PROJECT PROPOSAL

DESIGN AND IMPLEMENTATION OF LAN COMMUNICATION SYSTEM TO IMPROVE COMMUNICATION IN ORGANIZATIONS IN NIGERIA

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(B.Sc. COMPUTER SCIENCE)

1 INTRODUCTION:

Communication can be defined as the use of symbols to transfer information. Communication is a social process in which two or more parties exchange information and share meaning. Communication has been studies from many perspectives. Research shows that 44% of managerial effectiveness comes from routine communication. Organizational communication may be defined as all the patterns, networks and systems of communication within an organization. Good communication is often erroneously defined by the communicator as agreement with the message instead of clear understanding of the message. If someone disagrees with us, many of us assume that the person just did not fully understand our position. In other words, many of us define good communication as having someone accept our views. But anyone can clearly understand what we mean and just not agree with what we say. In fact, many times when a conflict has gone on a long time, people will say it is because the parties are not communicating effectively. This assumption reflects the tendency to think that effective communication equals agreement, which is not true.

1.1 BACKGROUND OF STUDY

Before the advent of personal computers (PCs), employees communicated with mainframe and mini-computers by means of terminals. The whole processes took place on the main computer to which all other individual computers were connected. When the use of this main computer is too much, the performance slows down.

The simultaneous advent of LAN with PCs also contributed greatly to improve communication in organizations in that before the advent of LANS, diskettes were passed around in offices to exchange information and also employees still communicated through mainframes and mini-computers, but when LAN came information were shared directly from PCs to PCs or from PCs to server and then to the receiving PCs, this gave room for easy sharing of information within organizations.

The development of LAN was in two phases, the era of wired transmission and the era of wireless transmission.

Wired communication refers to the transmission of data over a wire-based communication technology. Examples include telephone networks, cable television or internet access, and fiber-optic communication. Also waveguide (electromagnetism), used for high-power applications, is considered as wired line. Local telephone networks often form the basis for wired communications that are used by both residential and business customers in the area. Most of the networks today rely on the use of fiber-optic communication technology as a means of providing clear signaling for both inbound and outbound transmissions. Fiber optics are capable of accommodating far more signals than the older copper wiring used in generations past, while still maintaining the integrity of the signal over longer distances.

A wireless local area network (WLAN) is a wireless distribution method for two or more devices that use high-frequency radio waves and often include an access point to the Internet. A WLAN allows users to move around the coverage area, often a home or small office, while maintaining a network connection. The world's first wireless computer communication network was developed by **Norman Abramson**, a professor at the University of Hawaii, ALOHAnet. The system became operational in 1971 and included seven computers deployed over four islands to communicate with the central computer on the Oahu island without using phone lines. Wireless LAN hardware initially cost so much that it was only used as an alternative to cabled LAN in places where cabling was difficult or impossible. Early development included industry-specific solutions and proprietary protocols, but at the end of the 1990s these were replaced by standards, primarily the various versions of IEEE 802.11 (in products using the Wi-Fi brand name). Beginning in 1991, a European alternative known as HiperLAN/1 was pursued by the European Telecommunications Standards Institute (ETSI) with a first version approved in 1996. This was followed by a HiperLAN/2 functional specification with ATM influences accomplished February 2000. Neither European standard achieved the commercial success of 802.11, although much of the work on HiperLAN/2 has survived in the physical specification (PHY) for IEEE 802.11a, which is nearly identical to the PHY of HiperLAN/2. In 2009 802.11n was added to 802.11. It operates in both the 2.4 GHz and 5 GHz bands at a maximum data transfer rate of 600 Mbit/s. Most newer routers are able to utilise both wireless bands, known as **dualband**. This allows data communications to avoid the crowded 2.4 GHz band, which is also shared with Bluetooth devices and microwave ovens. The 5 GHz band is also wider than the 2.4 GHz band, with more channels, which permits a greater number of devices to share the space. Not all channels are available in all regions. A HomeRF group formed in 1997 to

promote a technology aimed for residential use, but it disbanded at the end of 2002. Wireless LANS are known as WLANS or LAWNS. The wires transmission is now the leading edge of LAN technology. An example of wireless transmission LAN is Wi-Fi (Wireless Fidelity).

