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Computer Network and its Types

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Abstract: ***Computer networks have become increasingly everywhere. In today's world, a computer network is much more than a collected works of interconnected devices. Computer networks are a system of interconnected computers for the purpose of transferring digital information. Networking not only helps in communication the data but also to share the available resources, to share the information, to send and receive emails, to update and analyses the data to reduce the cost and so on. The computer network enables to analyze, organize and disseminate the information that is essential to profitability. This paper provides information about different types of network. In this review paper we are presenting the basic concepts of network, network architecture and network type's i.e. LAN, MAN and WAN with its advantages and disadvantages.***
Keywords: LAN, MAN, WAN

I. INTRODUCTION

When two or more computers connected logically with the help of data communication devices and transmission media it is called as network. To connect different computers with each other, various hardware components like, telephone lines, radio waves, satellites, or infrared light beams[1].It is called nodes.Computer network is interconnection between two or more devices.The establishment between two nodes with the help of cables. This is also caalled Internet. Computer may be connected to each other with wired and wirelss media .Computer network establihsed with the help of weird media in this we can use cables such as, twisted pair cables , coaxial cables , fiber optics cables. We can also established wireless network such as Wifi. 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. Computer networks differ in the physical media.Becouse they used to transmit their signals, the communications protocols to organize network traffic, the network's size, topology and organizational intent [2]

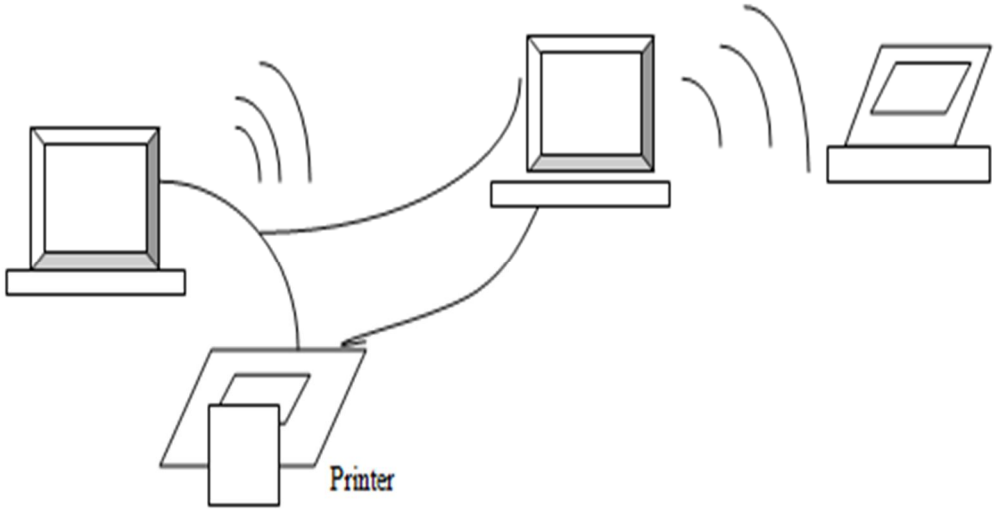


Figure 1: A computer network

A. Computer Network Architecture

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

1) There can be single or more systems acting as Server. Other being Client, they send the requests to the Server. Server takes the request and processes request on behalf of Clients.
2) Two systems can be connected Point-to-Point. It is called peers.
3) There can be hybrid network also. [3]

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Components Of Computer Network:[5]

Component	Function	Example
Application or app user	Uses the Network	Skype, I tune, Amazon
Host or end system, edge ,device, node ,source	Supports apps	Laptop, mobile ,desktop
Router or switch, node, intermediate system	Relays messages between links	Access points , cables, DSL Modems
Link or channels	Connects nodes	Weirs and wireless

B. Examples of Some Network

1) ISP (internet service provider)
2) Wi-Fi (802.11)
3) Bluetooth
4) Mobile.

