A MINI PROJECT REPORT

On

Enterprise Network Design For A School

Submitted in partial fulfillment of the requirement of
the University of Mumbai for

ITL701 Network Design Lab Mini Project
In
Information Technology

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CERTIFICATE

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PROJECT APPROVAL FOR

This project is entitled **" Enterprise Network Design For A School"** by Kumara Huliyurdurga, Junaid Khan, Aryan Mehtele and Aditya Modak are approved for the degree of Bachelor of Engineering in Information Technology.

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2. _____

3. _____

Date:

Place:

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DECLARATION

We declare that this written submission for the Network Design Lab Mini Project entitled "Project Title" represents our ideas in our own words and where others' ideas or words have been included. We have adequately cited and referenced the original sources. We also declare that we have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any ideas/data/fact/source in our submission. We understand that any violation of the above will cause disciplinary action by the institute and also evoke penal action from the sources which have not been properly cited or from whom prior permission has not been taken when needed.

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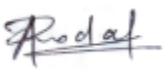

Date:

Place:

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Abstract

St. Xaviers school wants to open a branch in a new location for that we are creating network design for their branch. This report describes the network design of a working school branch. In this network topology the nodes (i.e., computers, switches, routers or other devices) are connected to a local area network (LAN) and network via links (twisted pair copper wire cable or optical fiber cable). We have used Cisco Packet Tracer for designing the network topology. It's a general design which can be implemented at any higher level to manage network systems. The network design is a major part of the infrastructure of a School. For faster transactions and speed of all the work related to education, internet speed is a major component of ensuring that a school provides better lectures for quality Education.

The main aim of this project is to design a School branch network which meets the requirements of a School network like Online Video lectures, Online Assessments, Flipped Learning, edtech learning, keeping track of student progress, communication with parents etc. The aim is to provide secured LAN and WLAN networks. The network is designed keeping in mind upcoming technology in this field. This is well suited to the upcoming changes in education which supports imparting digital IT related knowledge to each and every student.

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Chapter 1
Introduction

1.1 Introduction to School Network Design

The field of Information Technology and Network Infrastructure Management has become a crucial component inside the educational institutes. An educational institute network is an enterprise network (hundreds or thousands of users) where we have one or more LANs in one or multiple buildings. Everything is geographically close to each other so we typically use Ethernet (and Wireless) for connectivity. Typically the company owns everything on the campus…hardware, cabling, etc.
To support this many users we require a lot of switch ports which means a lot of switches. We need a physical design to connect these switches to each other and also a good logical design to make it work.

An important consideration of network design for today's networks is creating the potential to reliably, scalably and securely support future expansion. We need to design a network topology that is easy to understand, easy to manage, easy to troubleshoot and is adaptable to change in future according to the new medical equipment. Among the various topologies like bus topology, ring topology, mesh topology, star topology, etc, Hierarchical topology would best meet our demands. The hierarchical network design model serves to help us develop a network topology in separate layers. Each layer focuses on specific functions, enabling us to choose the right equipment and features for the layer. A hierarchical design avoids the need for a fully meshed network in which all network nodes are interconnected and thus making it simple and easy to understand.

1.2 Requirement gathering- customer premises equipment

1. Switches (2960-24TT Switch)
2. Servers (Server-PT)
3. Routers (Router-PT)
4. PC (PC-PT)
5. Access Points (AccessPoint-PT

1.3 Distribution as per enterprise campus

The proposal is to design a fully functional and reliable network for a School. The School consists of various departments distributed in the entire building. At the ground floor we have a principal's office ,conference room and a reception. The school office is located besides the reception which facilitates various options from enquiries to fees payment. The first floor consists of computer and IT labs which require highly reliable and quality internet connection for a seemingless experience. The third comprises a Library and AV room with multiple PC's. Also the staff IT room is located on the third floor wherein teachers update the performance of students for parents to track their wards progress and make the whole process of parent teacher interaction completely transparent. Finally at the top floor we have a Server Room which is the master network room connecting systems across the school.

1.4 Number of Components

Sr. No	**Name**	**Quantity**
1	Router	3
2	Servers	3
3	Switches	6
4	Ethernet	35

1.5 Service provider technology

The service provider technology used in the school's network design is LAN (Local Area Network). LAN is a collection of devices connected together in one location, such as a building, office, or home. A LAN can be small or large, ranging from a home network with one user to an enterprise network with thousands of users and devices in an office or school. The AP (Access Point) connects to a router (via a wired local area network), typically Ethernet, and the AP then provides wireless connections using wireless LAN technology, typically Wi-Fi, for other devices to use that wired connection.

