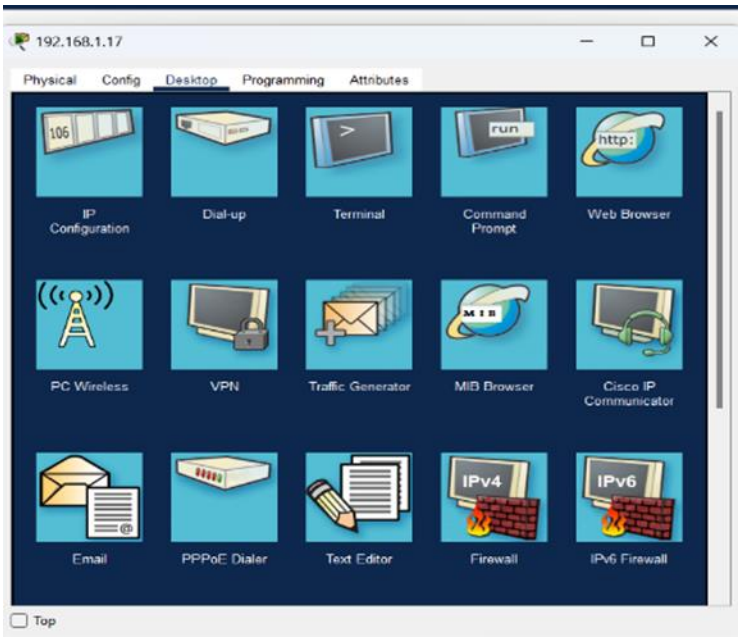


**Figure 3.3.2. Accessing the components from a Device**

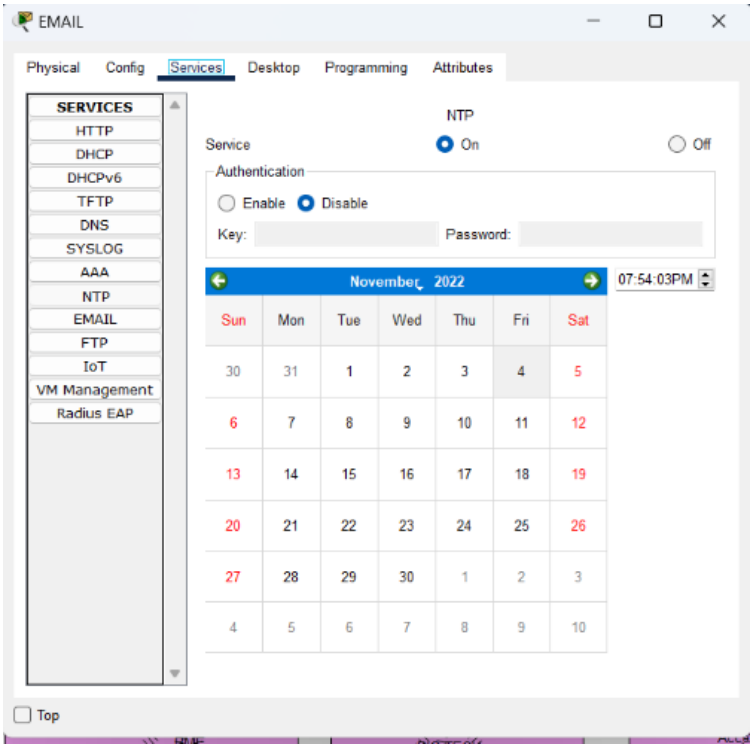


**Figure 3.3.3. Configuring the System using NTP**

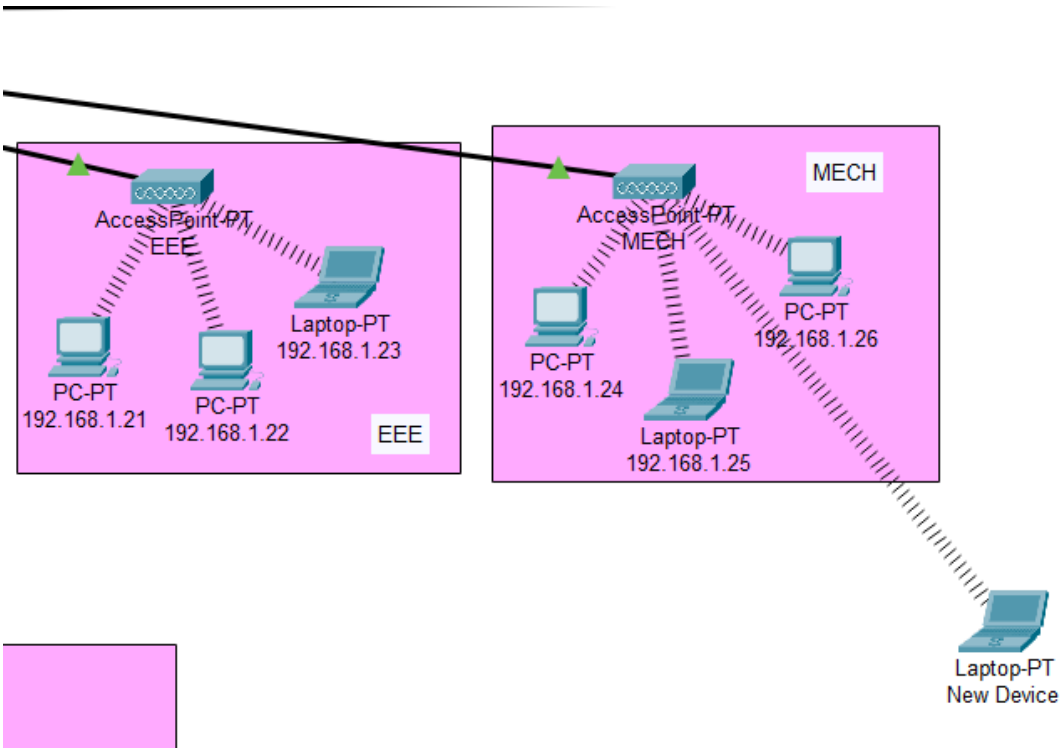


**Figure 3.3.4. Connecting Additional Devices to the Mechanical Department in our Network**

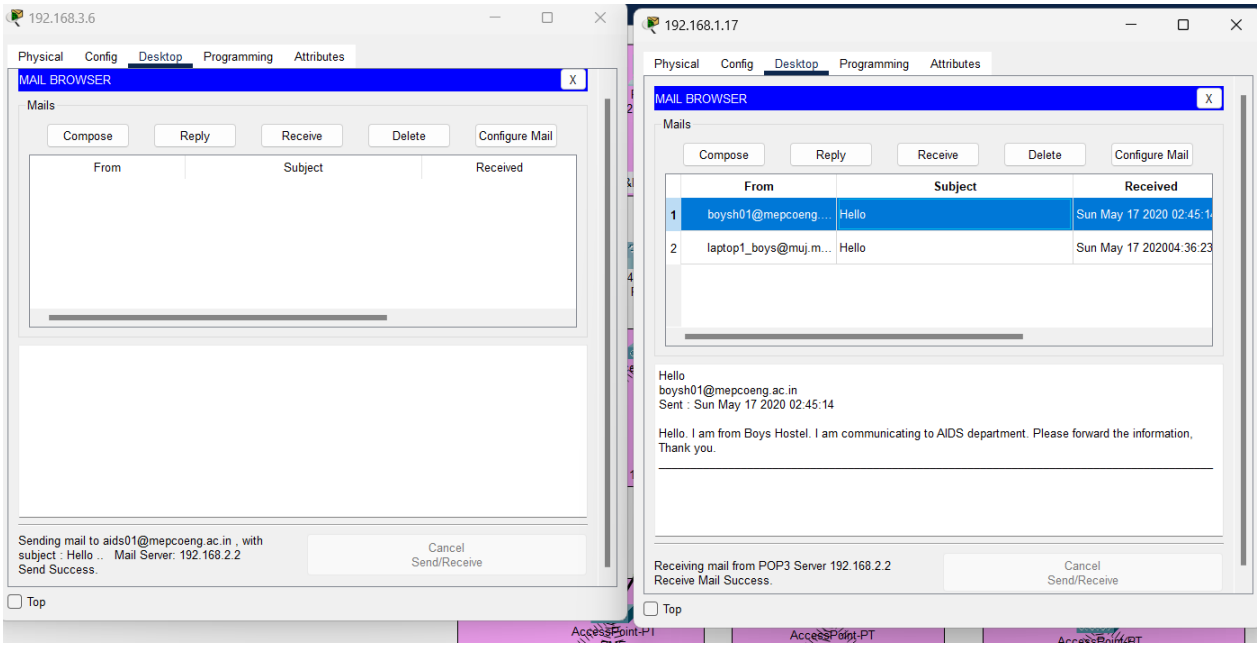


