РАЗДЕЛ I. ИНФОРМАТИКА, ВЫЧИСЛИТЕЛЬНАЯ ТЕХНИКА И УПРАВЛЕНИЕ

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ESMAGAMBETOV T.U., ESMAGAMBETOVA M.M. BASIC REQUIREMENTS TO THE LOCAL COMPUTER NETWORKS USED AT ENTERPRISES

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ABSTRACT

In this article, we present the main tasks in the construction of local computer networks. Describe such concepts as performance and bandwidth of the local area network. The main requirements for the process of building local computer networks used at enterprises are given.

Keywords: server, protocols, local area networks

ЕСМАГАМБЕТОВ Т.У., ЕСМАГАМБЕТОВА М.М. ОСНОВНЫЕ ТРЕБОВАНИЯ К ЛОКАЛЬНЫМ КОМПЬЮТЕРНЫМ СЕТЯМ, ИСПОЛЬЗУЕМЫМ НА ПРЕДПРИЯТИЯХ

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АННОТАЦИЯ

В данной статье приводятся основные задачи при построении локальных вычислительных сетей. Описываются такие понятия как, производительность и пропускная способность локальной вычислительной сети. Приводятся основные требования к процессу построения локальных вычислительных сетей, используемых на предприятиях.

Ключевые слова: сервер, протоколы, локальные вычислительные сети

INTRODUCTION

At present, the availability of computer networks in the office is an indispensable attribute of a successful business. A local computer network is an independent personal computer, server, printer, fax, and other telecommunications equipment connected to a single information system.

Using the resources of a local computer network, it is possible to link several offices that are remote territorially into a single corporate information system. Modern equipment allows you to transmit large data streams of data, both on wired lines and over the air, which increases the efficiency and flexibility of the local and corporate communication networks being created.

With the correct construction of a computer network and competent administration, it is easy to access the necessary information, as well as its protection against unauthorized access.

At the present stage of development and use of local computer networks, such issues as the evaluation of performance and quality of local computer networks and their components, optimization of existing or planned local computer networks, have gained the most topical importance. Now, when local computer networks have become a defining component in the information strategy of most organizations, insufficient attention to assessing the power of the local area network and its planning has led to the fact that today many networks need to be re-designed to support modern applications in the client-server architecture, and in many cases and replace.

The performance and bandwidth of the local computer network is determined by a number of factors: the choice of servers and workstations, communication channels, network equipment, network data transfer protocol, network operating systems and operating systems of workstations, their configuration servers, distribution of database files to servers on the network, distributed computing process, protection, maintenance and restoration of operability in situations of failures and failures, etc. Communication is becoming more computerized from day to day

The basis of the information infrastructure of a modern enterprise is a local area network (LAN). The speed and quality of the functioning of the computer network largely determine the effectiveness of the organization.

Since the local network of the enterprise ensures the operation and interconnection of applications, the malfunctioning of the computer network has a negative effect on all services and all employees using the information infrastructure. In the worst case, if the central equipment of the local network fails, the entire enterprise may fail - employees will not be able to send electronic messages, the accounting department will not be able to work with financial documents, etc.

Therefore, when building or upgrading the enterprise's network infrastructure, a careful approach is needed.

PURPOSE

The main tasks in building the network infrastructure are:

- Maintenance of various types of traffic. Thenetworkinfrastructureof a modern enterprise should guarantee the possibility of functioning of integrated applications, implement the transfer in addition to conventional data, voice and video transmission with the required quality.
- Economical. Reducing the cost of implementation and ownership of network infrastructure. Ensuring sufficient performance. It should be borne in mind that the values of peak loads can many times exceed their normal daily values. It is also necessary to ensure the necessary margin of productivity, assessing the potential growth of the needs of the enterprise.
- Scalabilityofthesolution. Due to the fact that in modern conditions the structure of the enterprise is changing rapidly, it is necessary that the network infrastructure also quickly change without affecting the budget and the work of the enterprise.
- Ensuringhighavailability. It is necessary that the infrastructure of the enterprise work as continuously as possible, and the possible failure of individual components was either invisible or quickly eliminated.
- Ensuringinformationsecurity. The network infrastructure must comply with existing enterprise security policies to differentiate access, protect against internal and external attacks.

- Easy of use or management. Solutions implemented in the network infrastructure must be easily managed, have the ability to quickly diagnose and replace. It is necessary to avoid unnecessary administrative costs.

In addition to the above tasks, each company when creating an infrastructure can deliver additional, depending on the characteristics of their business processes. The conduct of modern business is difficult to imagine without using the Internet, for example, to present products, communicate with partners, clients. The lack of access to the Internet can cause the enterprise almost the same damage as a failure of the local network.

