(17E00107) INFORMATION TECHNOLOGY FOR MANAGERS

The main objective of this course is to make the student familiarize in information technology and their applications to business processes.

1. **Fundamentals of IT:-** Components of a system - Meaning and nature – Role of IT in various sectors - Information technology management - Strategies for gaining IT advantage.
2. **Database Management Systems:** Introduction to DBMS - Applications to data base -concepts, data access methods – Types of data processing-data base languages
3. **Understanding Ms-Office:**- MS-Word - MS-Excel - Formulae, Graphs, Basis Statistical Formulae, MS-Access, MS-PowerPoint - Creating Effectiveness presentations.
4. **Data Communication and Networks:** Concepts of Data Communication, Types of Data-Communication Networks, Communications Media, Concepts of Computer Networks, the Internet, Intranet and Extranets: Operation of the Internet, Services provided by Internet, World Wide Web.
5. **Emerging Trends in IT:** Introduction to SAP, IP addresses, IP protocol, various ERP packages, Implementation of ERP - Introduction to big data - cloud computing

Textbooks:

- Fundamentals of Information Technology, Alexis Leon, & Mathews Leon - Vikas.

References:

- Basics of Computer Sciences, Behrouz Forouzan, Firoz Mosharraf, Cengage.
- Information Technology for Management, Ramesh Behi, Mc Graw Hill.
- Introduction to Computers and Communications, Peter Norton-Sixth Edition-Tata McGraw Hill.
- V.Rajaraman, Introduction to Information Technology, Prentice Hall India.
- Information Technology and theory Aksoy, Cengage Learnings.
- Foundations of IT,Dhiraj Sharma, Excel Books.
- MS Office 2000 for every one, Sanjay Saxena – Vikas

6. MS ACCESS:

- Micro soft office access, previously known as Microsoft access.
- It is a relational database management system from Microsoft that combines the relational Microsoft jet database engine with a graphical user interface and software development tools.
- MS ACCESS is a member of the Microsoft office suite of applications and is included in the professional and higher versions for windows and also sold separately.
- Ms Access helps in the management of database.
- Like relational databases, MS access also stores all the data in tabular form.
- One can also modify the contents of the stored table.
- Ms Access includes four main components.

(i) **TABLES**: stores the data in row and column format.

(ii) **QUERIES:** it asks questions about the information stored in tables.

(iii) **FORMS:** it allows the users to view data stored in tables.

(iv) **REPORTS**: it allows printing data based on the queries tables that users have created.

6.1: STARTING ACCESS:

To select MS ACCESS, following two steps are there,

STEP-1: click on **start** button

STEP-2: click on the **all programs** option and then click on **Microsoft access 2007**.

6.2: CREATING DATABASE:

To create the database following steps are there

STEP-1: click on **start** button

STEP-2: then click on **all programs** option and then click on **Microsoft access 2007**

STEP-3: select the **blank database**

STEP-4: in the **file name field** enter the name for the table

STEP-5: click **create** button.

6.3: COMPONENTS OF MS ACCESS:

Components of MS ACCESS are as follows,

1. **TABLES**:

- Tables are the basis requirements and building block of a relational database as these tables store all the data pertaining to user.
- Tables enable the users to sort and update data. Users can also filter the data using filtering option.
- A table is the combination of rows and columns where row give the different values for field and column shows the field.

CREATING A TABLE IN MS ACCESS:

In MS ACCESS there are three ways to create a table;

a. Table in a new database
b. Table by using a table template
c. Table by using a table design

a. CREATING NEW TABLE IN A NEW DATABASE:

STEP-1: click on **Microsoft office** button and then click on **new** option

STEP-2: write the file name for new database in the **file name box**.

STEP-3: then **browse** and **save** the database in the computer disk

STEP-4: Then click on **create** button

STEP-5: after clicking on create option a new table is created with **table 1** as the table name.

STEP-6: Next go to **quick access** tool bar and click to the **save** option. In the save as dialog box enter the name of table and then click on **OK** button.

b. CREATING NEW TABLE BY USING A TABLE TEMPLATE:

STEP-1: click on **Microsoft office** button and then click on the **open** option.

STEP-2: from the open dialog box **select and open the database** where the table is to be created.

STEP-3: select **table templates** from table group under create tab.

c. CREATING A TABLE USING TABLE DESIGN:

STEP-1: click on **table design** existing in table group

STEP-2: **Field name** column saves the name of the attribute of the table. First field of table should be the primary key.

STEP-3: Data type column contains the data type for the various fields defined under the field names.

NOTE: primary key- unique identifier for every record in a table. In MS ACCESS by default first field is set to be the primary key.

EXAMPLE; employee ID number is primary key for employee table.

(ii) **QUERIES**:

- To retrieve the information from the database, access provides the query tool.
- Query helps the users to collect the information from one or multiple tables. It also helps in the modification (addition, changing and deletion) of the data which is stored in the database.
- Queries are used to perform calculation with the stored data as well as to filter the data from database.
  FOR EXAMPLE: in a company HR needs to view the list of employee's name, whose salary is greater than 10,000?

CREATING QUERIES:

Queries are created in following ways,

a. From query design view
b. From query wizard

a. CREATING QUERIES FROM QUERY DESIGN VIEW:

Queries area always based on the tables or other queries. So to create a query, user needs to open a table, on which the created query is based. To run and display the queries user needs to press or use RUN button.

STEP-1: first activate the **create** tab.

STEP-2: then click on the **query design** button present on other group. Show table dialog box will appear on the screen

STEP-3: now **select the table or query** on which query is based.

STEP-4: Then click on **ADD** button to add the table.

STEP-5: now **select the next table or query** on which query is based.

STEP-6: Select all the tables or queries which are needed.

STEP-7: click **CLOSE**

STEP-8: **select first field** from the field row and then choose the table name option on the table line, table name will appear.

STEP-9: to run the queries just click on **run** button. All the records are fetched and displayed in a datasheet view.

b. <u>CREATING QUERY FROM QUERY WIZARD</u>:

STEP-1: first click on the **create** tab and then click on the **query wizard.**

STEP-2: the new query window appears on the screen and then clicks on **OK** button.

NOTE: always check that simple query wizard is selected.

STEP-3: after opening the simple query wizard just select and double click on the **field** required in the query.

OR

Just select the required field and click on the **'>> 'button**.

STEP-4: click on **next** button.

STEP-5: for the detailed summary select **the radio button** and click on **next** button.

STEP-6: when the final screen appears **type name and numbers**

STEP-7: Click on **finish** button.

After completion of the process query is saved and executed automatically.

(iii) **<u>REPORTS</u>**:

- Report is an effective method of presenting the data in the printed format.
- The user can present the information in desired format that he/she wants as there is possibility of altering the size, appearance and format in the report.

- The major source of the reports data is the table query from where the maximum information comes. The reports play a major role for several applications. Few examples of our daily life, where reports can be used as follows,

➢ Telephone bills produced from telephone department.
➢ Electricity bills
➢ Mark sheets etc.

CREATING REPORTS:

i) CREATING REPORT FORM BLANK REPORT:

STEP-1: After clicking on **create** tab select and click on **blank report button** available on reports group. Now the field list task pane appears and blank report is created.

STEP-2: In the field list task pane, the fields are dragged to the report from the table. Tabular format is normally used by default.

STEP-3: In case user needs other layout he/she has to highlight the fields in report by pressing **SHIFT** and then clicking on all fields header.

STEP-4: As stacked button is clicked in the control layout group on the arrange tab the fields will be rearranged.

ii) CREATING REPORT FROM REPORT WIZARD:

In case of report contains large number of fields and a complex layout then report wizard is the best option. Following are the steps to create a report using report wizard.

STEP-1: select the **create** tab and then click on **report wizard button** available on reports group.

STEP-2: select a **data source** and then **complete the wizard**

STEP-3: select the **desired field** then grouping options after that a style and so on.

iv. FORMS:

Forms is an MS ACCESS object used for three purposes,

- By using form one can perform the data entry. It allows users to insert, update and delete the data into various tables.

- Users can insert the custom information and perform tasks based on that information. For example, before running a report user needs to enter some parameters.
- **It provides users a method of navigating through the system.**
  Example, user can create a form; select a form to lad a report to run etc.

CREATING FORMS:

To create a form the following steps are included,

STEP-1: open the **navigation pane**.

STEP-2: click on the **table or query** on which the form is based.

STEP-3: now **activate the create tab**.

STEP-4: now to create the form, click on **form option** forms group.

STEP-5: to move through the various records users can use the navigation bar.

MODIFYING FORM:

After one creates a form it opens in layout view, where one can modify it.

1. **TO CHANGE THE SIZE OF A FIELD**:

- Click a side of the field and drag to change the width of the field
- Click on top or bottom of a field and drag to change the height of a field.

2. **TO MOVE A DATASHEET:**

- Click on the datasheet to select it.
- Click and drag the four sided arrow in the upper right corner to move the datasheet

3. **TO RESIZE A DATASHEET**:

- Click the datasheet to select it.
- Click a side of the datasheet and drag to change the width.
- Click on top or bottom of the datasheet and drag to change the height.

4. **TO APPLY AN AUTOFORMAT**:

   The auto format option on format tab enables one to apply formats quickly such as background colors, field colors field fonts.

- Activate format tab
- Click auto format the auto format menu appears
- Click the format wants to apply.

5. **TO CHANGE A FORM TITLE**:

   When create a firm by default access uses the form name as the title. One can change the title,

- Activate format tab
- Click on title button
- Type the new title

6. **TO ADD THE DATE AND TIME:**

   One can easily add the date and time to the form

- Activate format tab
- Click the date and time button. The date and time dialog box appears. Select the date and time format. The date and time appear on the form.

7. Power point:-

- PowerPoint is a presentation tool that helps to create effective, audio – visual – graphical presentations.
- Generally, the presentation consists of a number of slides that are arranged in a sequential manner.
- PowerPoint can also be used to prepare handouts and speaker notes automatically once the presentation is finally prepared.
- The slides prepared can be used either by taking out the printouts on the transparency slides or the computer can directly be attacked to the LCD display panel that can enlarge the picture and present the output on the screen.
- PowerPoint has provided the user with lots of predesigned slide formats, clip art graphic libraries, auto content wizards and design templates.
- The user can use any of the available options and design the presentation depending upon the time and the requirement.
- Other office components, like Word file, Excel spreadsheet or graph etc. Can be inserted in the presentation to make it more attractive and complete.

7.1: **Features of PowerPoint:-**

PowerPoint provides the facility;

- To create presentation slides using graphical objects.
- To apply text with varying fonts and styles along with animation and sound effect.
- To create professional quality paper, 35 MM slides, photo paint or on screen presentation
- Galleries of images on sound
- To create different versions of a presentation for different audience.
- To preview show, add special effects to the slides or displayed on screen and rehearse the timings of each slide.
- Presentations help to put across ideas and information in an attractive format.
- To apply build in professional design elements called auto layout and presentation templates.

7.2: **Components of PowerPoint:-**

The components of PowerPoint are given here under;

i. Title Bar:-

- The title bar is located at the top in the center of the PowerPoint window.
- The title bar displays the name of the presentation on which you are currently working.
- By default, PowerPoint names presentations sequentially starting with presentation 1. When you save your file, you can change the name of your presentation.

ii. Menu Bar:-

- Menu bar contains a list of options to manage and customize documents.

They are:

- File menu
- Edit menu
- View menu

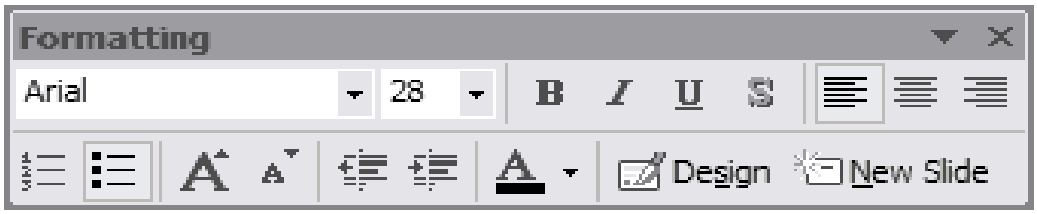
- Insert menu
- Format menu
- Tools menu
- Slide show menu
- Window menu
- Help menu

iii. Standard tool Bar:-

- Standard tool bar contains shortcut buttons for the most popular commands.
- This entire toolbar could become a floating window by double – clicking on the control bar at the far left end of this toolbar

iv. Formatting toolbar:-

Formatting toolbar contains buttons for formatting. Formatting toolbar could become a floating window by double – clicking on the control bar at the far left of this tool bar.



- Status bar displays slide position and the type of design in PowerPoint.
- The status bar is a long horizontal bar that spans the whole bottom section of Microsoft PowerPoint.

v. Drawing tool bar:-

- Drawing tool bar contains tools for drawing lines, shapes and objects.
- Drawing tool bar could become a floating window by double clicking on the control bar at the far left end of this tool bar.

This gives following window which can be placed anywhere on the screen:

vi. **Task pane:-**

- Task pane located on the right side of the computer screen, this pane allows user to select tasks in different categories and allows user to quickly enhance slides in a few steps.
- Task pane provides quick access to the most common actions and features in PowerPoint.

vii. **Help:-**

- Help component provides quick access to help topics.

viii. **Outline and slides tabbed pane:-**

This allows the user to easily view the presentation in outline format (text), as well as a list of all the slides in the presentation (with visuals).

8. Creating effective presentations:-

a. Creating PowerPoint presentation using Auto content wizard:-

Generally preparing presentations is difficult because a lot of designing, inserting text boxes, clip arts, graphs etc, are required.

To create presentations using Auto content wizard following steps are needed;

- Click on start button
- Click on Microsoft PowerPoint from the programs menu
- Click on auto content wizard button
- Click on ok to continue
- Click on next tab to select the type of presentation
- Select recommending a strategy from general option as the presentation type.
- Choose on – screen presentation button to get the type of output that user like to use.

- Type presentation title here
- Click on finish button to see the output.

A. Creating presentation using templates:

- Similar to auto content wizard there is another option available to PowerPoint users which can help an user in making presentation in very little time but giving it a professional touch.
- With templates option, user can choose own layouts, backgrounds, images, color schemes etc., from the given library. Steps to create presentation as follows
- Click on start button
- Click on Microsoft PowerPoint from the programs menu
- Click on design template button
- Click on ok to continue
- Check various templates designs given one by one you can see the preview of the selected template in the right part of the window.
- Select "lock and key" template and press ok to continue.
- A Window would be displayed
- User can choose any of the page layouts and press ok to continue.

Now all the steps are same as in auto content wizard for preparing a normal presentation. Here also user can make changes in the color schemes, the clipart images or backgrounds and layouts etc.,

8.1 Applications of PowerPoint:-

The applications of PowerPoint are as follows;

1. Business presentation:-

PowerPoint is a great timesaver for who makes business presentations, whether you have been asked to speak in front of hundreds of people, a group of sales representatives at a sales confirms etc,.

2. Sales presentation:-

Sales persons use PowerPoint to create a presentation about the profits of not owning life insurance.

3. **Lectures:-**

PowerPoint is also useful for teachers or conference speakers who want to back – up their lectures with slides.

4. **Homework:-**

PowerPoint is a great program to use for certain types of homework projects, such as those big history reports.

5. **Internet presentations:-**

PowerPoint can even help to set – up a presentation that user can broadcast over the internet so people can join in on the fun without having to leave the comfort of their own homes or offices.

6. **Information stations:-**

Users can use PowerPoint to set – up computerized information kiosks that people can walk – up to use and use.

UNIT-3
IMPORTANT QUESTIONS

1. Explain the formulae and functions in Ms-Excel
2. Explain about basic statistical formulae
3. How to perform mail merge in ms-Word
4. How to create charts in Ms – Excel
5. What are the steps for creating an effective presentation?

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UNIT-4

DATA COMMUNICATIONS AND NETWORKS

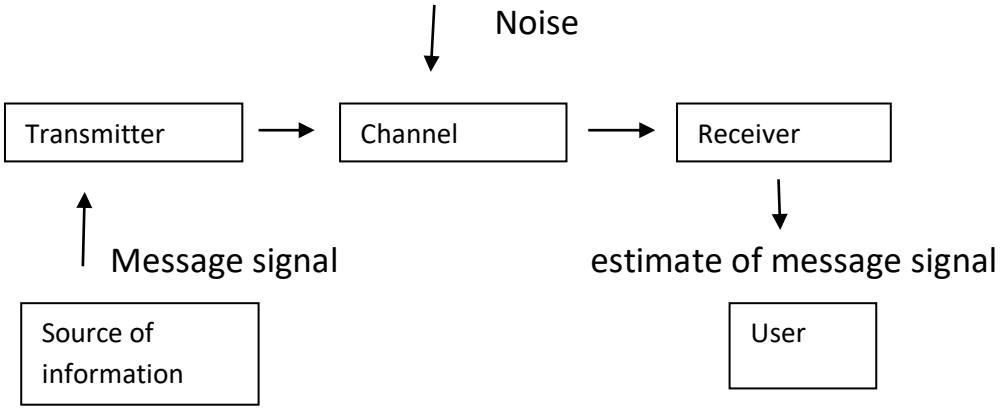
1. CONCEPT OF DATA COMMUNICATIONS:

1.1:INTRODUCTION:

- Communication is the need of the day and not having the basic knowledge of many communication systems (such as telephone etc) could easily imply to an individual being un educated.
- The telephones, the radios and the televisions in our living rooms the newspaper and of course the computer terminals are very reliable sources of information from any part of the world.
- The ships, air craft's, the rockets, the satellites etc, rely (depend) on the communication systems for their successful operation.
- And thus communication can be said to be one of the major factors for the rapid modernization of the world.
- Communication involves implicitly the transmission of information from one point to another through a succession of processes. Information being sent is also referred to as data.
- This deals with data transmission through computers and the communication channels involved in the process.