II. TYPES OF COMPUTER NETWORK:

There are several different types of computer networks. Computer networks can be considered by their size as well as their purpose. The size of a network can be articulated by the geographic area they occupy and the number of computers that are part of the network. Computer network involves small group of computers that are linked to the chain of more linked computers. This paper covers three main categories:

A. LAN

This kind of network occupies small area and are confined to localized areas like a building, an office etc. The main purpose of LAN is to established interconnection between different computers in an organization so that resources can be shared by the employees of office or organization. Users of LAN can use and share the resources like: Printer, Modem, Hard- Disk, programs etc. In LAN the speeds of Communicate is 10 Mbps to 10 GB. There are requires little wiring, typically a single cable connecting to each device. LAN‟s can be either wired or wireless. Twisted pair coaxes or fiber optic cable can be used in wired LAN‟s. Every LAN uses a protocol – a set of regulations that governs how packets are configured and transmitted. In a LAN Nodes are linked together with a certain topology. These topologies include: [6]

1) Bus topology
2) Ring topology
3) Star topology

The Advantages of LAN are with the help of LAN, within organization or company, messages can be transferred easily. Thus, companies linked in LAN can perform the task of intercom also. In LAN, as and when required, more terminals can be added or existing can be removed. Different hardware and software resources can be shared by different users working in LAN. LAN is suitable for short distance communication if network require for an office or for a department to make intercommunication between different users. The Disadvantages of LAN are The Disadvantages of Local Area Network is requires Administrative Time. The problem is file server may be fail. And there is chance cables may be Break.

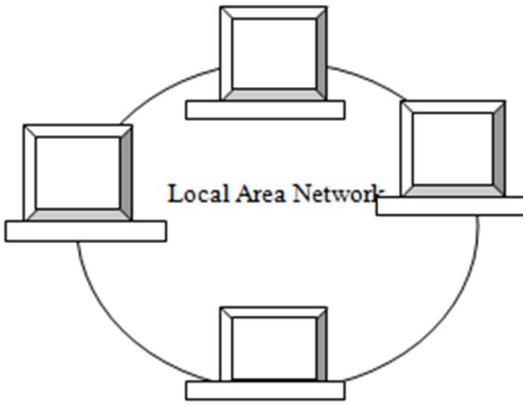


Figure2: Local Area network

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B. MAN

Metropolitan area network covers a city and can connect different building within the city. This kind of network is established using coaxial cable or fibre optic cables. Example of MAN is the cable network that is spread over a city and shares the resources of cable system. MAN covers more area as compared to LAN but less than WAN for the communication purpose. MAN covers 50km of distance area. It connects various LAN's covering the entire city. Various computers in wired MAN can be connected using different communication mediums such as: a twisted pair, optical cables and in wireless MAN with the help of radio waves etc. Example of MAN network: Network between different branches of a bank in a city, cable television networks, air reservation.[7]

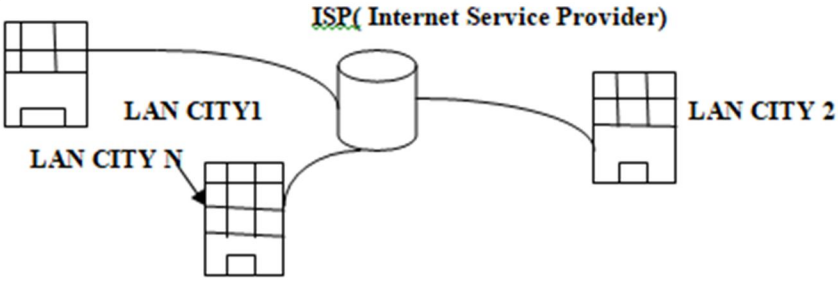


Figure3: Metropolitan Area Network

The Advantages of MAN are it covers more area as compared to LAN as it covers whole city. Different resources like printer, HDD, can be shared. One can easily send local messages to other persons. It is used by government agencies as well as also local libraries to connect and interact with the people. MAN is also used to interconnect several LANs, by bridging them using the backbone network. It increases the efficiency of handling data and also at the same time saves cost.[8]

The Disadvantages of MAN are Cost of managing of MAN is high as compared to LAN. More cables are required to connect different buildings within city. Setup of MAN is highly complex level. It is difficult to manage the network once it becomes large. It is difficult to make secure from hackers.[9]

C. WAN

WAN stand for wide area network which spread across countries. WAN covers a wide as compared to LAN and WAN. It is best suited for long-distance data transmission, voice, video, audio, image based information transmission. It covers the countries, continent and beyond that the whole world. It also connects different LANs with the help of Router. I t is the router which forward the packets, from one network to another and so on. The best example of WAN Internet connection that we use in homes, offices, colleges, business etc [10].

