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NETWORKS AND THEIR MAIN FEATURES IN COMPUTER SCIENCE

Abstract: This article discusses networks and their main features in informatics. The author explains the various functions of networks.

Key words: local network, global network, hard, internet

A local network is a set of computers, peripheral devices (printers, etc.) and switching devices connected by cables. As the cable used "thick" coaxial cable, "thin" coaxial cable, twisted pair, fiber optic cable. "Thick" cable is mainly used in long distances with high bandwidth requirements. Fiber-optic cable allows you to create long sections without repeaters at a speed and reliability unattainable with other cables. However, the cost of a cable network based on it is high, and therefore it has not yet found wide distribution in local networks. Basically, local computer networks are created on the basis of a “thin” cable or twisted pair.

Initially, networks were created on the principle of "thin" Ethernet. It is based on several computers with network adapters connected in series with a coaxial cable, and all network adapters send their signal to it simultaneously. The shortcomings of this principle came to light later.

With the growth of the size of networks, the parallel operation of many computers on one single bus has become almost impossible: mutual influences on each other have become very large. Random failures of the coaxial cable (for example, an internal wire break) put the entire network out of action for a long time. And it became almost impossible to determine the place of a break or the occurrence of a software malfunction that "shut up" the network.

Therefore, the further development of computer networks takes place on the principles of structuring. In this case, each network consists of a set of interconnected sections - structures.

Each individual structure consists of several computers with network adapters, each of which is connected by a separate wire - twisted pair - to the switch. If development is needed, a new structure is simply added to the network.

When building a network based on the twisted pair principle, you can lay more cables than currently installed computers. The cable is laid not only for every workplace, regardless of whether its owner needs it today or not, but even where there is no workplace today, but it may appear in the future. Moving or connecting a new user will eventually require only a change in the switching on one or more panels.

A structured system is somewhat more expensive than a traditional network due to significant redundancy in design. But on the other hand, it provides the possibility of operation for many years.

For networks built according to this principle, there is a need for special electronic equipment. One of these devices - a hub - is a switching element of the network. Each hub has from 8 to 30 connectors (ports) for connecting either a computer or another hub. Only one device is connected to each port. When you connect a computer to a hub, it turns out that part of the network interface electronics is in the computer, and some is in the hub. This connection improves the reliability of the connection. In normal situations, in addition to signal amplification, the hub restores the packet preamble, eliminates noise interference, etc.

Hubs are the heart of the system and largely determine its functionality and capabilities. Even in the simplest hubs, there is an indication of the status of the ports. This allows you to immediately diagnose problems caused by poor contacts in connectors, damaged wires, etc. An essential property of such a

structured network is its high noise immunity: if the connection between two of its elements is broken, the rest continue to operate. The task of connecting computer networks of various organizations, often created on the basis of different standards, has caused the emergence of special equipment (bridges, routers, hubs, etc.) that performs such interaction.

The vast majority of computers in the Western world are connected to one network or another. Network operation experience shows that about 80% of all information sent over the network is closed within one office. Therefore, special attention of developers began to attract the so-called local area networks (LAN). Local area networks differ from other networks in that they are usually limited to a moderate geographic area (one room, one building, one area).

There are two types of computer networks: peer-to-peer networks and dedicated server networks. Peer-to-peer networks do not provide for the allocation of special computers that organize the network. Each user, connecting to the network, allocates some resources to the network (disk space, printers) and connects to the resources provided to the network by other users. Such networks are easy to install, establish; they are significantly cheaper than networks with a dedicated server. In turn, networks with a dedicated server, despite the complexity of setting up and relative high cost, allow for centralized management.

Telephone lines are used to connect to remote computer networks.

The process of data transmission over telephone lines should take place in the form of electrical oscillations - an analogue of an audio signal, while information is stored in a computer in the form of codes. In order to transmit information from a computer over a telephone line, the codes must be converted into electrical vibrations. This process is called modulation. In order for the recipient to be able to read what was sent to him on his computer, the electrical oscillations must be converted back into machine codes - demodulation. A device that converts data from digital form, in which they are stored in a

computer, to analog (electrical oscillations), in which they can be transmitted over a telephone line, and vice versa is called a modem (short for modulator demodulator). The computer in this case must have a special telecommunications program that controls the modem, and also sends and receives signal sequences of transmitted information.

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