CAMPUS NETWORK DESIGN

18CSS202J- Computer Communication

Submitted by

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Submitted to

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COMPUTER COMMUNICATIONS-MINI PROJECT

AIM: CAMPUS NETWORK DESIGN

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INTRODUCTION:

Along with the constant development of social economy, computer networks have changed people's lifestyle in many aspects. Local area networks, which are widely applied, play a more and more important role in medical treatment, military, education and science. Not only enterprises and companies build LANs, but also school, college, families and schools establish their own small LANs. With LANs, work and study efficiency is improved, but it also brings some problems. Wired local area networks couldn't work without the cable, which means that we couldn't change the structure of networks casually according to actual situations. Therefore, we cannot implement mobile office and studies.

Compared with local area networks, wireless local area networks offer advantages at different places. One of the advantages of a wireless local area network is that if there is coverage of WLAN, users can move anywhere they want with their devices and transmit data at the same time.

This project designs the wireless campus network for campus. The project introduces basic knowledge of wireless LAN, designing and planning a wireless local area network based on the actual situation of the campus.

Motivation

- The aim of the study is to get knowledge of the definition, background, characteristics and technical standards of WLAN, to understand the advantages and limitations of WLAN and to get to know the basic process of designing a campus WLAN.
- The project introduces the theory of wireless local area networks in the first part of the paper and describes the basic process of designing a campus WLAN in the second part of the paper.
- A campus network is a building or group of buildings all connected into one
- enterprise network that consists of many local-area networks (LANs).
- With WLAN, faculty and students can use the same device to get connected to the network at anytime and anywhere. Therefore, in that case, WLAN is the most efficient way to extend the wired local area network, especially on campus.
- The project introduces basic knowledge of wireless LAN, designing and planning a wireless local area network based on the actual situation of the campus. And, the project also introduces the topology

Innovation Idea of the Project

- The goal of this research is designing a network which is able to bring mobility to all network users in this campus.
- This project will cater the needs of a campus by providing a genuine wireless network arrangement and by ensuring that only authorized personnel are able to access the wireless network.
- This project will cover five main segments of a campus, namely
- University Block
- Data Center
- Main Block
- The architecture of the approach combines wireless local- area network technology with high-speed switching technology. The combination provides a wireless communication system with sufficient aggregate bandwidth to handle massive, synchronized movements of mobile andcomputers.
- This architecture describes the design and implementation of a campus size wireless network. Through a Cisco packet tracer software implementation, we have shown that the approach is feasible, and reliable.

Purpose Of the Project

- This project will provide wireless network access throughout the school. We would be using Campus Area Network to make this project a success. Campus Area Network (CAN) is a computer network which provides wireless access to the Internet or LAN for the users located in two or more buildings on the limited geographical area, or in the open space surrounding these buildings.
- The topology used in this project would be hybrid topology which is a combination of two or more types of basic topologies like star-bus, star-ring topologies, etc. Each resulting hybrid topology has its own features, advantages and limitations of its components. Hybrid network topologies are more flexible, reliable, and have increased fault tolerance, the faults in them can be easily diagnosed and corrected, new nodes can be easily added.
- This project would meet all the requirements put forward by the client and we would also be accountable for all the failures and would ensure a quick repair of the failures. An IT team of 5 experts would be provided to you for any problem.

Functionalities

- The basic functionality of the project is to create a WLAN for campus. In theory gained deep knowledge of the features of WLANs, including the advantages and limitations of WLANs, technical standards of WLANs, security and authentications of WLANs, components of WLANs and different kind topologies of WLANs.
- After that, building a topology for the WLAN in the practical part by using the CISCO PACKET TRACER. Selecting the suitable methodology and hardware for the WLAN. selecting correct topology, providing definite and correct IP addresses.

