A COMPARATIVE STUDY OF DIFFERENT TYPES OF NETWORK

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Abstract- **The objective of this paper is to comprehensive study related to network and their different types. A** network **is basically all of the components (hardware and software) involved in connecting computers across small and large distances. Networks are used to provide easy access to information, thus increasing productivity for users. 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, i.e. the Earth. Computer networking is a vital part of any organization these days. The ability to exchange data and communicate efficiently is the main purpose of networking computers. But we have to consider beyond these points to evaluate the feasibility of networking for our own advantages.**

Index Terms- **network; hardware; software; geographical span; Bluetooth.**

I. INTRODUCTION

A **computer network** or **data network** is a telecommunications network that allows computers to exchange data. In computer networks, networked computing devices pass data to each other along data connections. Data is transferred in the form of packets. The connections (network links) between nodes are established using either cable media or wireless media. The best-known computer network is the Internet. There is a wide variety of networks and their advantages and disadvantages mainly depend on the type of network. There are so many different types of computer networks in existence; it can be hard to understand the differences between them, particularly the ones with very similar-sounding names. Computer networks differ in the physical media used to transmit their signals, the communications protocols to organize network traffic, the network's size, topology and organizational intent. In most cases, communications protocols are layered on (i.e. work using) other more specific or more general communications protocols, except for the physical layer that directly deals with the physical media. Computer networks support applications such as access to the World Wide Web, shared use of application and storage servers, printers, and fax machines, and use of email and instant messaging applications.

II. HISTORY

Today, computer networks are the core of modern communication. All modern aspects of the public switched telephone network (PSTN) are computer-controlled. Telephony increasingly runs over the Internet Protocol, although not necessarily the public Internet. The scope of communication has increased significantly in the past decade. This boom in communications would not have been possible without the progressively advancing computer network.

The following is a chronology of significant computer network developments:

- In 1962, J.C.R. Licklider developed a working group he called the "Intergalactic Computer Network", a precursor to the ARPANET, at the Advanced Research Projects Agency (ARPA).
- In 1965, Thomas Marill and Lawrence G. Roberts created the first wide area network (WAN). This was an immediate precursor to the ARPANET, of which Roberts became program manager.
- In 1972, commercial services using X.25 were deployed, and later used as an underlying infrastructure for expanding TCP/IP networks.

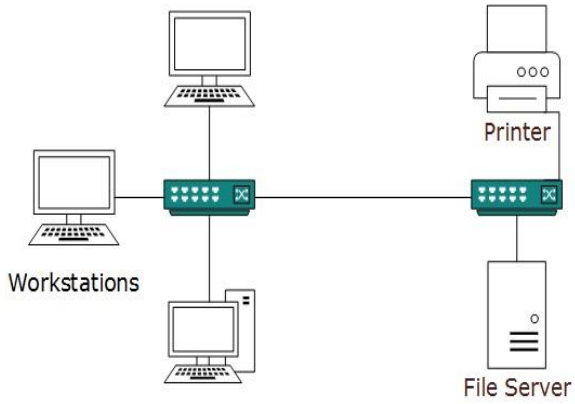
- In 1976, John Murphy of Datapoint Corporation created ARCNET, a token-passing network first used to share storage devices.

III. TYPES OF NETWORK

Networking is required to make accessible communication between computers possible by a network connection. Networking allows for many possibilities, such as accessing the internet, file sharing, file transferring, networks attacks and system communication. Let's look at the different types of networking ways in detail.

A. Local Area Network (LAN)

A LAN connects network devices over a relatively short distance. A networked office building, school, or home usually contains a single LAN, though sometimes one building will contain a few small LANs (perhaps one per room), and occasionally a LAN will span a group of nearby buildings. In TCP/IP networking, a LAN is often but not always implemented as a single IP subnet .



Data transfer speeds over a local area network can reach up to 10 Mbps (such as for an Ethernet network) and 1 Gbps (as with FDDI or Gigabit Ethernet).
A local area network can reach as many as 100, or even 1000, users.

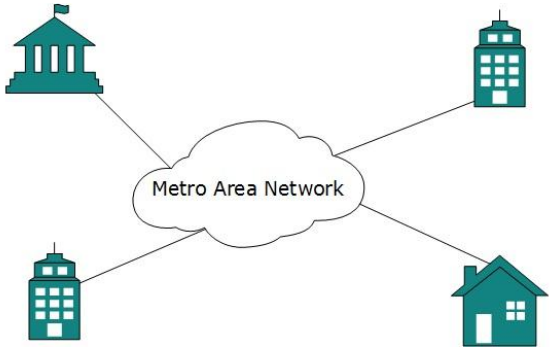
B. Wide Area Network (WAN)

Wide Area Networks are used to connect server machines and computers across continents are countries for constant information updates. Wide Area Networks, are used across the globe, many networks connect with one another across continents to create one giant Wide Area Network. Wide Area Networks use optic fiber as their communication medium.

