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## MODERN DATA TRANSMISSION SYSTEM

*In the article the modern existing data systems and their features.*

**Keywords:** network, a channel system, data transmission.

### Introduction

Today's realities require a person to be informed of all the latest events, news, financial and political world, as well as to respond immediately to any changes occurring in the world. Man needs a constant exchange of data. A striking example of such information depending on the communication channels may be called *trejderstvo*. Man playing the stock exchange, should possess all the information that affect the stock price. More than that, he needed the Internet, in time to make a change in his chips, otherwise he will not get profit. Due to the fact that now actively developing cable, satellite and mobile communication lines, such a person can be continuously operated canal, and often even a backup, just in case.

### Main part

The data transmission system - a system for transmitting information within various infrastructure management systems, and between them, as well as with external systems. The data transmission system is, directly or indirectly, the main component of the technical performance of virtually all medium and large organizations, as well as many small companies that use modern means of managing their businesses.

Historically, that the data transmission system each year becomes more versatile medium for transmitting a variety of information as between end users and among system devices. The greater the flexibility, the more requirements for this system.

The data transmission system consists of several components, determined in accordance with the task. They are not a complete list:

- switches;
- routers;
- Firewalls and bridges;
- multiplexers;
- wireless access points;
- CPE.

Data networks may be wired, which means connection of computers via cables, or wireless, in which the connections are made by means of radio waves through the air. The wireless connection allows you to work on computers anywhere in the house without the use of cables. Cabling costly process, and they do not look aesthetically pleasing and can be dangerous if freely lie on the floor. Wired data transmission system can be divided

into systems using twisted pair telephone wires, and systems using fiber optic cables, this category should also include systems in which, along with fiber optic cables are also used coaxial cable [1].

**Wireless data transmission systems.** At present, the rapid development of wireless technology has opened up new business opportunities for the effective organization of corporate network. The advantages of wireless solutions:

- The low cost of deployment;
- Mobility;
- Safety, the ability to encrypt traffic;
- Reliable and high-quality telephone service;
- High-speed Internet access;
- Independence from cable infra structure;
- Easy to connect and use.

The absence of wires and, as a consequence, reference to any particular place has always been important for mobile users who are on-line access to the information needed constantly, regardless of their location. Wireless networks are effective primarily for data transmission over distances up to several hundred meters, and are low cost implementation. The range of wireless network equipment may include a wireless video cameras and other devices. The development of wireless access systems are in three main areas. This satellite systems, terrestrial microwave systems and personal mobile communication systems which allow for access of mobile users. Of course, each of these means has its advantages and disadvantages [5].

**Personal cellular systems.** Access to the Internet can be arranged through the existing cellular system using analog modems (modem for transmission over telephone lines). Since cellular channels have a sufficiently narrow bandwidth, the data rate is low (in the gradual development of cellular communication systems and technology enhancements data rate also gradually grew from 9.6 kbit / s to 19.2 kbit / s). A certain increase in data transfer rates can be achieved through the use of temporarily free channels (in which telephone calls are not kept).

**Microwave systems.** As soon as the increased demand for increasing the number of long-distance links, systems were developed to satisfy such requirements. One of these systems were microwave links, in which as the carrier signal is not used cable and radio. Working at very high frequencies (UHF range), one radio link is capable of supporting the work of thousands of voice chan-

nels and several television channels simultaneously. Using this frequency range results in the need to place the repeaters at a small distance from each other (30 kilometers) in the line of sight (a microwave signal can not turn the corner, or even through a small jump hill). The need to build in a certain distance relay tower with antennas makes this technology rather expensive in communication organization over a long distance, but this technique may find application, for example, to arrange the fixed radio access high-speed data transmission between two buildings (at a rate of 2 Mbit / s and higher). In many cases, such a decision would have a lower cost compared with the laying of the buildings between the optical-fiber cable (for example, in the cities, where lay the cable is not always easy, or in the case when the building divided by the river). [4]-