1.2 THEORETICAL BACKGROUND

Data communications refers to the transmission of this digital data between two or more computers and a computer network or data network is a telecommunications network that allows computers to exchange data. The physical connection between networked computing devices is established using either cable media or wireless media. The best-known computer network is the Internet.

A system of interconnected computers and computerized peripherals such as printers is called computer network. This interconnection among computers facilitates information sharing among them. Computers may connect to each other by either wired or wireless media.

Classification of Computer Networks

Computer networks are classified based on various factors.They includes:

- Geographical span
- Inter-connectivity
- Administration
- Architecture

Geographical Span

Geographically a network can be seen in one of the following categories:

- It may be spanned across your table, among Bluetooth enabled devices,. Ranging not more than few meters.
- It may be spanned across a whole building, including intermediate devices to connect all floors.
- It may be spanned across a whole city.
- It may be spanned across multiple cities or provinces.
- It may be one network covering whole world.

Inter-Connectivity

Components of a network can be connected to each other differently in some fashion. By connectedness we mean either logically , physically , or both ways.

- Every single device can be connected to every other device on network, making the network mesh.
- All devices can be connected to a single medium but geographically disconnected, created bus like structure.
- Each device is connected to its left and right peers only, creating linear structure.
- All devices connected together with a single device, creating star like structure.
- All devices connected arbitrarily using all previous ways to connect each other, resulting in a hybrid structure.

Administration

From an administrator's point of view, a network can be private network which belongs a single autonomous system and cannot be accessed outside its physical or logical domain. A network can be public which is accessed by all.

Network Architecture

Computer networks can be discriminated into various types such as Client-Server,peer-to-peer or hybrid, depending upon its architecture.

- There can be one or more systems acting as Server. Other being Client, requests the Server to serve requests.Server takes and processes request on behalf of Clients.
- Two systems can be connected Point-to-Point, or in back-to-back fashion. They both reside at the same level and called peers.
- There can be hybrid network which involves network architecture of both the above types.

Network Applications

Computer systems and peripherals are connected to form a network.They provide numerous advantages:

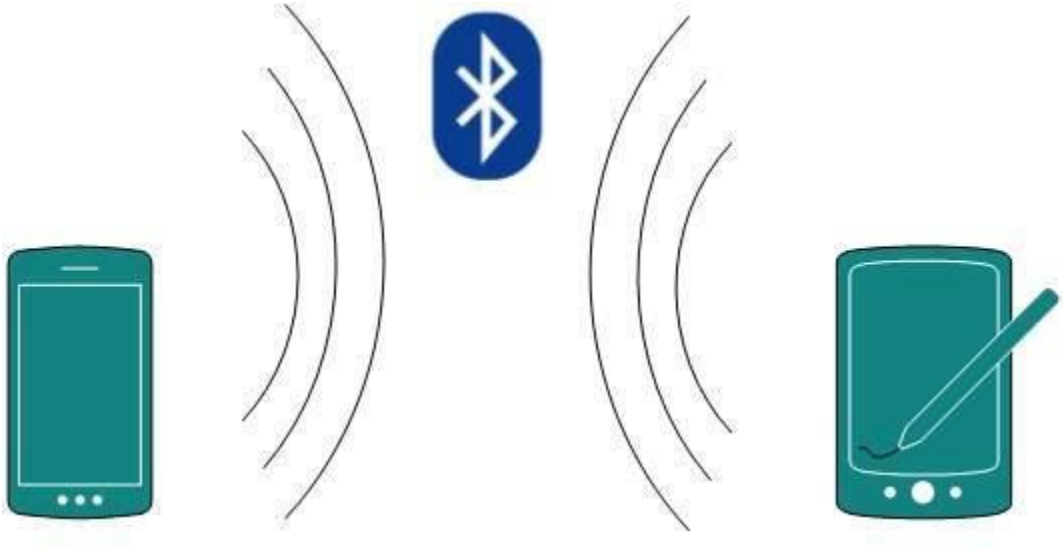
- Resource sharing such as printers and storage devices

- Exchange of information by means of e-Mails and FTP
- Information sharing by using Web or Internet
- Interaction with other users using dynamic web pages
- IP phones
- Video conferences
- Parallel computing
- Instant messaging

Generally, networks are distinguished based on their geographical span. A network can be as small as distance between your mobile phone and its Bluetooth headphone and as large as the internet itself, covering the whole geographical world,

Personal Area Network

A Personal Area Network (PAN) is smallest network which is very personal to a user. This may include Bluetooth enabled devices or infra-red enabled devices. PAN has connectivity range up to 10 meters. PAN may include wireless computer keyboard and mouse, Bluetooth enabled headphones, wireless printers and TV remotes.