1.2:MEANING:

- Data communication refers to the exchange of data between two devices via some form of transmission medium such as wire cable.
- For data communication to occur the communicating devices must be part of a communication system made up of a combination of hardware (physical equipment) and software (programs).
- There are three basic elements in every communication system namely,
- The transmitter
- The channel and
- The receiver



Basic communication system

- From the above fig, the transmitter and the receiver are isolated from each other and it is the channel that connects them together.
- The transmitter transforms the message signal produced by the source of information into a form suitable for transmission over the channel.
- As the signal progresses through the channel, noise and other distortions are added to it which corrupts the original signal.
- The receiver receives this corrupted signal and does the task of converting it back to the original signal and delivers it to the user destination.

The noise and other disturbances added depend upon the length of the channel.

1.3:CHARACTERISTICS OF DATA COMMUNICATION:

The characteristics of data communication are given here under,

Characteristics of data Communication

- **Delivery**
- **Accuracy**
- **timelines**
- **jitter**

1. **DELIVERY**: The system must deliver data to the correct destination. Data must be received by the intended device or user and only by that device or user.

2. **ACCURACY**: The system must deliver the data accurately. Data that have been altered in transmission and left uncorrected and unusable.

3. TIMELINESS:

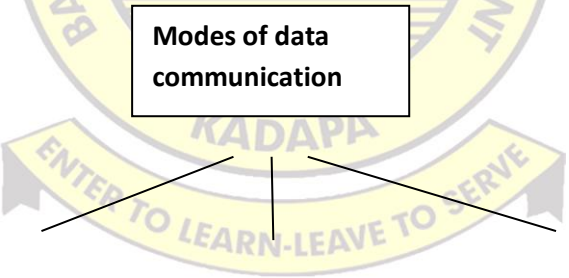
- The system must deliver data in a timely manner, data delivered late are useless.
- In case of video and audio, timely delivery means delivering data as they are produced in the same order that they are produced and without significant delay. This kind of delivery is called real time transmission.

4. JITTER:

- Jitter refers to the variation in the packet arrival time. It is the uneven delay in the delivery of audio or video packets.
- For example, let us assume that video packets are sent every 30ms. If some of the packet arrives with 30ms delay and others with 40ms delay an uneven quality in the video is the result.

1.4:MODELS OF DATA COMMUNICATION

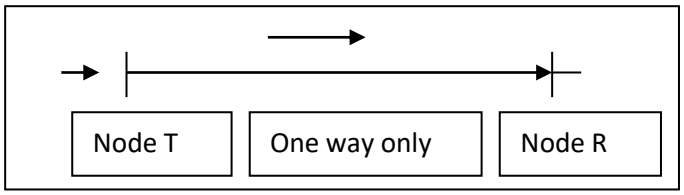
Data can be communicated or transmitted in one of the following three models;



Simplex mode half duplex mode full duplex mode

i. SIMPLEX MODE:

- In simplex mode of data communication, data is transmitted unidirectional i.e., in one direction.
- Here data can only go in one direction and hence only one data path is required.
- This mode can be represented by using semiconductor diodes as follows,



Node T = node transmitter

Node R = node receiver

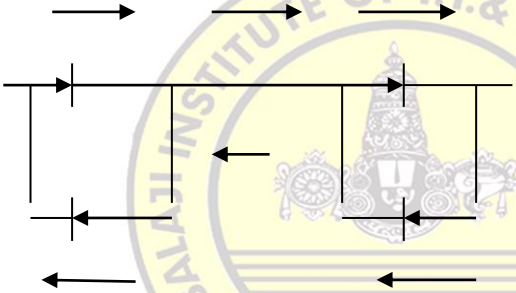
EXAMPLES OF SIMPLEX MODE

A television broadcast is an example of simplex duplex

- Fire alarm system
- Loud speaker system

ii. HALF-DUPLEX MODE:

- In half duplex mode, data can be sent in both directions but one by one.
- In this mode there is a signal path along which data transfer takes place but only in one direction at a time.



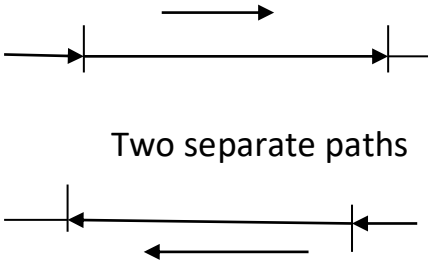
Both ways but only one at a time

EXAMPLES OF HALF DUPLEX MODE:

A walkie - talkie operates in half duplex mode. It can only sender receives a transmission at may given time. It cannot do both at the same time

iii. FULL DUPLEX MODE:

- In full duplex mode data transfer takes place in both directions simultaneously.
- It is obvious that full duplex mode is faster than half duplex mode as both directions are accessible simultaneously.



EXAMPLE, OF FULL DUPLE TRANSMISSION

Telephone networks operate in full duplex mode when two persons talk on telephone line; both can listen and speak simultaneously.

2. TYPES OF DATA COMMUNICATION NETWORKS:

2.1:DATA COMMUNICATION:

There are three basic elements in every communication system, namely the transmitter, the channel and the receiver.

The transmitter and the receiver are isolated from each other and it is the channel that connects them together.

2.2:TYPES OF DATA COMMINICATION NETWORKS:

Data communication networks are of following types

a. Local area network
b. Wide area network
c. Metropolitan area network

A. LOCAL AREA NETWORK:

- Networks that connect computers lying within a small distance from each other are called local area networks.
- All local area networks transfer data in digital format a high speed and have a low implementation cost.
- Local area networks normally use coaxial cables to connect the computers together.
- In LAN, data and messages can easily be transferred over networked computers.

B. WIDE AREA NETWORK:

- Wide area network connects computers which are very remotely placed. It may connect across countries or the entire globe.
- Communication medium in WAN are satellite, public telephone networks which are connected by routers.
- With the help of WAN messages can be sent very quickly to anyone else on the network. These messages can have pictures, sounds or data included with them.

C. METROPOLITOAN AREA NETWORK:

- Metropolitan area network is larger than a LAN and it covers areas as large as a city.
- Communication medium used for MAN are optical fibers, cables etc.
- The dual bus used in MAN helps the transmission of data in both directions simultaneously.

2.3:DATA SIGNALS:

If anyone wants to transfer data from one point of another either via a physical wire or through radio waves, the data has to be converted into a signal.

Signals are the electric impulses used to encode and communicate data.

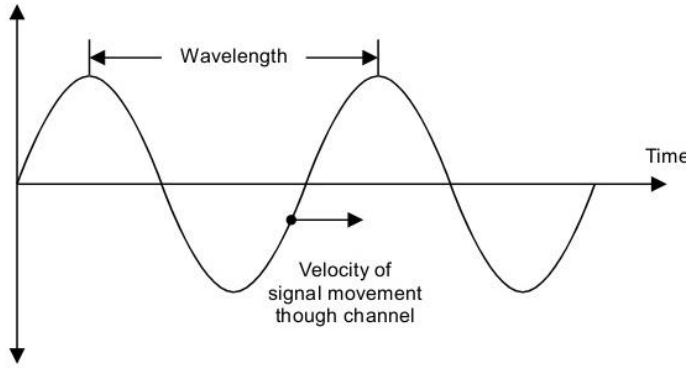
Three are 2 types of data signals i.e.

(i) Analog signals

(ii) Digital signals

(i) ANALOG SIGNALS:

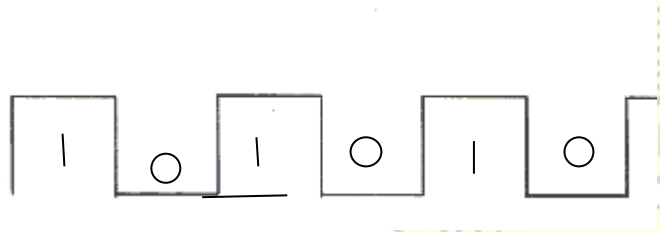
- Analog signals are a representation of time varying quantities in a continuous signal.
- Analog signal differs from a digital signal in terms of small fluctuations in the signal which are meaningful.
- An analog signal is a variable signal continuous in both time and amplitude (value of the signal at any point on the wave.)



Distance between two successive points of wave

(ii) DIGITAL SIGNALS:

- A digital signal uses discrete (discontinuous) values to represent information.
- Digital signals are the data stored in the form of amplitude Os and Is. When the signal is at high point its value is 1 and when it is low its value is O.
- Digital signals are not affected by noise as compared to analog signals which are very prone to noise.



Digital data signal

3. COMMUNICATION MEDIA:

- The communication medium plays an important role in networks.
- Communication medium acts as a link between the transmitter and receiver of data.
- If the medium works well and properly then the speed of transferring data is good but if the medium is not working properly then the data would be delayed or would not be sent or even can be lost during transmission.
- In computer networks we call this speed of transmitting data as DATA RATE.

- There are two types of networks can set up using communication media,
  (i) Wired network
  (ii) Wireless network

(i) <u>WIRED NETWORK</u>

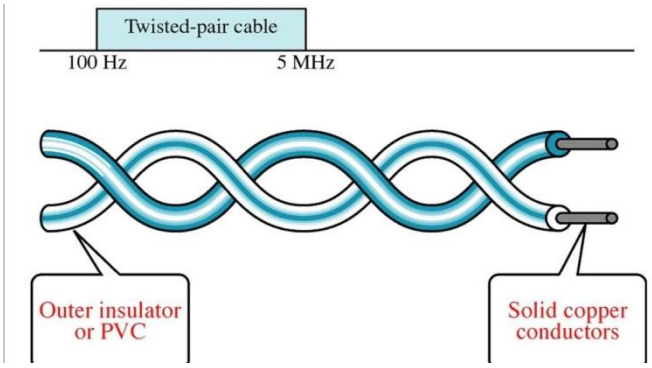
The wired network is mostly setup using an Ethernet cable. This can be done using 3 technologies,

a. Twisted pair wires
b. Coaxial cables
c. Fiber optics

<u>NOTE</u>: **Ethernet** is a system for connecting a number of computer systems to form a LAN.

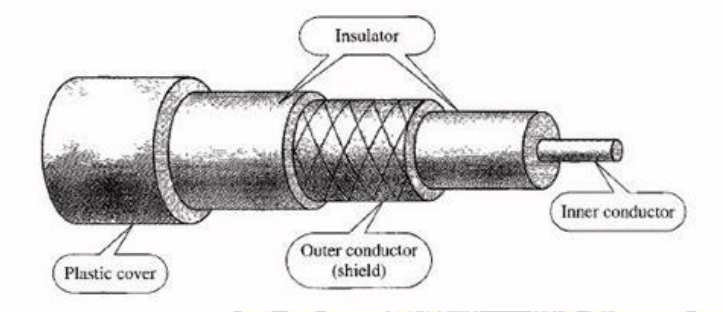
a. <u>TWISTED PAIR WIRES:</u>

- Twisted pair wires technology was invented by Alexander Graham Bell. These wires are the oldest means of communication in computer networking.
- A twisted pair consists of two insulated copper wires twisted together in helical form .The twisting of the two wires prevents electromagnetic interface and radiations.
- Twisted pair cables may either be shielded or unshielded. shielded cables surround the center conductors with a jacket of fine, branded wires. Unshielded cables are less expensive and more commonly used. Shielded cables transfer data at higher rate than the unshielded cable.
- Twisted pair cables provide a speed of few MBPS (mega bits per second) which is low compared to fiber optic cables.
- Twisted pair cables are low in cost as compared to fiber optics.



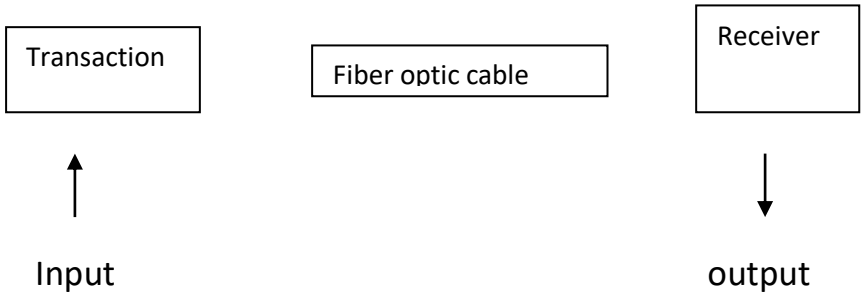
b. COAXIAL CABLES:

- Coaxial cables same as twisted wire cables consists of two copper wires.
- A coaxial cable consists of copper wire surrounded by insulation and over the insulation a copper wire mesh is wrapped. This forms an electric shield around the main copper wire and reduces the electromagnetic interface.
- The central copper wire carries the data while the braided outer conductor prevents the electrical disturbance. Coaxial cables used in cable TV network.



c. FIBRE OPTICS:

- Fiber optic cables are very thin tubes made of glass or plastic (mostly silica).
- Fiber optic cables transmit light pulses from the light source to the detector.
- Fiber optics can generate high data rates. Transmission of data through these cables is very fast and most importantly is unaffected by electrical interface's. These cables can process data at GB/sec of speed i.e., 75,600 times faster.
- Fiber optic cables are more expensive and also another advantage they have is that of providing high bandwidths.



Data transmission using fiber optic cable

(ii) WIRELESS NETWORKS:

Wireless networks of communication media includes,

a. Radio waves
b. Micro waves
c. Satellite links

A. RADIO WAVES:

- Radio waves are electromagnetic waves with wavelengths greater than infrared radiations.
- The frequency of these waves varies from as high as 300GHZ to as low as 3KHZ
- Radio waves travel by speed of light.
- Radio waves can be natural and artificial also. Natural radio waves occur due to lighting and artificial radio waves are used in mobile, radio, telecommunication etc.
- Radio waves don't need any physical wire to travel. They can penetrate walls and windows and can be used to deliver long distance messages i.e., from 3 meters to 1000's of kilometers.

B. MICROWAVE:

- Microwave signals travel in straight lines.
- Microwaves cannot pass through buildings like radio waves.
- Microwave signals are weather and frequency dependent. Hence, the atmospheric topology of the region has to be taken into account while transmitting the signal.
- The data is concentrated into a beam having a frequency above 100MHZ (megahertz) and is transmitted in a straight line to a satellite. The

communication satellite redirects the signal to some other point on earth.

- Data transmission using microwave signals is much more expensive due to the cost of satellites but, the error rate is much lower here.

C. SATELLITE LINKS:

- A communication satellite links two or more transmitter or receiver that is situated on earth called as ground stations.
- The satellite receives the message on one frequency band reproduce the signal using a repeater and transmits the signal or the message on another frequency.
- One form of communication through satellite is by using microwave signals.
- Another form of communication through satellites is by using radio and TV waves which are generally used for broadcast purposes.

4. CONCEPTS OF COMPUTER NETWORKS:

4.1 COMPUTER NETWORK:

- A network can be defined as the interconnection of two or more systems.
- The minimum number of systems required to make a network is two.
- Computer systems connected in a network can exchange information between them and share the use of hardware devices connected such as the printer etc.
- A system with one controlling unit known as the master and many slave terminals is not a network.
- In recent years networking has increasingly become common. A computer network is a complex process having two or more computers interconnected.
- A networking is the capability of the computer which permits to link computers together. The purpose of this linking is to facilitate communication between computers and information can be exchanged between this interlinking.
- The interlinking of computers is more useful when the information is to be altered and updated for strategic decision making control etc.

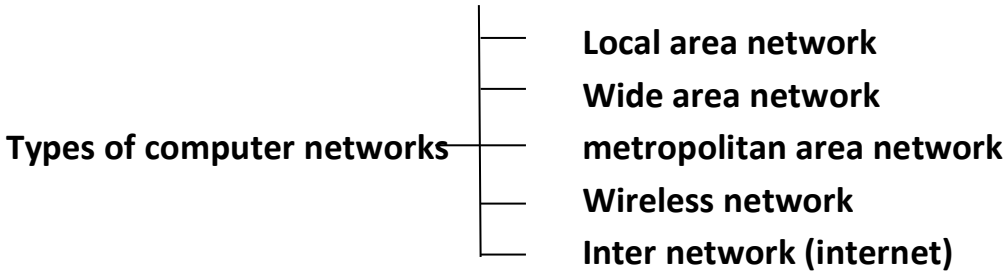
4.2:FEATURES OF COMPUTER NETWORKING:

The features of computer networking are explained here as follows,

- Networking facilitates to have **external communication** with outside organization.
- Computer networking **frees the executives** from the need to change data or churning out business regards
- It permits the user to **employ the same of type of servers and browsers** distributed over the local network of organization
- With computer networking **employee can interact** with the business applications and co workers of any department.
- There is **no need to use the same brand of software and hardware** before they can share information
- The ultimate object of developing networking is achieved by **making employees more productive.**
- The networking system **permits the distribution of information quickly,** efficiently and particularly in the case of multinational corporations to a global work force in several countries.
- The information is always online it is real time and constantly **improving the quality of the data.**
- Computer network connects more computers or terminals and **makes communication** possible between the groups of networks and individual networks.

