REPORT ON DESIGN AND IMPLEMERENTATION OF NETWORK FOR UNIVERSITY

at

MODEL INSTITUTE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)
(Permanently Affiliated to the University of Jammu, Accredited by NAAC with "A" Grade)

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD

OF THE DEGREE

BACHELOR OF TECHNOLOGY
(Computer Science and Engineering)

2022-2023

SUBMITTED BY:

Group 1-

Samragyi Vats || 2020A1R011

Bhoomi || 2020A1R009

Poonam Bhalwal || 2020a1r020

Haritik Narayan || 2020A1R018

ACKNOWLEDGEMENT

Through this section of my report, I want to present my gratitude towards my institute MIET, from where I learned and gained an experience worth enhancing my credibility for my career. Being able to work on projects that require you to analyze and solve a problem that exists in the real world is an experience that one can achieve rarely, and I am happy and thankful to get that chance here.

I would also like to thank my mentors Prof. Ankur Gupta, Dr. Sahil Sawhney, Prof. Dr. Ashok Kumar, and Asst. Prof. Ms. Vishalika for being a guiding force throughout this period of internship. It was a great experience to work under your guidance as I learned a lot of new things and got the privilege to have a good experience with practical work.

Lastly, I want to thank my parents and colleagues who have been a support system throughout my life and helped me lessen my burden and stress at work.

TABLE OF CONTENTS

INDEX | HEADING **PAGE NUMBER**

PROJECT SUMMARY

1) INTRODUCTION:

A computer network is defined as a co-lateral connection of various devices that are connected through different communication medium/channels. Main purpose of a computer network is to facilitate the users to communicate among themselves and share resources with other users. Networks can be classified into various categories with different characteristics that are mentioned and explained further in this section of the research work. As the computers and networked systems thrive in today's world, the need for increase and strong computer and network security becomes increasingly necessary and important. The increase in the computer network system has exposed many networks to various kinds of internet threats and with this exposure. The security may include identification, authentication and authorization, and surveillance camera to protect integrity, availability, accountability, and authenticity of computer hardware or network equipment. There is no laid-down procedure for designing a secure network. Network security has to be designed to fit the needs of an organization . Campus network is essential and it plays an important role for any organization. Network architecture and its security are as important as air, water, food, and shelter. Computer network security threat and network architecture are always serious issues. A campus network is an autonomous network under the control of a university which is within a local geographical place and sometimes it may be a metropolitan area network.The physical network infrastructure is required for a contemporary university network. University Management and IT manager may know exactly what kind of network they want to set up, upcoming plans, and expected growths. Contingencies for future area, power, and other resource must be part of the physical plan of a university. Building a contemporary university network atmosphere also contains functional and safety elements that also go beyond the IT department's obligations and skills.

Problem Statement:

Design and implementation of network for a university campus.

The objective of the project:

A Campus network is an important part of campus life and network security is essential for a campus. Campus network faces challenges to address core issues of security which are governed by network architecture.

A university network has a number of uses, such as teaching, learning, research, management, e-library, result publishing and connection with the external users.

A hierarchical architecture of the campus network is configured with different types of security issues for ensuring the quality of service.

2. Implementation:

Hierarchy of University-

The university is distributed in 4 faculties:

- Health and Sciences
- Business
- Engineering/Computing
- Design

Each member of staff has a PC and students have access to PCs in labs.