The largest example of a Wide Area Network is the internet itself, which connects all users to the information and data that is available on the internet.

C. Metropolitan Area Networks (MAN)

The term Metropolitan Area Network (MAN) is typically used to describe a network that spans a citywide area or a town. MANs are larger than traditional LANs and predominantly use high-speed media, such as fiber optic cable, for their backbones. MANs are common in organizations that need to connect several smaller facilities together for information sharing.

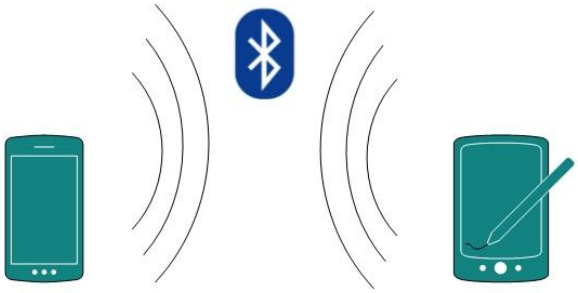


MANs share many of the same security threats as LANs, but on a larger scale. The plight of an administrator in a central location granting access to countless offices that are scattered within a city is a

difficult one that demands strict access control mechanisms to protect against unauthorized information access.

D. Personal Area Network(PAN) or Bluetooth Network

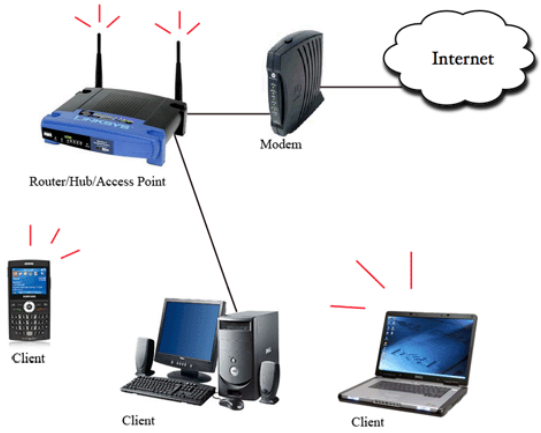
A more recent term used to describe a type of network is a Personal Area Network (PAN). PAN networks are usually wireless, established in an on-demand or ad-hoc fashion when needed to communicate between two or more devices. PAN networks can be used between devices owned by two different parties, or between two devices owned by one person, such as a PDA and a laptop or mobile phone. These networks are usually characterized as short-range, often limited to 10 meters or less in range.



An example of a PAN technology is Bluetooth wireless networking. Bluetooth is designed as a cable-replacement technology, allowing users to discard the serial and USB cables used by many of today's peripheral devices and rely on a Bluetooth PAN for communication.

E. Wireless Local Area Networks (WLAN)

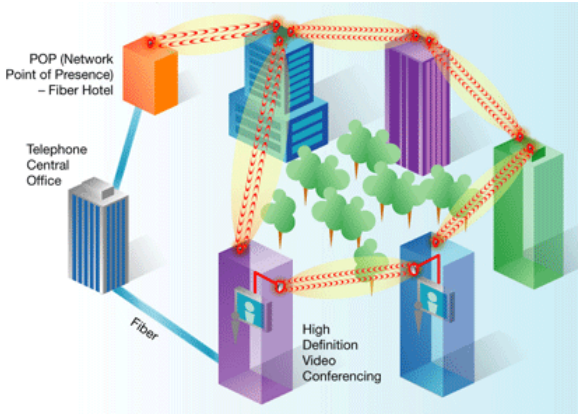
Wireless Local Area Networks are much like LAN networks, except they do not require network cables to connect each other. Radio and infrared signals are used to communicate between machines whilst using a wireless local area network. Wireless Local Area Networks allow for small amounts of mobility whilst being connected to the internet.



Wireless Local Area Networks work according to the IEEE 802.11 standards. Wireless Area Networks are commonly seen being used by a WiFi internet connection. Wireless LAN connections offer a surprising amount of mobility for users with laptops and smart phones while being able to stay connected to the internet by different networking topology.