Computing Resources

- 2 CISCO 2911 Routers – The Cisco 2911 Integrated Services Router (ISR) delivers highly secure data, voice, video, and application service.
- 3 Switches
- Access Point (Wired/Wireless) - An access point is a device that creates a wireless local area network, or WLAN, usually in an office or large building. An access point connects to a wired router, switch, or hub via an Ethernet cable, and projects a Wi-Fi signal to a designated area.
- Server
- Personal Computers (Users)

Identify design constraints for required performance criteria

Based on the functionalities, computing resources, and team skill we describe the design constraints. There were still some difficulties left during the implementation of this project. For example, selecting correct topology, providing definite and correct IP addresses, etc. If you want to build WLANs, you need an IT group to discuss and consider more about the project, it is not an easy job in the real environment, you have to consider all the hardware and software at the same time.

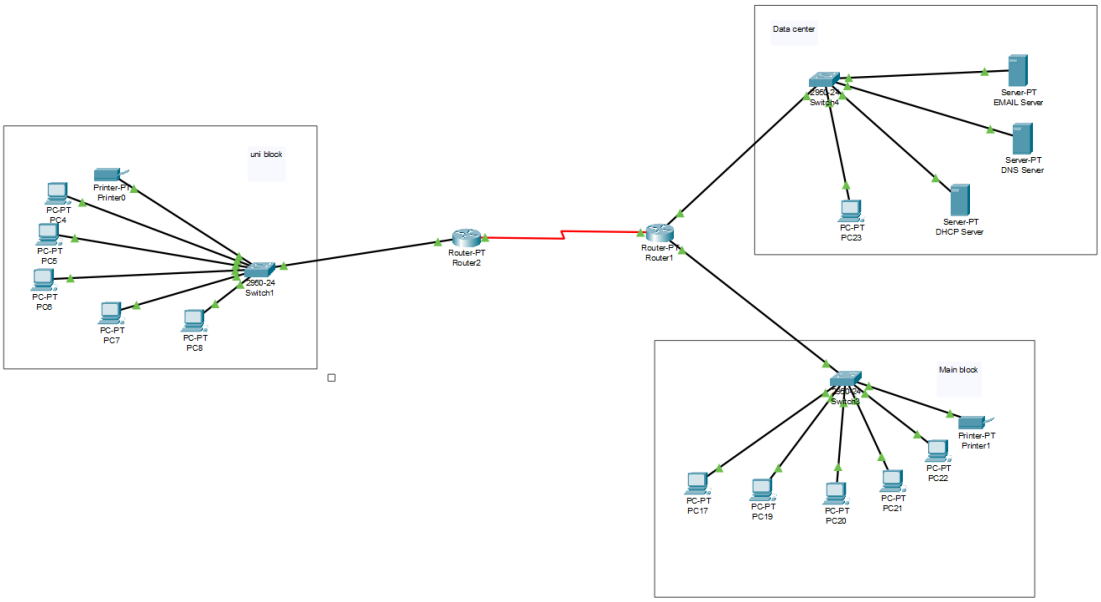
DESIGN OF THE PROJECT

Design of the Project

The target architecture includes a campus building, it consists: -

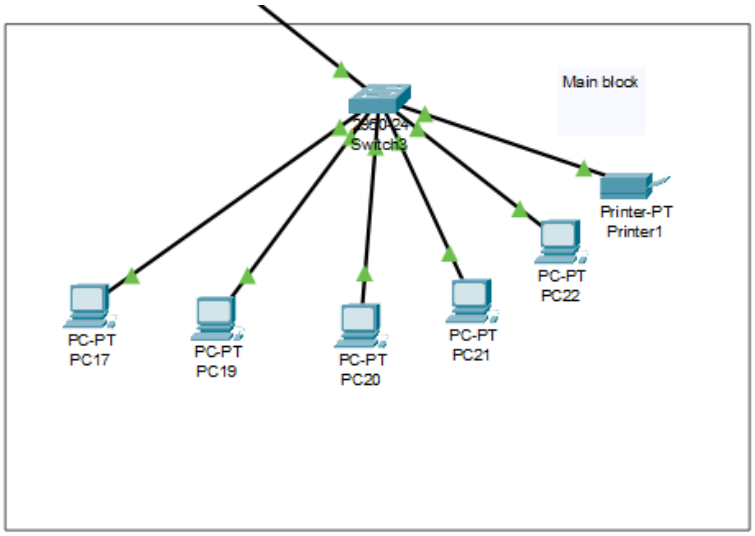
- University Block
- Data Center
- Main Block

