NETWORK DESIGN PROPOSAL FOR SMALL BUSINESS ORGANIZATION

A COURSE PROJECT REPORT

By

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BONAFIDE CERTIFICATE

Certified that this lab report titled "Campus Network Design" is the bonafide work done by **Vaibhav Mahajan (RA2011003010161), Rohan John Santosh (RA2011003010158), Swapnil Roop Rai (RA2011003010155), Pratul Singh (RA2011003010193), who carried** out the lab exercises under my supervision. Certified further, that to the best of my knowledge the work reported herein does not form part of any other work.

SIGNATURE

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ABSTRACT

This project aims to design a suitable network system for colleges/campuses in developing countries and to design a network with high security and low cost. This project will help to enhance the education of developing countries. The advantages of networking can be seen clearly in terms of efficiency, security, manageability, and cost as it allows collaboration between users in a wide area. To improve college campus network design, the technology used was creating LAN and WLAN and using a cheap device to reduce the cost of the network. But the network can also become better by using routing protocols and other protocols. So, we are going to use such protocols using a smaller number of devices and will also maintain the low cost of the network.

The network was constructed and implemented on the college campus. Students can successfully connect and utilize the internet, provided they enter the correct admin details. Teachers can also connect to the network that has been set up.

OBJECTIVE

The objective of the project is to set up a network that is easily accessible and provides a fast, reliable, and secure connection to the global internet at a low cost.

INTRODUCTION

The network is referred to as connecting computers electronically to share information. Resources such as a file, applications, printers & software are some common information shared in the networking. The advantage of networking can be seen clearly in terms of security, efficiency, manageability & cost-effectiveness as it allows collaboration between the users in a wide range. The Switches and Routers play an important role in data transfer from one place to another.

We designed a computer network for a college/campus. There are 50 users in the college. 20 users in the main building, 20 users in the annex campus tech park building, and 10 users in the annex campus hospital block. Every building has a lobby which is 200 square feet of open space, where wireless access to the network is required. Only authorized personnel should have access to the wireless network.

The distance between the annex campus hospital block and the main building is 300 meters. The distance between the annex campus tech park and the main building is 90 meters. The distance between the annex campus hospital block and tech park is 70 meters. A high-speed cable internet connection is available in the main building which is shared among the users.

REQUIREMENTS

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 only https on the e-commerce server.

3. Users on the internet should have access only to the public IP address of the server and not the private IP address.

4. The users in the organization should have full access to the server.

5. TCP/IP Network design with IP addressing

6. Features and configuration required on the hardware with explanation

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

From the given scenario, we draw the following requirements:

For Organization XYZ (Private Network):

Hardware Required:

1x Wireless Router (For address 192.168.0.2)

2x Router (For address 193.161.155.1 & 193.161.158.1)

3x Switches:

