Networking Essentials
ITC 2243

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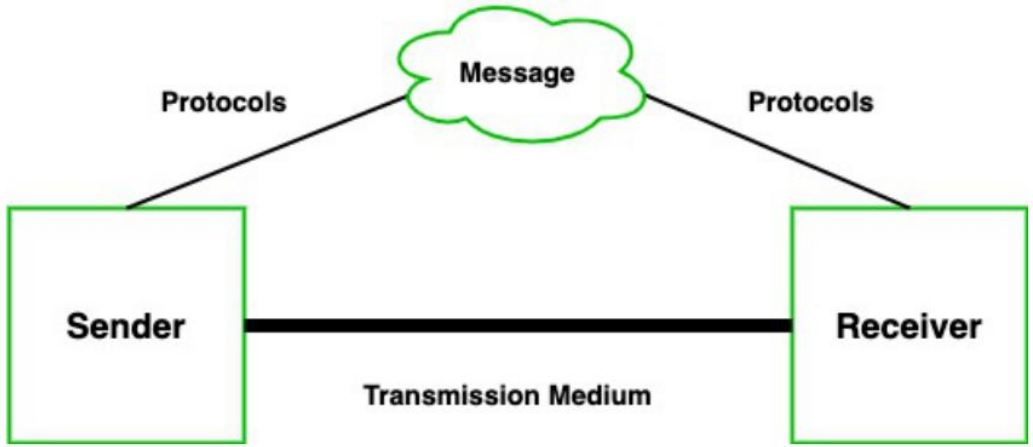
What is Data Communication?



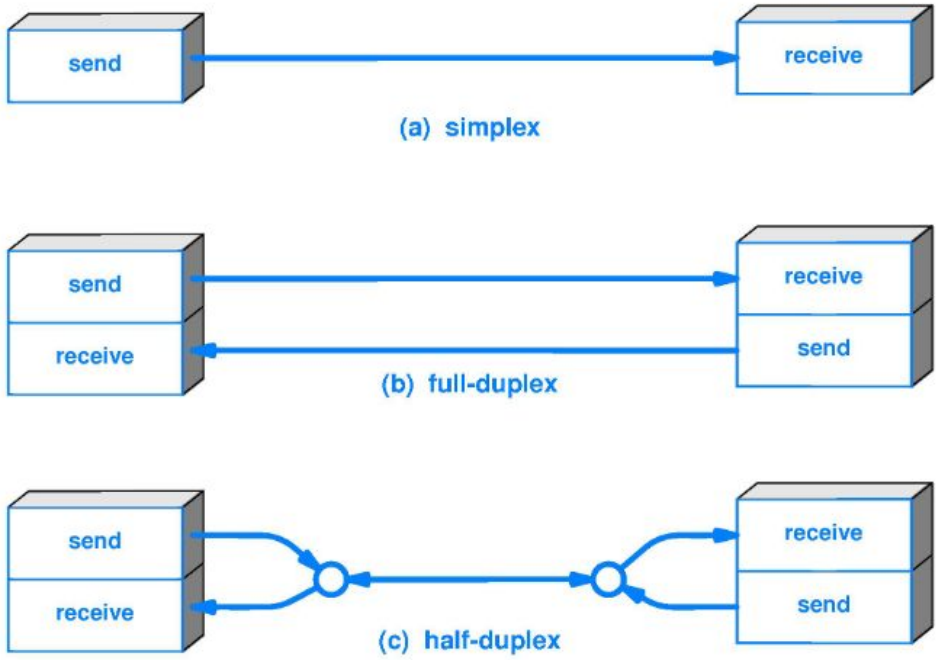
- Data communication is communication in which we can send or receive data from one device to another for the objective of simple communication.

Characteristics of Data Communication

- **Message:** A message is a piece of information that is to be transmitted from one person to another. It could be a text file, an audio file, a video file, etc.
- **Sender:** It is simply a device that sends data messages. It can be a computer, mobile, telephone, laptop, video camera, or workstation, etc.
- **Receiver:** It is a device that receives messages. It can be a computer, telephone mobile, workstation, etc.
- **Transmission Medium / Communication Channels:** Communication channels are the medium that connect two or more workstations. Workstations can be connected by either wired media or wireless media.
- **Set of rules (Protocol):** When someone sends the data (The sender), it should be understandable to the receiver also otherwise it is meaningless. For example, Sonali sends a message to Ravindu. If Sonali writes in Sinhala and Ravindu cannot understand Hindi, it is a meaningless conversation.

Types of Data Communication

- **Simplex Communication:** It is one-way communication, or we can say that unidirectional communication in which one device only receives, and another device only sends data and devices uses their entire capacity in transmission. For example, IoT, entering data using a keyboard, listing music using a speaker, etc.
- **Half Duplex communication:** It is a two-way communication, or we can say that it is a bidirectional communication in which both the devices can send and receive data but not at the same time. When one device is sending data then another device is only receiving and vice-versa. For example, walkie-talkie.
- **Full-duplex communication:** It is a two-way communication or we can say that it is a bidirectional communication in which both the devices can send and receive data at the same time. For example, mobile phones, landlines, etc.