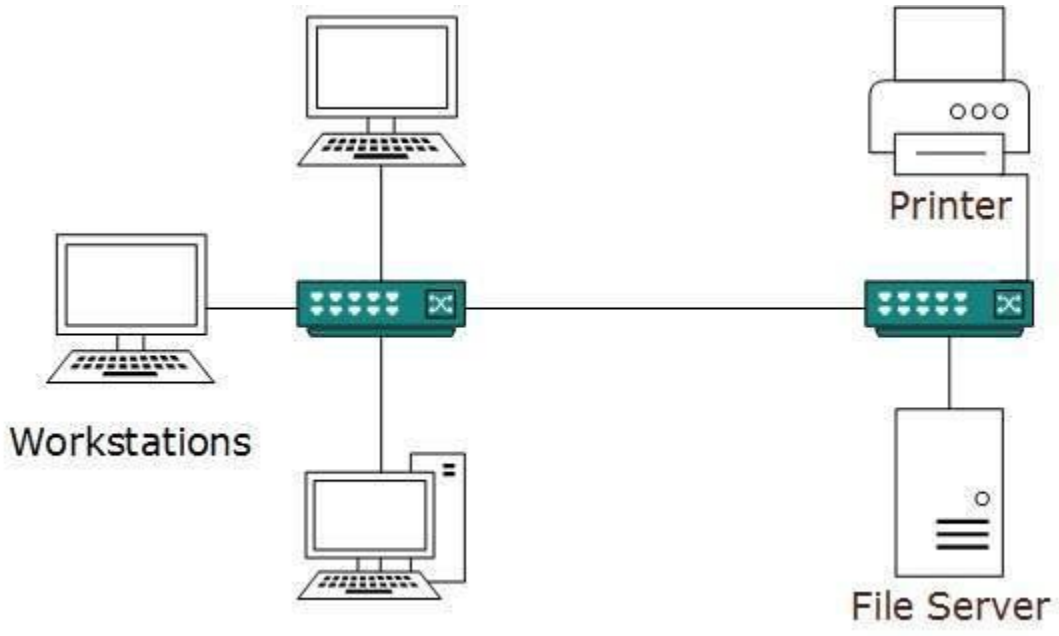


For example, Piconet is Bluetooth-enabled Personal Area Network which may contain up to 8 devices connected together in a master-slave fashion.

Local Area Network

A computer network spanned inside a building and operated under single administrative system is generally termed as Local Area Network (LAN). Usually,LAN covers an organization' offices, schools, colleges or universities. Number of systems connected in LAN may vary from as least as two to as much as 16 million.

LAN provides a useful way of sharing the resources between end users.The resources such as printers, file servers, scanners, and internet are easily sharable among computers.



LANs are composed of inexpensive networking and routing equipment. It may contains local servers serving file storage and other locally shared applications. It mostly operates on private IP addresses and does not involve heavy routing. LAN works under its own local domain and controlled centrally.