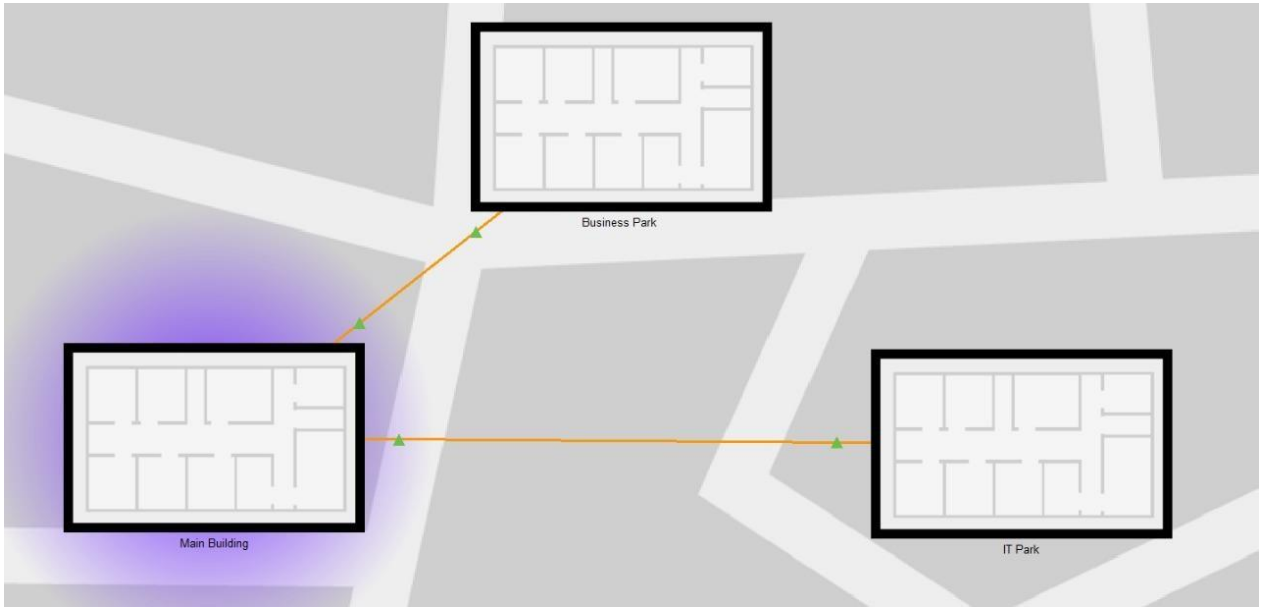
- 1x Department Specific Switches
- 1x Master Company Dept. Switch
- 1x Primary Company Switch

80x End Devices:

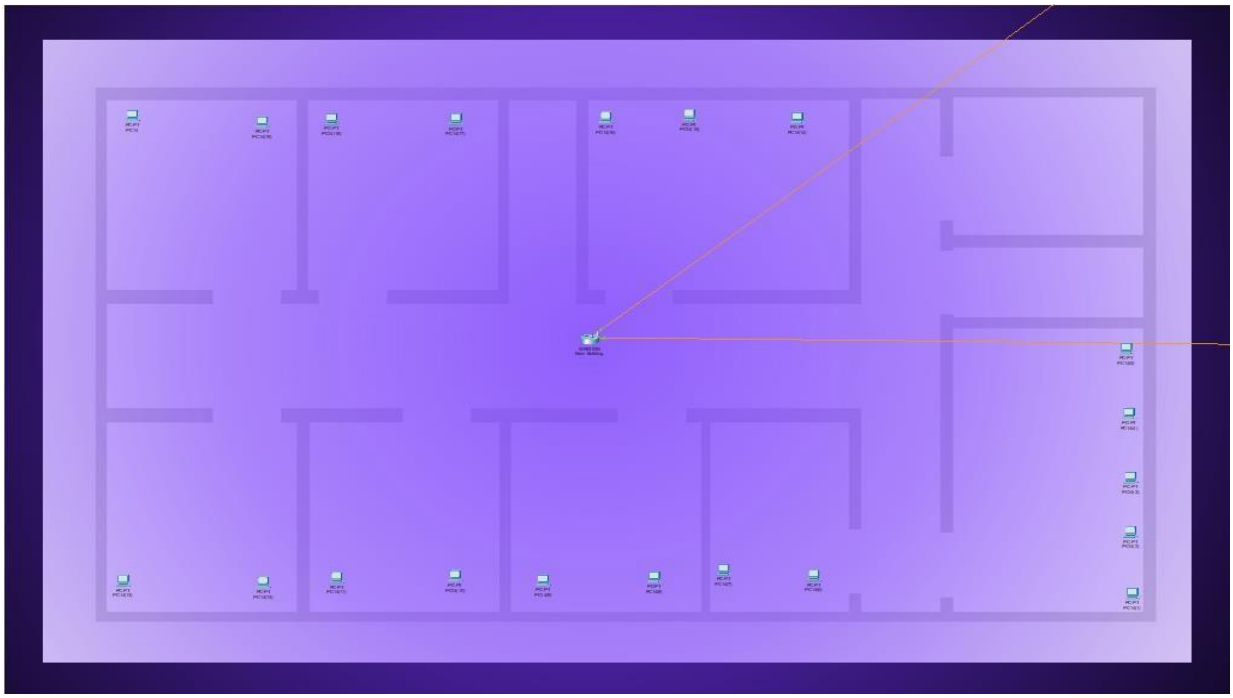
- 50x PCs for Main Building Representation
- 20x PCs for IT Park Representation
- 10x PCs for Business Park Representation

