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THE MODELS OF INFORMATION TRANSMISSION IN COMPUTER NETWORKS

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This paper discusses the models of information dissemination in computer networks. The problems of information transmission in fiber-optic networks are discussed. The advantages of fiber optics compared to telecommunications are given.

Keywords: computer networks, telecommunications, fiber-optic networks.

The latest technology of wireless data transmission quickly implemented and are widely used in the production activities of most companies and to build networks for home use. Wi-Fi networks actively deployed in public places such as hotels, transportation terminals, restaurants, cafes, providing users visitors Internet access.

According to experts, the rapid development and popularity of technologies wireless information transfer in recent years was due specifically to this opportunity.

For wave propagation inside the confined spaces of the premises can be noted such effects as a large number of rays that are associated with the fact that there are multiple reflections from various objects (furniture, walls, ceilings, floors, etc.). As a result you can observe quite a difficult picture for the final field distribution.

Is of interest not calculating the exact intensity of the signal, and some of it evaluation, since obtaining the exact values will be difficult because of the refusal to take into account the fine-grained effektive attenuation as well as on the grounds of ignoring interiors premises.

The value of the coarse-grained attenuation (attenuation) of a signal depends on the distance from the point of transmission and the frequency of the signal.

Means for modeling internal propagation can be divided into the following four groups: The statistical model. These models do not require any information about the walls in the building. You only need a description of the type of buildings (office, hotel, hospital, old building, etc.)

Empirical models with a direct path propagation (single-beam). They are based on a direct path between the transmitter receiver, no other beams are not considered.

Empirical multipath model. This new approach based PA multipath wave propagation between the transmitter and the receiver.

Calculated different types of ways, and their parameters are used for prediction.

Models based on geometrical optics. The microwave range can be described by quasi-optical propagation models that consider the reflection at diffraction angles.

Created various approaches such as ray tracing (tracking beam) and the start of the beam.

Each group contains different implementations of the basic idea, but all models belonging to the same group, lead to some similar results and have the same advantages (and disadvantages).

In the premises due to distance attenuation is not the same as in free space, because of reflection, diffraction and dispersion, even if the antennas of the transmitter and receiver are located in a zone of direct visibility. Proposed to date, empirical models of single-beam propagation inside buildings can be divided into 2 groups, depending on the relative position of receiver and transmitter: single-storey and multi-storey models model.

The calculation of the loss on distribution is made when comparing the output power at the transmitter point and the input signal of the receiver and includes all the losses between these points due to antennas, cables, free space loss, and others.

The mathematical model includes fixed parameters, such as signal frequency, the speed of light, then independent parameters: angle of incidence of the wave, the distance from the receiver to the wall, the distance from transmitter to wall, then enter the value of n c for some

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step, this allows you to most accurately select the value of the refractive index.

On the basis of mathematical models it is possible not only to obtain the parameter of refraction, but also the relative magnitude of the attenuation. A convenient parameter is the angle of incidence of the signal relative to the walls, which you can modify. A small change in the angle varies considerably in the level of attenuation.

Fiber optics has the advantage over telecommunications, such as:

1. Information capacity. The bandwidth of optical fiber exceeds all requirements of today's network applications. The fiber optic cable 62.5/125 µm, is recommended for use in buildings, has a bandwidth of 160 MHz-km (at a wavelength of 850 nm or 500 MHz×km (at 1300 nm).

The bandwidth depends on frequency and distance, so the length of the optical cable 100 m, its width exceeds 1 GHz. (For comparison: copper category 5 cable at the same length has a bandwidth of 100 MHz.). Width the bandwidth of single-mode fiber can be from 50 to 100 GHz km.

The existing cables have a bandwidth of several GHz and allow you to transfer over distances in the tens and even hundreds of kilometers.

2. Low loss. Due to the small attenuation can work at considerable distances. Depending on the type of fiber can transmit information at distances from several hundred meters to hundreds of kilometers.

(For copper cables this distance is 100 m. this is an essential drawback of copper cable losses grow with increasing signal frequency. In other words, with increase of speed of data transmission increases and attenuation decreases with distance. The optical fiber does not have this drawback.

3. Resistance to electromagnetic influences. According to some estimates, more than 60 percent of failures in networks based on copper cables are connected with their dense location.

Cross distortion, misalignment, electromagnetic susceptibility are the main sources of noise and failures in copper systems. Moreover, these problems are aggravated by the improper installation of the cable system, in particular in the case of systems of the fifth category.

Optical fiber is an insulator and is not affected by electromagnetic influences. It is impossible to cross distortion.

The optical fiber can be used in conditions of strong electromagnetic fields. It is not influenced by such noise sources as power lines, fluorescent lamps.

4. Light weight. Fiber optic cable is lighter than copper. Two-core optical cable is 20-50% lighter 4-pair category 5 cable. Less weight facilitates installation.

5. Dimensions. Fiber optic cable takes up less space. Optical cable from 2 to 8 have lived for 15% less space than a cable of 5th category.

6. Security. Fiber does not spark. In terms of ignition and gas development, fiber optic cables and twisted pair cables have the same parameters.

7. Secrecy. To the optic cables is extremely difficult to connect to, and unnoticed by such a connection can not be.

As well as optical cables do not emit radiation, interception of information without connection is impossible.

8. Efficiency. Optical cable for the price complies with the category 5 cable.

However, a dynamic annual price drop on S and much higher transmission speeds compared to UTP-5 gives him a distinct advantage.

The cost of laying optical and copper cables are the same.

The termination time is also almost the same (system category 5 requires more care and time during installation). Fiber optic cable systems are easier to operate and more reliable. The cost recovery system associated with aging optical system is lower than copper.

Optical fiber, as well as any other technical achievement has shortcomings, which will eventually be reduced to a minimum.

9. Strength. Modern fiber optic cables have a breaking strength of more than copper of the same diameter.

They are easy to bend and resist corrosion. Fiber optic cables can withstand "pulling" force 6 times greater than recommended for category 5 cable. In fact the category 5 cables are more fragile than optical, if not expose the taut straps and sharp bends.

Such bends can decrease the characteristics of the cable below the requirements of category 5.

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МОДЕЛИ ПЕРЕДАЧИ ДАННЫХ В КОМПЬЮТЕРНЫХ СЕТЯХ

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В данной работе рассматриваются модели распространения информации в компьютерных сетях. Обсуждаются проблемы передачи информации в оптоволоконных сетях. Указаны преимущества волоконной оптики по сравнению с электросвязью.

Ключевые слова: компьютерные сети, телекоммуникации, оптоволокно.