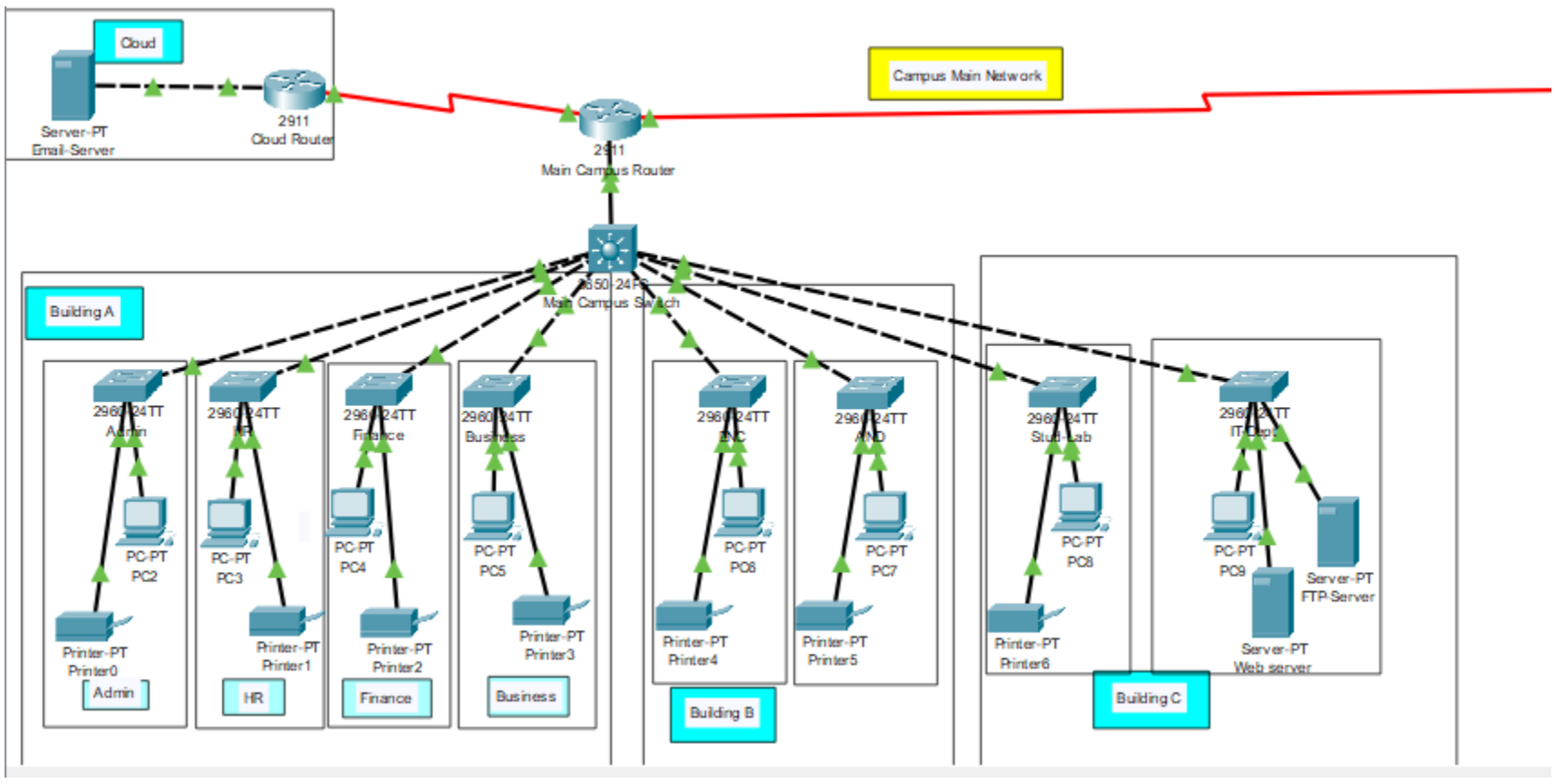
Components in network topology

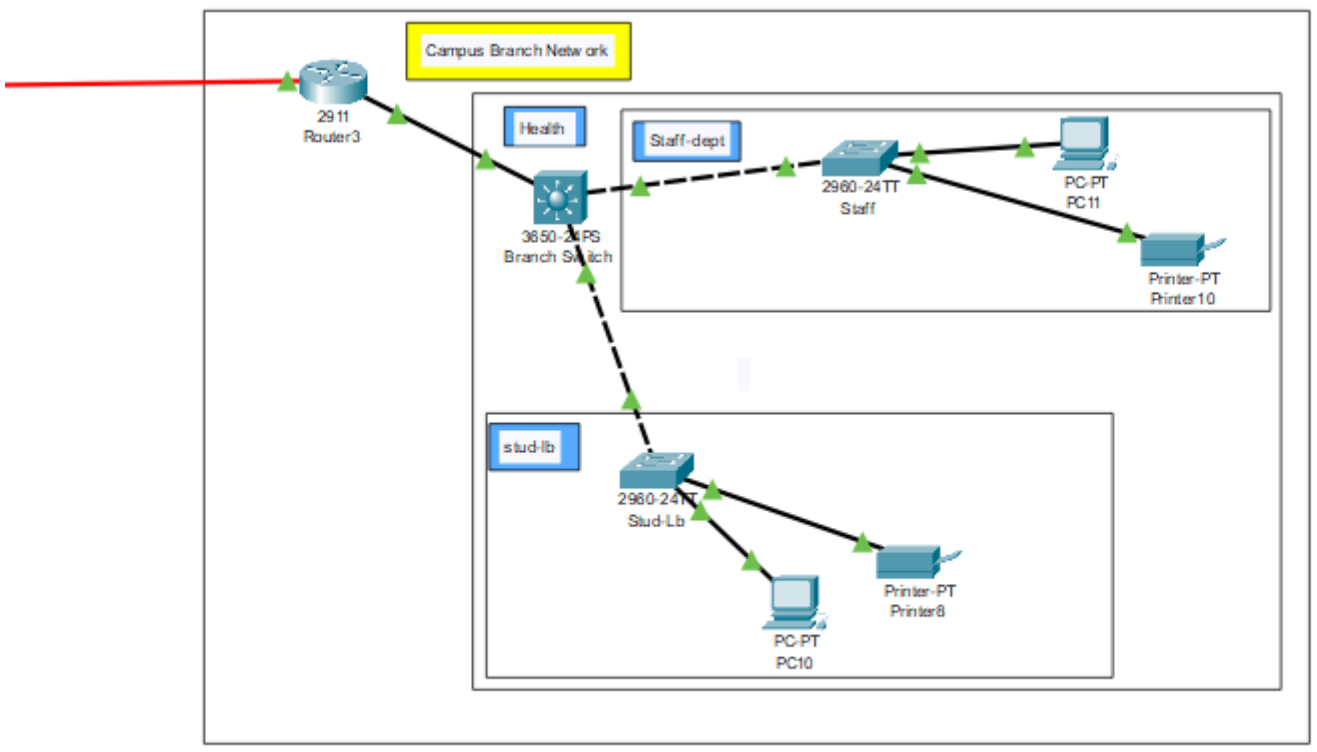
- Main Campus
  - Building A - Admin, HR, Finance and Business faculty.
  - Building B - Faculty of Engineering and Computing and Faculty of Design.
  - Building C - Student's labs and IT department. The IT department hosts the University Web Server and other servers.
  - Email server hosted externally on the cloud.
- Branch Campus
  - Faculty of health and sciences
  - Staff and student labs are situated on separate floors

Network Configuration

- Each department/faculty has its own IP network.
- Switches should be configured with appropriate VLANs
- RIPv2 will be used to provide routing for the routers in the internal network and static routing for the external network.
- The devices in building A will be expected to acquire dynamic IP addresses from a router-based DHCP server.

3. Network Design





APPENDIX

Platform used:

Cisco Packet Tracer (CPT):

Cisco Packet Tracer is cross-platform visual simulation tool designed by cisco system that allows users to create network topologies and imitate modern computer networks. The software allows users to simulate the configuration of cisco routers and switches using a simulated command line interface. Packet makes use of a drag and drop user interface, allowing users to add and remove simulated network. The best way to learn about networking, according to Cisco, is to do it. This programme cannot replace hardware routers or switches because the protocols are implemented solely in software. This tool, however, does not just contain Cisco hardware but also a wide range of other networking devices.

Devices used:

Switch: A switch is a device that sends data in the form of packets from one user to another user by looking at the physical device address i.e. MAC address or Media Access Control. It determines to which MAC address the packet belong to and if the packet belong to none of the port then it sends the packet to all the ports. A switch has an advantage to function as Router as well.

Hub: A hub is a simplest networking device which connects various network devices to each other through ethernet. Multiple devices are connected to hub as it consist of various input and output ports. All the devices are set on a same network segment to transmit data from one device to the other.

PC: A personal computer (PC) is a microcomputer designed for use by one person at a time.

Networking: Computer networking refers to interconnected computing devices that can exchange data and share resources with each other. These networked devices use a system of rules, called communications protocols, to transmit information over physical or wireless technologies.