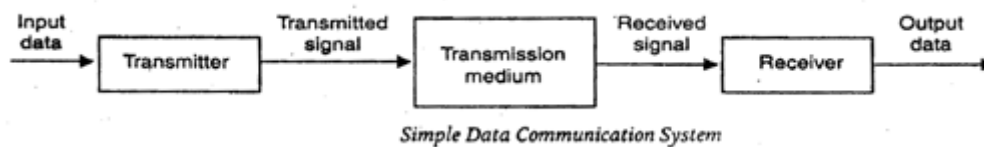


## UNIT 5: NETWORKING CONCEPT

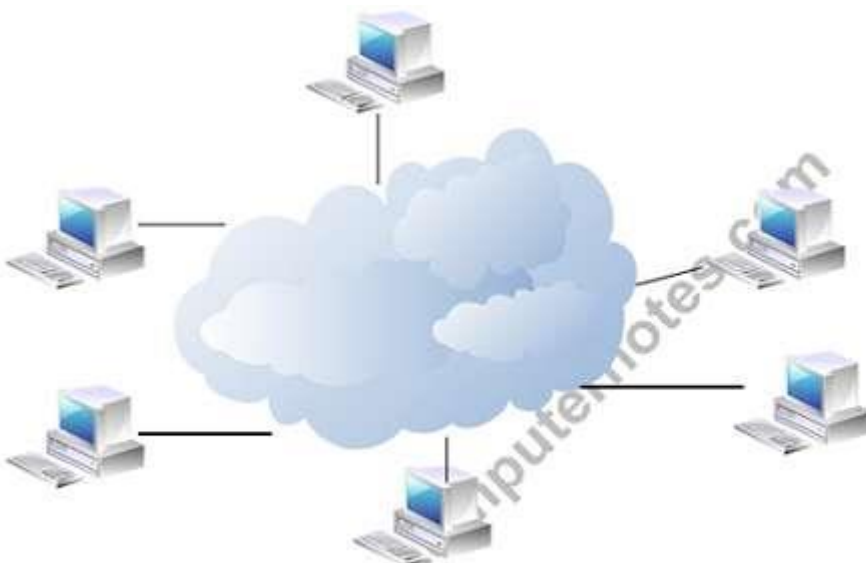
### Data Communication - What is Data Communication?

**Data communication** refers to the exchange of data between a source and a receiver via form of transmission media such as a wire cable. Data communication is said to be local if communicating devices are in the same building or a similarly restricted geographical area. The meanings of source and receiver are very simple. The device that transmits the data is known as source and the device that receives the transmitted data is known as receiver. Data communication aims at the transfer of data and maintenance of the data during the process but not the actual generation of the [information](#) at the source and receiver.

**Datum** mean the facts information statistics or the like derived by calculation or experimentation. The facts and information so gathered are processed in accordance with defined systems of procedure. Data can exist in a variety of forms such as numbers, text, bits and bytes. The Figure is an illustration of a simple data communication system.



The term data used to describe information; under whatever form of words you will be using. A data communication system may collect data from remote locations through data transmission circuits, and then outputs processed results to remote locations. Figure provides a broader view of data communication networks. The different data communication techniques which are presently in widespread use evolved gradually either to improve the data communication techniques already existing or to replace the same with better options and features. Then, there are data communication jargons to contend with such as baud rate, modems, routers, LAN, WAN, TCP/IP, ISDN, during the selection of communication systems. Hence, it becomes necessary to review and understand these terms and gradual development of data communication methods.



**A Data Communication System using Remote Locations**

# UNIT 5: NETWORKING CONCEPT

## Components of data communication system

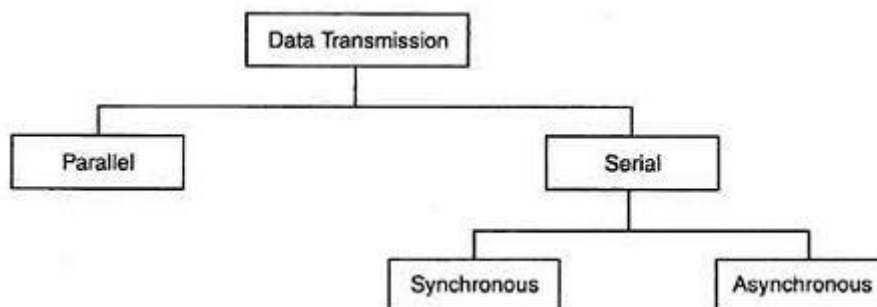
A Communication system has following components:

1. **Message:** It is the information or data to be communicated. It can consist of text, numbers, pictures, sound or video or any combination of these.
2. **Sender:** It is the device/[computer](#) that generates and sends that message.
3. **Receiver:** It is the device or computer that receives the message. The location of receiver computer is generally different from the sender computer. The distance between sender and receiver depends upon the types of network used in between.
4. **Medium:** It is the channel or physical path through which the message is carried from sender to the receiver. The medium can be wired like twisted pair wire, coaxial cable, fiber-optic cable or wireless like laser, radio waves, and microwaves.
5. **Protocol:** It is a set of rules that govern the communication between the devices. Both sender and receiver follow same [protocols](#) to communicate with each other

## What is Data Transmission? Types of Data Transmission.

**Data Transmission:** When we enter data into the [computer](#) via keyboard, each keyed element is encoded by the electronics within the keyboard into an equivalent binary coded pattern, using one of the standard coding schemes that are used for the interchange of [information](#). To represent all characters of the keyboard, a unique pattern of 7 or 8 bits in size is used. The use of 7 bits means that 128 different elements can be represented, while 8 bits can represent 256 elements. A similar procedure is followed at the receiver that decodes every received binary pattern into the corresponding character. The most widely used codes that have been adopted for this function are the Extended Binary Coded Decimal (EBCDIC) and the American Standard Code for Information Interchange codes (ASCII). Both coding schemes cater to all the normal alphabetic, numeric, and punctuation characters, collectively referred to as *printable characters* and a range of additional control characters, known as *non-printable characters*. Data transmission refers to the movement of data in form of bits between two or more digital devices. This transfer of data takes place via some form of transmission media (for example, coaxial cable, fibre optics etc.)

## Types of Data Transmission

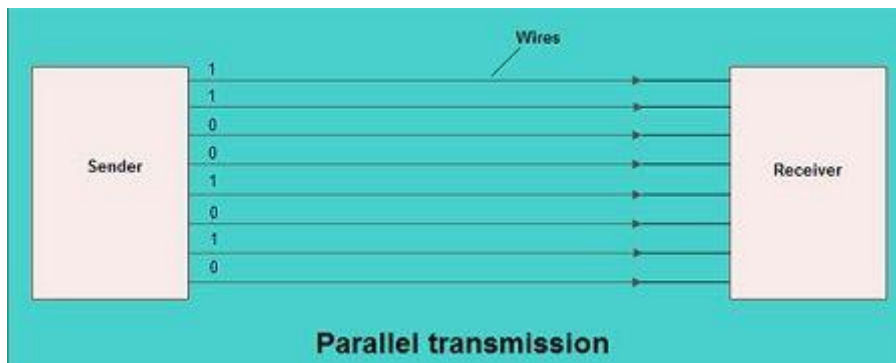


## UNIT 5: NETWORKING CONCEPT

### Parallel transmission

**Definition:** Within a computing or communication device, the distances between different subunits are too short. Thus, it is normal practice to transfer data between subunits using a separate wire to carry each bit of data. There are multiple wires connecting each sub-unit and data is exchanged using a *parallel transfer* mode. This mode of operation results in minimal delays in transferring each word.

- In parallel transmission, all the bits of data are transmitted simultaneously on separate communication lines.
- In order to transmit  $n$  bits,  $n$  wires or lines are used. Thus, each bit has its own line.
- All  $n$  bits of one group are transmitted with each clock pulse from one device to another *i.e.* multiple bits are sent with each clock pulse.
- Parallel transmission is used for short distance communication.
- As shown in the fig, eight separate wires are used to transmit 8-bit data from sender to receiver.



### ***Advantage of parallel transmission***

It is speedy way of transmitting data as multiple bits are transmitted simultaneously with a single clock pulse.

### ***Disadvantage of parallel transmission***

It is costly method of data transmission as it requires  $n$  lines to transmit  $n$  bits at the same time

### **Serial Transmission**

**Definition:** When transferring data between two physically separate devices, especially if the separation is more than a few kilometres, for reasons of cost, it is more economical to use a single pair of lines. Data is transmitted as a single bit at a time using a fixed time interval for each bit. This mode of transmission is known as *bit-serial* transmission.

- In serial transmission, the various bits of data are transmitted serially one after the other.
- It requires only one communication line rather than  $n$  lines to transmit data from sender to receiver.