ARCHITECTURE AND DESIGN

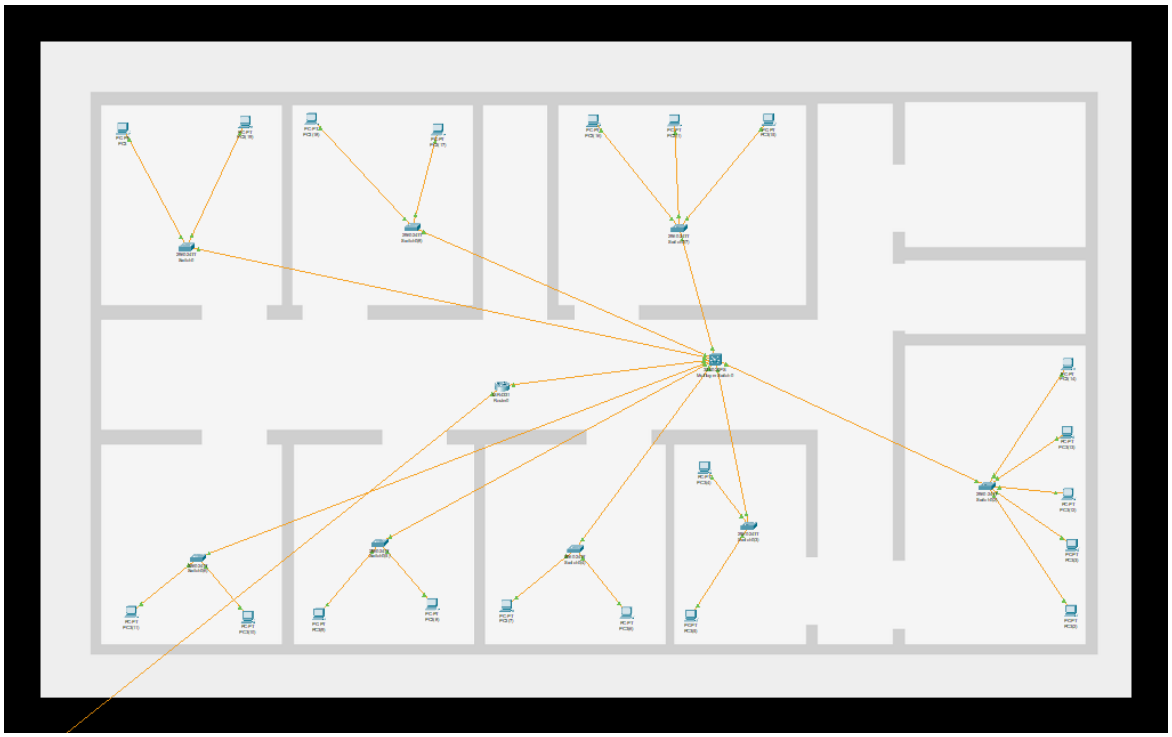
1. Overview:



2. Main Building:



3. IT Park:



4. Business Part:

IMPLEMENTATION

For Main Building:

In the main building, there are 20 users which are provided with the high-speed internet wirelessly, and only authorized persons are given access to the network for this purpose we have used the WRT300N router which is a wireless router and is capable of providing high-speed internet to the users within its range. For providing the internet we are using DHCP protocol. Dynamic Host Configuration Protocol (DHCP) is a client/server protocol that automatically provides an Internet Protocol (IP) host with its IP address and other related configuration information such as the subnet mask and default gateway. The Network address used here is 192.168.0.0. For protection purposes, this router is using WPA2-PSK authentication which has a PSK pass phase. This passkey will be provided only to the authorized personnel.

