

Networking is everywhere:

- Network supports the way we learn.

Online Education

- Network support the way we communicate.

WhatsApp Call

- Network support the way we work.

Work From Home

BASICS OF DATA COMMUNICATION

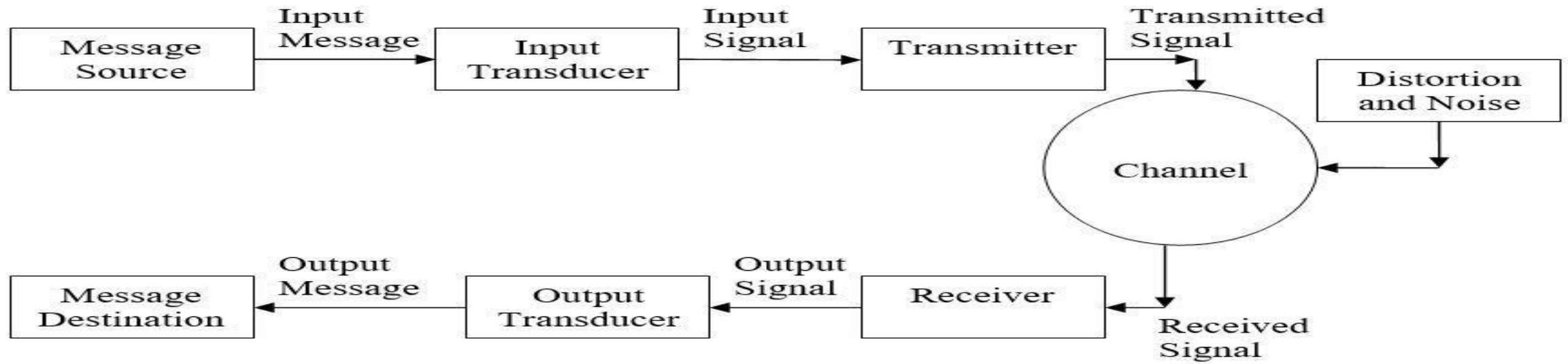


Fig 1 Block Diagram of Data Communication



Fig 2 Example of Data Communication

Data Communication

- **Message Source (Devices used):** Keyboard, Microphone/Speaker ,Webcam
(generates the data)
- **Input Message:** Text, Image, Audio/ Sound, Video
- **Transducer** convert data from one form to another.(i.e. electrical signal).
- **Transmitter** is used for:
 1. **Amplify Signal** :Increases the baseband (original) signal energy or frequency.

Data Communication

2.Modulation:Original message is transmitted through some carrier

i.e.. Frequency ,Phase , Code

3.Encoding:conversion of analog to digital signal

Digitization helps to: 1.Reduce the noise

2. Easy to process and

3. Easy storage

Signal is transmitted on Channel /Medium.

Data Communication

Medium: **1. Wired:** Twisted Pair Cable

Co-axial

Optical Fibre

2. Wireless: Antenna

Electromagnetic wave

Problems of Channel: During the long distance transmission it introduce the **Noise**.

Attenuation (Amplifier is used to address the issue)

Distortion

Multiple
Impairment
methods

Data Communication

Receiver: Performs the *demodulation*

decoding :convert it to analog form.