Chapter 2

Implementation of Mini Project

2.1 Designing of Mini Project

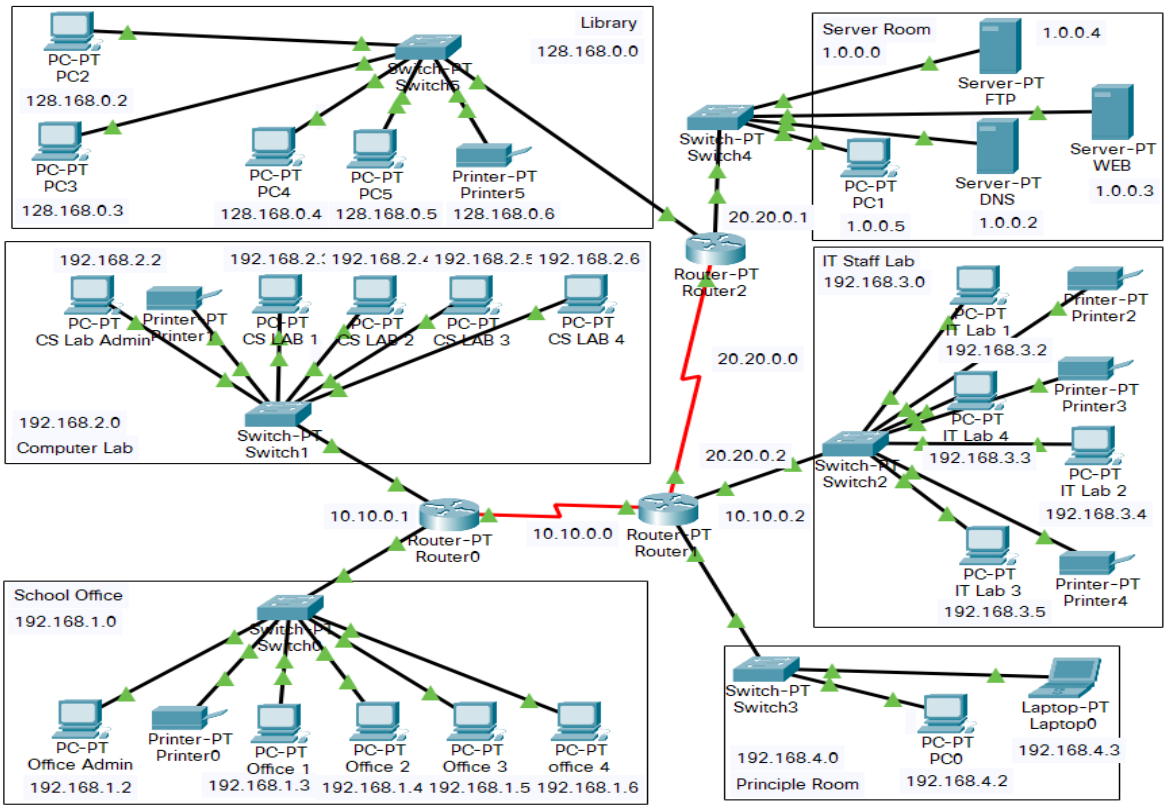

Fig. 1 Network Design for School

2.2 Simulation of working mini-project

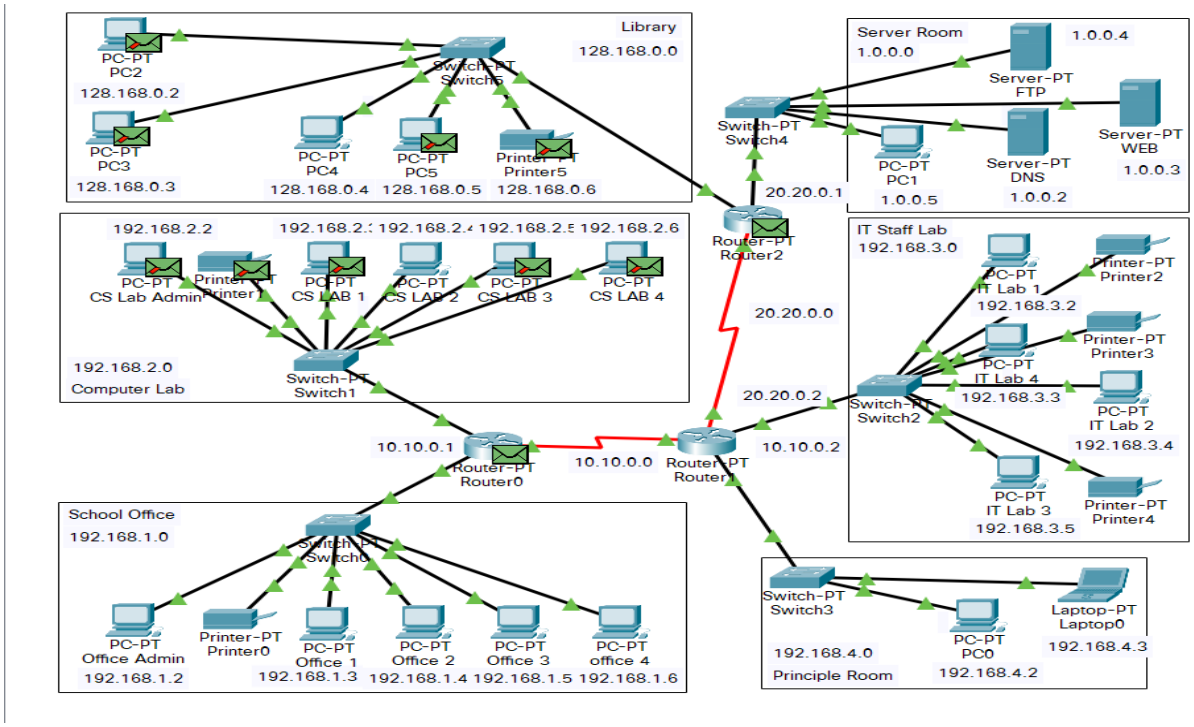

Fig.2

Simulation Panel

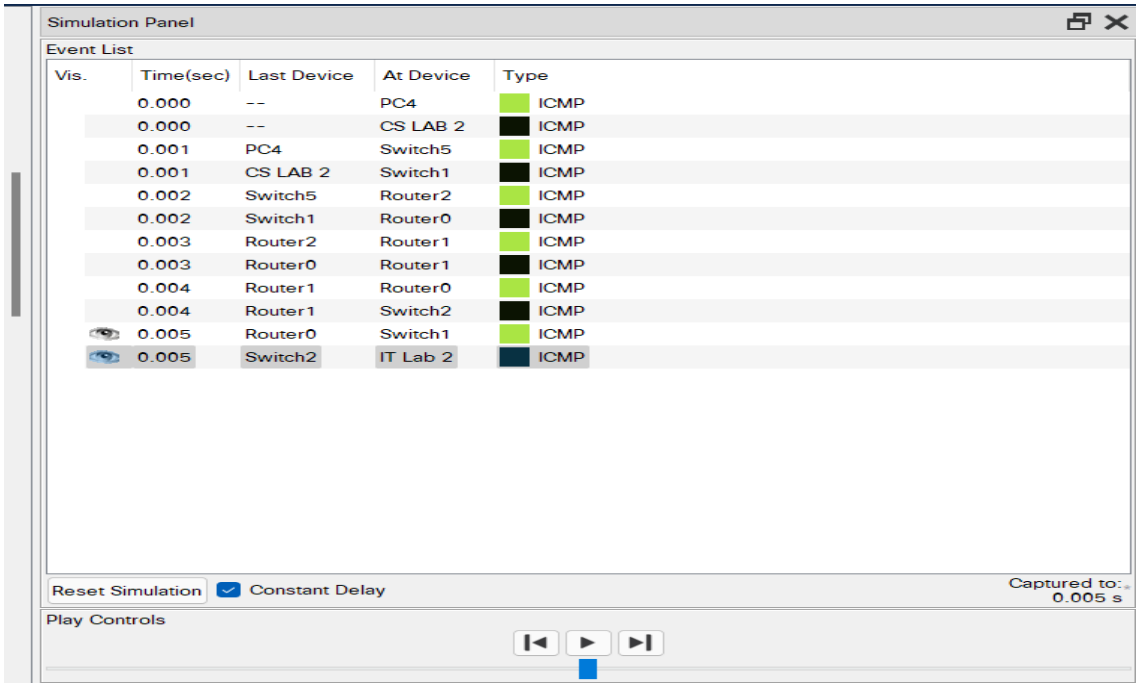

Fig.3

Simulation Status

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC0	CS LAB 3	ICMP		0.000	N	0	(edit)	(delete)
	Successful	Office 2	IT Lab 4	ICMP		0.000	N	1	(edit)	(delete)
	Successful	PC4	IT Lab 4	ICMP		0.000	N	2	(edit)	(delete)

Fig.4

2.3 Tools used for Designing

Cisco Packet Tracer :

Packet Tracer is a cross-platform visual simulation tool designed by Cisco Systems 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 Tracer makes use of a drag and drop user interface, allowing users to add and remove simulated network devices as they see fit.

2.4 Applications

- This makes the work collaboration smoother and easier.
- This network design is easy to scale and can be used in small schools or by adding a few components it can be used in large campuses.
- To make communication fast and easy.
- Complex network designs can be achieved easily and are reliable as well.

Simulation Video Link:
https://drive.google.com/file/d/1PHaXUGvpUvSpAzePGMlTpDibxrgU0kmy/view?usp=sharing

Chapter 3

Conclusion

With the growth of Information Technology in every sector including the educational sector, the design of a network of any educational institute has become the need of the hour. The campus needs to have a reliable, secure and scalable network design in order to impart digitized educational agenda, great relationship between parent and teacher, convenient communication between various departments, etc. as well as keep it ready for any new educational upgrades that may be introduced in the future. The hierarchical model of networking best suits our needs along with providing additional features like easy maintenance, high security, simplified troubleshooting and effective performance.

Chapter 4

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[3]. Campus Network Planning and Design Huichao Ma,Guoliang Lv,Chunyu Wu School of Computer and Information, Hefei University of Technology, Anhui, China

Acknowledgement

We would like to extend our deepest gratitude to our Project guide Prof. Sheetal Gawande for her exemplary guidance, monitoring and constant encouragement throughout this project which helped us improve our work. We would also like to extend our gratitude to our Head of IT Department Dr. Satishkumar Varma for providing us with an opportunity and platform to carry out this project. We are also extremely grateful to our Principal Dr. Sandeep Joshi who provided us with this golden opportunity as well as all the facilities needed to carry out this project successfully.

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