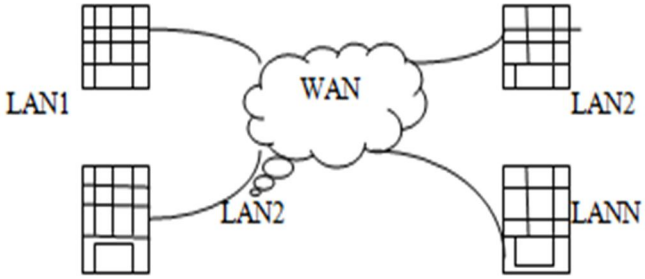


Figure4: Wide Area Network

The Advantages of WAN are WAN allows the users to communicate with others and also provides remote services to users.

Wan covers larger distance as compared to LAN and MAN. It covers the entire globe.WAN provides the services like E- mail;, downloading, Navigation, file transfer etc[11]. The Disadvantages of WAN are Setting up a network is an expensive and complicated. It is not easy to keep information secure and free from the attack of hackers. Require skilled professionals supervise the network, so huge cost is involved. Not secured from outside threats [12].

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III. COMPENSATION OF COMPUTER NETWORK:

A. *It Enhances Announcement And Availability Of Information:* Networking, especially with full entrance to the web, allows ways of communication that would simply be impossible before it was developed. Direct messaging can now allow users to talk in real time and send files to other people wherever they are in the world, which is a giant boon for businesses.

B. *It Allows For More Suitable Resource Sharing:* This advantage is very important, particularly for larger companies that really need to produce huge numbers of resources to be shared to all the people. Since the technology involves computer-based work, it is assured that the resources they wanted to get across would be completely shared by connecting to a computer network which their audience is also using.

C. *It Makes File Sharing Easier:* Computer networking allows ease access for people to distribute their files, which greatly helps them with saving more time and effort, since they could do file sharing more accordingly and effectively.

D. *It Is Highly Flexible:* The computer network is known to be very flexible, as it gives users the break to discover everything about vital things, such as software without disturbing their functionality. Plus, people will have the ease of access to all information they need to get and share.

E. *It Is An Inexpensive System:* Installing networking software on your device would not cost too much, as you are secure that it lasts and can effectively share information to your peers. Also, there is no need to change the software repeatedly, as mostly it is not required to do so.

F. *It Increases Cost Efficiency:* With the help of computer networking, you can use a set of software stuff available on the market which can just be stored or installed in your system or server, and can then be used by different workstations.

G. *It Boosts Storage Capacity:* Since you are going to distribute information, files and resources to other people, you have to ensure all data and content are properly stored in the system. With this networking technology, you can do all of this without any disturb, while having all the space you need for storage.[4]

IV. DISADVANTAGES OF NETWORKS

1) *Security Concerns:* One of the main drawbacks of computer networks is the security issues that are involved. If a computer is a unconnected computer, physical access becomes necessary for any kind of data theft. However, if a computer is on a network, a hacker can get illegal access by using different tools. In case of big organization, various network security software needs to be used to prevent theft of any private and secret data

2) *Virus and Malware:* If even one computer network gets affected by a virus, there is a possible risk for the other systems getting affected too. Viruses can spread on a network easily, because of the inter-connectivity of workstations. Also, multiple systems with common resources are the perfect reproduction ground for viruses that multiply. Alike, if malware gets accidentally installed on the central server, all clients in the network that are connected to that server will get affected automatically.

V. COMPARISON BETWEEN DIFFERENT COMPUTER AREA NETWORKS

Table 1 show the comparison between LAN, MAN, WAN[14]

Criteria	LAN	MAN	WAN
Cost	Low	High	Higher
Network	Privately owned	Private or may be leased based network	Leased or server provider based
Transmission media type	Twisted pair	Twisted pair and fibre-optic cables	Fibre optic, radio waves^&satellite
Number of Computers	Small	Large	Largest
Area	Within offices	Within cities	cover the world
Devices	Repeater, hub router	Bridges& Router	WAN switches & Modems
Bandwidth	10Mbps to 1 Gbps (approx)	10Mbps to 1 Gbps (approx)	15.4 Kbps to 2.4 Gbps(approx)