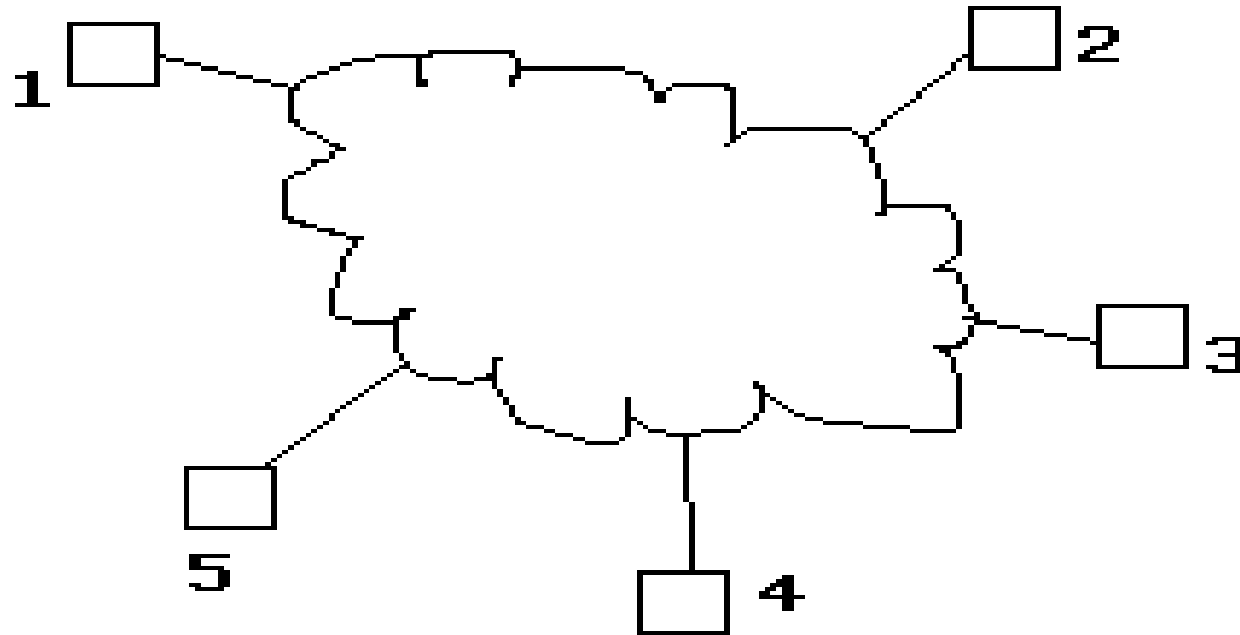
Repeater /Amplifier is used to boost the energy of the signal

Output Transducer: It is used to reconstruct the original signal.

Basics Computer Networks

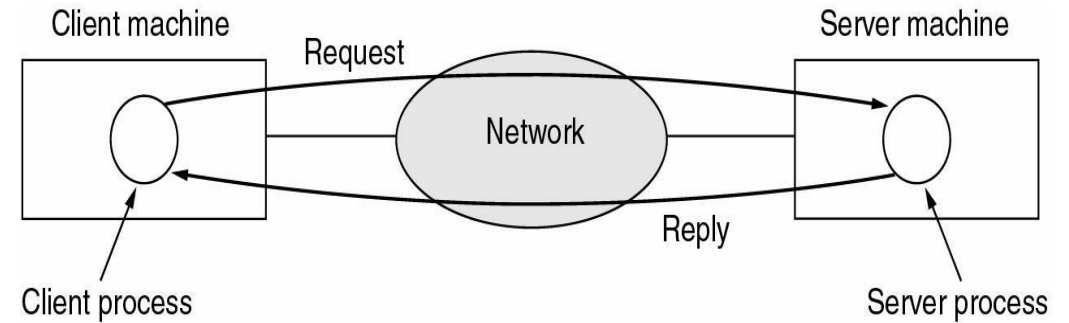
Networks

- ***A Network:*** *A group of devices that can communicate with each other over links.*
- *Each device is called a host. Each host has a unique address.*