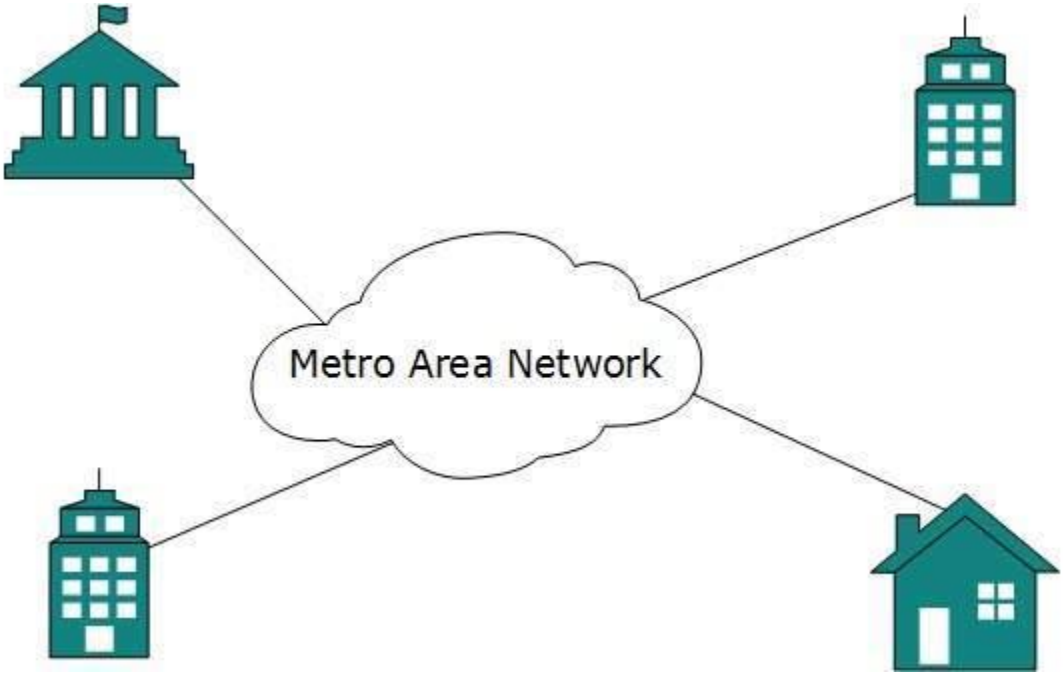
LAN uses either Ethernet or Token-ring technology. Ethernet is most widely employed LAN technology and uses Star topology, while Token-ring is rarely seen.

LAN can be wired,wireless, or in both forms at once.

Metropolitan Area Network

The Metropolitan Area Network (MAN) generally expands throughout a city such as cable TV network. It can be in the form of Ethernet,Token-ring, ATM, or Fiber Distributed Data Interface (FDDI).

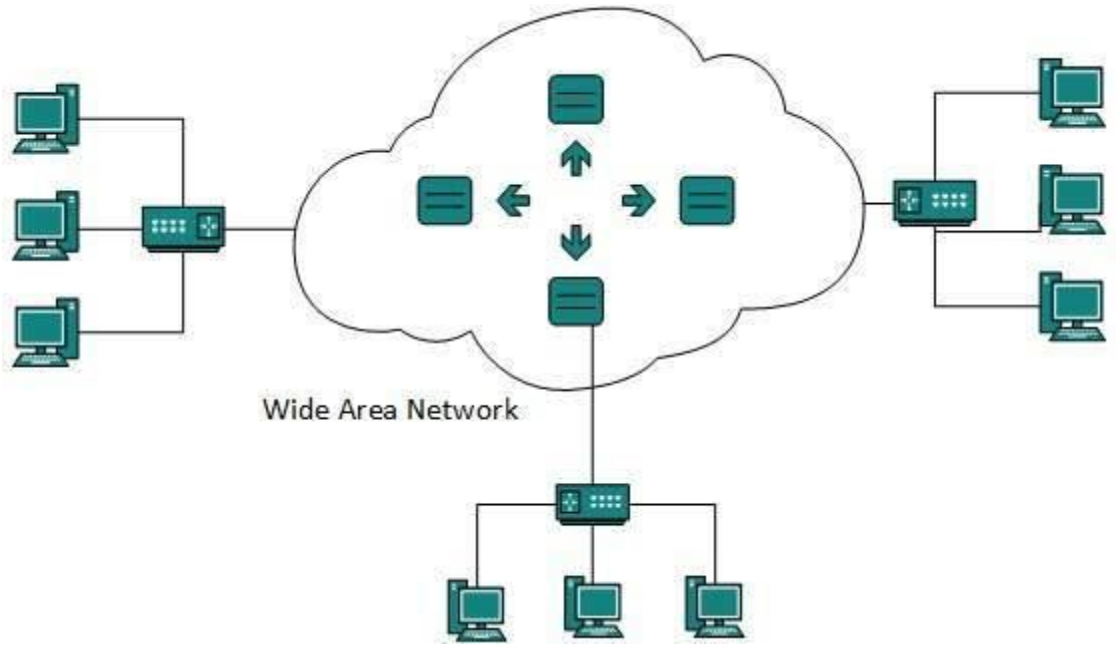
Metro Ethernet is a service which is provided by ISPs. This service enables its users to expand their Local Area Networks. For example, MAN can help an organization to connect all of its offices in a city.



