CAMPUS NETWORK DESIGN MODULE

A MINOR PROJECT REPORT

Submitted By

KARTIK JAIN(RA2011026010335)
IRAM KAMDAR(RA2011026010312)

Under the guidance of

Dr. A REVATHI

(Asst. prof CINTEL/SRMIST)

In partial fulfilment for the Course

of

18CSC302J - COMPUTER NETWORKS

in CINTEL DEPARTMENT

FACULTY OF ENGINEERING AND TECHNOLOGY

SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

Kattankulathur, Chenpalpattu District

NOVEMBER 2022

SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

(Under Section3 of UGC Act,1956)

BONAFIDE CERTIFICATE

Certified that this mini project report "**Campus Network Design Module** " is the bonafide work of **Kartik Jain (RA2011026010335)** and **Iram Kamdar (RA2011026010312)** who carried out the project work under my supervision

SIGNATURE

Dr. A. Revathi
SUPERVISOR
Assistant Professor Department of Computational Intelligence
SRM Institute Of Science and Technology

ABSTRACT

A Campus Network Design Module is a type of network designed for establishing the Internet network in the campus. A Campus Network Design Module is a project which can be usefully established for the network in any college or campus . We have used the Cisco Packet Tracer software for designing of this network module. It is implemented in this software using real-time simulation that confirms live data transfer is working or not. This will help in network designing have an edge over others when it comes to cost and product designing. The study provides an insight into various concepts such as topology design, IP address configuration and how to send information in form of packets in a single network and the use of Virtual Local Area Networks (VLANs) to separate the traffic generated by different departments.
Keywords: Computer Networks, IP Addresses, Ping Test, Simulation Tool, Subnetting, VLANs.

ACKNOWLEDGEMENT

We express our heartfelt thanks to our honorable **Vice Chancellor Dr. C. MUTHAMIZHCHELVAN**, for being the beacon in all our endeavors.

We would like to express my warmth of gratitude to our **Registrar Dr. S. Ponnusamy,** for his encouragement.We express our profound gratitude to our **Dean (College of Engineering and Technology) Dr. T. V.Gopal,** for bringing out novelty in all executions. We would like to express my heartfelt thanks to Chairperson, School of Computing **Dr. Revathi Venkataraman,** for imparting confidence to complete my course project. We wish to express my sincere thanks to **Course Audit Professor Dr.Annapurani Panaiyappan, Professor and Head, Department of Networking and Communications** and **Course Coordinators** for their constant encouragement and support. We are highly thankful to our my Course project Faculty **Dr. Revathi Ma'am , Asst Professor , CINTEL** for her assistance, timely suggestion and guidance throughout the duration of this course project.

We extend my gratitude to our **HoD Dr.R. Annie Uthra, Professor and Head, CINTEL** and my Departmental colleagues for their Support. Finally, we thank our parents and friends near and dear ones who directly and indirectly contributed to the successful completion of our project. Above all, I thank the almighty for showering his blessings on me to complete my Course project.

TABLE OF CONTENTS

1. INTRODUCTION

1.1 Scenario Description

The need for computer networking was borne out of the need to use personal computers for sharing information within an organization in form of messages, sharing files and data bases and so forth. Whether the organization is located in one building or spread over a large campus, the need for networking the computers cannot be over emphasized. As the name implies, a Local Area Network (LAN) interconnects computers in a limited geographic area. It provides high-bandwidth communication over inexpensive transmission media. The corporate LAN has evolved from a passive background business component to a highly active, visible core asset that enterprises rely on to support day-to-day operations critical to their market success. Today's network is a strategic instrument that must be accessible anytime from anywhere-simultaneously offering fast, secure, reliable services at scale regardless of location. The main purpose of a network is to reduce isolated users and workgroups. All systems should be capable of communicating with others and should provide desired information. Additionally, physical systems and devices should be able to maintain and provide satisfactory performance, reliability and security.

In this project, we designed this project in Cisco Packet Tracer using Servers, Routers, PCs, Laptops, Wireless Routers(WIFI campus), etc and for the connection purposes we have used the optic fiber cables and copper cables for the best efficiency in network purpose. This project is developed for the college campus taking in consideration the phases like main building, library, hostels, etc.

2. LITERATURE SURVEY

For interconnectivity of components, network topology describes the physical and logical appearance and interconnection between arrangement of computers, cables and other components in a data communication network and how it can be used for taking a packet from one device and sending it through the network to another device on a different network.