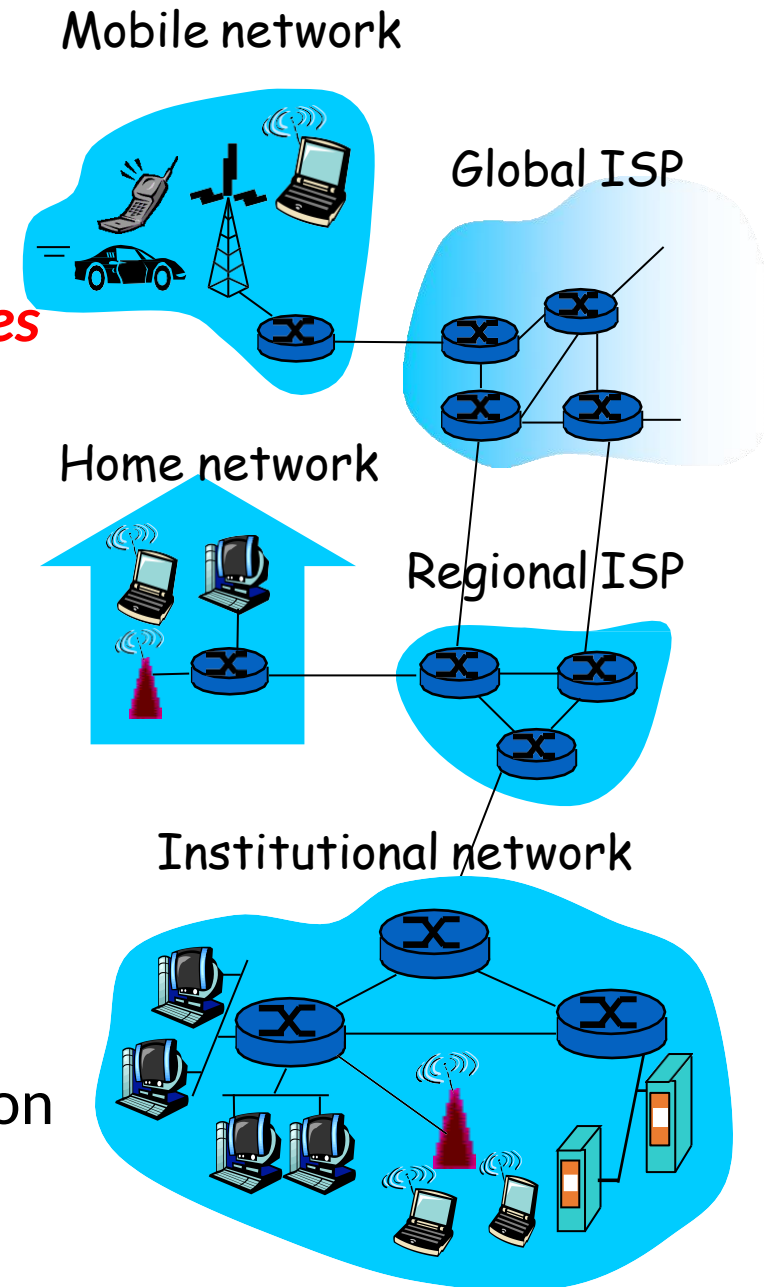
Components of Network

- **Client** : Which gives the Request.
- **Server** : Which gives the Response
- **Modem** : It Indicates Modulator / Demodulator
- **Router** : Which identifies the Path between Client & Server.
- **Channel** : Links are used to exchange the information



What is a Computer Network?

- ❑ Computer Network is a collection **of interconnected devices**
- ❑ Provides **communication** that is
 - Reliable
 - Fair
 - Efficient
 - From one application to another
- ❑ Automatically **detects and corrects**
 - Data corruption
 - Data loss
 - Duplication
 - Out-of-order delivery
- ❑ Automatically **finds optimal path** from source to destination



What is a ComputerNetwork?(2)

☐ A **node** can be

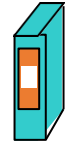


PC

■ Computer



router



server

■ Printer

■ Security Camera



wireless
laptop

■ Switches ,Bridges and Routers



cellular
handheld



access
points



wired
links

In short any device who is capable of sending and receiving data generated by any nodes in the network.

What is a ComputerNetwork?(3)

❑ **Communication link carries the information** .it can be Wired or Wireless
i.e. Links are used to exchange the information.

❑ **End Devices**: Starting point or End point.

❑ **Intermediary devices**.

Basic purpose of network is Resource Sharing which saves lots of infrastructure cost.

Uses of Computer Networks

☐ Business Applications

- online buying

☐ Home Applications

- mail, chat

☐ Mobile Users

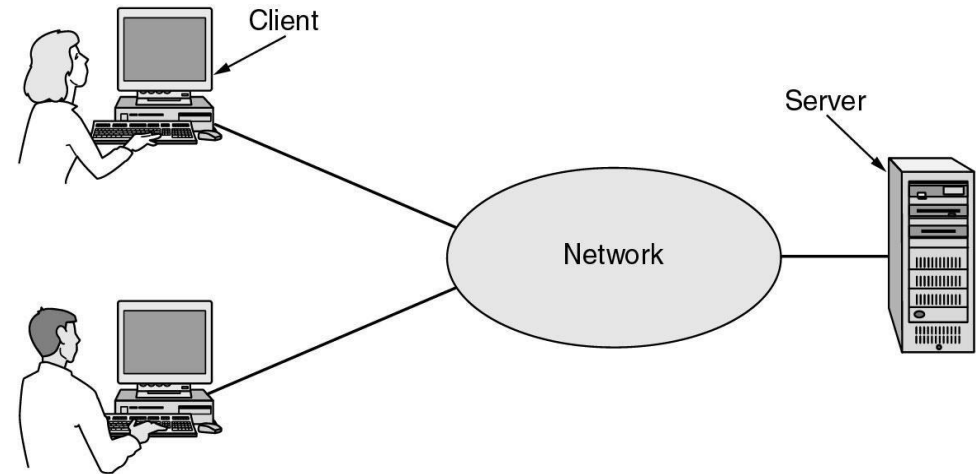
- wireless: laptops, PDA, mobile, in plane