4.3:TYPES OF COMPUTER NETWORK

Following are the types of computer network;



i. LOCAL AREA NETWORK:

- Local area network also called LAN and designed for small physical areas such as an office, group of buildings or a faculty.
- Networks that connect computers lying within a small distance from each other are called local area networks.

- Local area networks normally use coaxial cables to connect computer together.
- Two or more computers connected together can share besides data, their peripherals such as printers, modems etc., and these cuts down a lot on the hardware equipment cost.

CHARACTERISTICWS OF LAN:

- LAN's are private networks not subject to tariffs or other regularly controls.
- LAN's operate at relatively high speed when compared to the typical WAN
- LAN connects computers in a single building block or campus i.e., they work in a restricted geographical area.
- There are different types of media access control methods in a LAN, the prominent ones are Ethernet.

APPLICATIONS OF LAN:

- One of the computers in a network can become a server serving all the remaining computers called clients.
- Connecting locally all the workstations in a building to let them communicate with each other locally without any internet access.
- Sharing common resource like printers etc, are some common applications of LAN.

ADVANTAGES OF LAN:

a. RESOURCE SHARING: Computer resources like printers, modems DVD-ROM drives and hard disks can be shared with the help of LAN's. This reduces the cost and hardware purchase.

b. SOFTWARE APPLICATIONS SHARING: It is cheaper to use same software over network instead of purchasing separate licensed software for each client a network.

c. EASY AND CHEAP COMMUNICATION: Data and messages can easily be transferred over networked computers.

d. INTERNET SHARING:

- Local area network provides the facility to share a single internet connection among all the LAN users.
- In net cafes, single internet connection sharing system keeps the internet expenses cheaper.

e. DATA SECURITY: Since data is stored on server computers centrally it will be easy to manage data at only one place and the data will be more secure too.

DISADVANTAGES OF LAN:

a. HIGH SETUP COST: Although the LAN will save cost over time due to shared computer resources but the initial setup costs of local area networks is high.

b. PRIVACY VIOLATIONS:

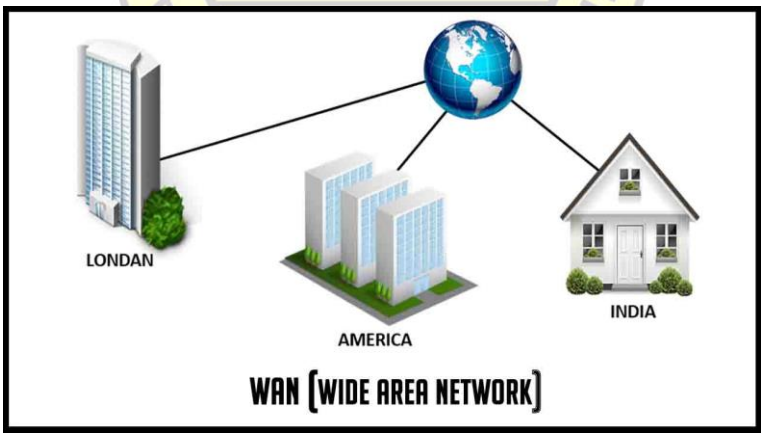
- The LAN administrator has the rights to check personal data files of each and every LAN user.
- Moreover administrator can check the internet history and computer use history of the LAN user.

c. COVERS LIMITED AREA: LAN covers a small area like one office one building or a group of nearby building.

d. LAN MAINTENANCE JOB: LAN requires a LAN administrator because there are problems of software installations or hardware failures or cable disturbances in local area network. A LAN administrator is needed at this full time job.

ii. WIDE AREA NETWORK (WAN):

- A wide area network connects computers which are very remotely placed. It may connect across the countries or the entire globe.
- Wide area networks are also referred to as long haul networks (LHNs)
- Wide area networks can either be,
  - Point to point type
  - Broad cast type
- In a point to point type network, the source and the destination machines are connected to each other via several intermediate routers.
- The broadcast type wide area networks (WAN) use satellite or ground radio system. All or some routers have antennas through which they can receive signal from the satellite. When a ground radio system is being used, the routers can communicated between each other.



CHARACTERISTICS OF WAN:

- WAN generally covers large distance (states, countries and continents)
- Communication medium in WAN are satellite, public telephone networks which are connected by routers.

ADVANTAGES OF WAN:

a. COVERAGE: WAN covers a large geographical area .So long distance business can connect on the one network.

b. SHARING: WAN shares software and resources with connecting workstations.

c. QUICK SENDING OF MESSAGES: with the help of WAN, messages can be sent very quickly to anyone else on the network. These messages can have pictures, sounds or data included with them called attachments.

d. SHARE EXPENSIVE THINGS: Expensive things such as printers or phone lines to the internet can be shared by all the computers on the network without having to buy a different peripheral for each computer.

DISADVANTAGES OF WAN:

a. GOOD FIREWALL: WAN needs a good firewall to restrict outsiders from entering and disrupting the network.

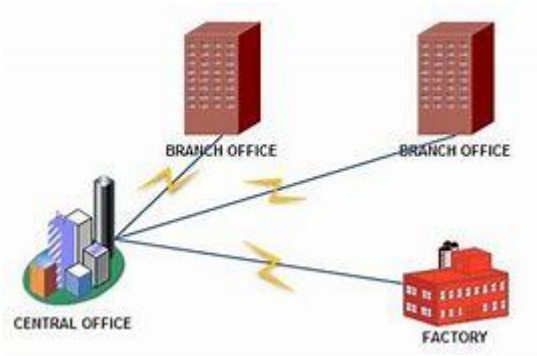
b. EXPENSIVE: Setting up a network can be an expensive, slow and complicated. The bigger the network the more expensive it is.

c. MAINTAINANCE: Once set up maintaining a network is a full time job which enquires network supervisors and techniques to be employed?

d. SECURITY ISSUES: Security is a real issue when many different people have the ability to use information from other computers. Protection against hackers and viruses adds more complex and expense.

iii. METROPOLITON AREA NETWORK:

- The metropolitan area network is larger than a LAN and it may cover areas as large a city.
- Metropolitan area network also called as MAN and it was developed in 1980's.
- MAN can be means to connecting number of LAN's into a large network or it can be a single cable.
- MAN is mainly hold and operated by single private company or a public company.



CHARACTERISTICS OF MAN:

- MAN generally covers towns and cities (50km)
- Communication medium used for MAN are optical fibers cables etc,
- Data rates adequate for distributed computing applications

ADVANTAGES OF MAN:

a. EFFICIENT: MAN is extremely efficient and provides fast communication via high speed carriers such fiber optic cables.

b. MORE ACCESS: metropolitan area network provides a good back bone for large network and provide greater access to wide area networks.

c. DATA TRANSMISSION:

- The dual bus used in MAN helps the transmission of data in both directions simultaneously.
- A MAN usually encompasses several blocks of a city or an entire city.

DISADVANTAGES OF MAN:

- Metropolitan area network **requires more cable** for a MAN connection from one place to another.
- It is difficult to make the system **secure from hackers and industrial espionage** (spying) graphical regions.

iv. WIRELESS NETWORKS:

Digital wireless communications is not a new idea earlier, more code was used to implement wireless networks. Modern digital wireless systems have better performance but the basic idea is the same.

Wireless networks can be divided into three main categories.

a. System interconnection
b. Wireless LANs
c. Wireless WANs.

a. SYSTEM INTERCONNECTION:

- System interconnection is all about interconnecting the components of a computer using short range radio.
- Some companies got together to design a short range wireless network called Bluetooth to connect various components such as monitor, keyboard, mouse and printers to the main unit without wires.
- In simplest form, system interconnection network use the master slave concept. The system unit is normally the master taking to the mouse, keyboard etc, as slaves.

b. WIRELESS LANs:

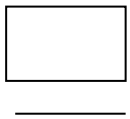
- Wireless LANs are the system in which every computer has a radio, modem and antenna with which it can communicate with other system.
- Wireless LANs are becoming increasingly common in small offices and homes.
- There is a standard for wireless LANs called IEEE 802.11, which most systems implement and which is becoming very widespread.

c. WIRELESS WANs:

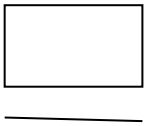
- The radio networks used for cellular telephones is an example of a low bandwidth wireless WAN. This system has already gone through three generations.
- The first generation was analog and for voice only.
- The second generation was digital and for voice only.
- The third generation is digital and is for both voice and for data.

WIFI network connection

Connected



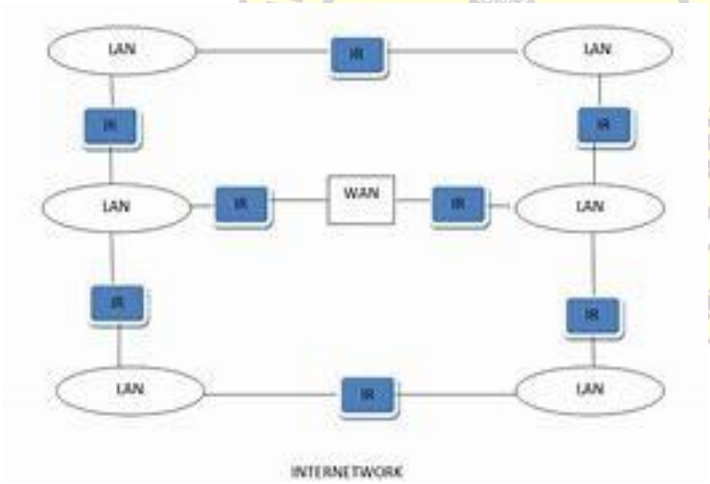
connected



Transmitting connection signals

v. INTER NETWORK (INTERNET):

- Inter network or internet is a combination of two or more networks.
- Inter network can be formed by joining two or more individual networks by means of various devices such as routers, bridges and gateways.



5. INTERNET:

- Internet is' network of networks'. A network is an interconnection of two or more autonomous computers such that they can share resources and information and when this happens on large scale or we can say globally is known as internet.
- Internet is a network of networks, an information superhighway and electronic web that connect people and business that have responsibility to networks.

- Internet is a huge repository (collection) of information on every possible and imaginable topic. It is fully scalable and doesn't determined user profile.
- The roots of the internet lie in a project called **the ARPANET** which was sponsored by United States department of defense – **ARPA** (advanced research projects agency)
- Internet is a communication network which bridges the entire small computer networks worldwide as a whole. Internet is based upon internet technology in particular World Wide Web (WWW) to build information system within organization or enterprise to accomplish standardization and automation.

5.1<u>CHARACTERISTICS OF INTERNET:</u>

The characteristics of internet are explained here as follows,

(i) **COMPLEX NETWORK**: Internet is a network of networks. Hence it is a complex network comprises of over 150 million computers.

(ii) **DECENTRALIZED SYSTEM**: Internet is a decentralized system because millions of individual networks and over 150 million individual computers connected throughout the world.

(iii) **COMPOSED OF BILLIONS OF FILES**: In internet, files pertaining to thousands of subject's, disciplines and professions are available in a numerous forms of file formats.

(iv) **WIDE USAGE**: Internet has wide usage. More than 147 million people use the internet over 40 million of whom use it every day.

(v) **INTERNATIONAL SCOPE:** This global network is accessed by people in approximately 140 countries. People in 155 countries use internet e-mail, a facility for instant messaging.

(vi) **DYNAMIC**: Internet is a dynamic one because it is changing every minute of every day. On average, a network is connected to the internet every 30 minutes presently.

(vii) **EXPONENTIAL EXPANSION**: The internet is growing at a rate of 12% per month. It doubles in size every 18 months. This is enormous growth of facility available almost free.

(viii) **DISORGANIZED**: The internet can be cumbersome and confusing even for experienced users.

5.2 ARCHITECTURE OF INTERNET:

The architecture of internet is hierarchy in nature. A brief description of the internet architecture is as follows,

(i) **CLIENT:** client is user of computer at home or to a LAN network is at the lowest level in hierarchy.

(ii) LOCAL INTERNET SERVICE PROVIDER (ISP):

- An ISP is an organization that has its own computer connected to the internet and provides facility to individual users to connect to internet through their computer.
- Internet service provider is the agency which enables users to access internet services. The ISP is equipped with all tools and technology to provide internet services.
- **EXAMPLES,** BSNL (Bharat Sanchar Nigam ltd), Airtel, and MTNL (Mahanagar Telephone Nigam ltd)

(iii) REGIONAL ISP:

- The local ISP is connected to regional ISP.
- The regional ISP connects the local ISP's located in various cities via routers.
- A router is a special hardware system consisting of a processor, memory and an I/O (input - output) interface, used for the purpose of interconnecting networks.

(iv) BACKBONE:

- Backbone is at the top of the hierarchy.
- Backbone networks are connected to regional ISP's with a large number of routers through high speed fiber optics.
- Backbone operators are large corporation which have their own server forms connected to the backbone. There are many backbones existing in the world.
- Network access point (NAP) connects different backbones so that packers travel across different backbones.

5.3 ADVANTAGES OF INTERNET:

(i) **EMPLOYMENT OPPORTUNITIES:** With increasing presence of organizations on the net many career opportunities have been created like that of web administrators, web designers and web developers.

(ii) **IMPROVED DATA FLOW:** E-mails can be delivered in matter of minutes anywhere in the world which enhances the flow of data.

(iii) **ACCESS TO KNOWLEDGE**: The internet can be easily considered as a vast encyclopedia containing the latest information on almost all the subjects.

(iv) **NO DISCRIMINATION:** Internet does not discriminate between users. It allows communication to take place all over the world without preference being given to a specific person, organization or country.

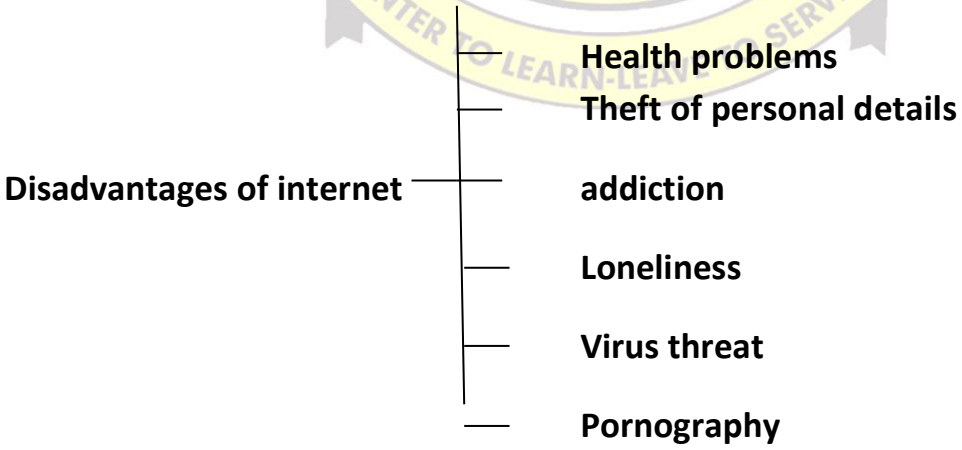
(v) **IMPROVED AVAILABILITY:** The servers around the world are constantly up and running making information available round the clock.

(vi) **ONLINE COMMUNICATION:** The internet offers online facility that is a two way communication interaction unlike letters, telegrams faxes which are essentially one way communication.

(vii) **REDUCED COST:** Unnecessary and avoidable expenditure such as stationary or printing, cost mailing cost etc is not involved in the internet operations.

(viii) **E-BUSINESS:** All sorts of business functions like ordering of items, making quotations, payment of bills exchange of business documents can be carried out on the internet.

5.4DISADVANTAGES OF INTERNET:



i. HEALTH PROBLEMS: Internet gaming gives people longtime exposure to computer screens and bad sitting posture which can lead to various health problems.

ii. THEFT OF PERSONAL DETAILS: while using the internet, there is high probability that personal details like name, address and credit card number may be accused by cheater and used for fraudulent purposes.

iii. ADDICTION: Some people are getting addicted to the internet and thus causing problems with their interactions of friends and loved ones.

iv. LONELINESS: People that use the internet often are more likely to become lonely and depressed that those don't.

v. VIRUS THREAT:

- Virus is a program that interrupts the usual operations of personal computer system
- Personal computers linked to the internet have high probability of virus attacks and as a result of this hard disk can crash giving user a lot of trouble.

vi. PORNOGRAPHY: Pornography is definitely harmful for children. There are numerous pornography sites are available over the internet and watching any of those can have very bad influence on the mental health of children.

