

STRUCTURAL ELEMENTS OF A NETWORK

A computer network can connect computer systems with stand-alone computers, other peripheral devices, and generally any type of terminal arrangement that has a processor. The communication channel can be any copper or optical fiber cable, laser and microwave through which various forms of information can be transferred from one computer to another. A computer network, for example, can be considered a set of connected computers as well as terminals that communicate with each other with specific rules. These rules characterize the performance and quality of the network.

The structural elements of a computer network can be the following:

1) the communication nodes: They are mainly devices that mainly have a processor and memory. It can be a set of calculations or a calculation of any type and size.

2) The physical means of transport: It is the means through which the information will pass in the form of communication signals. This could be some kind of cable, but it could also be a wireless connection.

3) interconnection arrangements: Hardware units that ensure the connection of the nodes and the transfer of information in the network. These arrangements are placed between the node and the physical means of transmission. Typical functions that execute such orders are, for example, a modulator, it is the configuration and demodulation as well as the control of the correctness of the data being transferred.

4) The network software: this is the set of programs that ensure the connection.

They implement and control the communication of the computer systems of the network. Their basic functions are the control and allocation of access rights to network users.

5) Network application software: These are applications and programs that are designed to take advantage of the possibilities offered by a computer network.

NETWORK CLASSIFICATION

Classification of networks according to the transmission medium:

A network interconnects a multitude of computers or nodes. In the simplest form of connection, computers are connected directly by some physical medium or link, such as a copper cable, an optical fiber or some wireless link. We have two main categories of connections:

1) **Cable or wired communication:** includes all types of aerial, terrestrial or underground connections of this type. An example of such networks are optical networks.

2) **Wireless communication:** The medium of transmission is the air. In these networks, the information is transmitted through electromagnetic waves with a frequency that depends each time on the transmission rate that a network is intended to have. Examples of such networks are microwave link networks, radio communication networks, satellite networks, etc.

Classification of networks according to the type of connection:

Connections are divided into two categories:

1) **Point to point connection : (POINT TO POINT)** which connects two single nodes each time. The result of this direct connection is that the communication between two nodes that are connected through other nodes is not done segmentally

2) **Open listening or broad broadcast connection : (BROADCASTING)** Connects two or more nodes simultaneously. The result of this connection is that every message sent by a node is received by all the nodes above the network without exception. For this reason, the connection of this form is also called a point-to-multiple point connection, and the corresponding connections are called multi-access connections.

Classification of networks according to the type of topology:

The network topology is the one that characterizes the physical arrangement of the cables that connect the nodes of the network. Some of the known topologies are as follows:

1) **Bus or Artery:** The nodes of the network are connected through a cable whose ends are open. The use of this topology is usually limited to mixed local area networks. A disadvantage of this type of connection is that if the cable is cut, the network cannot work.

2) **Ring:** The computers of the network are also connected through a cable, with the difference that their ends are joined.

3) **Star topology:** In this topology there is a distributed or central computer that is connected to every computer in the network with a direct connection line. Two computers of the network of this form can connect to each other only through the central computer.

The nodes of the network are connected to each other with high transmission rate lines, forming the so-called trunk of the network. In order to connect

networks, these nodes often also function as gateways of a lower transmission rate.