☐ Social Issues

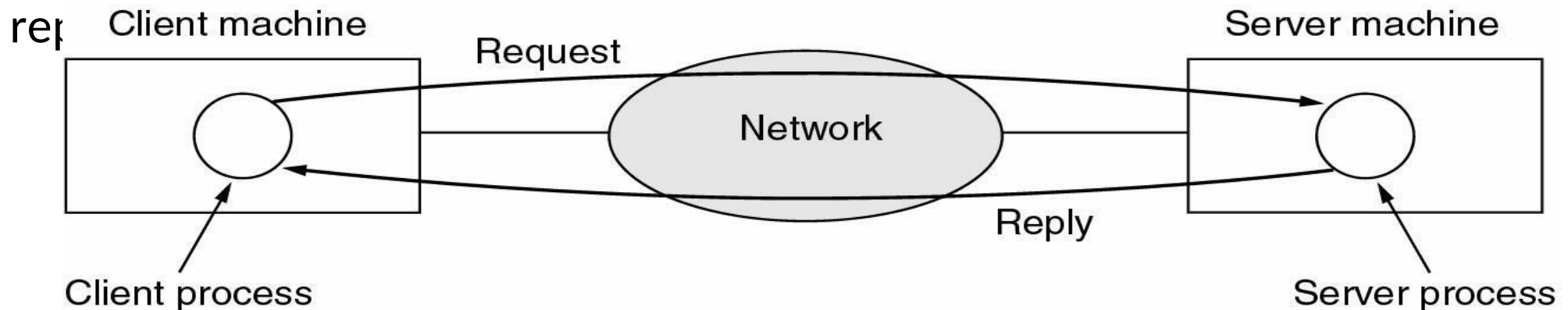
Business Applications of Networks

❑ A network with **two clients and one server**.

- Check bank account
- Pay bills
- Reserve ticket



❑ The **client-server model** involves requests and



Home Network Applications

☐ Access to remote information

- Learning online, downloading

☐ Person-to-person communication

- chat, phone

☐ Interactive entertainment

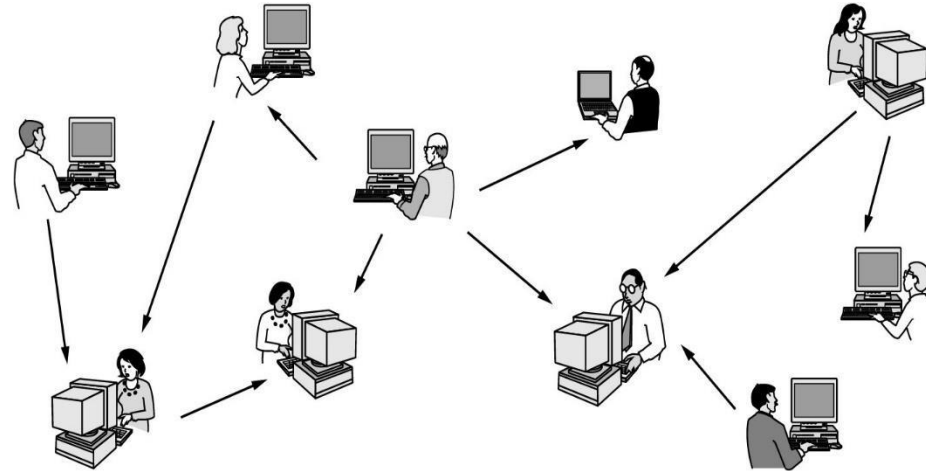
- games, movies, ...

☐ Electronic commerce

Home Network Applications (2)

☐ Peer-to-peer (P2P)

- BitTorrent, ForstWire



☐ E-commerce

Full name	Example
Business-to-consumer	Ordering books on-line
Business-to-business	Car manufacturer ordering tires from supplier
Government-to-consumer	Government distributing tax forms electronically
Consumer-to-consumer	Auctioning second-hand products on-line
Peer-to-peer	File sharing

Social Issues

- Discussions about
 - **politics,**
 - **technology,**
 - ...
- Hack and robbery