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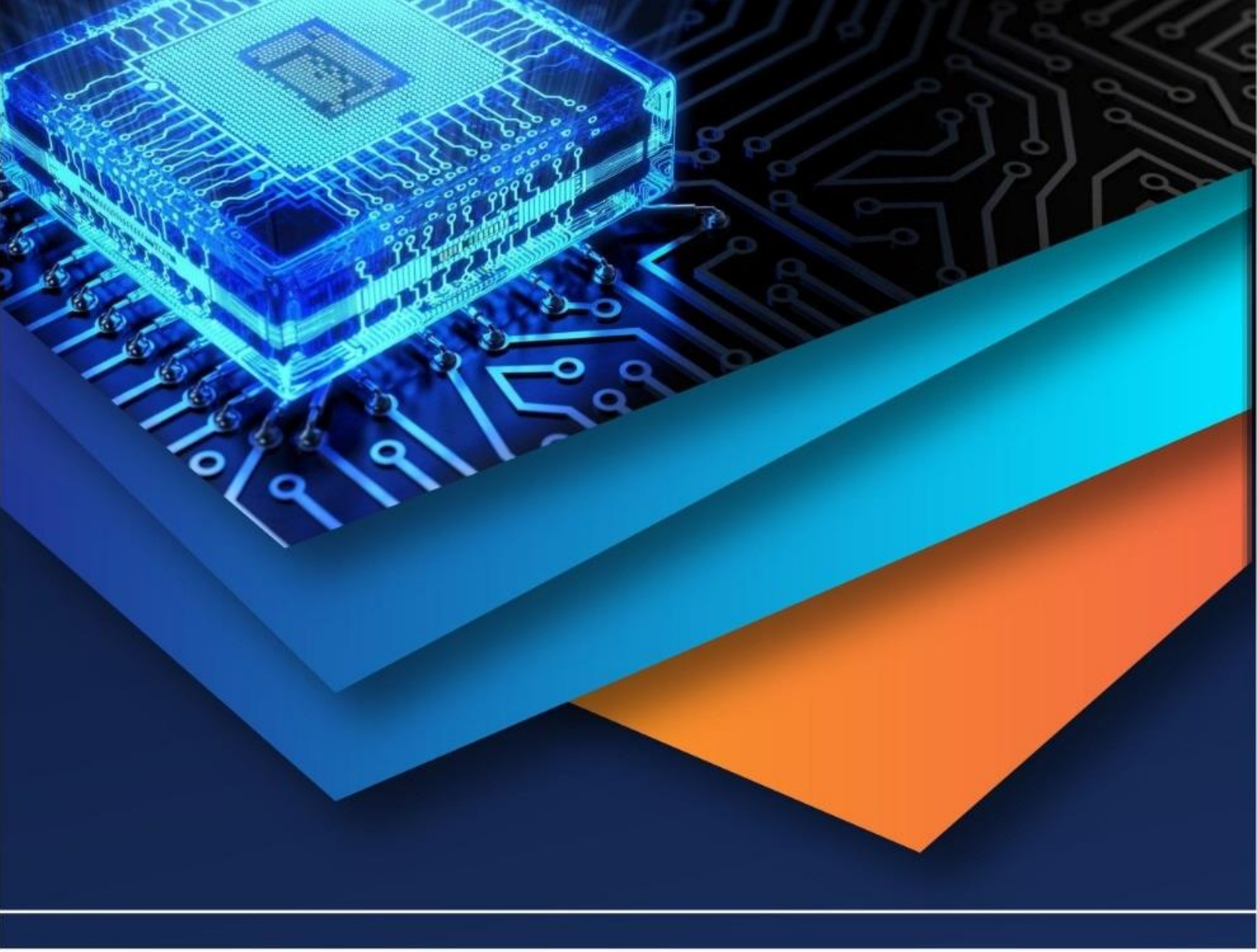
VI. CONCLUSION

Computer network is import part of the internet and for communication in the world over computer. So, understanding computer network and its mechanisms is very important for all especially for the people who work around it. Also, the knowledge of computer network can be great asset for understanding hacking and how to defend ourselves from it. In the above we also discuss the categories of computer network with advantages and disadvantages.

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