

Data Communication Part-1



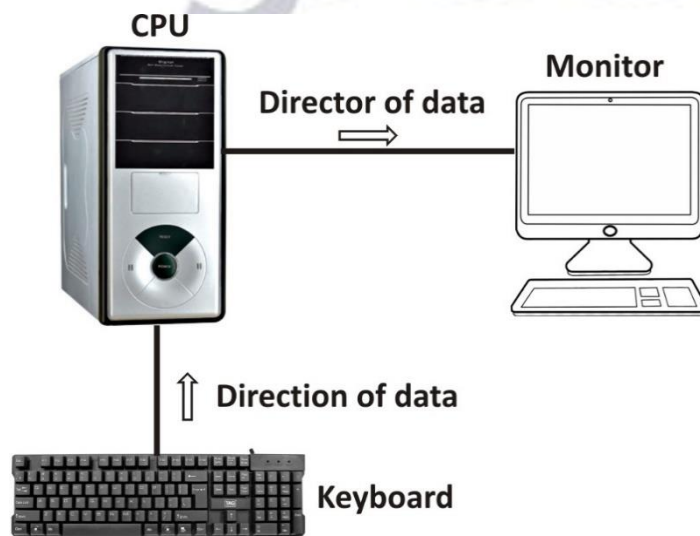
Data Communication part -1

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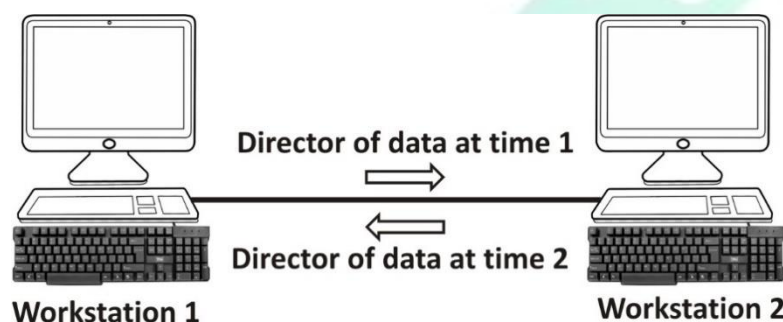
Simplex System:

- In these systems the information is communicated in only one direction. For example the radio or TOC broadcasting systems can only transmit. This cannot receive.
- In data communication system the simplex communication takes place as shown in the diagram.
- The communication from the CPU to monitor or keyboard to CPU is unidirectional.
- Keyboard and traditional monitors are examples of simplex devices.



Half Duplex Systems:

- These systems are bi-directional i.e. they can transmit as well as receive but not simultaneously .
- At a time these systems can either transmit or receive , for example a transceiver or walky -talky set .
- A data communication system working in the half duplex mode as shown in diagram
- Each station can transmit and receive , but not at the same time. When one device is ending the other one is receiving and vice versa .
- The half duplex transmission , the entire capacity of the channel is taken over by the transmitting .



Full Duplex systems :

- These are truly bi-directional systems as they allow the communication to take place in both the direction simultaneously .
- These systems can transmit as well as receive simultaneously , for example the telephone system
- A full duplex communication system is shown in the diagram . Each station can transmit and receive information
- In full duplex mode signal , signal going either direction share the full capacity of link.
- The link may contain two physically separate transmission paths one for sending and another for receiving.

- Otherwise the capacity of channel is divided between signals travelling in both directions.
- Many networks provide at least two logic channels per connection , one for the normal data and the other for urgent data.

Connection Oriented and connectionless services :

1. Connectionless
2. Connection oriented

1. Connection oriented Service :

- The connection oriented service is similar to the one provided in the telephone system .
- The service users of the connection oriented service undergo the following sequence of operation :
 1. Establish a connection
 2. Use the connection
 3. Release the connection
- The connection acts like tube. The sender pushes bits from one end of the tube and the receiver takes them out from the other end.
- The order is generally preserved that means the order in which the bits are sent is same as the order in which they are received.
- Sometimes after establishing a connection, the sender and receiver can discuss and negotiate about parameters to be used such as maximum message size, quality of service and other issues .

2. Connectionless Service :

- The connectionless service is similar to the postal service
- Each message (analogous to a letter) carries the full address of the destination . Each message is routed independently from source to destination through the system.
- It is possible that the order in which the messages are sent and the order in which they are received may be different.



Quality Of Service(QOS) :-

- Each service can be judged by its quality of service.
- Services can be of two types
 1. Reliable
 2. Unreliable
- Reliable service are those which never lose data. Generally reliable service are implemented with the receiver sending acknowledgements of the received message .
- But the acknowledgements introduce overheads and delay which are sometimes undesirable
- For the applications like digested voice traffic , the delays due to acknowledgements are unacceptable .
- Applications such as electronic mail do not require any connections. The cost associated , complexity and overheads of reliable services is not required here .
- Such application require high reliability of message arrival but not guarantee i.e. unreliable service will be ok.
- The unacknowledged service are unreliable connectionless services. Such services are called so datagram service which is similar to telegram service.
- However note that acknowledgement datagram service can also be provided.
- One more type of services is the request-reply service . In this type , the sender transmits a single datagram which contains the request and a reply obtained from the receiver contains the reply.

Different types of services:-

S.No.	SERVICE	TYPE	EXAMPLE
1	Reliable message stream	Connection oriented	Sequence of pages
2	Reliable bytes stream	Connection oriented	Remote login
3	Unreliable connection	Connection oriented	Digitized voice
4	Unreliable datagram	Connectionless	Electronic mail
5	Acknowledgement datagram	Connectionless	Registered e-mail



6	Request-Reply	Connectionless	Database query
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NOTE:-Theunreliable service is used only if the reliable service is not available or is too expensive.

Service Primitives :

- Primitive means operation. A service is specified by a set of primitives. A user process can access these primitives to access the service.
- Primitives of connection oriented services are different from those of connectionless service.
- The service primitives required to implement a reliable byte stream in a client server environment are as follows :

Service Primitive

S.No.	Name	Meaning
1	LISTEN	Block waiting for an incoming connection
2	CONNECT	Establish a connection
3	RECEIVE	Block waits for a message
4	SEND	Send the message
5	DISCONNECT	Terminates the connection

1. Listen:-

- When a server is prepared to accept an incoming connection it executes the LISTEN primitive
- After executing the LISTEN , the server process is blocked until request for connection arises

2. Connect:

- The next step is that the client process executes the CONNECT for establishing a connection with the server
- The client process is suspended until there is a response

3. Receiver :The server executes RECEIVE as the next step. The RECEIVE call with block the server.



4. Send:

- The client then executes the SEND primitive in order to transmit its request followed by the execution of RECEIVE to get the reply.
- The request packet reaches the server machine and unblocks the server process so that it can process the request .
- After doing the work it uses SEND for returning the answer to the client

5. DISCONNECT:

- This primitive is for terminating and releasing the connection
- An initial DISCONNECT is a blocking call which suspends the client and sends a packets to the server to tell that this connection is no longer required
- After receiving this packet the server also issues DISCONNECT to acknowledge the client and terminate the connection
- When the servers packet reaches the client machine , the client process is released after the connection is broken

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