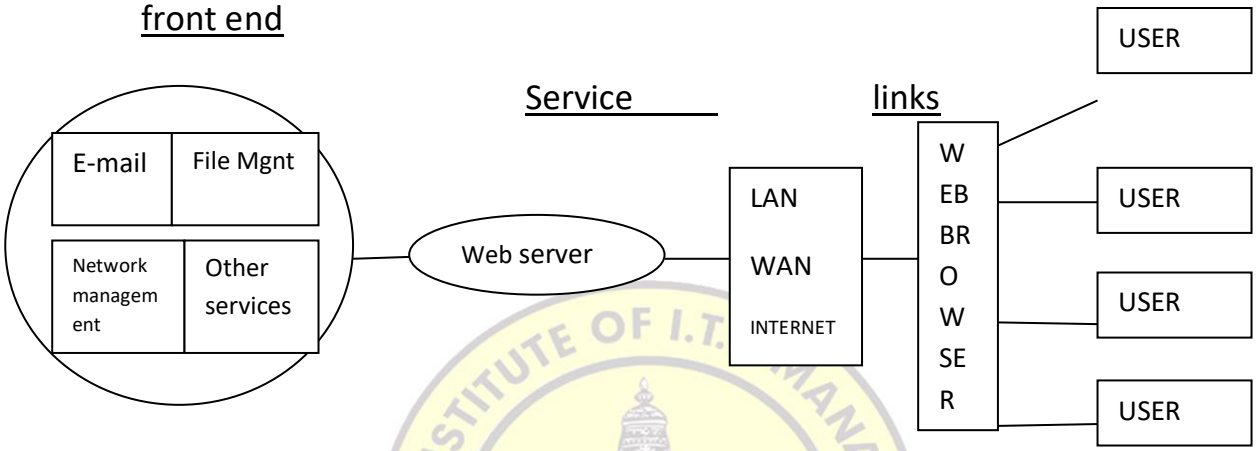
6. INTRANET AND EXTRANETS:

6.1: INTRANET:

- Intranet generally consists of internal corporate web servers made available to employees across the LAN.
- Using the corporate databases and other repositories of information and documents these web servers bring diverse kinds of information to employees.
- Intranet use internet technology to deliver can organizations internal information. This includes integration of e-mails, FTP (file transfer protocol) mail server and web server with the internal applications the user interface is provided by the web browsers.
- The objective of intranet is to organize each individual desktop with minimal cost time and effort to be more productive, cost efficient, timely and competitive with an intranet access to all information

applications and the departments in an organization which could browser.

- The department in an organization which could benefit by implementing an internet includes finance, sales and marketing manufacturing, R&D, personal and customers support.



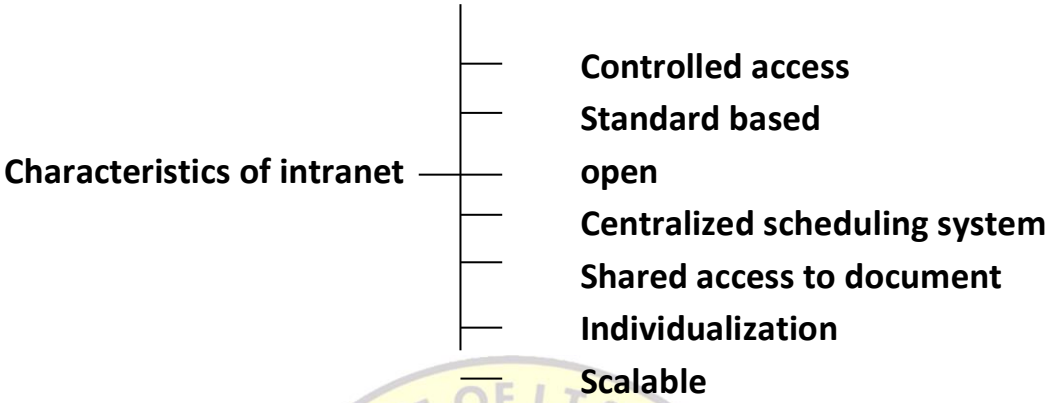
ELEMENTS OF INTRANET

The essential components of an intranet include the following,

- A network
- Transmission control protocol/intranet protocol on servers and clients
- Hardware for hosting intranet services
- Software mail server and web servers
- Browsers
- Proxy servers
- E-mail remote user agents

6.2: CHARACTERISTICS OF INTRANET:

The characteristics of intranet includes the following,



i. CONTROLED ACCESS:

- Intranet should be password protected.
- It should allow different levels of access. Controlled access makes intranet more flexible and greatly widens the range of uses.

ii. **STANDARD BASED:**

- Intranet and web technologies are based on open system technology standards and have two basic promises ensure the viability of internet network and be scalable on a global basic.

iii. **OPEN:**

- Web is platform neutral and global and web browsers functions as universal clients; web technology is based on open standards and is available for almost all leading operating system and hardware platforms.

iv. **CENTRALIZED SCHEDULING SYSTEM**:

- A centralized scheduling system ensures that everyone stays on the same page.
- It allows meeting and events and team level.

v. **SHARED ACCESS TO DOCUMENT**:

- If intranet doesn't provide shared access to documents to the users it is really not intranet.

vi. **INDIVIDUALIZATION:**

- Intranets should ideally conform to the individual user.
- The idea is that intranets should be comfortable and convenient for a variety of employees with a varying range of responsibility.

vii. **SCALABLE**:

- Web based intranets are fully scalable from 10 documents to 10 million.
- Intranet can serve its constituents truly as long as network bandwidth suffices to meet user demands.

6.3: NEED OF INTRANET:

The need of intranet is explained here as follows,

(i) TO CUT COSTS:

- The cost effectiveness is the mantra in the today's competitive world.
- Intranet attempts to streamline flow of information and is user directed. That saves on time and cost of communicating information.

(ii) DYNAMICS OF MARKET:

- Today changes take place more quickly in the market and company than ever before.
- Therefore, the information needs to be reported and exchanged more quickly among all those associated with the company including employees, customers and vendors.

(iii) **CHANGING WORK ENVIRONMENT:**

- As the business and markets become scattered employees have to be mobile and away from office.
- Thus it becomes imperative for the workforce to sue less expensive means of communication to remain in touch with the office.

(iv) CUSTOMER SUPPORT:

- The increasing role of customer support in the marketing strategy has changed the whole concept of communication in enterprises.
- A direct contact of the customer with the customer support department through intranet directs the job specialist and ensures better handling of complaints.

6.4: ADVANTAGES OF INTRANET:

Advantages of intranet are explained as follows,

(i) **TIME**: With intranets organizations can make more information available to the employee on a pull basis (i.e., employees can link to relevant information at a time which suites them)

(ii) COMMUNICATION:

- Intranets can serve as powerful tools for communication within an organization vertically and horizontally.
- Intranets are useful to communicate strategic initiatives that have a global reach through the organization.
- By providing the information on the intranet, staff has the opportunity to keep up to date with the strategic focus of the organization.

(iii) **BUSINESS OPERATIONS AND MANAGEMENT**: Intranets are also being used as a platform for developing and deploying applications to support business operations and decisions across the internetworked enterprise.

(iv) **ENHANCE COLLARATION:** with information easily accessible by all authorized users teamwork is enabled.

(v) **COST-EFFECTIVE:** Users can view information and data via web browser rather than maintaining physical documents such as procedure manuals, internal phone list and requisition forms.

6.5: DISADVANTAGES OF INTRANETS:

The disadvantages of intranets are given here as follows,

(i) PERFORMATION LIMITATIONS:

- Some applications that have been well optimized for conventional and proprietary systems create a heavy system workload when migrating them to an internet platform.
- This problem will reduce with enhanced internet technologies and continuing improvements in hardware performance

(ii) **PRESENTATIONAL ISSUES:** Some people whose experience is rooted in paper presentations want web pages (for e.g.) to look like printed equivalents and burden the systems and their users with unnecessary and sometimes tedious “graphics”.

6.6: EXTRANETS:

- An extranet is a private network that uses the internet protocol and public telecommunication system to securely share part of business information or operations with suppliers, vendor's, partners, customers or other business.
- An extranet can be viewed as a part of a company's intranet that is extended to users outside the company usually via the internet.
- An extranets give the assistance to the firm to exchange and process the high volumes of business data from one computer to another.
- Extranet applications help to improved business efficiency by improving data flow and in accuracy reduction.
- Extranet also reduces the need to re-enter the data from paper documents and thus prevent secretarial errors.

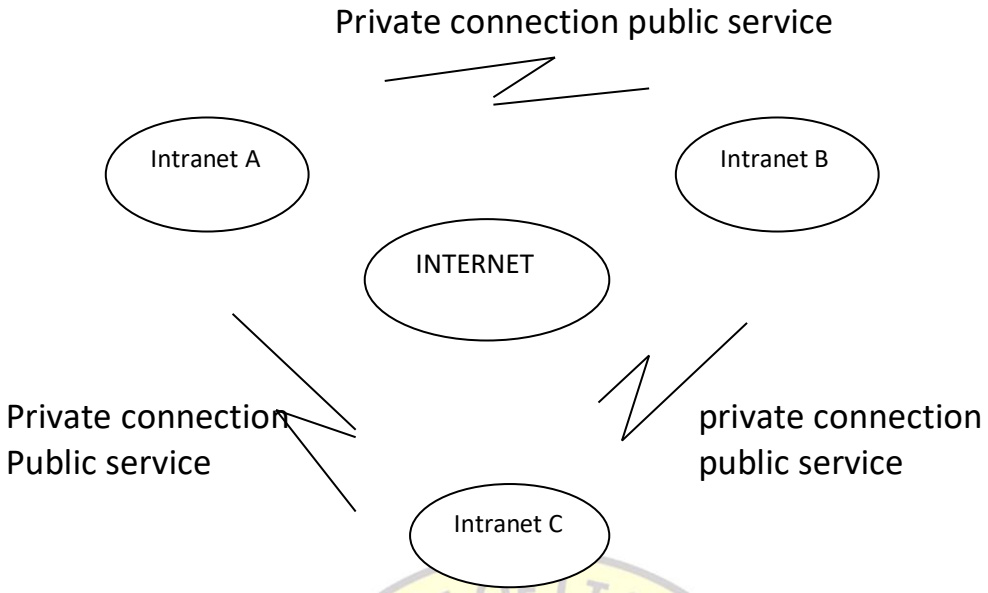
DEFINITION:

"Companies use the extranets to be in touch with customers, merchants, trading partners, suppliers and several others who contribute to the operating effectiveness".

-ACCORDING TO ANANDARAJAN

6.7; ARCHITECTURE OF EXTRANETS:

- An extranet uses the transaction control protocol internet protocol to link; intranets in different locations.
- Extranet transactions are usually conducted over the internet which offers little privacy or transmission security. Therefore it is necessary to add security features. This is done by creating tunnels of secured data flows using authorization algorithms to provide secure transport of private communications.

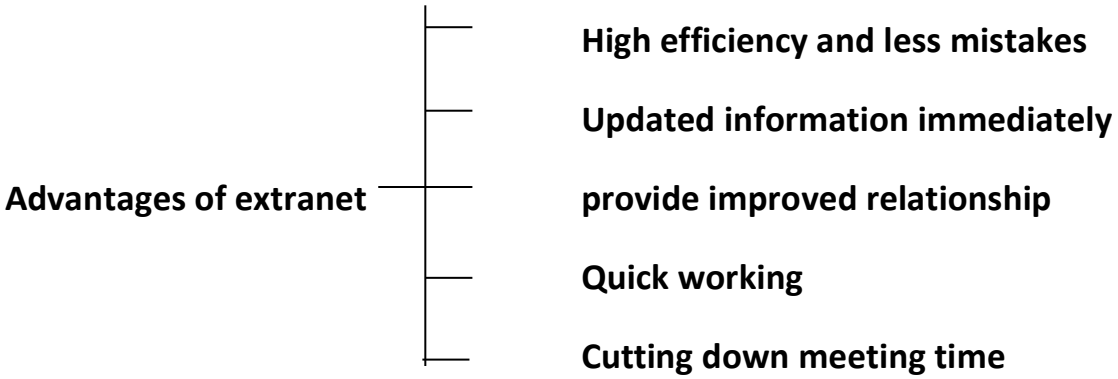


ENTRANET CONNECTION

- Extranets provide secured connectivity between a corporation intranets and the intranets of its business partners, materials suppliers ,financial services ,government and customers
- Access to an extranets is usually limited by agreements of the collaborating parties is strictly controlled and is available only to authorized personnel.
- The protected environment of an extranet allows partners to collaborate and share information and to perform these activities security.
- Because an extranet allows connectivity between business through the internet it is an open and flexible platform suitable for supply chain activates.
- To further increase security many companies replicate the portions of their database that they are willing to share with their business partners and separate them physically from their regular intranets.

6.8: ADVANANTAGES OF EXTRANET:

The advantages of extranets are given here under



(i) HIGH EFFICIENCY AND LESS MISTAKES:

- Extranet helps improve company efficiency and output by automating procedures that were done manually in the past.
- Automation can also decrease the scope of mistake

(ii) **UPDATAED INFORMATION IMMEDIATELY**: Information can be modified, updated and charged immediately on an extranet. All approved members thus have instant access to the most advanced information.

(iii) **QUICK WORKING:** with the help of extranets work is done quickly as compared to past manual systems.

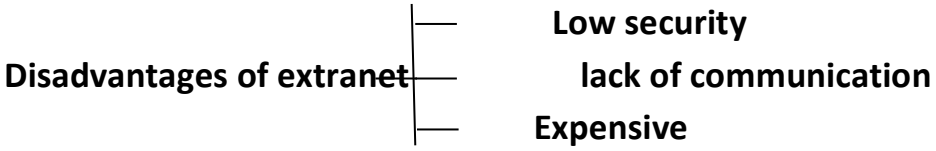
(iv) **PROVIDE IMPROVED RELATIONSHIP**: Extranets can help in improving relationship with main or potential customers by giving those correct prices and efficient information.

(v) CUTTING DOWN MEETING TIME:

- Extranets permit company information to be analyzed at period suitable of business customer's, partner's, suppliers, employees and others. This helps in cutting down the conference/meeting times.
- It also helpful when doing multinational business having with partners located in different countries.

6.9: DISADVANTAGES OF EXTRANETS:

Disadvantages of extranets include;



(i) LOW SECURITY:

- Security of extranets can be a big concern when dealing with valuable information.
- System access needs to be carefully controlled to avoid sensitive information falling into the wrong hands.

(ii) LACK OF COMMUNICAITON:

- Extranets can reduce personal contact (face to face meetings) with customers and business partners.
- This could cause a lack of connection made between people and a company.

(iii) **EXPENSIVE**: Extranets can be expensive to implement and maintain within an organization (example, hardware, software, employee training costs) if hosted internally.

7. OPERATION OF THE INTERNET:

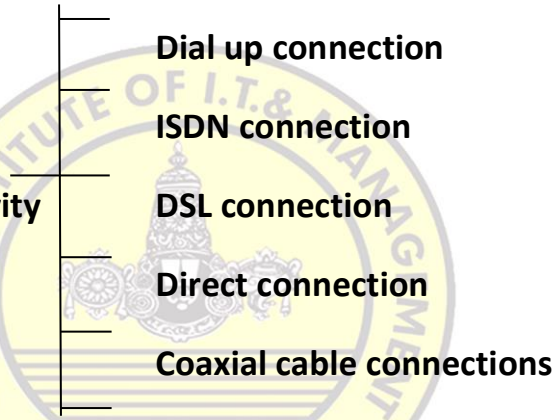
- Internet can potential link the computer to any other computer. Anyone with access to the internet can exchange text, data files and programs with another user.
- For all practical purposes, almost everything that happens across the internet is a variation of one of these activities.
- The internet itself is the pipeline that carries data between computers.
- Most computers are not connected directly to the internet. Rather they are connected to smaller networks that connect to the internet backbone through gateways.
- This is the fact why the internet is described as a 'network of networks'.

INTERNET CONNECTIVITY:

- Several types of high-speed internet connections also known as broadband are available today like cable modem, satellite, wireless broadband and fiber optic in some countries.
- The bandwidth delivered by internet connections is loosely categorized as low, medium or high.

7.1: TYPES OF INTERNET CONNECTIVITY

The types of internet connectivity are given as follows,



(i) DIAL UP CONNECTION:

- Dial up modem connections also called intermittent connection is the most common type of internet connection.
- Dial up modems are popular among individual and small to mid-sized organizations because they are in expensive and easy to install and maintain.

(ii) **ISDN (INTEGRATED SERVICES DIGITAL NETWORK) CONNECTION**:

- ISDN is a low to medium bandwidth digital connection.
- A dual channel ISDN connection can combine both phone (voice) and internet (data) transmissions simultaneously.

(iii) **DSL (DIGITAL SUBSCRIBER LINE) CONNECTION**:

- DSL is a high bandwidth digital connection.
- DSL is a new emerging type of internet connectivity that delivers high-speed bandwidth (similar to coaxial cable modems).

(iv) DIRECT CONNECTION:

- Direct connection also called as persistent connections offer highest bandwidth of all connection types.
- Direct connections do not use a modem or anything; instead they involve a continuous high speed connection to an internet service powder.

