

Q. Explain different types of computer networks.

A computer network is an interconnection of various computer systems located at different places. In computer network two or more computers are linked together with a medium and data communication devices for the purpose of communicating data and sharing resources. The computer that provides resources to other computers on a network is known as server. In the network the individual computers, which access shared network resources, are known as workstations or nodes.

Computer Networks may be classified on the basis of geographical area in two broad categories.

1. *Local Area Network (LAN)*

2. *Wide Area Network (WAN)*

I. Local Area Network:

Networks used to interconnect computers in a single room, rooms within a building or buildings on one site are called Local Area Network (LAN). LAN transmits data with a speed of several megabits per second (106 bits per second). The transmission medium is normally coaxial cables.

LAN links computers, i.e., software and hardware, in the same area for the purpose of sharing information. Usually LAN links computers within a limited geographical area because they must be connected by a cable, which is quite expensive. People working in LAN get more capabilities in data processing, work processing and other information exchange compared to stand-alone computers. Because of this information exchange most of the business and government organisations are using LAN.

Major Characteristics of LAN are as follows:

- *Every computer has the potential to communicate with any other computers of the network*
- *High degree of interconnection between computers*
- *Easy physical connection of computers in a network*
- *Inexpensive medium of data transmission*
- *High data transmission rate*

Advantages of LAN are as follows:

- The reliability of network is high because the failure of one computer in the network does not effect the functioning for other computers.
- Addition of new computer to network is easy.
- High rate of data transmission is possible.
- Peripheral devices like magnetic disk and printer can be shared by other computers.

Disadvantages of LAN is

- If the communication line fails, the entire network system breaks down.

Use of LAN

Followings are the major areas where LAN is normally used

- File transfers and Access
- Word and text processing
- Electronic message handling
- Remote database access
- Personal computing
- Digital voice transmission and storage

II. Wide Area Network:

The term Wide Area Network (WAN) is used to describe a computer network spanning a regional, national or global area. For example, for a large company the head quarters might be at Delhi and regional branches at Bombay, Madras, Bangalore and Calcutta. Here regional centers are connected to head quarters through WAN. The distance between computers connected to WAN is larger. Therefore the transmission medium used is normally telephone lines, microwaves and satellite links.

Characteristics of WAN are as follows:

- a. *Communication Facility*: For a big company spanning over different parts of the country the employees can save long distance phone calls and it overcomes the time lag in overseas communications. Computer conferencing is another use of WAN where users communicate with each other through their computer system.
- b. *Remote Data Entry*: Remote data entry is possible in WAN. It means sitting at any location you can enter data, update data and query other information of any computer attached to the WAN but located in other cities. For example, suppose you are sitting at Madras and want to see some data of a computer located at Delhi, you can do it through WAN.
- c. *Centralised Information*: In modern computerised environment you will find that big organisations go for centralised data storage. This means if the organisation is spread over many cities, they keep their important business data in a single place. As the data are generated at different sites, WAN permits collection of this data from different sites and save at a single site.

Examples of WAN are as follows:

- a. *Ethernet*: Ethernet developed by Xerox Corporation is a famous example of WAN. This network uses coaxial cables for data transmission. Special integrated circuit chips called controllers are used to connect equipment to the cable.
- b. *Arpanet*: The Arpanet is another example of WAN. It was developed at Advanced Research Projects Agency of U. S. Department. This Network connects more than 40 universities and institutions throughout USA and Europe.

Difference between LAN and WAN are as follows:

- LAN is restricted to limited geographical area of few kilometers. But WAN covers great distance and operate nationwide or even worldwide.
- In LAN, the computer terminals and peripheral devices are connected with wires and coaxial cables. In WAN there is no physical connection. Communication is done through telephone lines and satellite links.
- Cost of data transmission in LAN is less because the transmission medium is owned by a single organisation. In case of WAN the cost of data transmission is very high because the transmission medium used is hired either telephone lines or satellite links.
- The speed of data transmission is much higher in LAN than in WAN. The transmission speed in LAN varies from 0.1 to 100 megabits per second. In case of WAN the speed ranges from 1800 to 9600 bits per second (bps).

- Few data transmission errors occur in LAN compared to WAN. It is because in LAN the distance covered is negligible.

III. Hybrid Networks:

Between the LAN and WAN structures, you will find hybrid networks such as campus area networks (CANs) and metropolitan area networks (MANs). In addition, a new form of network type is emerging called home area networks (HANs).

The need to access corporate Web sites has created two classifications known as intranets and extranets. The following sections introduce these networks.

- a. Campus Area Networks (CANs):** A campus area network (CAN) follows the same principles as a local area network, only on a larger and more diversified scale. With a CAN, different campus offices and organizations can be linked together. For example, in a typical university setting, accounts office might be linked to a registrar's office. In this manner, once a student has paid his or her tuition fees in the accounts section, this information is transmitted to the registrar's system so the student can enroll for classes. Some university departments or organizations might be linked to the CAN even though they already have their own separate LANs.
- b. Metropolitan Area Networks (MANs):** The metropolitan area network (MAN) is a large-scale network that connects multiple corporate LANs together. MANs usually are not owned by a single organization; their communication devices and equipment are usually maintained by a group or single network provider that sells its networking services to corporate customers. MANs often take the role of a high-speed network that allows for the sharing of regional resources. MANs also can provide a shared connection to other networks using a WAN link.
- c. Home Area Networks (HANs):** A home area network (HAN) is a network contained within a user's home connects a person's digital devices, from multiple computers and their peripheral devices, such as a printer, to telephones, VCRs, DVDs, televisions, video games, between LANs, MANs. Home security systems, "smart" appliances, fax machines, and other digital devices that are wired into the network.
- d. Intranets and Extranets:** Much of the technology available on the Internet is also available for private network use. The company's internal version of the Internet is called an intranet. An intranet uses the same Web server software that gives the public access to Web sites over the Internet. The major difference is that an intranet usually limits access to employees and selected contractors having ongoing business with the company.