**Figure 3.3.5. Sending Mail from Boys Hostel to AI&DS Department**

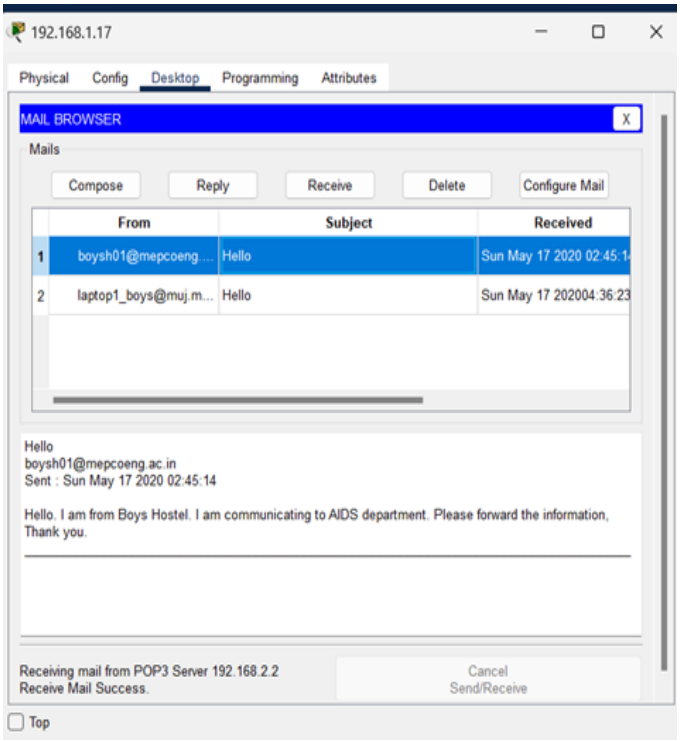


**Figure 3.3.6. Mails Inbox of AI&DS Department**

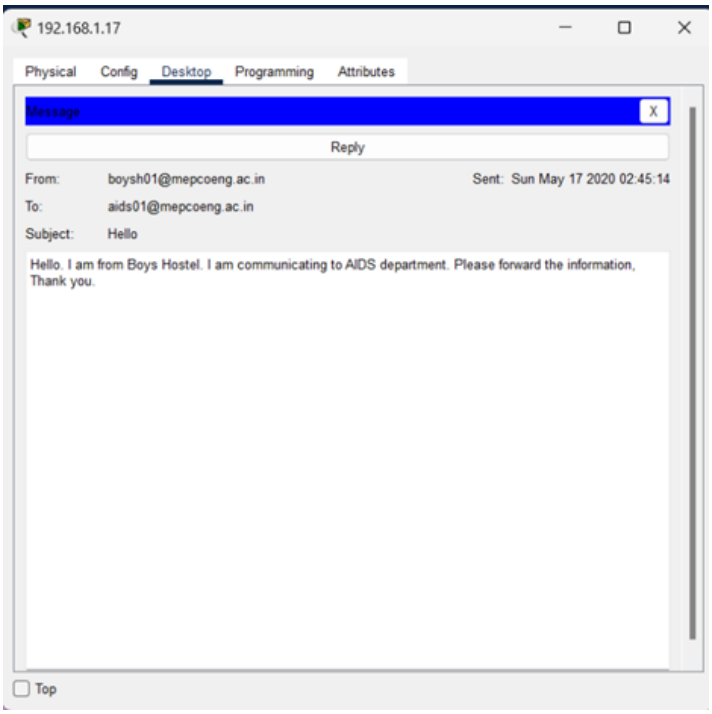


**Figure 3.3.7. Reading the Mail from Boys Hostel**

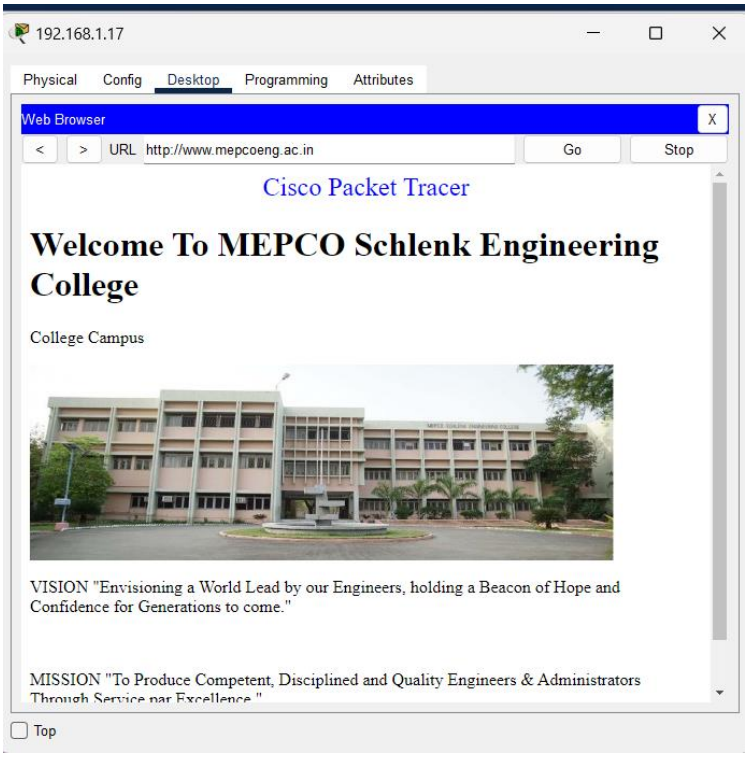


**Figure 3.3.8. Accessing MEPCO Website using Web and DNS Server**

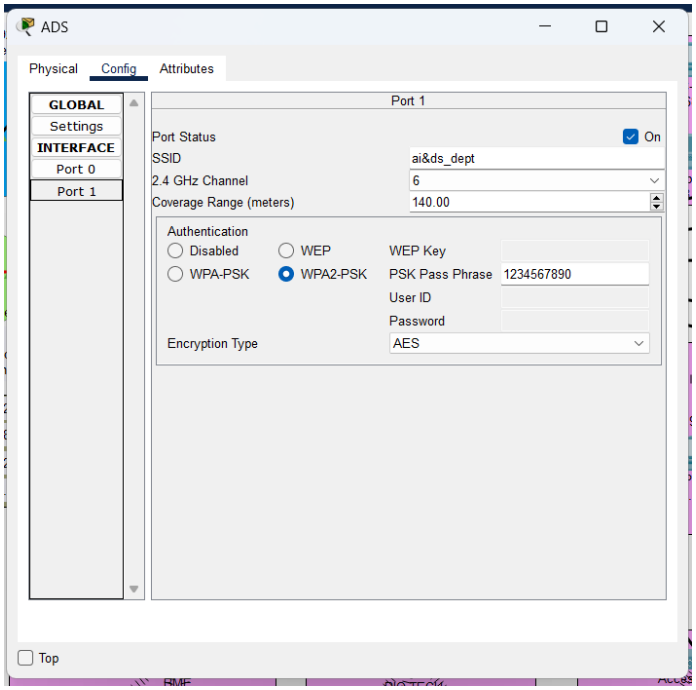