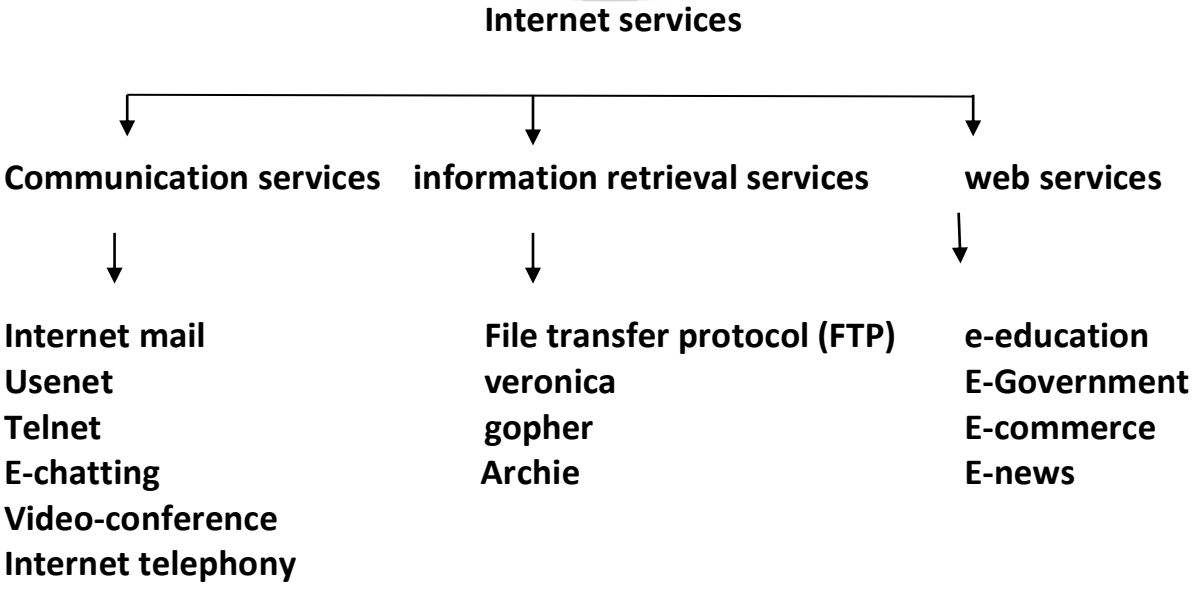
(v) **COAXIAL CABLE CONNECTIONS**: A new internet connectivity technology has emerged that yields high bandwidth at a relatively low expense. This technology is used primarily by consumers not businesses.

(vi) **REPURPOSED CABLE TV**: A coaxial cable internet connection utilizes your current cable television connection. The main benefits of cable internet connectivity are high bandwidth.

8. SERVICES PROVIDED BY THE INTERNET:

- An internet service provider (ISP) is an organization that provides services for accessing, using, or participating in the internet.
- Internet service provides may be organized in various forms such as commercial, community owned, non profit or private owned.
- Internet service providers in India include,

a. **BSNL**: servicing all of India except Mumbai and Delhi
b. **MTNL**: serving Mumbai and Delhi
c. **JIO**: Serving all over India etc,



1. COMMUNICATION SERVICES:

Communication services through internet include the following,

(i) INTERNET MAIL:

- Electronic mail is the oldest service on the internet and still the most dominant.
- E-mail enables one to send information in the form of letters, messages advertisements, spreadsheets, game, and programs across the net to one or more internet addresses.
- E-mail on the internet is inexpensive, volume independent and distance independent. As an internet user, one can send and receive message from anyone else on the internet.

(ii) USENET:

- Usenet is a worldwide replicated bulletin board network with thousands of topic that individual around the world discuss constantly.
- User will find that it is an unparalleled resource for solving technical especially computer and computer networking problems
- For any problem user can be assured that someone has already faced that problem and found a solution to it.
- Many companies also provide technical support in newsgroup.

(iii) TELNET:

- Telnet is a protocol or set of rules that connects one computer to another computer.
- The user's computer which initiates the connect icon is referred as local computer and the machine being connected to which accepts the connection is remote or host computer.
- Once connected the user computer emulates the remote computer. When user types in commands they are executed on remote computer.

(iv) E-CHATTING:

- Chatting on the internet has become a popular way for people to connect online in a group to share similar interests.
- Chatting is like talking except that one type of words rather than speak.

(v) VIDEO CONFERENCING:

- Video conferencing is an emerging service on the internet that allows a group of users located around the globe to talk and interact with each other.

- The parties interacting can see each other on their computer screens and can hear each other's voice through special audio device fixed in their computers.

(vi) **INTERNET TELEPHONY:** Internet telephony is the use of internet rather than the traditional telephone to exchange spoken or other telephonic information.

2. INFORMATION RETRIEVAL SERVICES:

(i) FILE TRANSFER PROTOCAL (FTP):

- File transfer protocol is a protocol or set of rules which enables files to be transferred between computers.
- File transfer protocol works on client/server principle. A client program enables the user to interact with a server in order to access information and services on the server computer.
- Files that can be transferred and stored on computers called FTP servers.

(ii) VERONICA:

- Veronica is a tool for searching the items on gopher menus throughout the internet.
- With the help of veronica, user can get necessary information very rapidly. Any user can easily access any database with the help of veronica server.

(iii) GOPHER:

- Gopher is a protocol designed to search, retrieve and display documents from remote sites on the internet.
- In addition to document display and document retrieval, it is possible to initiate on line connections with other systems via gopher.
- Information accessible via gopher is stored on many computers all over the internet. These computers are gopher servers.

(iv) ARCHIE:

- Archie means thousands of FTP services around the world offering more files than user imagine.
- The role of Archie is to make the whole system manageable by helping user find what he need. There are number of Archie servers around the net each of which consists of a database of most of the files.

3. WEB SERVICES:

(i) **E-EDUCATION**: E-education refers to the applications of internet to the delivery of learning experiences. E-education takes place in formal electronic classrooms on corporate intranets used for just in time trainings, audio and video conferencing.

(ii) **E-GOVERNMENT:** E-government describes the use of technologies to facilitate the operation of government and disbursement of government information and services.

(iii) **E-COMMERCE**: E-commerce is the buying and selling of product or service over electronic systems such as internet and other computer networks.

(iv) **E-NEWS**: Internet now has literally thousands of electronic form of news that can be found both for free and low cost.

(v) **E-RECRUITMENT**: It is also known as online recruitment is the practice of using technology and in particular web-based resources for finding, attracting assessing, interviewing and hiring new personnel.

9. WORLD WIDE WEB (WWW):

- The World Wide Web (www) also called the web is an information space where documents and other web resources are identified by uniform resource locations (URLs) interlinked by hypertext links and accessible via the internet.
- English scientist **TIM BERNERS-LEE** invented the World Wide Web in **1989**.
- Web is a huge collection of pages of information linked to each other around the globe. With a web browser, one can view web pages. Web utilizes browsers such as internet explorer to access web pages.
- Web uses the HTTP (hyper text transfer protocol) one of the languages over the internet to transmit data.

9.1: COMPONENTS OF WORLD WIDE WEB:

Components of WWW includes,

(i) HTML (HYPER TEXT MARKUP LANGUAGE):

- HTML is an authorizing language used to create documents on The WWW.
- HTML defines the structure and layout of a web document by using variety of tags and attributes.
- The correct structure of HTML document starts with > HTML > < HEAD > (this is what is about) < BODY > and ends with </BODY> </HTML >

(ii) UNIVERSAL RESOURCE LOCATOR (URL):

Uniform resource locator is an addressing protocol for objectives in WWW. This include,

a. **UNIVERSAL RESOURCE NAMES (URN):** It is the name of a document that may be available from several at difference URLs.

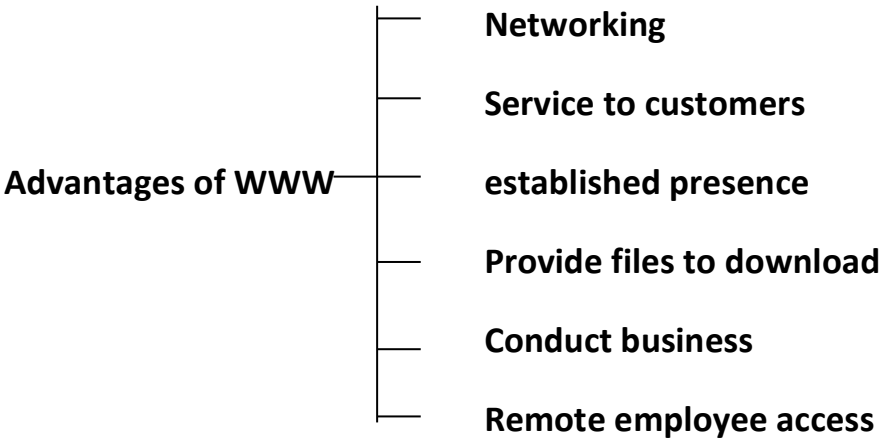
b. **UNIVERSAL RESOURCE LOCATORS (URLs):** A URL is a unique address for website or webpage.

(iii) **HTTP (HYPER TEXT TRANSFER LANGUAGE):** HTTP defines how messages are formatted and transmitted and what actions web servers and browsers should take in response to various commands. Sending and receiving messages can be done through HTTP.

(iv) CGT (COMMON GATEWAY INTERFACE):

- The CST is a standard way for web server to pass a web users request to an applications program and to receive data back to forward to the user.
- When the user requests a web page, the server sends back the requested page.

9.2: ADVANTAGES OF WORLD WIDE WEB:



(i) **NETWORKING**: WWW develops lines of communication that promote contact with potential clients and organization.

(ii) SERVICE TO CUSTOMERS:

- Customers can have access to business information and services that may not be available any other way.
- Clients can be from anywhere in the world and shop in organizations store like never before and from the comfort of their homes.

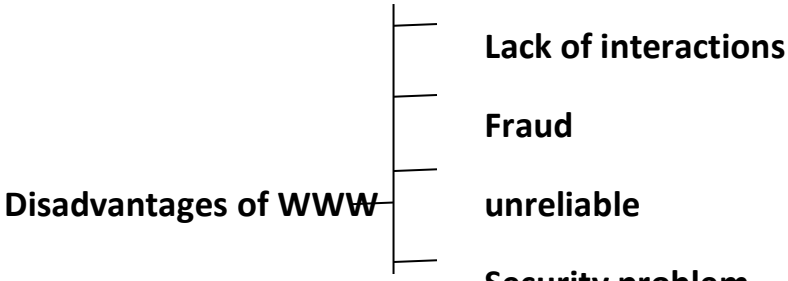
(iii) **ESTABLISHED PRESENCE:** Over seven million people have access to the WWW with more and more added every day. Modern companies can easily and inexpensively expand with a new store.

(iv) **PROVIDE FILES OT DOWNLOAD**: All pamphlets, brochures, advertisements and even a demonstration video of product or service can be downloaded from website.

(v) **CONDUCT BUSINESS**: The website can provide customers with the tools needed to locate the exact product that they are looking for and the forms needed to purchased any item or serviced online with these organizations are conducting their business.

(vi) **REMOTE EMPLOYEE ACCESS:** Employee in of satellite may need up-to the minute information to properly accomplish their tasks. Sensitive information can be protected with a password for employee access only.

9.3: DISADVANTAGES OF WWW:



(i) **LACK OF INTERACTIONS:** WWW may separate and isolate people as the person may spend all their time on internet instead of interacting people face to face.

(ii) **FRAUD:** WWW may enable frauds. Fraud over the web is popular because of its anonymity and ease of promotion and its lack of borders.

(iii) **UNRELIABLE**: WWW may distribute unreliable and unchecked information.

(iv) **SECURITY PROBLEM**: WWW may threat national security. Most of the security problems encountered on the web are due to human mistakes.

UNIT-4

IMPORTANT QUESTIONS

1. Discuss the concept of data communications
2. What are the services provided by the internet? Explain
3. Explain about types of data communication networks
4. What is computer network? Explain concepts of computer network.

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(17E00107) INFORMATION TECHNOLOGY FOR MANAGERS

The main objective of this course is to make the student familiarize in information technology and their applications to business processes.

1. **Fundamentals of IT:-** Components of a system - Meaning and nature – Role of IT in various sectors - Information technology management - Strategies for gaining IT advantage.
2. **Database Management Systems:** Introduction to DBMS - Applications to data base -concepts, data access methods – Types of data processing-data base languages
3. **Understanding Ms-Office:**- MS-Word - MS-Excel - Formulae, Graphs, Basis Statistical Formulae, MS-Access, MS-PowerPoint - Creating Effectiveness presentations.
4. **Data Communication and Networks:** Concepts of Data Communication, Types of Data-Communication Networks, Communications Media, Concepts of Computer Networks, the Internet, Intranet and Extranets: Operation of the Internet, Services provided by Internet, World Wide Web.
5. **Emerging Trends in IT:** Introduction to SAP, IP addresses, IP protocol, various ERP packages, Implementation of ERP - Introduction to big data - cloud computing

Textbooks:

- Fundamentals of Information Technology, Alexis Leon, & Mathews Leon - Vikas.

References:

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- Introduction to Computers and Communications, Peter Norton-Sixth Edition-Tata McGraw Hill.
- V.Rajaraman, Introduction to Information Technology, Prentice Hall India.
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UNIT-5

EMERGING TRENDS IN IT

1. INTRODUCTION TO SAP:

- 21st century has been defined by application of and advancement in information technology. Information technology has become an integral part of our daily life.
- According to Information Technology Association of America, information technology is defined as the study, design, development, application, implementation, support or management of computer based information systems.
- Information technology has served a big change agent in different aspects of business and society. It has proven game changer resolving economic and social issues.
- Advancement and application of information technology are ever changing. Some of the trends in the information technology are dealt in this chapter.

1.1: SYSTEMS, APPLICATION AND PRODUCTS (SAP):

- One of the most popular business process oriented ERP solutions can be considered as SAP.
- An integrated system which facilitates the major business operations such As sales, production and financial accounting are offered by SAP.
- The real time updating and processing of transactions are facilitated by these applications which allow the effortless integration and communication between the various fields of a business.
- Time to time new versions with enriched features is released by SAP. SAP ERP system is the new form of older SAP R/3.

1.2: SAP APPLICATION MODULES:

SAP business structures consists of following modules,

(i) FINANCIAL ACCOUNTING (FI):

- FI is mainly used for collecting the important corporate data related to accounting.
- FI facilitates the service of full documentation and latest information for enterprise wide planning and control activities.

(ii) **PRODUCT PLANNING (PP):**

- Product planning is used for facilitating the overall processes for entire manufacturing including from make to order, lot and make to stock manufacturing, repetitive to integrated supply chain management.

(iii) **CONTROL (CO**):

- These are the compatible planning and control instrument for organization wide controlling systems having a uniform reporting system for the coordination of various processes of any firm.

(iv) **HUMAN RESOURCE MANAGEMENT (HRM):**

- HRM uses in planning and management of human resource of a firm so that various activities of personnel management can be made easily.

(v) **MATERIALS MANAGEMENT (MM):**

- Materials management is mainly implemented for optimizing various purchasing process having workflow driven processing functions allowing automated supplier evaluation, minimizing procurement and cost of warehousing with exact inventory and warehouse management.

(vi) **SALES AND DISTRIBUTION (SD**):

- This element helps in sales and distribution activities with outstanding functions for prompt order processing, pricing, interactive multi level variant configuration and on time delivery.

1.3: SAP INDUSTRY SOLUTIONS:

- In depth functionality for 21 business groups is provided by SAP industry solutions which are based on strong functions and overall capabilities of cross industry solutions.
- There are two classifications which can be used for these solutions.

MANUFACTURING	SERVICE
Aerospace and defense	Banking
Automotive	Financial service providers
Chemicals	Healthcare
Consumer products	Higher education and research
Engineering and constructions	Insurance
High technology	Media
Mining	Retail
Oil and gas	Service providers
Pharmaceuticals	telecommunications

1.4: ADVANTAGES OF SAP:

Advantages of SAP include,

(i) SAP allows easier global integration.

(ii) SAP allows bridging some barriers like currency exchange rates, language, and culture automatically.

(iii) SAP provides real time information.

(iv) SAP reduces the possibility of redundancy errors.

(v) By using SAP ,company or enterprise have more efficient work environment

(vi) SAP provides a good knowledge like an expert about building and implementing of a system

1.5: DISADVANTAGES OF SAP:

Disadvantages of SAP include,

(i) A conduct is required to sign by the company of use SAP software and it holds that companies to the vendor until expiry of contract.

(ii) SAP is inflexible because sometimes vendor package doesn't fit a company's business model.

(iii) To implement and use SAP can be very expensive.

2. IP ADDRESSES:

- IP address refers to an internet protocol address which is a numerical label assigned to each device connected to a computer networking that uses the internet protocol for communication.
- An IP address serves two principal functions host or network interface identification and location addressing.
- IP address are usually written and displayed in human readable notations such as 172.16.254.1 in IPV4, and 2001:db8:0:1234:0:567:8:1 in IPV6
- Internet protocol version 4 (ipv4) defines an IP address as a 32 bit number. However because of the growth of internet and depletion of available ipv4 address a new version of IP (IPV6) using 128 bits for the IP address was developed in 1995.
- The IP address allow user to pinpoint internet. An IP address consists of four numbers each can contain one to three digits. These numbers are separated with a single dot (.). These four numbers can range from 0 to 255.

2.1: TYPES OF IP ADDRESSES:

The IP addresses can be classified into two. They are listed below,

(i) STATIC IP ADDRESSES:

- As the name indicates, static IP address usually never change but they may be changed as a result of network administration.
- Static IP address serve as a permanent internet address and provide a simple and reliable way for the communication.
- From the static IP address of a system one can get many details such as the continent country region and city in which a computer is located.
- The internet service provider (ISP) that serves that particular computer and non technical information such as latitude and longitude of the country and the locale of the computer.