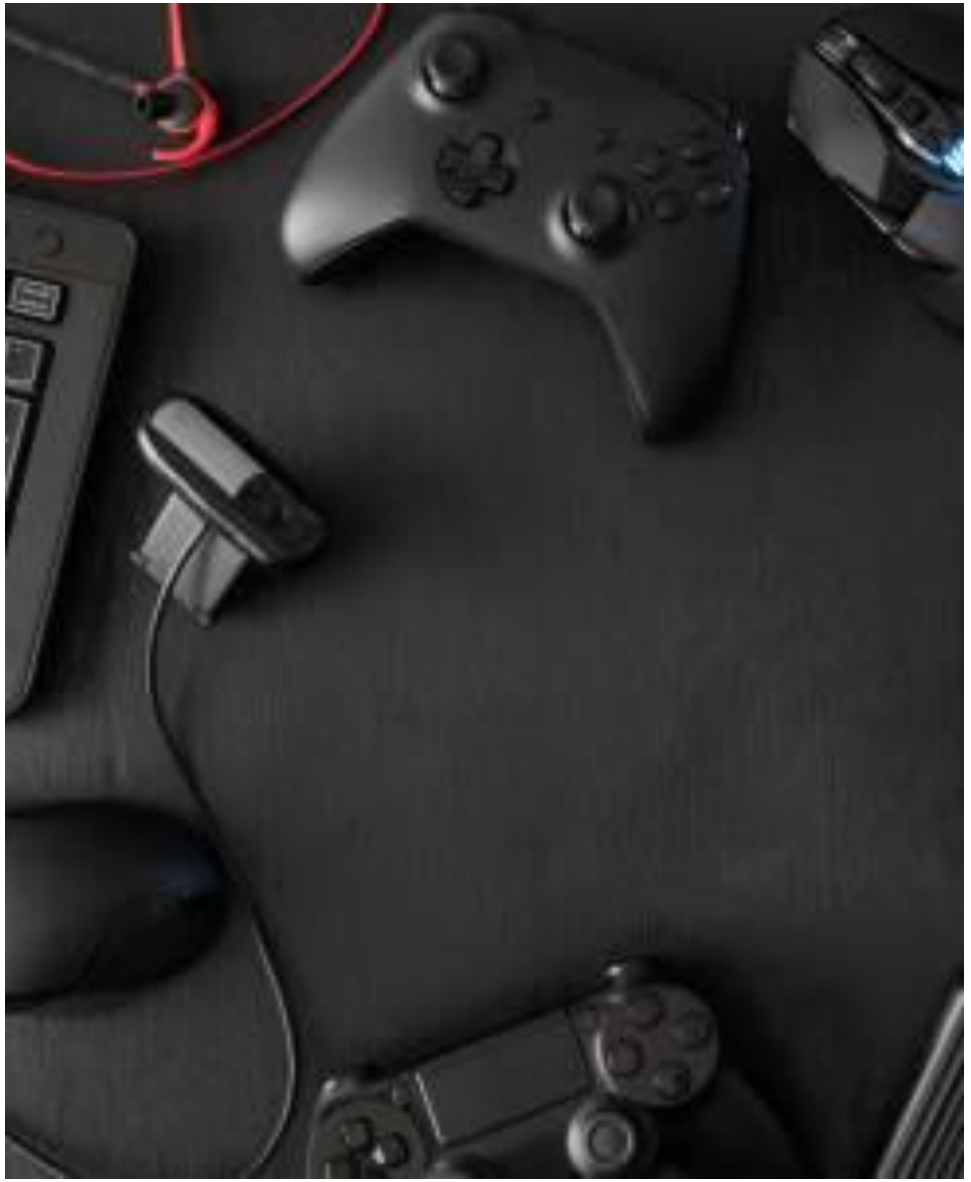
What is a Network?

- Many types of network provide different kinds of services.

In the course of a day,

- ❑ A person might make a phone call,
- ❑ Watch a television show,
- ❑ Listen to the radio,
- ❑ Look up something on the Internet or
- ❑ Even play a video game with someone in another country.

- **All of these activities depend on robust, reliable networks;**



What is a Network?

- A Computer Network is a collection of autonomous computing devices that are interconnected in various ways in order to exchange information by common conventions, called protocols, over a shared communication medium.

➢ Note: A single computer system with its peripherals such as printers, scanners etc. is not considered as a network.

Stand Alone vs Computer Network

In Computer Networking,

- The generic term **node** or **host** refers to any device on a network (usually refers to a computer)

- Network infrastructure contains three broad categories of network components:

❑ Devices

❑ Media

❑ Services

- **Data transfer rate**

✔ The speed with which data is moved from one place on a network to another

- Data transfer rate is a key issue in computer networks

Advantages of Computer Networks

❖ Share Information and Resources

❖ Access databases

❖ Ecommerce

❖ Easy administration

❖ Communication

❖ Provides data security

Risk of Computer Networking

- Network security is an integral part of networking regardless of the size of the network.
- The network security that is implemented must take into account the environment while securing the data, but still allowing for quality of service that is expected of the network.
- Securing a network involves many protocols, technologies, devices, tools, and techniques in order to secure data and mitigate threats.
- Threat vectors might be external or internal.

Types of Security Risks

- Equipment malfunctions
- System failures

✔ Note: equipment malfunctions and system failures may be caused by natural disasters such as floods, storms or fires and electrical disturbances.

- Computer hackers

External vs Internal

External Threats:	Internal Threats:
• Viruses, worms, and Trojan horses • Spyware and adware • Zero-day attacks • Threat Actor attacks • Denial of service attacks • Data interception and theft • Identity theft	• lost or stolen devices • accidental misuse by employees • malicious employees

Factors To Be Considered When Installing a Network

1) Performance

- It can be measured in following ways:

✔ **Transit time:** It is the time taken to travel a message from one device to another.

✔ **Response time:** It is defined as the time elapsed between a request and response.

2) Reliability

▪ It decides the frequency at which network failure take place. More the failures are, less is the network's reliability.

3) Security

• It refers to the protection of data from the unauthorized user or access.

• While travelling through network, data passes many layers of network, and data can be traced if attempted.

• Hence security is also a very important characteristic for Networks.

Thank You!!!