In the context of the lack of frequency resources have been created, developed and successfully applied a fixed wireless access systems operating in the infrared (IR-based LEDs and semiconductor lasers). They provide a working distance from 300 meters to 1-3 km at speeds up to 155 Mbit / s. All of the major drawbacks of these systems (relatively high cost and some dependence on weather conditions and pollution optics) more than compensated the absence of the need to obtain permission to use radio frequencies, as well as the speed and simplicity of installation. But the next step in the development of fixed radio access systems has been the creation of information-sharing protocols between the transceiver to enable connectivity to organize many objects to one (compound "point-to-multipoint") that best fits the task of organizing access to Internet. In addition, various mechanisms have been established (e.g., packet transmission, work in changing frequency), which will increase the capacity, transfer rate and spectral efficiency [2].

Providing an average data rate of this type of system used to organize the transmission channel at a sufficiently large distance. At the same time, exposure to external interference and dependence on the geographical conditions (obligatory need line of sight) make use of such systems is not always appropriate.

**Satellite systems.** For data transfer used, and satellite systems. Moreover, options may be different - from the low-speed individual channels for individual users to high-speed channels, simultaneous access to which may have a large number of users (multiple access). In the first case, the bidirectional channel can be used (but it can afford only a very rich organizations). In the second case, the satellite only serves to transmit downstream data coming from the Internet to the user. The user must be sure to install a satellite dish, a microwave receiver and decoder card directly to a personal computer. For the organization of the upstream (from the user to the Internet network) used telephone line and modem.

The satellite covers a large area on the surface of the Earth and is the most "widely covered" Internet access technology from a geographical point of view. Satellite access systems are not very high data rate (about 400 kbit / s towards the user) and do not work very quickly.

**Fiber-optic and fiber-coaxial system.** Fiber-optic and fiber-coax system originally created for cable TV and video signals. Due to the fact that these systems are, by definition, broadband, developed just such a technology that would allow use this advantage for high-speed data transmission, mainly to provide Internet access to individual users. Bidirectional CATV system can transmit downlink data stream in the frequency band from 50 MHz to 750 MHz, which is divided into 6 MHz channels. The frequency band allocated for upstream data is shared between all users to which a coaxial cable is laid. Typically, this frequency range from 5 MHz to 40 MHz. One video channel having a nominal bandwidth of 6 MHz can be used for transmitting data from the Internet at speeds up to 30 Mbit / s. The total flow rate of the uplink data up to 10 Mbit / s, but the method is practiced in reality collective use for each individual user gives a much lower value [3].

It would seem that all is well. And why not develop a fiber-optic user access to Internet technology. Everything is very simple. The development of fiber-optic technology and the deployment of fiber-optic cable networks is very expensive. Especially if we compare the implementation of this technology with other technologies. Does it make sense to build new expensive communication lines to each user, if the vast majority of these users already connected to at least one telecommunications company telephone.-

**The use of twisted pair telephone wires, and subscriber data.** Twisted pair cable type of communication, represents one or more pairs of insulated conductors twisted together, covered with a plastic sheath. Cabling conductors made to improve communication of one pair of conductors (electromagnetic interference equally affect both wires of the pair) and subsequent reduction of electromagnetic interference from external sources, and the mutual interference when transmitting differential signals. To reduce the communication of individual pairs of cables (periodic convergence conductors of different pairs) in the cables UTP category 5 or higher wire pair wove with different pitches. Twisted pair - a component of modern structured cabling systems. Used in telecommunications and computer networks as a network carrier in many technologies, such as Ethernet, Arcnet and Tokenring. Currently, due to its low cost and ease of installation, it is the most common solution for building local networks. Telephone wires is the main carrier, which is currently used to connect to all subscribers to the telephone network equipment. Each subscriber telephone network has a single physical pair of wires in the cable leading from the telephone exchange, which connects it to the telephone switching equipment installed at the telephone exchange. Each pair in the cable is twisted, thus reducing unwanted noise. In the implementation of regular telephone cable, each pair at the subscriber site cabling supports one voice channel. Also twisted pairs of wires used for connecting PCs on a LAN (local area networks). There are three main solutions in the organization access to the Internet over a twisted pair network. It is an