(ii) DYNAMIC IP ADDRESSES:

- Dynamic IP address is the second category of IP address.
- Dynamic IP addresses are temporary IP addresses. These IP addresses are assigned to a computer when they get connected to the internet each time.

- They are actually borrowed from a pool of IP addresses shared over various computers.
- Static IP address is considered as less secure then dynamic IP address because they are easier to track.

  Relating to versions of IP addresses they are or of 2 types,

(i) **IP VERSION 4 (IPV4):** Internet protocol version 4 consists of 32 bit and can accommodate more than 4,294,967,296 hosts worldwide.

(ii) **IP VERSION 6 (IPV6):** With the increased number of network users from day to day, IPV6 with 128 bits was created.

2.2: FUNCTONS OF IP ADDRESS:

An IP address serves two principal functions;

(i) HOST OR NETWORK IDENTIFICATION:

- This function is illustrated as the person's name as a method to identify who the person is.
- In a computer network also applies the same thing that a unique IP address will be used to identify a computer or device on a network.

(ii) NETWORK LOCATION ADDRESSING:

- This function is illustrated as our home address that indicates the location where we are.
- To facilitate delivery of data packets the IP address contains information of its existence.
- There is a route to be followed so that data can get to the destination computer.

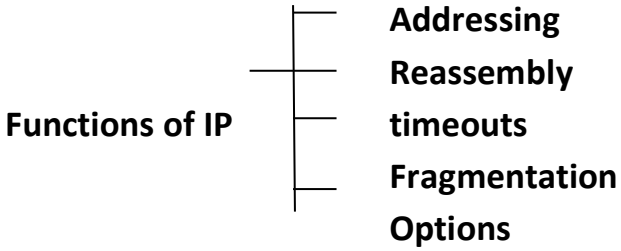
3: IP PROTOCOL:

- Internet protocol is the principal communications protocol in the internet protocol suite (set of communication protocols used on the internet) for relaying datagram's (basic transfer unit associated with a packet – switched network) across network boundaries.
- Internet protocol has the task of delivering packets from the source host to the destination host solely based on IP address.
- The first major version of IP internet protocol version 4 (IPV4) is the dominant protocol of the internet, its successor internet protocol

version 6 (IPV6) has been growing in adoption for the last years reaching almost 25% of the internet traffic as of October 2018.

3.1: FUNCTIONS OF INTERNET PROTOCOL:

Functions of IP include the following;



(i) ADDRESSING

- IP packet headers contain addresses that identify the sending computer and the receiving computer.
- Routers use this information to guide each packet across communication networks and connect the sending and receiving computer.

(ii) REASSEMBLY:

- Messages between computers are broken into packets.
- Since most messages are too big to fit in one packet and since packets are not sent in only organized order.
- So they must be reassembled as they arrive at recipient.
- IP dictates how packets are reassembled into usable messages.

(iii) TIMEOUTS:

- Each IP packet contains a time to live (TTL) field.
- Every time when router handles a packet TTL field is decremented.
- If a packets defined lifeline expires the packet is destroyed so that the internet doesn't get overloaded with broken packets wandering aimlessly.

(iv) FRAGMENTATION:

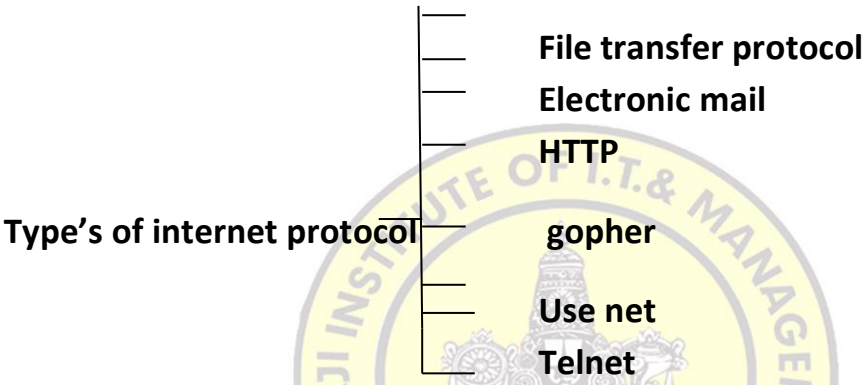
- IP packets may be split or garmented into smaller packet.
- This fragmentation permits a large packet to travel across a network which can only handle smaller packets.
- IP fragments packets transparently.

(v) OPTIONS:

- IP includes optional features such as allowing the sending computer to decide the path its packets take to get to the receiving computer.
- Also to trace the path they take over to include added security in the packets.

3.2: TYPES OF IP:

Several protocols are used on the internet and these include following things,



(i) FILE TRANSFER PROTOCOL:

- File transfer protocol or FTP is a means of transferring a file from one computer to another.
- FTP is commonly used for uploading a web page to a web server so that it may be seen on World Wide Web.
- A special program, called a client is usually needed to use FTP.

(ii) ELECTRONIC MAIL:

- Email protocol includes three distinct protocols like SMTP (simple mail transfer protocol), IMAP (internet message access protocol) and POP3 (post office protocol 3)
- SMTP is a protocol used for sending mail, while IMAP and POP3 are used for receiving.
- Mostly SMTP is used for sending and POP3 used for receiving mails.

(iii) **HTTP (HYPER TEXT TRANSFER PROTOCOL**):

- HTTP is the protocol used by web server to allow web pages to be shown in a web browser.

- If you look up into the address bar of your web browser the place where you type in the address that you want to visit it has prefix “HTTP://” in front of address.

(iv) GOPHER:

- Another tool of internet is gopher, a menu based program that enables user to browse for information without knowing where the material is located.
- Gopher lets a user to search a list of resources and when sends the material.

(v) USENET:

- Network news transfer protocol (NNTP) is used for serving user net posts.
- Usenet is divided into several areas. Some of the forums included in Usenet are,
- **COMP.** for discussion of computer-related topics.
- **SCI.** for discussion of scientific objects.
- **REC.** for discussion of recreational activities (games and hobbies).
- **TALK.** For discussion of continuous issues (like religion and politics).

(vi) TELNET:

- Telnet lets you log into a remote computer.
- So any commands that user would be able to run from the remote computer if he/she were sitting in front of it, he/she would be able to run from computed they logged in from.

4: VARIOUS ERP PACKAGES:

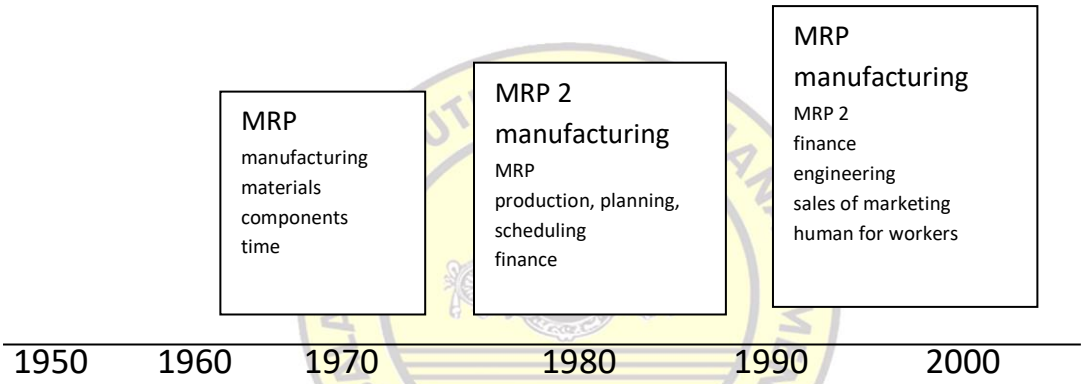
4.1: ENTERPRISE RESOURCE PLANNING:

- Enterprise resource planning (ERP) is the integrated management of core business processes often in real time and mediated by software and technology
- ERP is usually referred to as a category of business management software-typically a suite of integrated applications that an organization can use to collect, store, manage and interpret data from these many business activities.

- Being specific, ERP system are large computer systems that integrate application programs in accounting (i.e., accounts receivable), sales (i.e., order booking) manufacturing (i.e., product shipping) and other functions in the firm.
- A typical ERP system will use multiple components of computer hardware and software to achieve the integration. A key ingredient of most ERP systems is the use of a unified database to store data for various system modules.

4.2: HISTORY OF ERP:

History – manufacturing perspective



Planning & Inventory control | materials management planning | manufacturing resource planning | enterprise resource

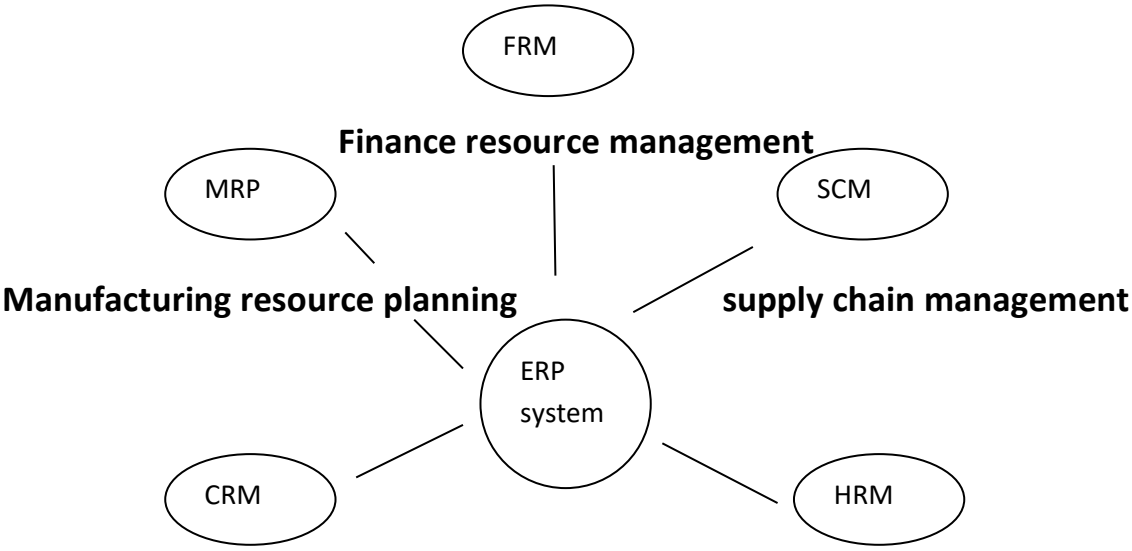
1960's – systems just for inventory control

1970's – MRP – material requirement planning (inventory with material planning & procurement)

1980's – MRP 2 – manufacturing resources planning (extended MRP to shop floor & distribution management)

Mid 1990's – ERP – enterprise resource planning (covering all the activities of an enterprise)

2000 onwards – ERP 2 – collaborative commerce (extending ERP to external business)



4.3: CHARACTERISTICS OF ERP:

Characteristics of ERP are explained here as follows,

Characteristics of ERP
- **Seamless integration**
- **Supply chain management**
- **accommodating variety**
- **Resource management**
- **Integrated data model**

(i) SEAMLESS INTETGRATION:

- Introduction of new products and changes in existing products can be fully integrated into enterprise system.
- This function is called engineering change management.
- This function of enterprise must include routing, automatic generation of product structures, change order processing, electronic approval and revision level control.

(ii) SUPPLY CHAIN MANAGEMENT:

- For those enterprises that have multiple distribution networks and manufacturing units the end to end supply chain management is very crucial.
- With the help of intelligent resource planning, it is possible to optimize the flow of demand and supply data.

(iii) ACCOMMODATING VARIETY:

- The ERP software has the ability to support multiple currencies as well as languages.
- The business is also able to succeed globally as ERP software supports multi facility and multi mode manufacturing.

(iv) RESOURCE MANAGEMENT:

- It is necessary to effectively manage the human resources and equipment of an enterprise.
- The ERP software package also provides functions for the effective management of human resource which includes taking care of training needs, career and succession planning, performance review ,applicant tracking, job evaluations, requisition management ,cost benefits etc.

(v) INTEGRATED DATA MODEL:

- The creation of an integrated data model is the heart of any ERP system.
- It is able to integrate the data associated with the entire enterprise system and provide data to customers, suppliers and employees.

(vi) **FLEXIBILITY:**

- ERP systems are flexible to accommodate the changing needs of an enterprise. These systems are generally implemented over some client server technology or distributed data base system which enables them to run across various data bases.
- Moreover, the distributed database implementation allows ERP to integrate existing legacy application with the new ERP system.
- Further most of the ERP packages can to some extent be modified as per organizational requirements using their own standard tools and languages.

(vii) **MODULAR AND OPEN ARCHITECTURE**:

- ERP systems have open-system architecture.
- It enables any module to be interfaced or detached whenever required without affecting the other modules.
- ERP software packages can also be integrated to other software applications tools (CRM, SCM etc) and third party add-ons using enterprise application integration (EAI).

(viii) **GLOBAL FUNCTIONALITY:**

- ERP system provide both multiannual and multi-currency functionalities.
- For example while these systems are flexible enough for customer service representatives in different countries to take order in different languages orders get printed or referred back to the customer in their native language.
- Multi currency functionality facilitates for instance receiving invoices in Indian rupees slitting the payment into German marks billing in Italian lire receiving cash in British pounds with the German Ledger stated un US dollars.

4.4: BENEFITS OF ERP:

(i) IMPROVED ORGANISATIONAL EFFICIENCY:

- ERP systems help integrate business processes across departments into a single enterprise wide information system.
- These systems provide firms with transactional processing models that are integrated with other activities of the firm.
- By implementing standard enterprise processes and a single database that spans the range of enterprise activities and locations, ERP systems provide integration along multiple locations and functional areas.

(ii) IMPLEMENT BEST PRACTICES AND REMOVE INFORMATION ASYMMETRIES:

- ERP systems have integrated within themselves a thousand or more best practiced business processes. Such practices can be to improve the way firms do business and enable organizational standardization across different locations.
- As a result locations with substandard processes can be brought in line with other more efficient processes.
- In continuation of process standardization the ERP system removes information asymmetries by consolidating all the information into a common database.

(iii) **ORGANISATION ALIGNMENT:**

- ERP systems facilitate better alignment of strategies and operations. Such systems help run the enterprise in accordance with a unifying

strategy and plan accessing the right information in real time to identify concerns and challenges early.

- These systems help achieve corporate objective by aligning workforce and organization objectives.

(iv) **DATA ACCESSIBILITY:**

- The implementation of ERP systems nurtures the establishment of backbone data warehouses.
- These systems offer greater accessibility to data so that the management can have up to the minute access to information for enhanced decision making and managerial control.

(v) LOWER OPERATIONAL COST:

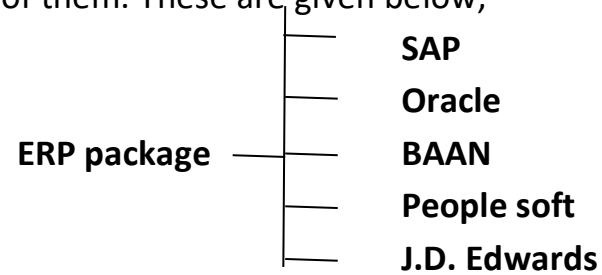
- ERP systems optimize IT spending by making redundant a number of legacy applications and by providing integrated business solutions.
- The immediate benefit of implementing ERP systems is reduced operating costs as well as lower inventory control cost, lower production costs to decreased inventory levels, work force reduction, speeding up the financial close process etc.

(vi) ADDITIONAL TANGIBLE BENEFITS:

- The more direct benefits of ERP systems are reduced lead time ,enhanced inventory management on time shipment, freedom to change manufacturing and planning methods, minimized data transfer time, fewer errors, optimum design productivity reduced cycle time, and various simulated capacity and resource utilization scenarios.
- There are many more benefits arising out of using ERP systems such as increased flexibility for the organization, reduced capability etc.

4.5: ERP PACKAGES:

There were mainly 5 major ERP vendors in the beginning of 1990's which are known as big business process oriented ERP systems were offered by each of them. These are given below,



i) SAP:

- One of the most popular business process oriented ERP solutions can be considered as SAP
- SAP is an integrated system which facilitates the major business operations such as sales production and financial accounting.
- Every business field is supported by the vast functionality provided by SAP without having any compromise with the convenience of an integrated system

SAP INDUSTRY SOLUTIONS:

In depth functionality for 21 business groups is provided by SAP industry solutions which are based on strong functions. There are two categories which can use these solutions are,

MANUFACTURING	SERVICE
Aerospace and defense	Financial service providers
Automotive	Healthcare
Chemicals	Higher education and research
Consumer products	Insurance
Engineering and constructions	Media
High technology	Retail
Mining	Service providers
Oil and gas	telecommunications
Pharmaceuticals	

ADVANTAGES OF SAP:

Advantages of SAP include,

- SAP allows easier global integration
- SAP allows bridging some barriers like currency exchange rates, languages and culture automatically.
- SAP provides real time information
- SAP reduces possibility of redundancy errors
- By using SAP Company or enterprise have more efficient work environment.