F. Campus Area Networks (CAN)

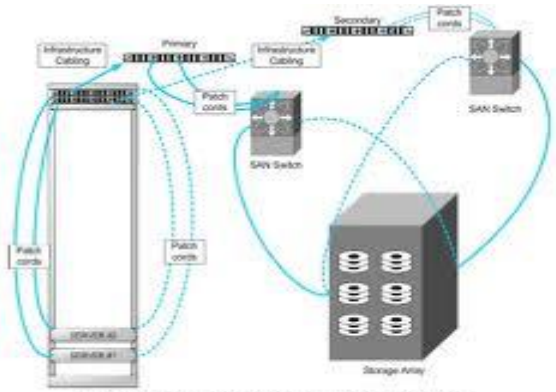
Campus Area Networks are usually a connection of many small LAN networks which are often used on university campuses and office buildings. Campus Area Networks allow for easy file sharing between different departments as all the files are usually shared on the server machines of each LAN network. This type of network offers a lot of simplicity in the transfer and downloading of files.



G. Storage Area Network (SAN)

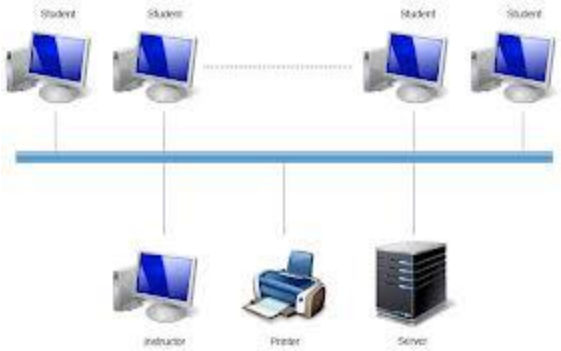
Storage Area Networks are primarily used as information databases. They are not usually used by

large organizations or similar entities. They are specifically used for the storage of information, and easy retrieval of specific pieces of data whenever required. Storage Area Networks are usually used by websites which offer downloading services.



H. System Area Network (SAN)

System Area Networks are speed oriented networks which provide high speed internet connections to a cluster of computers. These are primarily used for server purposes, and allow other computers to connect to these System Area Networks.



Permission to different access points are given according to what status a system is on the System Area Network, such as administrators or simple users.

IV. ADVANTAGES OF NETWORKS

A. File Sharing

This is one of the major advantages of networking computers. People can find and share information and data because of networking. This is beneficial for large organizations to maintain their data in an organized manner and facilitate access for desired people.

B. Inexpensive Set-Up

Shared resources mean reduction in hardware costs. Shared files mean reduction in memory requirement, which indirectly means reduction in file storage expenses. A particular software can be installed only once on the server and made available across all connected computers at once. This saves the expense of buying and installing the same software as many times for as many users.

C. Flexible Handling

A user can log on to a computer anywhere on the network and access his files. This offers flexibility to the user as to where he should be during the course of his routine. A network also allows the network administrator to choose which user on the network has what specific permissions to handle a file.

D. Increased Storage Capacity

Since there is more than one computer on a network which can easily share files, the issue of storage capacity gets resolved to a great extent. A standalone computer might fall short of storage memory, but when many computers are on a network, the memory of different computers can be used in such a case. One can also design a storage server on the network in order to have a huge storage capacity.

V. DISADVANTAGES OF NETWORKS

A. Security Concerns

One of the major drawbacks of computer networks is the security issues that are involved. If a computer is a standalone computer, physical access becomes necessary for any kind of data theft. However, if a computer is on a network, a hacker can get

unauthorized access by using different tools. In case of big organization, various network security software need to be used to prevent theft of any confidential and classifieddata.

B. Virus and Malware

If even one computer on a network gets affected by a virus, there is a possible threat for the other systems getting affected too. Viruses can spread on a network easily, because of the inter-connectivity of workstations. Moreover, multiple systems with common resources are the perfect breeding ground for viruses that multiply. Similarly, if malware gets accidentally installed on the central server, all clients in the network that are connected to that server will get affected automatically.

C. Lack of Independence

Since most networks have a centralized server and dependent clients, the client users lack any freedom whatsoever. Centralized decision making can sometimes hinder how a client user wants to use his own computer.

D. Lack of Robustness

If the main file server of a computer network breaks down, the entire system becomes useless. If there is a central linking server or a bridging device in the network, and it fails, the entire network will come to a standstill. In case of big networks, the file server should be a powerful computer, which often makes setting up and maintaining the system doubly-expensive.

VI. CONCLUSION

Computer networks help users on the network to share the resources and in communication. Now, we cannot imagine a world without emails, online newspapers, blogs, chat and the other services offered by the internet. **Information and communication** are two of the most important strategic issues for the success of every enterprise. While today nearly every organization uses a substantial number of computers and communication tools (telephones, fax, personal handheld devices), they are often still isolated. While managers today are able to use the newest applications, many departments still do not communicate and much needed information cannot be readily accessed. To overcome these obstacles in an effective usage of information technology, computer networks are necessary.

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