analog modem designed specifically for transmission over telephone lines, ISDN, and about the technologies, under the general title xDSL. Analog modems are well-known principle of operation is based on a range of voice frequencies twisted pair for data transmission. For this purpose, transmission technology, known as "frequency shift keying" and "quadrature amplitude modulation". Analog modem allows to achieve the data rate to 56 kbit / SK Unfortunately, analog modem transfer speed depends largely on the quality of the telephone line and the established connection. That is why to receive the maximum data transfer rate is almost impossible (usually a modem with a claimed speed of 33.6 kbit / s allows you to work at a speed of 28.8 kbit / s, at best, 31.2 Kbit / s). Lay Internet users can use analog modems, but sooner or later, any one of them is faced with the problems associated with low quality connections and overloads the public telephone network. This network, in its current form at the moment, it is not designed to pass Internet traffic. Higher-speed analog modem is an alternative ISDN.

ISDN is a digital technology which allows to transmit data at a rate of 144 kbit / s. For this purpose 2V1Q coding scheme. The data rate of 144 kbit / s consists of two B channels of 64 kbit / s each are used for voice and data, and a single overhead channel D of 16 Kb / s for transmitting control signals. The channels may be used as two separate voice channels and two data channels at 64 kbit / s, as two separate voice and data channels, and also together with a data transmission rate of 128 kbit / s.

xDSL technology can significantly increase the data transmission rate over copper telephone wire pairs, thus not requiring a global modernization subscriber cable network. It is an opportunity to convert existing telephone lines, subject to a certain amount of preparatory technical measures in high-speed data channels is the main advantage of xDSL technologies. These technologies make it possible to significantly expand the bandwidth of copper subscriber telephone lines. Any subscriber who uses a conventional telephone connection is a potential candidate for the fact that with the help of one of the xDSL technologies to significantly increase the speed of your Internet connection. At the same time provided for the preservation and the normal operation of a conventional telephone connection, regardless of the use of the Internet [5].

The variety of xDSL technology allows a user (subject to certain restrictions relating to the length and quality of a subscriber line), it is suitable to select a data rate of 32 kbit / s to more than 50 Mbit / s. Advanced xDSL technologies make it possible to organize a high-speed

Internet access for each individual user and each small business, turning ordinary telephone lines into high-speed digital channels. xDSL includes a set of different technologies to organize the digital subscriber line that are different from the distance by which the signal is transmitted, data transmission rate, and the difference in transmission rates "downlink" (from the network to the user) and the "bottom" ( from the user to the network) data stream. xDSL technology provides telecommunication companies the opportunity, from which they simply can not refuse. They provide a quick and inexpensive method for the additional use of an existing cable network, as well as the framework for the transition to future technologies. To ignore this would be just silly.-

## Conclusions

The data transmission system - a system for transmitting information within various infrastructure management systems, and between them, as well as with external systems. Data transmission systems may be wired or wireless, in which the connections are made by means of radio waves through the air. The development of wireless access systems are in three main areas. This satellite systems, terrestrial microwave systems and personal mobile communication systems which allow for access of mobile users. Wired data communication system can be divided into systems using twisted pair telephone wires, and systems using fiber-optic cables, this category should also include a system in which, together with fiber-optic cables are also used coaxial cables. The wireless connection allows you to work on computers anywhere in the house without the use of cables. However, for the freedom and mobility of a wireless network comes at a price: a wired network work a little faster. However, most users enough speed wireless network.-

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## СУЧАСНІ СИСТЕМИ ПЕРЕДАЧІ ДАНИХ

О.В. Прищепа

*У статті розглянуті сучасні існуючі системи передачі даних та їх особливості.*

**Ключові слова:** мережа, канал, система, передача даних.

## СОВРЕМЕННЫЕ СИСТЕМЫ ПЕРЕДАЧИ ДАННЫХ

А.В. Прищепа

*В статье рассмотрены современные существующие системы передачи данных и их особенности.*

**Ключевые слова:** сеть, канал, система, передача данных.