

Introduction Computer Systems

Lecture 5

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Storage Devices

- **Storage Devices**

Some devices are used for storage purposes and are known as secondary storage devices. Some of them are discussed below:

- **1. CD (Compact disc):** A CD is circular and made up of thin plated glass and plastic polycarbonate material. It has a storage capacity of 600 MB to 700 MB of data. It has a standard size of 12 cm with a hole in the centre of about 1.5 cm and 1.2 mm in thickness. There are 3 types of CDs, which are:
 - **CD-ROM** (**CD - Read Only Memory**): Contents of this type of CD cannot be erased by the user. Only the publisher is allowed to access the data imprinted on this CD. CD-ROM is used for commercial purposes like for a music album or any application package by a software company.

- **CD-R (CD-Recordable):** In this, content or data can be stored once. After that, they can be read many times but the data or content cannot be rewritten or erased. (Kind of one-time use)
- **CD-RW(CD-Rewritable):** As the name suggests, this type of CD is used to rewrite the content or erase previous content and again write new content many times.

- **2. DVD (Digital Video/Versatile Disc):** A DVD is the same as a CD but with some more features. A DVD comes in single and dual-layer formats. It has much greater storage capacity in comparison to CD. The storage capacity of a DVD with a one-sided single layer is - 4.7 GB, one-sided double layer - 8.5 GB, double-sided single layer - 9.4 GB, and double-sided double layer - 17 GB. There are also some types of DVDs, which are :
 - **DVD-ROM:** In this type, the contents of the DVD cannot be written on or erased by the user. DVD ROM is used for applications and databases for distributing them in large amounts.
 - **DVD-R / DVD+R:** DVD-R (DVD minus R) and DVD+R (DVD plus R) are two different kinds of discs and they are once recordable formatst. Also, they have no difference virtually.

- **DVD-RW / DVD+RW:** This is a kind of rewritable disc and it allows up to 1,000 rewrites.
- **DVD-RAM:** DVD RAM is accessed like a hard disk. It provides high data security and storage capacity. This is a kind of rewritable disc and it allows up to 1,00,000 rewrites.

- **3. Hard Disk** A hard disk is a non-volatile storage device that uses its read/write heads to store digital data on the magnetic surface of a rigid plate. It is generally 3.5 inches in size for desktops and 2.5 inches in size for laptops. A hard disk can be classified further into 3 types, which are:
 - **Internal Hard Disk:** It has a common storage capacity stated as GB or TB. A system case or cabinet is the place where it is located. It can perform faster operations and its storage is fixed. It is mainly used to store large data files and programs.
 - **Internal Cartridges:** The Internal hard disk can't be removed from the system cabinet easily. To resolve this problem Internal Cartridges are introduced. So, Internal cartridges make it easy to remove CDs. It has a storage capacity of 2 GB to 160 GB. It is used as an alternative to an internal hard disk.

- **Hard Disk Packs** are used by organizations such as banks and government sector organizations to store large amounts of data. They have a storage capacity of PB (peta bytes).

Computer network and communication

- Earlier computers used to be stand alone. Different computers were used for information gathering, processing or distribution. Due to rapid technological progress, the areas of information gathering, processing and distribution are rapidly converging and differences between them are quickly disappearing. In this , we will learn about the different types of networks, their applications, networking models and topologies.

What Is A Network

- In the simplest form, data transfer can take place between two devices which are directly connected by some form of communication medium. But it is not practical for two devices to be directly Point-to-Point connected. This is due to the following reasons:
 - (i) The devices are very far apart.
 - (ii) There is a set of devices, each of which may require to connect to others at various times.
- 11 Solution to this problem is to connect each device to a communication network. Computer network means interconnected set of autonomous systems that permit distributed processing of information.

- In order to meet the needs of various applications, networks are available with different interconnection layouts and pLANs, method of access, protocols and media. Networks can be classified on the basis of geographical coverage.

There are many types of computer network components, but some of the most common hardware ones are:

- Router. A router is an intermediary device that connects two or more networks and forwards data packets between them. ...
- Switch. ...
- Hub. ...
- Repeater. ...
- Network interface card (NIC) ...
- Firewall. ...
- Modem. ...
- Access point.

Types of communication networks:



There are several different types of communication networks used in organizations. Some of the more common types include

The chain network.

All-channel network.

Circle network.

Wheel network.

Star network.

Classification of Networks

- Local Area Network (LAN)
- Metropolitan Area Network (MAN)
- Wide Area Network (WAN)
- Local Area Network (LAN) A local area network is a relatively smaller and privately owned network with maximum span of 10km to provide local connectivity within a building or small geographical area. The LANs are distinguished from other kinds of networks by three characteristics:
 - (i) Size
 - (ii) Transmission technology, and
 - (iii) Topology Accordingly, there are many LAN standards known as IEEE area standards 802

Metropolitan Area Network (MAN)

- Metropolitan Area Network is defined as less than 50km and provides regional connectivity typically within a campus or small geographical area. It is designed to extend over an entire city.
- It may be a single network, such as cable television network, or it may be a means of connecting a number of LANs into a large network, so that resources may be shared LAN-to-LAN as well as device to device. For example, a company can use a MAN to connect to the LANs in all of its offices throughout a city.

Wide Area Network (WAN)

- Wide Area Network provides no limit of distance. In most WAN, the subnet consists of two distinct components. Transmission lines, also called circuits or channels, and routers. Transmission lines are used for moving bits between machines, whereas routers are used to connect two or more transmission lines. A WAN provides long distance transmission of data, voice, image and video information over large geographical areas that may comprise a country, a continent or even the whole world. In contrast to LANs (which depend on their own hardware for transmission), WANs may utilize public, leased or private communication devices usually in combination, and span an unlimited number of miles. A WAN that is wholly owned by a single company is often referred to as an enterprise network.

Computer Network Goals/Motivation

- Computer Network Goals/Motivation The main goal of a computer network is to enable its users to share resources and to access these resources (i.e hard disks, high quality expensive laser printer, modems, peripheral devices, licensed software. etc.), regardless of their physical locations. Physical locations may be a few feet or even thousands of miles apart, but users exchange data and programs in the same way. In other words, distance is removed as a barrier for the above application. The computer network thus creates a global environment for its users and computers. Another goal is to provide communication services (such as E-mail) and in general, to provide robust transport network. i.e., (highway) over which application can be built.

Applications of Networks

- The following is the list of some applications of computer network. Generic application Resource sharing (CPU, peripherals, information and software)● Personal communication (text+graphics+audio+video)● Network wide information discovery and retrieval.● We are now moving from personalized computing to network computing. Therefore, its applications are increasing everyday.