DISADVANTAGES OF SAP;

Disadvantages of SAP include,

- A conduct is required to sign by the company to use SAP software and it holds that companies to the vendor until expiry of contract.
- SAP is inflexible because sometimes vendor package doesn't fit a company's business model
- To implement and use SAP can be very expensive

ii) ORACLE:

- Oracle Corporation California was founded in year 1977.
- It provides the database tools and application products and consultation education support services.
- Oracle applications can be considered as one of the first suites of enterprise business applications using internet computing model
- This is possible to transfer the complex applications from the desktop of the user to the professionally managed centralized servers with the help of this architecture.
- More than 76 countries are currently using oracle and it is available in more than 29 languages.
- The various categories which include more than 45 software modules are,
- Oracle financials
- Oracle human resource
- Oracle projects
- Oracle manufacturing
- Oracle supply chain
- Oracle customer relationship management and
- Oracle front office.

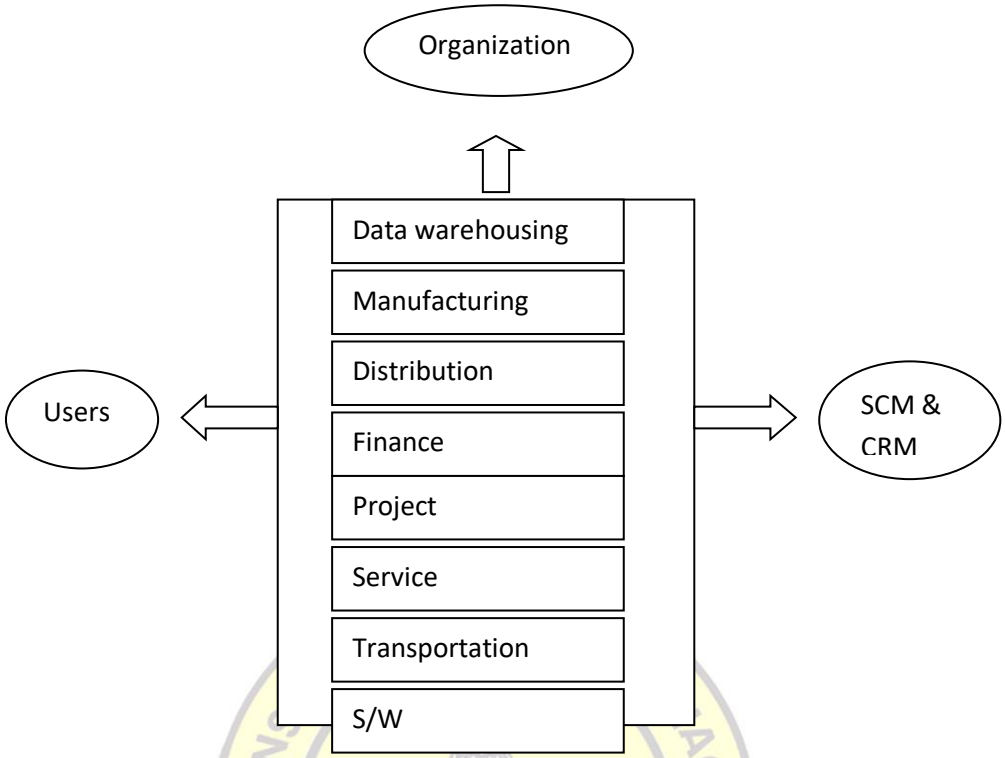
ORACLE INDUSTRY SPECIFIC SOLUTIONS:

- Aerospace and defense
- Automotive
- Chemicals
- Communications

- Consumer packaged goods
- Energy
- Engineering and construction
- Financial services
- Government
- Health care
- High technology
- Higher education
- Industrial manufacturing
- Life sciences
- Professional sciences
- Retail
- Travel and transportation
- Utilities

iii) <u>BAAN</u>:

- One of the largest providers of scalable enterprise business solutions of the world is BAAN.
- BAAN was founded by JAN & PAUL BAAN in 1978.
- More than 2,800 companies applications and being used in more than 80 countries having more than 5,000 sites worldwide.
- The manpower of the firm ranges up to 4,500 and it is famous for facilitating most flexible suite of enterprise business applications which can be used for providing the complete value chain, from SCM and ERP.
- The architecture of BAAN is shown as below,



BAAN architecture

BAAN INDUSTRY SPECIFIC SOLUTIONS:

- Aerospace and defense
- Automotive
- Equipment and machinery
- Process manufacturing
- Logistics

iv) PEOPLE SOFT:

- In 1987**, DAVE DUFFIELD & KEN MORRIS** founded the company named **people soft Inc**.
- In this they developed the first human resource application which was dependent on client server platform rather than on traditional mainframe by improving flexibility and users were more empowered.
- The organization wide software solutions are provided by people soft in order to effectively manage the main business operations such as,
- Project management
- Human resource management

- Accounting and control
- Supply chain management
- Treasury management
- Performance measurement

INDUSTRY SOLUTIONS:

- In order to provide the best fit services to the company specific needs, people soft industry solutions implements the best practices.
- Depending upon the specific requirements of the industry it provides specific industry oriented solutions.
- It included the wide array of the requirements such as regulatory, feature functionality, industry specific or complete solutions.
- Different industry verticals catered by people soft ware as below,
- Banking and capital markets
- Communications
- Public sector
- Wholesale distribution
- Staffing
- Professional service organization
- Insurance
- Higher education
- High technology
- Healthcare and
- Consumer products

The main focus of people soft is on mid-size firms in order to simplify the application selection and implementation process.

v) J.D EDWARDS:

J.D EDWARDS mainly deals with the long term business partnerships and is being used by more than 6700 customers spreading over 110 countries around the world.

- The company was formed by **JACK THOMSON, DAN GREGORY and ED MCVANCY** in 1977.

- In order to manage the various processes related to enterprise assets, relationship between supplier and customer and supply chain of its customers business, the company uses electronic mediums.

J.D EDWAREDS MODULES:

J.D EDWARDS offers following product modules

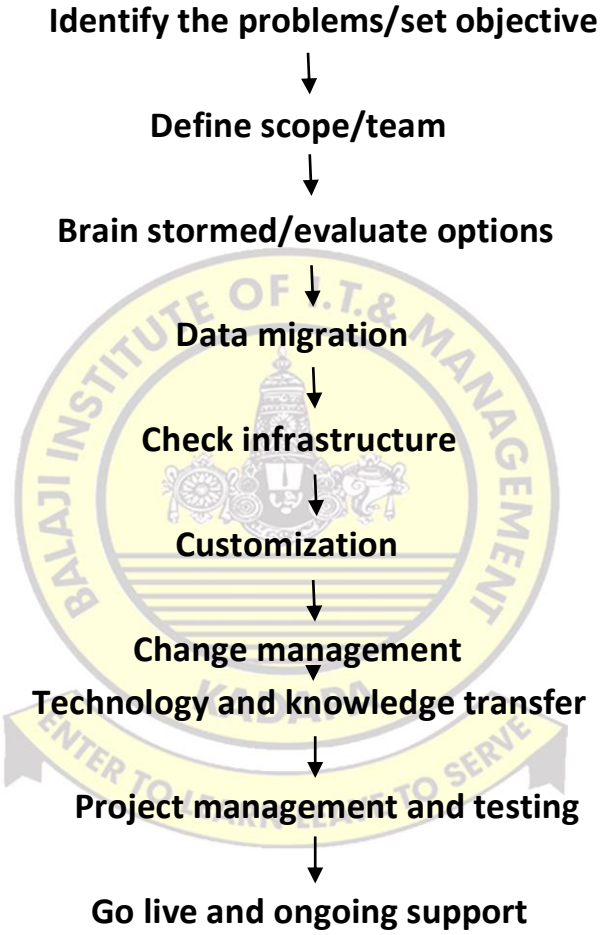
- Foundation suite
- Financial suite
- Distribution suite
- Services suite
- Manufacturing suite
- Human resource suite
- Payroll suite
- Customer services management suite
- Government education and non for profit solutions
- Utility and energy solutions
- Architecture engineering construction mining and real estate suite
- Energy and chemical suite

J.D EDWARDS INDUSTRY SPECIFIC SOLUTIONS:

- Automotive
- Chemicals
- Constructions
- Consumer products
- Energy
- Financial services
- High tech/electronics, home buildings
- Industrial manufacturing
- Mining
- Professional service
- Public services
- Paper
- Real estate telecommunication
- Field service

5. IMPLEMENTATION OF ERP:

- It is said,' **first right move leads to half of the war won'**, thus it's fundamental to have a correct implementation of ERP for optimal utilization.
- For successful implementation of the ERP solution includes following steps;



(i) IDENTIFY THE PROBLEMS/SET OBJECTIVES:

- ERP provides vast solution to many issues faced by companies.
- However it is important to identify the real objective for implementing ERP.
- Key performances indicators (KPI) have to be analyzed understand the necessity of the software intervention.
- It is essential to identify the problem or necessity motivating the ERP and also objectives with respect to present and future projections.

(ii) DEFINE SCOPE/TEAM:

- As per study 61.1% of ERP implementations take longer than expected and 74.1% of ERP projects exceed budget. The primary cause of delays and over budgeting is due to unclear definition of ERP requirement.
- Depending upon the budget and core necessity, the ERP demand list should be generated which achieves a smooth and hurdle less ERP implementation.

(iii) BRAINSTROME/EVALUATE THE OPTIONS:

- For successful implementation of ERP software, the management of the company has to invest its time in evaluating the options available.
- Evaluating ERP options is very difficult task as options are to be evaluated based on current needs as well as future requirements.

(iv) DATA MIGRATION:

- Once an ERP solution is identified, the next most important step is data migration.
- It provides for a smooth transition and future utilization of the software.
- Implementing an ERP can be a huge change especially if the company trying the software problem is very important.
- Therefore only necessary and most important data should be transferred to the software.

(v) CHECK INFRASTRUCTURE:

- After detailed brainstorming between vendor and its management the requisite infrastructure is installed.
- The infrastructure on which the software will run has to have the scope of scalability along with options to update as per the demand. Such requirement should not be limited.

(vi) CUSTOMIZATION (Action of modifying something to suit a particular individual or task):

- ERP software is designed after a significant amount of research and according to the needs of specific industry.
- In this step, one should have a check on the system adopted by the company since its inception so long as the company is following best practices or it un follows.
- If any changes required they should be made to the system.

(vii) **CHANGE MANAGEMENT:**

- ERP is not a fixed asset like computer which is purchased and set up company.
- It's actually a system that would change the environment and working style for the better.

(viii) **TECHNOLOGY AND KNOWLEDGE TRANSFER**:

- To make the ERP process successful, proper use of technology and an effective knowledge transfer along with proper training should be considered since they are responsible for the entire project's success.

(ix) PROJECT MANAGEMENT AND TESTING:

- After evaluation of all available options, selecting the best suited and then training employees, the real aspect of implementation is the project implementation itself
- The core objective should not change or diluted.
- Testing is an important phase of the implementation process, which cares of system and user acceptance testing

(x) GO LIVE AND ONGOING SUPPORT:

- Once the ERP solutions is properly checked and implemented it's time to go live
- An ERP solution is not a onetime event but rather a continuous process. It is something that the company has to continuously keep checks on to avoid any aberrations (deviations) which could affect ERP software functionality.

6. INTRODUCTION TO BIG DATA:

- **Big data** is a term used to refer to data sets (collection of data) that are too large or complex for traditional data-processing application software to adequately deal with. Data with many cases (rows) offer greater statistical power, while data with higher complexity (more attributes or columns) may lead to a higher rate. Big data challenges include capturingdata, datastorage, dataanalysis,search, sharing, transfer, visualization, querying, updating, information privacy and data source.
- Big data was originally associated with three key concepts: **volume, variety, and velocity**. Other concepts later attributed with big data are **veracity (i.e., how much noise is in the data)**.

- Current usage of the term "big data" tends to refer to the use of predictive analytics, user behavior analytics, or certain other advanced data analytics methods that extract value from data, and seldom to a particular size of data set.

6.1: Characteristics of Big data:

Big data can be described by the following characteristics:

a. Volume:

- The quantity of generated and stored data.
- The size of the data determines the value and potential insight and whether it can be considered big data or not.

b. Variety:

- The type and nature of the data.
- This helps people who analyze it to effectively use the resulting insight. Big data draws from text, images, audio, video; plus it completes missing pieces through data fusion.

c. Velocity:

- In this context, the speed at which the data is generated and processed to meet the demands and challenges that lie in the path of growth and development.
- Big data is often available in real-time.

d. Veracity:

- The data quality of captured data can vary greatly, affecting the accurate analysis.

6.2: Applications of big data:

Applications of big data include the following:

i. Government;

- The use and adoption of big data within governmental processes allows efficiencies in terms of cost, productivity, and innovation.

- Data analysis often requires multiple parts of government (central and local) to work in collaboration and create new and innovative processes to deliver the desired outcome.

CRVS (Civil Registration and Vital Statistics) collects all certificates status from birth to death. CRVS is a source of big data for governments.

ii. **International development**:

- Research on the effective usage of information and communication technologies for development (also known as ICTD) suggests that big data technology can make important contributions, but also present unique challenges to International development.
- Advancements in big data analysis offer cost-effective opportunities to improve decision-making in critical development areas such as health care, employment, economic productivity, crime, security, and natural disaster and resource management.

iii. **Manufacturing**:

- Based on TCS 2013 Global Trend Study, improvements in supply planning and product quality provide the greatest benefit of big data for manufacturing.
- Big data provides an infrastructure for transparency in manufacturing industry, which is the ability to unravel uncertainties such as inconsistent component performance.
- A conceptual framework of predictive manufacturing begins with data acquisition where different type of sensory data is available to acquire such as acoustics, vibration, pressure, current, and voltage and controller data.
- Vast amount of sensory data in addition to historical data the data quality of captured data can vary greatly, affecting the accurate analysis.
- Construct the big data in manufacturing. The generated big data acts as the input into predictive tools and preventive strategies such as Prognostics (an engineering approach focus on time prediction) and Health Management (PHM).

iv. Healthcare:

- Big data analytics has helped healthcare improve by providing personalized medicine and prescriptive analytics, clinical risk

intervention and predictive analytics, waste and care variability reduction, automated external and internal reporting of patient data, standardized medical terms and patient registries.

- The use of big data in healthcare has raised significant ethical challenges ranging from risks for individual rights, privacy and autonomy, to transparency and trust.

v. **Media:**

- To understand how the media utilizes big data, it is first necessary to provide some context into the mechanism used for media process.
- The industry appears to be moving away from the traditional approach of using specific media environments such as newspapers, magazines, or television shows and instead taps into consumers with technologies that reach targeted people at optimal times in optimal locations.
- The ultimate aim is to serve or convey, a message or content that is (statistically speaking) in line with the consumer's mindset. For example, publishing environments are increasingly tailoring messages (advertisements) and content (articles) to appeal to consumers that have been exclusively gleaned through various Targeting of consumers (for advertising by marketers)
- Data capture
- Data journalism: publishers and journalists use big data tools to provide unique and innovative insights and info graphics

vi. **Insurance:**

Health insurance providers are collecting data on social "determinants of health" such as food and TV consumption, marital status, clothing size and purchasing habits, from which they make predictions on health costs, in order to spot health issues in their clients. It is controversial whether these predictions are currently being used for pricing

vii. Information Technology:

- Big data has come to prominence within Business Operations as a tool to help employees work more efficiently and streamline the collection and distribution of Information Technology (IT).

- The use of big data to resolve IT and data collection issues within an enterprise is called IT Operations Analytics (ITOA).
- By applying big data principles into the concepts of machine intelligence and deep computing, IT departments can predict potential issues and move to provide solutions before the problems even happen

6.3: TYPES OF BIG DATA:

Types of big data includes following**;**

a. Structured data

b. Unstructured data

c. Semi-structured data.

a. Structured data:

- Structured Data is used to refer to the data which is already stored in databases, in an ordered manner. It accounts for about 20% of the total existing data, and is used the most in programming and computer-related activities.
- There are two sources of structured data- machines and humans.
- All the data received from sensors, web logs and financial systems are classified under machine-generated data.
- Human-generated structured data mainly includes all the data a human input into a computer, such as his name and other personal details.

b. Un structured data:

- While structured data resides in the traditional row-column databases, unstructured data is the opposite- they have no clear format in storage.
- The rest of the data created, about 80% of the total account for unstructured big data. Most of the data a person encounters belongs to this category- and until recently, there was not much to do to it except storing it or analyzing it manually.
- Unstructured data is also classified based on its source, into machine-generated or human-generated.

- Machine-generated data accounts for all the satellite images, the scientific data from various experiments and radar data captured by various facets of technology.
- Human-generated unstructured data is found in abundance across the internet, since it includes social media data, mobile data and website content. This means that the pictures we upload to out Face book or Histogram handles, the videos we watch on YouTube and even the text messages we send all contribute to the gigantic heap that is unstructured data.

c. Semi structured data:

- The line between unstructured data and semi-structured data has always been unclear, since most of the semi-structured data appear to be unstructured at a glance.
- Information that is not in the traditional database format as structured data, but contain some organizational properties which make it easier to process, are included in semi-structured data.
- For example, No SQL documents are considered to be semi-structured, since they contain keywords that can be used to process the document easily.

6.4: What Are the Benefits of Big Data?

Benefits of Big data are given here as follows;

- **Big Data is Timely** – 60% of each workday, knowledge workers spend attempting to find and manage data.
- **Big Data is Accessible** – Half of senior executives report that accessing the right data is difficult.
- **Big Data is Holistic** – Information is currently kept in silos within the organization. Marketing data, for example, might be found in web analytics, mobile analytics, social analytics, CRMs, A/B Testing tools, email marketing systems, and more… each with focus on its silo.