Why DHCP?

Every device on a TCP/IP-based network must have a unique unicast IP address to access the network and its resources. Without DHCP, IP addresses for new computers or computers that are moved from one subnet to another must be configured manually; IP addresses for computers that are removed from the network must be manually reclaimed.

With DHCP, this entire process is automated and managed centrally. The DHCP server maintains a pool of IP addresses and leases an address to any DHCP-enabled client when it starts up on the network. Because the IP addresses are dynamic (leased) rather than static (permanently assigned), addresses no longer in use are automatically returned to the pool for reallocation.

For Tech Park Building and Hospital Block Building:

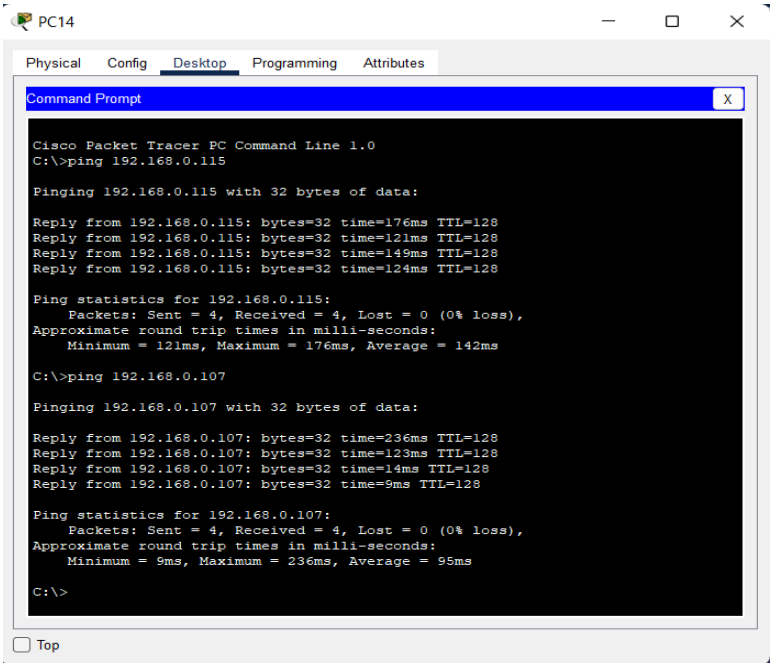
In the tech park building, 20 users are all connected to the same network using switches. In the hospital block, 10 users are all connected to the same network using switches. We are using 2960-244TT switches to connect PCs in different rooms and to connect all of the switches we are using a 3560-24PS switch which is a Multi-layered switch. The network address we used in Tech Park is 193.161.155.0. The network address used in the hospital block is 193.161.158.0 It is necessary to protect these networks from unauthorized users and prevent them from hacking, so it is necessary to maintain security in these networks by using various security options. To implement this, we need the best devices that can support these protocols more efficiently. So, we decided

to use multi-layered switches which work as a switch as well as a router and using this router it is possible to implement the EIGRP routing protocol. By using EIGRP it is possible for load balancing on parallel links between sites and also manages load balancing. Both the buildings are then connected to the main building's router using a fast Ethernet connection so to provide the internet connection available in the main building to the tech park and the hospital block.