Backbone of MAN is high-capacity and high-speed fiber optics. MAN works in between Local Area Network and Wide Area Network. MAN provides uplink for LANs to WANs or internet.

Wide Area Network

As the name suggests,the Wide Area Network (WAN) covers a wide area which may span across provinces and even a whole country. Generally, telecommunication networks are Wide Area Network. These networks provide connectivity to MANs and LANs. Since they are equipped with very high speed backbone, WANs use very expensive network equipment.



WAN may use advanced technologies such as Asynchronous Transfer Mode (ATM), Frame Relay, and Synchronous Optical Network (SONET). WAN may be managed by multiple administration.

Internetwork

A network of networks is called an internetwork, or simply the internet. It is the largest network in existence on this planet.The internet hugely connects all WANs and it can have connection to LANs and Home networks. Internet uses TCP/IP protocol suite and uses IP as its addressing protocol. Present day, Internet is widely implemented using IPv4. Because of shortage of address spaces, it is gradually migrating from IPv4 to IPv6.

Internet enables its users to share and access enormous amount of information worldwide. It uses WWW, FTP, email services, audio and video streaming etc. At huge level, internet works on Client-Server model.

Internet uses very high speed backbone of fiber optics. To inter-connect various continents, fibers are laid under sea known to us as submarine communication cable.

Internet is widely deployed on World Wide Web services using HTML linked pages and is accessible by client software known as Web Browsers. When a user requests a page using some web browser located on some Web Server anywhere in the

world, the Web Server responds with the proper HTML page. The communication delay is very low.

Internet is serving many proposes and is involved in many aspects of life. Some of them are:

- Web sites
- E-mail
- Instant Messaging
- Blogging
- Social Media
- Marketing
- Networking
- Resource Sharing
- Audio and Video Streaming

1.3 PROBLEM STATEMENT:

In most organizations in Nigeria, sharing of information is don via external storage devices like flash drive or through some online services like slack, emails, Google hangouts etc. Employees always have to move from their seat to the seat of a work partner to retrieve or to send files through flash drives or external hard disk. This is usually stressful and time wasting, there could be also issues of insufficient space on this external devices and also the device may be corrupted which could prevent the PC that wants to send the file from accessing the device. Sharing information of information could also waste resources like cost of accessing the internet and time before the receiving end could receive the shared information. And also it is not safe for information being shared across a firm to be shared through a third party because anyone could be monitoring the conversations and information being shared within the organization and also once those third party servers are hacked, there is probability of losing useful and delicate information or getting back a corrupted information.

One could say that the Bluetooth technology should be a proffered solution to the above problems, but the Bluetooth technology itself has some weaknesses and cannot be as effective as the wireless LAN technology in that WLAN operates at a much faster rate - of about 11mbps, whereas Bluetooth only operates at a much slower rate of around 720kbps. This makes Bluetooth too slow for video transfers or for moving large amounts of large photo images from a digital camera. Also, Bluetooth device is not designed to link up entire networks, but rather computer to computer.

1.4 AIMS AND OBJECTIVES:

Aims:

- To develop a LAN communication software that allows real-time communication within an organization.

Objectives:

- To create a faster and easy means of sharing information in an organization.
- To reduce unnecessary cost involved in sharing of information in an organization

1.5 METHODOLOGY:

This project will be developed using AGILE methodology (this depends on time constraint) and the Model-View-Controller software architectural pattern of coding, it will also make use of object oriented programming. The MVC pattern separates an application in 3 main modules: Model, View and Controller.

- **The Model** is responsible for the data design and management. It involves the model or blueprint of the database. It stores and retrieves entities used by an application, from the database or API.
- **The View (Presentation)** is responsible for displaying or rendering the data provided by the format in a specific format.
- **The Controller** handles the model and view layers to work together. The controller sends commands to update the state of the model and also sends

commands to change the data rendered by the view or the format in which the data is rendered.

DEVELOPMENT TOOLS:

- Netbeans Ide
- Java programming language

HARDWARE REQUIREMENTS:

- Personal Computer
- WLAN Device

1.6 SCOPE OF THE PROJECT

The project concentrates on creating an easy, cheap and less stressful means of transferring and exchanging information in an organization.

1.7 JUSTIFICATION

After the completion of this project, the problem of unnecessary high cost in managing a library will be solved and also there will be increase in the efficiency of library services.