- **Big Data is Trustworthy** – 29% of companies measure the monetary cost of poor data quality. Things as simple as monitoring multiple systems for customer contact information updates can save millions of dollars.
- **Big Data is Relevant** – 43% of companies are dissatisfied with their tools ability to filter out irrelevant data. Something as simple as filtering customers from your web analytics can provide a ton of insight into your acquisition efforts.
- **Big Data is Secure** – The average data security breach costs $214 per customer. The secure infrastructures being built by big data hosting and technology partners can save the average company 1.6% of annual revenues.
- **Big Data is Authorities** – 80% of organizations struggle with multiple versions of the truth depending on the source of their data. By combining multiple, vetted sources, more companies can produce highly accurate intelligence sources.
- **Big Data is Actionable** – Outdated or bad data results in 46% of companies making bad decisions that can cost billions.

6.5: DRAWBACKS OR DISADVANTAGES OF BIG DATA:

Following are the drawbacks or **disadvantages of Big Data;**

- Traditional storage can cost lot of money to store big data.
- Lots of big data is unstructured.
- Big data analysis violates principles of privacy.
- It can be used for manipulation of customer records.
- It may increase social stratification.
- Big data analysis is not useful in short run. It needs to be analyzed for longer
- Duration to leverage its benefits.
- Big data analysis results are misleading sometimes.
- Speedy updates in big data can mismatch real figures.

7.CLOUD COMPUTING:

- The term' Cloud' refers to a Network or Internet. In other words, we can say that Cloud is something, which is present at remote location.
- Cloud can provide services over network, i.e., on public networks or on private networks, i.e., WAN, LAN or VPN.
- Applications such as e-mail, web conferencing, customer relationship management (CRM), all run in cloud.
- The **cloud** is just a metaphor for the Internet.
- **Cloud Computing** is a technology uses the internet and central remote servers to maintain data and applications.
- **Cloud computing** allows consumers and businesses to use applications without installation and access their personal files at any computer with internet access.
- The availability of high-capacity networks, low-cost computers and storage devices as well as the widespread adoption of hardware virtualization, service-oriented architecture, and autonomic and utility computing has led to growth in cloud computing.

7.1. Basic Concepts of Cloud Computing:

Here are certain services and models working behind the scene making the cloud computing feasible and accessible to end users. Following are the working models for cloud computing:

a. Deployment Models;

P U B L I C C L O U D;

The Public Cloud allows systems and services to be easily accessible to the general public. Public cloud may be less secure because of its openness, e.g., e-mail.

P R I V A T E C L O U D

The Private Cloud allows systems and services to be accessible within an organization. It offers increased security because of its private nature.

C O M M UN I T Y C L O U D

The Community Cloud allows systems and services to be accessible by group of organizations.

H Y B R I D C L O U D

The Hybrid Cloud is mixture of public and private cloud. However, the critical activities are performed using private cloud while the non-critical activities are performed using public cloud.

b. SERVICE MODELS

Service Models are the reference models on which the Cloud Computing is based. These can be categorized into three basic service models as listed below:

1. Infrastructure as a Service (IaaS)
2. Platform as a Service (PaaS)
3. Software as a Service (SaaS)

INFRASTRUCTURE AS A SERVICE (IAAS)

IaaS provides access to fundamental resources such as physical machines, virtual machines, virtual storage, etc.

PLATFORM AS A SERVICE (PAAS)

PaaS provides the runtime environment for applications, development & deployment tools, etc.

SOFTWARE AS A SERVICE (SAAS)

SaaS model allows using software applications as a service to end users.

7.2: CHARACTERISTICS OF CLOUD COMPUTING:

i. AVAILABLE ON-DEMAND:

- Cloud services are expected to be available on-demand.
- A customer can typically create a new instance or a new customer relationship online at any time using a credit card, without having to wait for delivery and without having to go through a complicated purchasing process.

ii. ACCESSIBLE FROM A NETWORK:

- Cloud services are generally accessible from the public Internet.
- Private cloud services would generally be accessible from anywhere within the enterprise. Additional security restrictions, such as a virtual firewall, may be configured to limit what services may be accessed from where.
- A VPN (Virtual Private Network) connection may also be offered between on-premise resources and an isolated set of servers in a public cloud (virtual private cloud).

iii. RESOURCE POOLING (OVERBOOKING):

- Much of the cost advantage of cloud services comes from resource pooling and overbooking.
- Statistically, most applications and services don't operate at their peak capacity most of the time, and different applications peak at different times.
- Cloud services utilize this to overbook capacity so that most of the time all services gets enough capacity.
- Some services may be configured to have guaranteed service, while others may run opportunistically only when there is spare capacity. In most cases, customers are willing to accept that services may run somewhat slower at times.

iv. ELASTIC SCALABILITY:

- A key characteristic and benefit of cloud computing is elastic scalability.
- For example, if a web application gets an unusual amount of traffic; more servers may be created to provide that service. Thus, the application can gracefully and automatically scale with demand.
- Scalability also allows cost-effectively running workloads that need a very high number of servers but only for short periods of time or occasionally.
- Many customers have such workloads, and especially if they can utilize the spare capacity, they can be run very cost-effectively.

v. MEASURED SERVICE:

- Cloud services generally charge users per hour of resource usage, or based on the number of certain kinds of transactions that have occurred, amount of storage in use, and the amount of data transferred over a network. All usage is measured.
- The measurements are also used by the cloud service provider to determine how to best allocate its physical computing resources to all of its customers to best meet its SLA (Service Level Agreement) commitments and minimize the cost of providing the service (thus maximizing its margins and competitiveness).

vi. SERVICE LEVEL AGREEMENTS:

- Many cloud services provide service level agreements that guarantee a certain level of availability, performance, or capacity.
- Lowest-cost service tiers usually come without any guarantees, while higher-paying tiers are specified to offer certain guarantees.
- Large enterprises are generally able to negotiate custom service guarantees.

viii. MULTI TENANCY:

- A key distinguishing characteristic of public cloud services is multi tenancy.
- The infrastructure serves multiple customers, and in SaaS, even the same virtual machine may serve multiple customers.

- Sometimes compliance requirements mandate that a service must run on a dedicated infrastructure that is not shared.
- Such an arrangement eliminates certain security risks, such as escaping virtual machines and spreading an attack to other customers running on the same infrastructure.

Many cloud services offer dedicated servers to counter this. Some service providers will even create a dedicated cloud infrastructure, complete with dedicated and isolated provisioning tools, for larger customers on demand.

7.3: Components of cloud computing:

Components of cloud computing include following;

i. Storage-as-a-Service

ii. Information-as-a-Service

iii. Database-as-a-Service:

iv. Process-as-a-Service

v. Application-as-a-Service

vi. Platform-as-a-Service:

vii. Integration-as-a-Service

viii. Security-as-a-Service:

Ix. Management-as-a-service

i. Storage-as-a-Service:

- This is the component where we can use or request storage, like as we do it physically using the remote site.
- It is also called disk space on demand.
- This is the main component where even other components will have a base component as Storage-as-a-Service.

ii. Information-as-a-Service:

- Information that can be accessed remotely from anywhere is called Information-as-a-Service.
- Here the information will be fetched remotely.
- This includes, for example, live stock prices, internet banking, online news, credit card validation and so on.

iii. Database-as-a-Service:

- This component acts as a live database from remote where its functionality and other features works as though a physical db is present in the local machine.
- Its main objective is to reduce the cost of db using many software as well as hard wares.

iv. Process-as-a-Service:

- This component combines various resources such as data and services.
- This happens either hosted within the same cloud computing resource or remotely.
- Mainly this is used for business processes where various key services and information are combined to form a process.
- This helps delivery on demand. For example mobile networks (internet settings are sent as soon as activated).

v. Application-as-a-Service:

- Application-as-a-Service (also known as SAAS) is the complete application built ready for use by the client.
- This is built to use the internet to the end users and the end users normally use browsers and the internet to access this service.
- This component is the ultimate front-end for end users. Some of the applications are Sales force, Gmail, Google calendar and so on.

vi. Platform-as-a-Service:

- This is the component where the app is being developed and the database is being created, implemented, stored and tested.

- In recent times this component allows creation of enterprise-level applications easily and is cost-effective.

vii. Integration-as-a-Service;

- Integration-as-a-Service deals with the components of an application that has been built but must be integrated with other applications.
- It helps in mediating between the remote servers with the local machines.
- Stacks from the cloud are fetched and communicated with local machines. For example sales force has recently integrated Google maps into it.

viii. Security-as-a-Service;

- This is the main component many customers require.
- Whoever goes for a cloud environment needs security features a lot since all the data and operations are handled remote.

ix. Management-as-a-service;

- This is a component that is mainly useful for management of the clouds, like resource utilization, virtualization and server up and down time management.
- This will be like a small role like an admin point of view.

7.4: Advantages of cloud computing:

- Advantages of cloud computing are explained as below;
- In simple words, cloud computing may be called as computing that is based entirely on the internet. The most trending cloud computing services are the AWS Cloud Services (Amazon Web Services).
- There are several advantages of cloud computing. It helps in improving the cash flow, increases the efficiency and numerous others.

i. Less Costs:

- The services are free from capital expenditure.
- There are no huge costs of hardware in cloud computing. You just have to pay as you operate it and enjoy the model based on your subscription plan.

ii. 24 X 7 Availability:

- Most of the cloud providers are truly reliable in offering their services, with most of them maintaining an uptime of 99.9%.
- The workers can get onto the applications needed basically from anywhere.
- Some of the applications even function off-line.

iii .Flexibility in Capacity:

- It offers flexible facility which could be turned off, up or down as per the circumstances of the user.
- For instance, a promotion of sales is very popular; capacity can be immediately and quickly added to it for the avoidance of losing sales and crashing servers. When those sales are done, the capacity can also be shrunk for the reduction of costs.

iv. . All over Functioning:

- Cloud computing offers yet another advantage of working from anywhere across the globe, as long as you have an internet connection.
- Even while using the critical cloud services that offer mobile apps, there is no limitation of the device used.

v. Automated Updates on Software:

- In cloud computing, the server suppliers regularly update user's software including the updates on security, so that he do not need to agonize on wasting your crucial time on maintaining the system.
- User can find extra time to focus on the important things like 'How to grow in business.

vi. Security:

- Cloud computing offers great security when any sensitive data has been lost.
- As the data is stored in the system, it can be easily accessed even if something happens to computer. User can even remotely wipe out data from the lost machines for avoiding it getting in the wrong hands.

vii. Carbon Footprint:

- Cloud computing is helping out organizations to reduce their carbon footprint.
- Organizations utilize only the amount of resources they need, which helps them to avoid any over-provisioning. Hence, no waste of resources and thus energy.

viii. Enhanced Collaboration:

- Cloud applications enhance collaboration by authorizing diverse groups of people virtually meet and exchange information with the help of shared storage.
- Such capability helps in improving the customer service and product development and also reducing the marketing time.

ix. **Control on the Documents:**

- Before cloud came into being, workers needed to send files in and out as the email attachments for being worked on by a single user at one time ultimately ending up with a mess of contrary titles, formats, and file content.
- Moving to cloud computing has facilitated central file storage.

x. **Easily Manageable:**

- Cloud computing offers simplified and enhanced IT maintenance and management capacities by agreements backed by SLA(service level agreement), central resource administration and managed infrastructure.
- You get to enjoy a basic user interface without any requirement for installation.

- Plus you are assured guaranteed and timely management, maintenance, and delivery of the IT services.

7.5: Disadvantages of cloud computing:

Disadvantages of cloud computing includes the following;

i. Downtime:

- Downtime is often cited as one of the biggest disadvantages of cloud computing.
- Since cloud computing systems are internet-based, service outages are always an unfortunate possibility and can occur for any reason.
- Best Practices for minimizing planned downtime in a cloud environment:
- Design services with high availability and disaster recovery in mind. Leverage the multi- availability zones provided by cloud vendors in your infrastructure.
- If your services have a low tolerance for failure, consider multi-region deployments with automated failover to ensure the best business continuity possible.
- Define and implement a disaster recovery plan in line with your business objectives that provide the lowest possible recovery time (RTO) and recovery point objectives (RPO).
- Consider implementing dedicated connectivity such as AWS Direct Connect, Azure Express Route, or Google Cloud's Dedicated Interconnect or Partner Interconnect. These services provide a dedicated network connection between you and the cloud service point of presence. This can reduce exposure to the risk of business interruption from the public internet.

ii. Security and Privacy:

- Any discussion involving data must address security and privacy, especially when it comes to managing sensitive data.
- We must not forget hacking of their AWS EC2 console, which led to data deletion and the eventual shutdown of the company. Their dependence

on remote cloud-based infrastructure meant taking on the risks of outsourcing everything.

Best practices for minimizing security and privacy risks:

- Understand the shared responsibility model of your cloud provider.
- Implement security at every level of your deployment.
- Know who is supposed to have access to each resource and service and limit access to least privilege.
- Make sure your team's skills are up to the task.
- Take a risk-based approach to securing assets used in the cloud Extend security to the device.
- Implement multi-factor authentication for all accounts accessing sensitive data or systems.

iii. Vulnerability to Attack:

- In cloud computing, every component is online, which exposes potential vulnerabilities.
- Even the best teams suffer severe attacks and security breaches from time to time.

Best practices to help you reduce cloud attacks:

- Make security a core aspect of all IT operations.
- Keep ALL your teams up to date with cloud security best practices.
- Ensure security policies and procedures are regularly checked and reviewed.
- Proactively classify information and apply access control.
- Use cloud services such as AWS Inspector, AWS Cloud Watch, AWS Cloud Trail, and AWS Configuration to automate compliance controls.
- Prevent data exfiltration (un agent secret).

- Integrate prevention and response strategies into security operations.
- Discover rogue projects with audits.
- Remove password access from accounts that do not need to log in to services.
- Review and rotate access keys and access credentials.
- Follow security blogs and announcements to be aware of known attacks.
- Apply security best practices for any open source software that you are using.
- Apply security best practices for any open source software that you are using.

iv. **Limited control and flexibility:**

- A cloud provider's end-user license agreement (EULA) and management policies might impose limits on what customers can do with their deployments.
- Customers retain control of their applications, data, and services, but may not have the same level of control over their backend infrastructure.

Best practices for maintaining control and flexibility:

- Consider using a cloud provider partner to help with implementing, running, and supporting cloud services.
- Understanding your responsibilities and the responsibilities of the cloud vendor in the shared responsibility model will reduce the chance of omission or error.
- Make time to understand your cloud service provider's basic level of support. Will this service level meet your support requirements? Most cloud providers offer additional support tiers over and above the basic support for an additional cost.

- Make sure you understand the service level agreement (SLA) concerning the infrastructure and services that you're going to use and how that will impact your agreements with your customers.

v. Vendor Lock-In:

- Vendor lock-in is another perceived disadvantage of cloud computing
- Differences between vendor platforms may create difficulties in migrating from one cloud platform to another, which could equate to additional costs and configuration complexities.
- Gaps or compromises made during a migration could also expose your data to additional security and privacy vulnerabilities.

Best practices to decrease dependency:

- Design with cloud architecture best practices in mind. All cloud services provide the opportunity to improve availability and performance, decouple layers, and reduce performance bottlenecks. If you have built your services using cloud architecture best practices, you are less likely to have issues porting from one cloud platform to another.
- Properly understanding what your vendors are selling can help avoid lock-in challenges.
- Employing a multi-cloud strategy is another way to avoid vendor lock-in. While this may add both development and operational complexity to your deployments, it doesn't have to be a deal breaker. Training can help prepare teams to architect and select best-fit services and technologies.
- Build in flexibility as a matter of strategy when designing applications to ensure portability now and in the future.

vi. Costs:

- Adopting cloud solutions on a small scale and for short-term projects can be perceived as being expensive.

Best practices to reduce costs:

- Try not to over-provision, instead of looking into using auto-scaling services
- Scale DOWN as well as UP
- Pre-pay if you have a known minimum usage
- Stop your instances when they are not being used
- Create alerts to track cloud spending.

UNIT-5

IMPORTANT QUESTIONS

1. Explain implementation of ERP.
2. Explain about big data and cloud computing.
3. What is ERP? Briefly explain various ERP packages.
4. Explain about emerging trends in information technology.

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ITM IMPORANT QUESTIONS

UNIT.1:

1. Explain the components of a system?
2. What are the roles of IT in various sectors?
3. Explain the strategies for gaining IT advantages?

UNIT.2:

1. What do you mean by data? Explain the concepts and models of DBMS?
2. Define DBMS? Explain the various data models with examples?
3. Explain applications of database with examples?
4. Discuss about database languages in detail?
5. What are the data access methods?
6. Discuss about types of data processing?

UNIT.3:

1. Explain the formulae and functions in Ms-Excel
2. Explain about basic statistical formulae
3. How to perform mail merge in ms-Word
4. How to create charts in Ms – Excel
5. What are the steps for creating an effective presentation?

UNIT.4:

1. Discuss the concept of data communications
2. What are the services provided by the internet? Explain
3. Explain about types of data communication networks
4. What is computer network? Explain concepts of computer network.

UNIT.5:

1. Explain implementation of ERP.
2. Explain about big data and cloud computing.
3. What is ERP? Briefly explain various ERP packages.
4. Explain about emerging trends in information technology

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