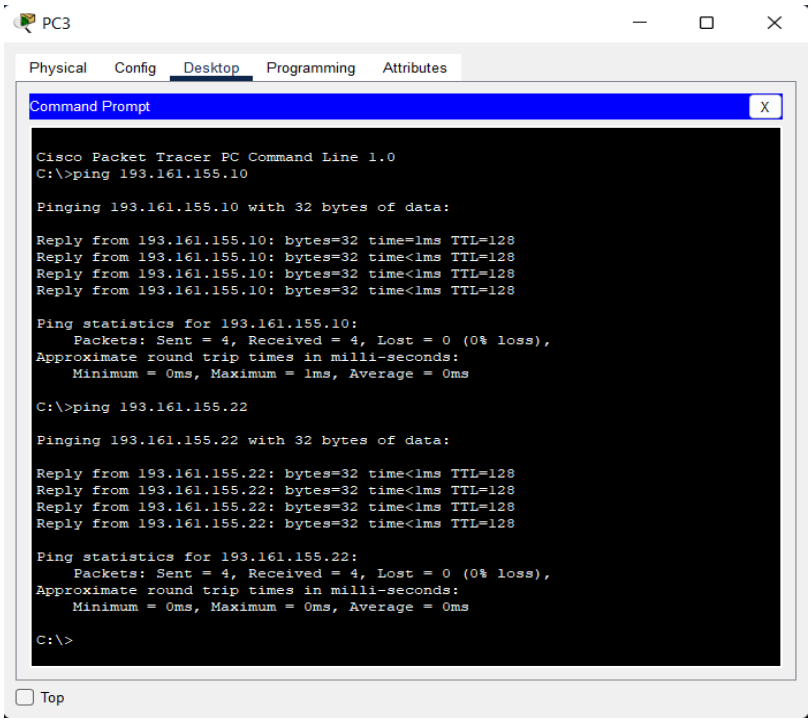
The topology we used here is BUS topology as we have to provide the internet connection to all the users using the main building's internet connection.

RESULTS

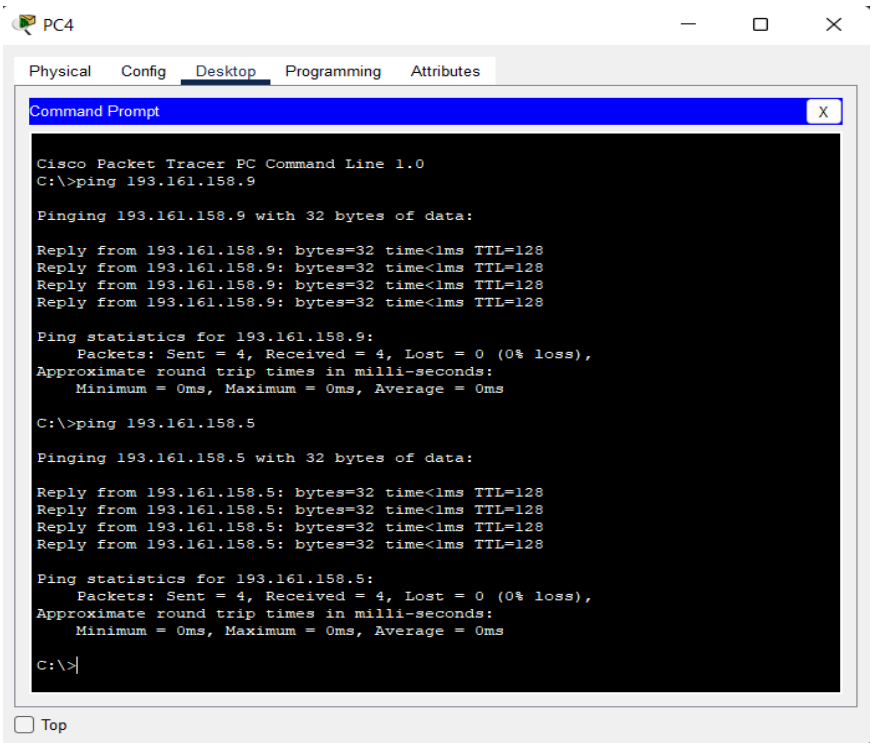
1. Main Building:



2. IT Park



3. Business Park



CONCLUSION AND FUTURE ENHANCEMENT

This project has proven that a standard network system can be designed with less cost. Although we used cheaper devices, in designing the network, security was considered paramount, and hence, the security of the network has turned out to be very strong. The utilization of DHCP helps the networks smoothly perform their functions. The advantage of networking can be seen clearly in terms of efficiency, manageability & cost-effectiveness as it allows collaboration between the users in a wide range. We utilized switches and routers for ease of transfer of data.

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