**Figure 3.3.9. Configuring Wireless Connection in AI&DS Department**

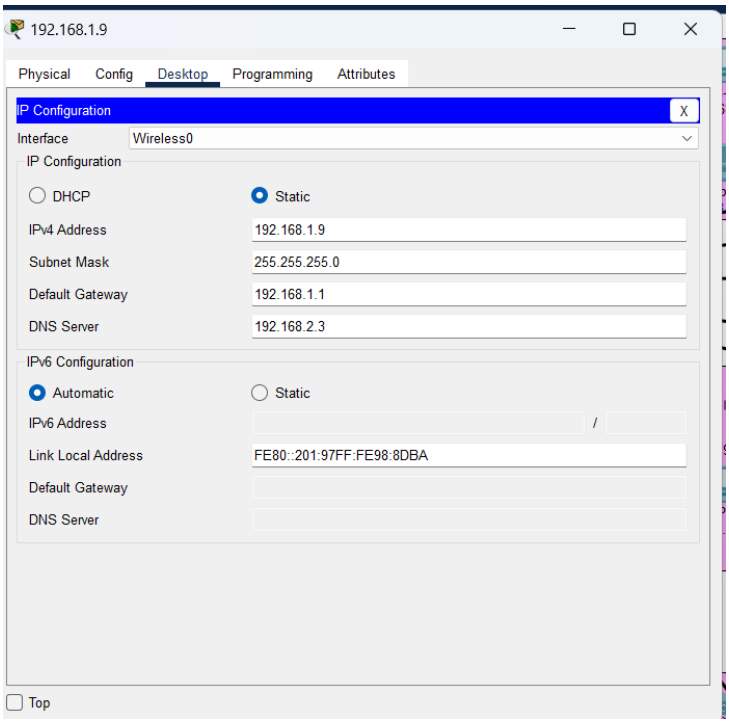


**Figure 3.3.10. IP Configuration and Subnetting in a Device**

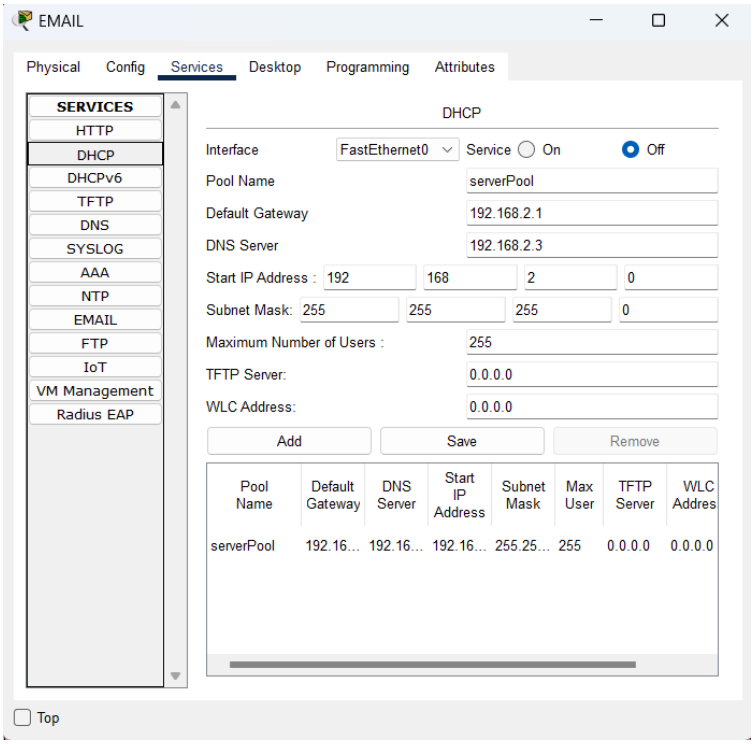


**Figure 3.3.11. DHCP Configuration**

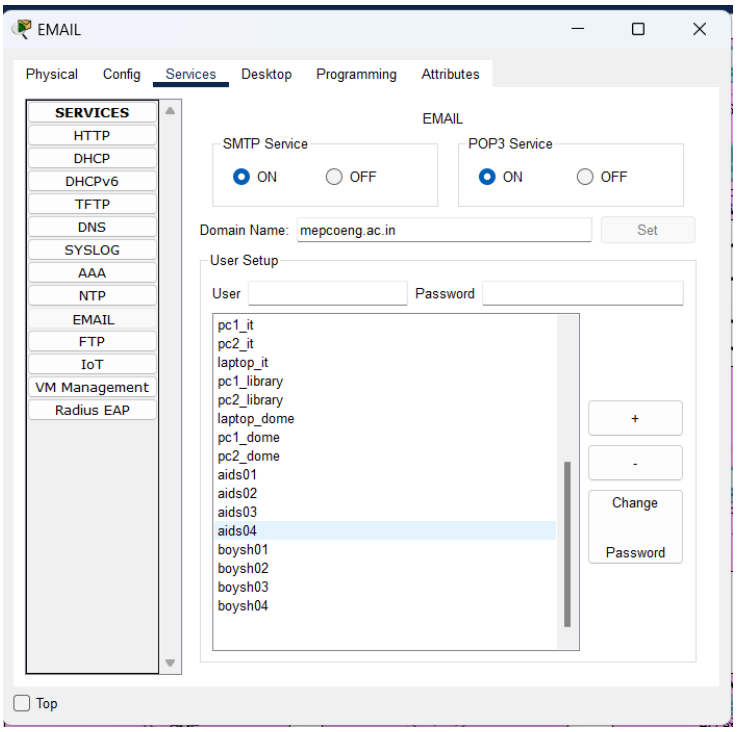


**Figure 3.3.12. Domain and User Setup in Email Server**

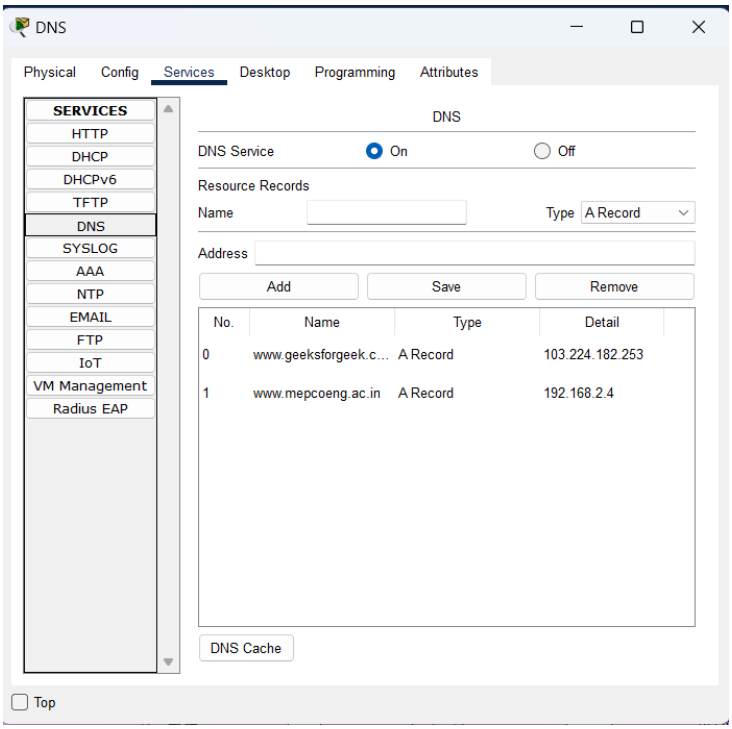