A network topology is the physical layout of computers, cables, and other components on a network. There are a number of different network topologies, and a network may be built using multiple topologies. The different types of network topologies are: Bus topology, Star topology, Mesh topology, Ring topology, Hybrid topology and Wireless topology. The bus topology typically uses a cable running through the area requiring connectivity. Devices that need to connect to the network then tap into this nearby cable. To prevent signal bounce, a terminator is designed to absorb the signal when the signal reaches the end.

The Star Topology is a network topology in which all the clients or machines on the network are connected through a central device known as a hub or switch. Each workstation has a cable that goes from the network card to the hub or switch device. One of the major benefits of the star topology is that a break in the cable causes only the workstation that is connected to the cable to go down, not the entire network as it is with the bus topology.

Alternatively referred to as a line topology, a bus topology is a network setup in which each computer and network device are connected to a single cable or backbone. Depending on the type of network card used in each computer of the bus topology, a coaxial cable or an RJ-45 network cable is used to connect them together. Some networks of today are implemented by having a combination of more than one topology: star and bus, star and ring, ring and bus or ring, bus and star. Networks implemented in this way are said to be hybrids.

A wireless topology is one in which few cables are used to connect systems. The network is made up of transmitters that broadcast the packets using radio frequencies. The network contains special transmitters called wireless access points which extend a radio sphere in the shape of a bubble around the transmitter. Wireless topology can either be an ad-hoc or an infrastructure-based implementation.

3. REQUIREMENTS

3.1Requirement Analysis

From the given scenario, we draw the following requirements:

1. Identifying the appropriate hardware which would be used (Cisco Packet Tracer)
2. Users on the internet should be able to access.
3. Users on the internet should have access only to the public IP address of the server.
4. The users in the organization should have full access to the server.
5. Features and configuration required on the hardware with explanation

We need to configure a network design keeping the following requirements in mind.

3.2 Hardware Requirement

From the given scenario, we draw the following requirements:

For Main service provider,

Hardware Required:

1x Server – PT Primary Server ISP

1x Router (For address 14.1.1.1)

1x Switches:

Switch-PT (For address 8.8.8.1)

1x End Devices:

1x PC (For address 8.8.8.2)

For College server:

Hardware Required:

1x Server – PT GCOEJ

1x Switch- PT

1x Router – PT GCOEJ

1x End Devices

For Floor Plan (Main Building floors):

Hardware Required:

4x Router

2x switch

8x PCs

For library:

2x Router

2x Switch

4x End devices

For hostel:

8x Router

2x Switch

7x PCs

4. ARCHITECTURE AND DESIGN

4.1 Network Architecture

The network architecture is as follows:

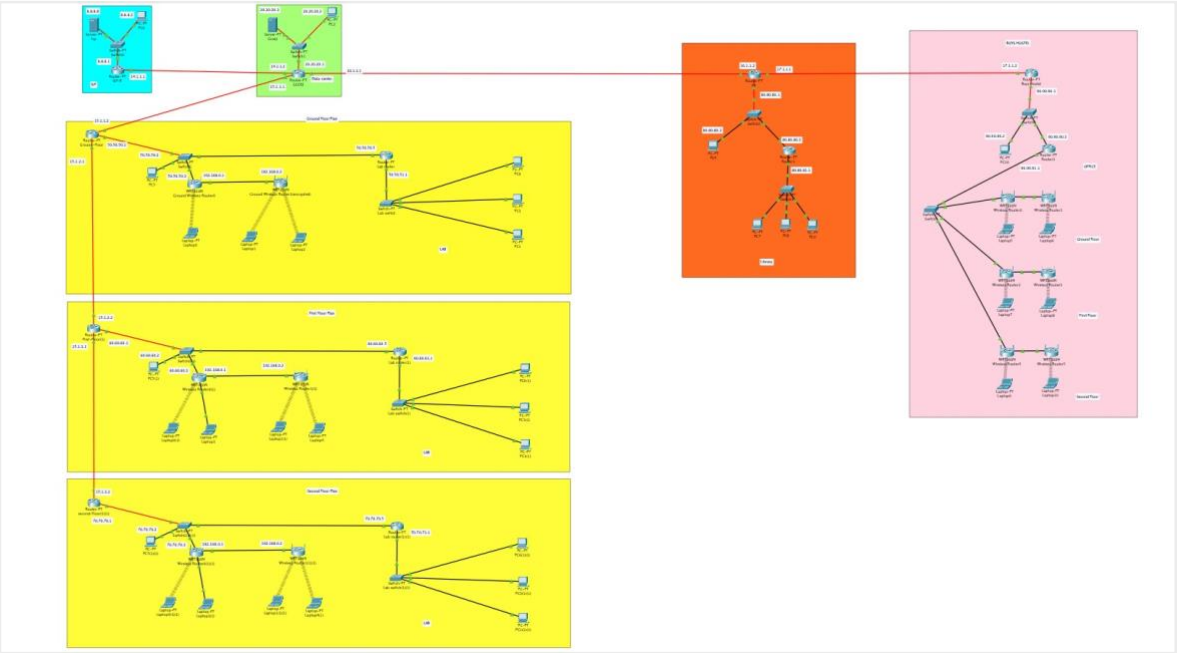


FIG.1 NETWORK ARCHITECTURE

The architecture consists of three major networks:

- Main Building
- Hostel
- Library

These networks are interconnected with each other with varying degrees (discussed in the implementation chapter).

5. IMPLEMENTATION

5.1 Address Table

The address table is as follows:

Device	Interface	Address
ISP Server	Fa0	8.8.8.8
ISP Router	Fa0/0	14.1.1.1
ISP Switch	Fa0/0	8.8.8.1
College Server	Se2/0	20.20.20.3
College router	Fa0/0	15.1.1.1
College Switch	Fa0/1	20.20.20.1

The Access Control List contains the entire broadband network. Any request from that network is translated to the private IP of the server.

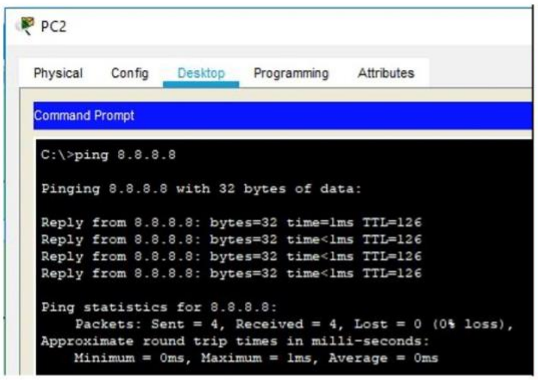
Static Routing is used on all the routers to interconnect the networks.

6. RESULTS AND DISCUSSION

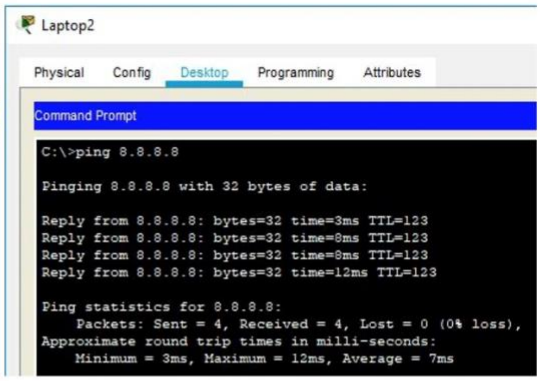
6.1 Connection Check

The network connections were checked by ping requests:

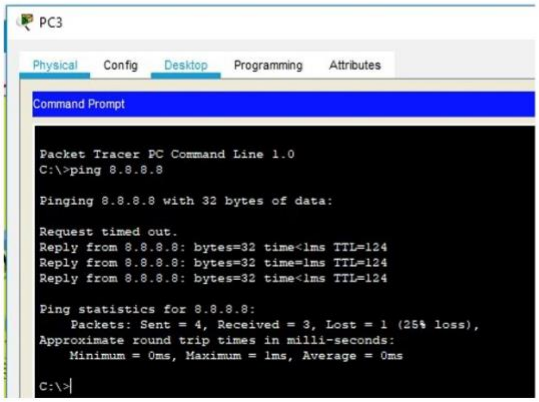
1)ping from datacenter to main server



2) ping from main building ground floor Wi-Fi to server



3)ping Main build. Gnd floor->server



4) ping Main build. 1st floor->server

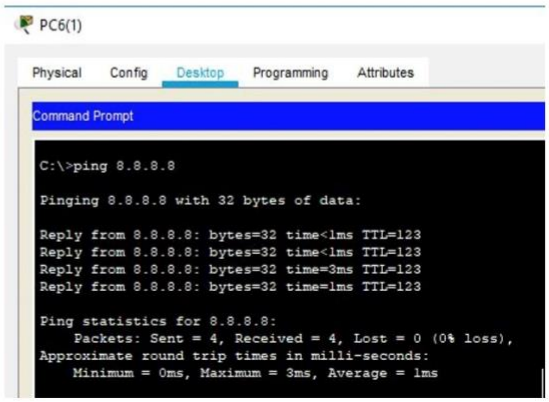
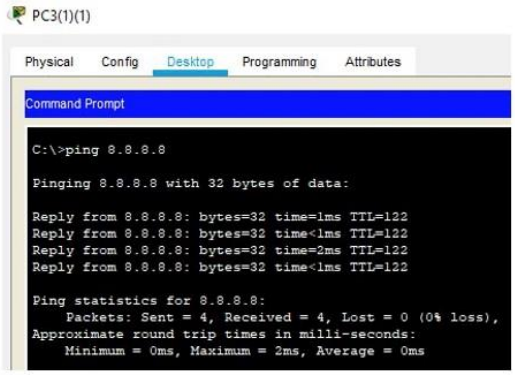
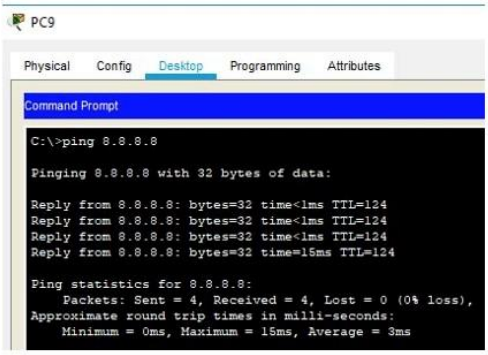


FIG.2 NETWORK CONNECTION

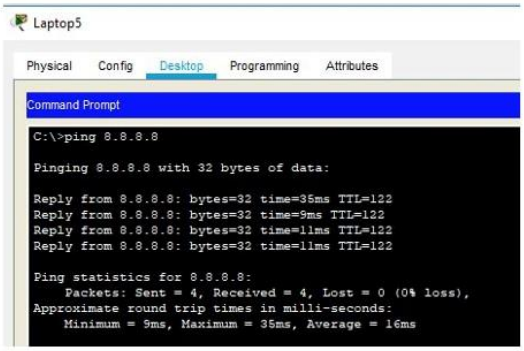
5)ping Main build. 2nd floor->server



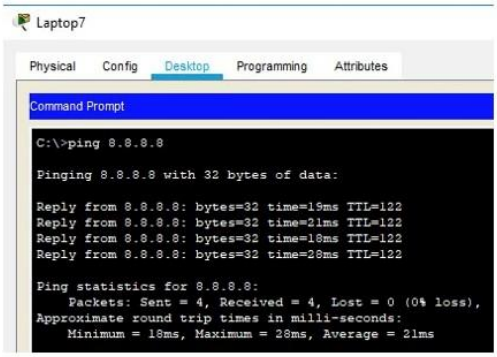
6)ping library->server



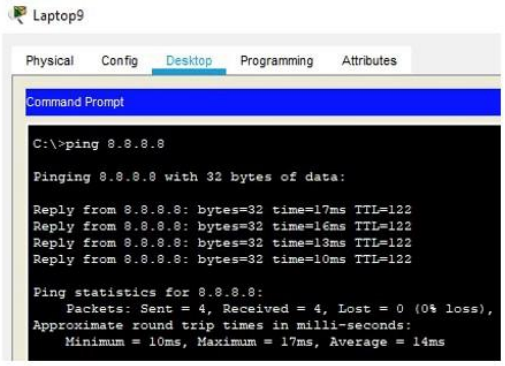
7)ping hostel ground floor->server



8)ping hostel 1st floor->server



9)ping hostel 2nd floor->server



10)ping hostel office->server

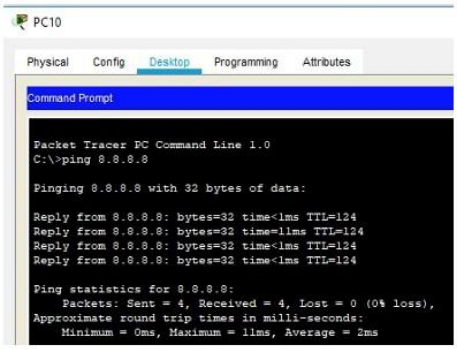


FIG.3 NETWORK CONNECTION

6.2 HTTPS Check

The server access was checked with HTTPS by using a browser:

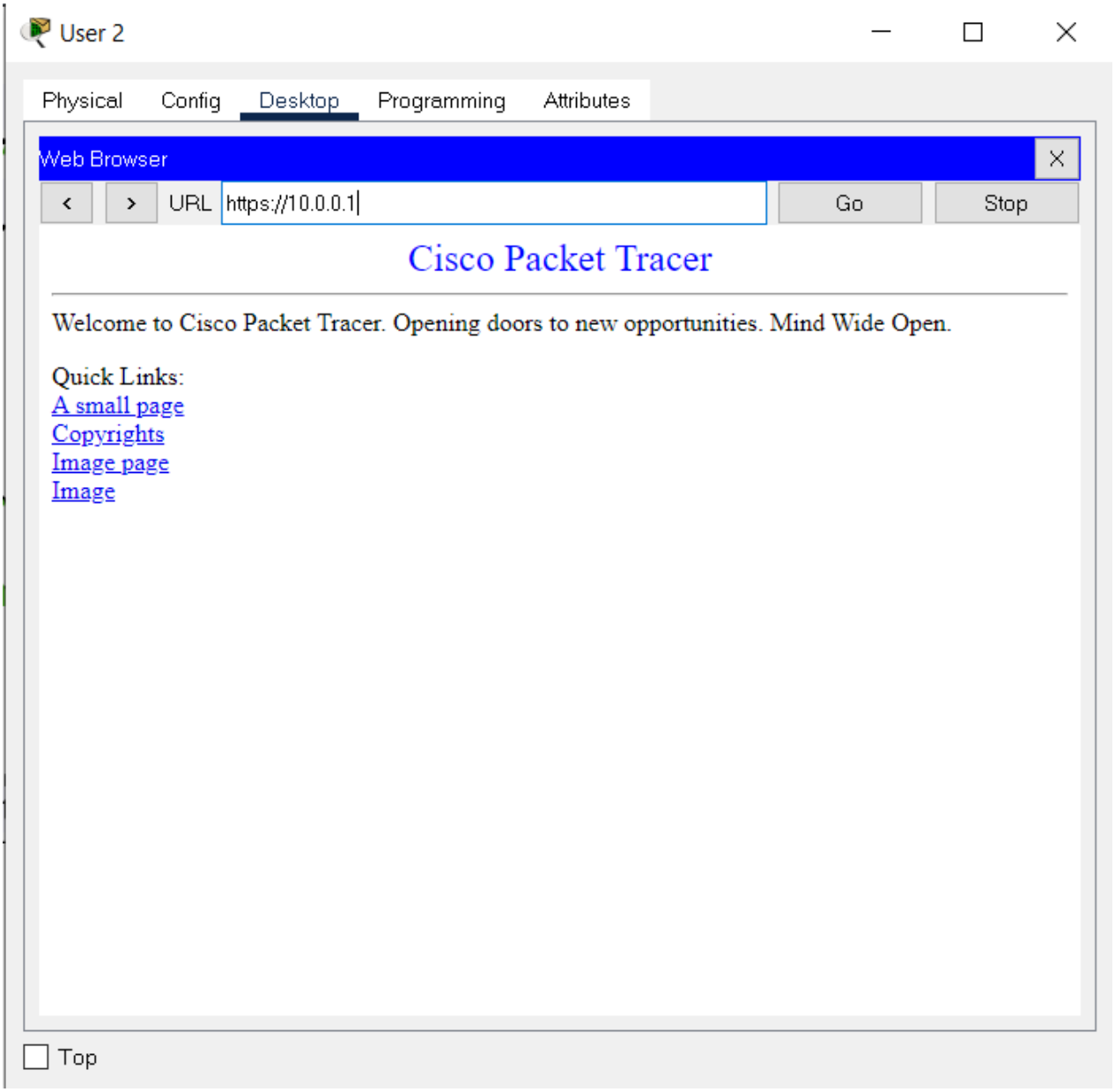


FIG.4 HTTPS BROWSER

7.CONCLUSION AND FUTURE ENHANCEMENT

Thus, in this way the “CAMPUS NETWORK DESIGN MODULE” using cisco packet tracer was developed.

In this project the members got a knowledge of how to design and implement the networking module in cisco packet tracer. The networking module for the main building, library, and hostel along with the main internet service provider and college server was successfully implemented.

It is also noteworthy that, the configuration and specifications are for the initial prototype and can further be developed and additional functionality can be added to increase support and coverage. The procedures provide a veritable approach for the design of LANs for end-to-end IP network connectivity for next generation network (NGN) architecture implementations.

REFERENCES

Mainly referred to the documentation of CISCO Packet Tracer, while building the network.
Other Resources:
http://www.ijstr.org/final-print/feb2020/Implementation-Of-Smart-Home-By-UsingPacket-Tracer.pdf
http://www.ijesird.com/jan2.PDF