

Computer Communication and Networks

(Lecture-01)



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What is Computer Networks

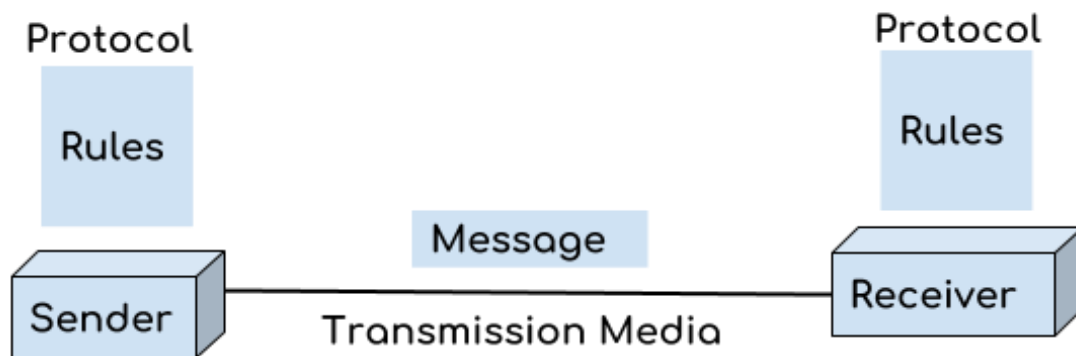
Two or more computers that are connected with one another for the purpose of communicating data electronically. Besides physically connecting computer and communication devices, a network system serves the important function of establishing a cohesive architecture that allows a variety of equipment types to transfer information in a near-seamless fashion.

Explanation

It is a set of devices connected through links. A node can be computer, printer, or any other device capable of sending or receiving the data. The links connecting the nodes are known as communication channels. It is a group of devices connected with each other through a transmission medium such as wires, cables etc. These devices can be computers, printers, scanners, Fax machines etc. The purpose of having computer network is to send and receive data stored in other devices over the network. These devices are often referred as nodes.

Basic Component of a Network

There are five basic components of a computer network



Message: It is the data or information which needs to be transferred from one device to another device over a computer network.

Sender: Sender is the device that has the data and needs to send the data to other device connected to the network.

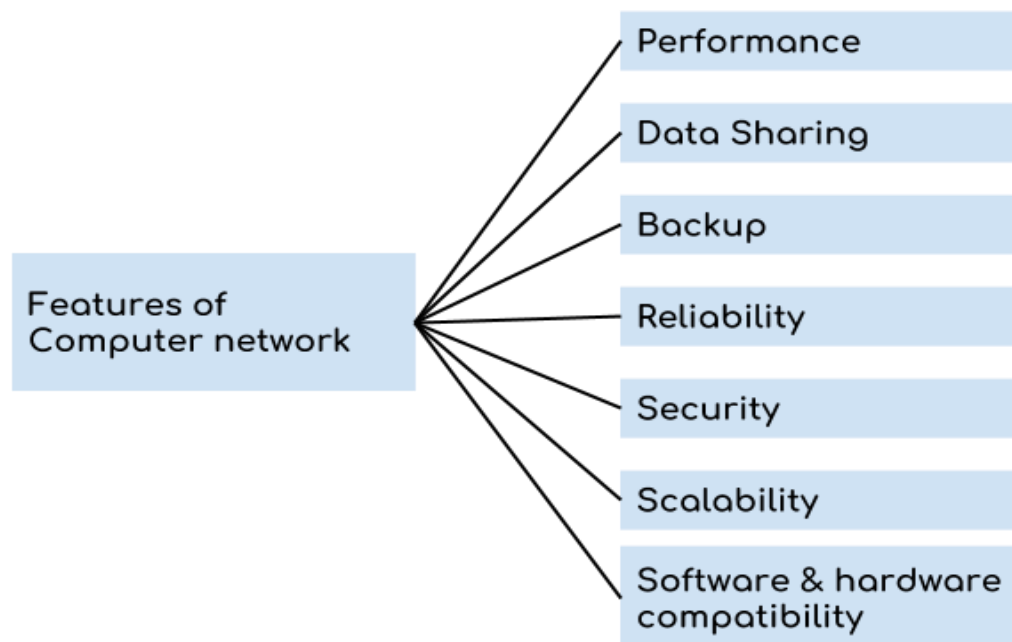
Receiver: A receiver is the device which is expecting the data from other device on the network.

Transmission Media: Transmission media is a communication channel that carries the information from the sender to the receiver. Data is transmitted through the electromagnetic signals. It is a path between transmitter and receiver in data communication. In a copper-based network, the bits in the form of electrical signals and in a fiber based network, the bits in the form of light pulses.

Protocol: A protocol is a set of rules that are agreed by both sender and receiver, without a protocol two devices can be connected to each other but they cannot communicate. In order to establish a reliable communication or data sharing between two different devices we need set of rules that are called protocol. For example, http and https are the two protocols used by web browsers to get and post the data to internet, similarly Simple Mail Transfer Protocol (SMTP) is used by email services connected to the internet.

Main Features of a Computer Network

A computer network has many features but the most prominent are as follows:



Performance: Performance of a computer network is measured in terms of response time. The response time of sending and receiving data from one node (computer in a computer network are often referred as node) to another should be minimal.

Data Sharing: One of the reason why we use a computer network is to share the data between different systems connected with each other through a transmission media.

Backup: A computer network must have a central server that keeps the backup of all the data that is to be shared over a network so that in case of a failure it should be able to recover the data faster.

Software and hardware compatibility: A computer network must not limit all the computers in a computer network to use same software and hardware, instead it should allow the better compatibility between the different software and hardware configuration.

Reliability: There should not be any failure in the network or if it occurs the recovery from a failure should be fast.

Security: A computer network should be secure so that the data transmitting over a network should be safe from unauthorized access. Also, the sent data should be received as it is at the receiving node, which means there should not be any loss of data during transmission.

Scalability: A computer network should be scalable which means it should always allow to add new computers (or nodes) to the already existing computer network. For example, a company runs 100 computers over a computer network for their 100 employees, let's say they hire another 100 employees and want to add new 100 computers to the already existing LAN then in that case the local area computer network should allow this.

End of Lecture-1