**Figure 3.3.13. DNS Server Configuration**

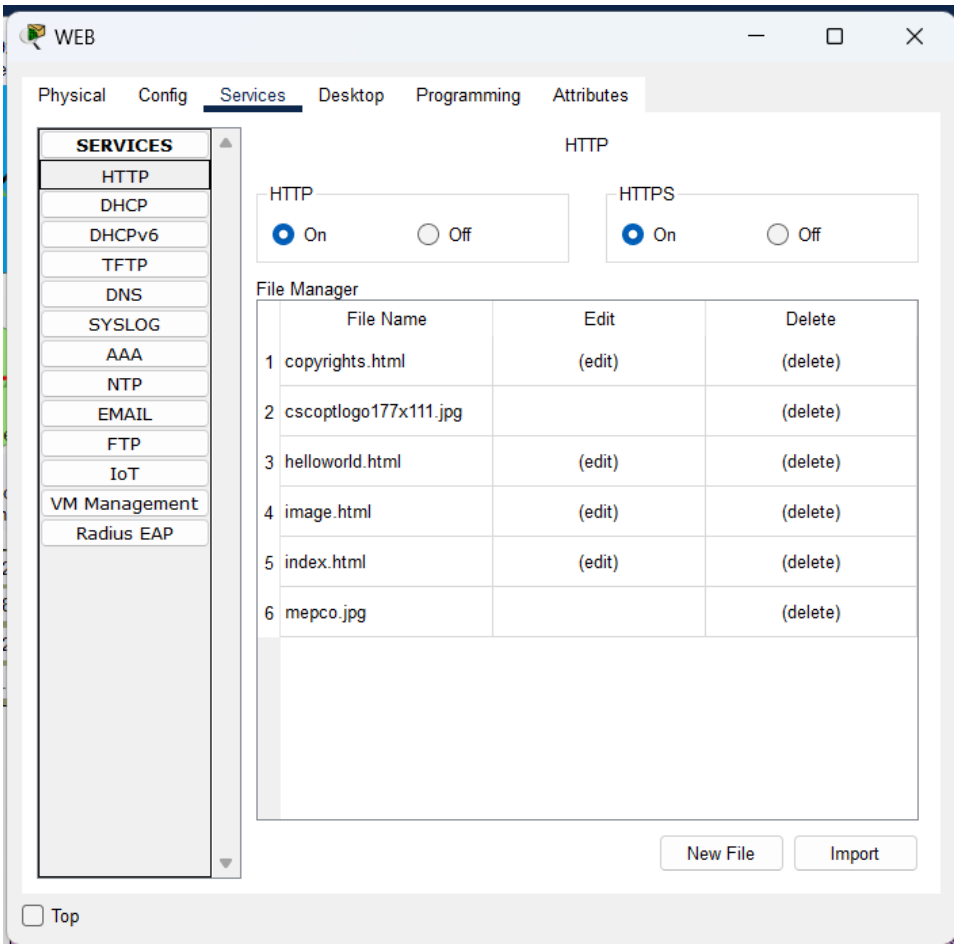


**Figure 3.3.14. Adding Web Pages to Web Server Using HTTP and HTTPS**

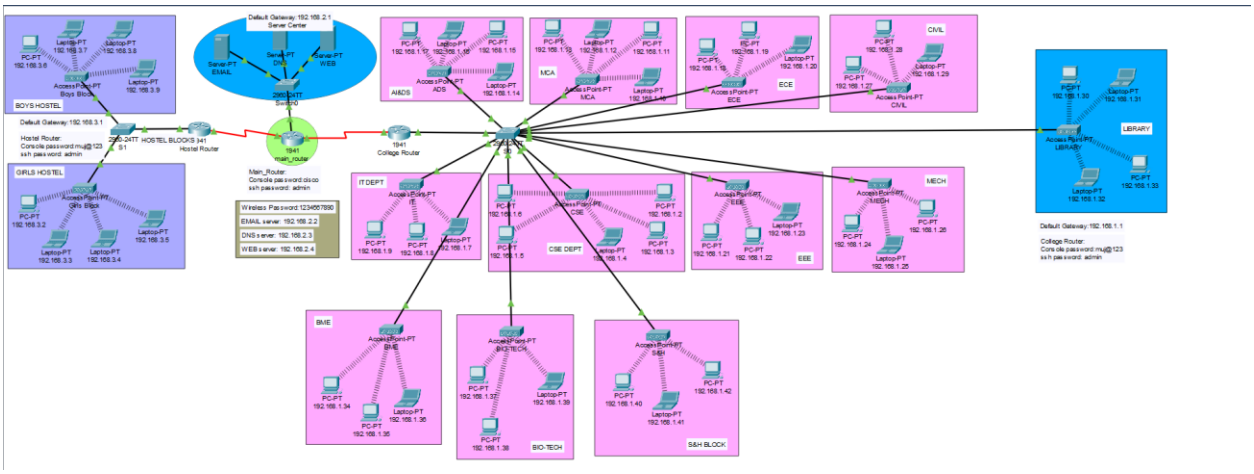

**Figure 3.3.15. MEPCO Network**

# CHAPTER 4

# CONCLUSION

We started our discussion with the word “digitalization” and in order to achieve it, we aimed to start with an educational institute, and finally, we designed a network for our College, which is wireless. As we mentioned, mobility and efficiency are the key aspects of wireless networks, which were our main goal, and hence, we decided to shift to a wireless network instead of a wired one, making our network clean and less chaotic. In this project, we designed our College’s Network using Cisco Packet Tracer that uses a networking topology implemented using servers, routers, switches, and end devices in a multiple area networks. We have covered all the necessary features that are required for a network to function properly. We have included a DNS server and a web server for establishing a smooth communication system between different areas of our network and specifically for the communication between students and teachers. We have included an email server to facilitate intra university communication through emails within the domain. We have used console passwords and ssh protocol to ensure a safe and secure transfer of data.

## REFERENCES


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