The architecture of the approach combines wireless local-area network technology throughout the specified architecture. The project aims at studying the architecture properly and caters the need of wireless connection through- out the specified architecture.



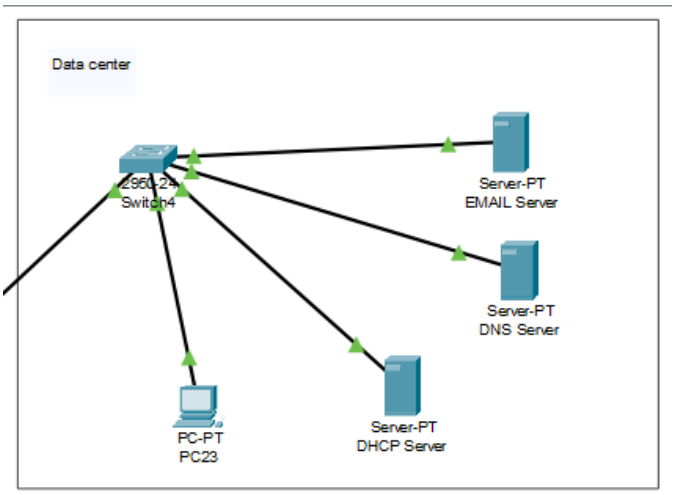
Main Block:

The Main block consist of 5 PC and a printer connected to a switch which provides the connectivity between the PCs in the administration room allowing them totalk to each other.



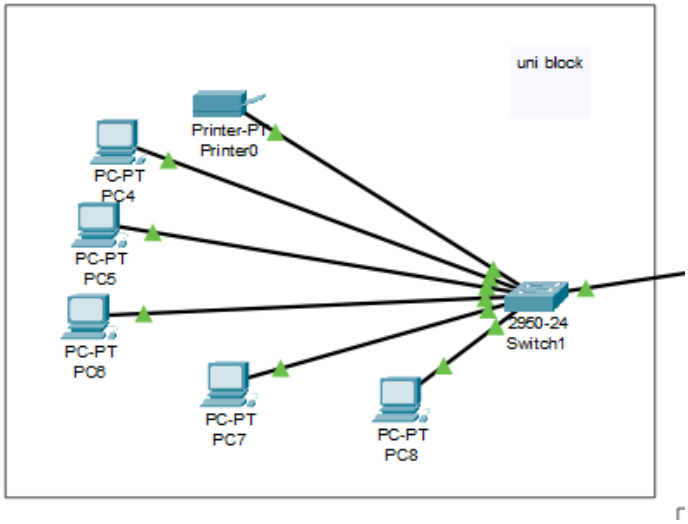
Data Center:

The Data Center consist of 1 PC and 3 Servers connected to a switch which provides network connectivity to the server and appliances which further offers network and user services.



University Block:

The University block consist of 5 PCs and a printer connected to a switchwhich provides the connectivity between the PCs and mobile devices in the office allowing them to create a network.



Inference

Within a limited geographical area, LANs are interconnected with help of Switches and Routers and connects buildings to buildings of a single campus where all networking resources like wiring, hubs, switches, routers etc. are owned by organization itself. In this, they use same kind of technologies like Local Area Network only interconnection between different buildings is there.

Reference:

https://www.geeksforgeeks.org/
https://www.wikipedia.org/

------Thank You------