RESULTS AND DISCUSSION

The complex of software and hardware of the network can be described by a multilayer model. At the heart of any network is the hardware layer of standardized computer platforms. At present, computers are widely and successfully used computers of various classes - from personal computers to mainframes and supercomputers. The set of computers on the network must correspond to a set of various tasks that are solved by the network.

A software product running on the same computer can not directly access the resources of another computer - its disks, files, or printer. It can only "ask" for this program running on the computer to which these resources belong. These "requests" are expressed in the form of messages transmitted through the communication channels between computers. Messages can contain not only commands for performing certain actions, but also the actual information data

The most top layer of network tools are various network applications, such as network databases, mail systems, data archiving tools, team automation systems, etc. It is very important to represent the range of capabilities provided by applications for various applications, and also to know how compatible they are with other network applications and operating systems.

The second layer is communication equipment. Although computers are central elements of data processing in networks, communication devices have recently played an equally important role. Cable systems, repeaters, bridges, switches, routers and modular hubs from the auxiliary network components have become the main ones along with computers and system software both in terms of the influence on the characteristics of the network and at cost. Today, a communication device can be a complex specialized multiprocessor that needs to be configured, optimized, and administered. The study of the principles of the operation of communication equipment requires familiarization with a large number of protocols used in both local and global networks.

The third layer that forms the software platform of the network is the operating system (OS). The efficiency of the entire network depends on which management concepts of local and distributed resources are the basis for the network OS. When designing a network, it is important to consider how easy this operating system can interact with other network OS, how much it ensures the security and security of data, to what extent it allows to increase the number of users, whether it can be transferred to another type of computer and many other considerations.

At the first stage of work it is necessary to determine the number and location of active and passive network equipment, to develop the logical structure of the local computer network, to make its segmentation, if necessary, to calculate the cable system, to make an informed choice of communication equipment, and to develop measures to protect the network. At the next stage it is necessary to check the working capacity of the projected network by modeling its functioning on the computer. The modeling procedure involves

creating a network topology in the modeling program editor, configuring the equipment according to the technical task and checking the functioning of the network.

After correction based on the simulation results of the topology and the configuration program, it is necessary to draw up and draw an electrical circuit for connecting the network components. When designing a local area network, the following tasks must be solved:

- Determine how many users will be calculated network.
- Define the main tasks and applications the network is intended for.
- Define the network topology and access method for users.
- Select the appropriate active and passive hardware: the type of switches, routers, switchboards, type and number of cables, etc.
- Develop a scheme of electrical connections of computer network components and calculate the length of the cables that make up its structure.
- Configure the equipment, which ensures reliable and safe operation of the network in accordance with the requirements.
- Simulate the projected network in one of the simulation packages and verify the correctness of its configuration.

Means of analysis and optimization of networks:

When designing a new network or upgrading an old network, it often becomes necessary to measure some characteristics of the network such as the intensity of data streams over network links, the delays that occur at various stages of packet processing, the response times to the requests of a particular type, the frequency of occurrence certain events and other characteristics.

For these purposes, various means can be used and, above all, monitoring tools in network management systems. Some measurements on the network can be performed and built into the operating system by program meters. Even cable testers in their modern design are able to capture packets and analyze their contents.

But the most perfect means of researching the network is the protocol analyzer. The protocol analysing process involves capturing packets circulating on the network that implement a particular network protocol and examining the contents of these packets. Based on the results of the analysis, you can implement a reasonable and weighted change of any network component, optimizing its performance, troubleshooting and troubleshooting. Obviously, in order to make any conclusions about the effect of some change on the network, it is necessary to perform an analysis of the protocols before making changes and after that.

The protocol analyzer is either a stand-alone specialized device or a personal computer, usually portable, of the Notebook class equipped with a special network card and the corresponding software. The network card and software used must correspond to the network topology (ring, bus, star). The analyzer is connected to the network in exactly the same way as a normal node. The difference is that the analyzer can receive all data packets transmitted over the network, while the ordinary station is only addressed to it. The analyzer software consists of a kernel that supports the operation of the network adapter and decodes the received data, and additional program code, depending on the type of topology of the network under investigation. In addition, a number of decoding procedures are provided, oriented to a specific protocol, for example, IPX. Some analyzers may also include an expert system that can provide the user with recommendations on what experiments should be conducted in this situation, what some measurement results may mean, how to eliminate some types of network malfunction.

CONCLUSIONS

Protocol analyzers are indispensable for the investigation of real networks, but they don't allow to obtain quantitative estimates of characteristics for still existing networks in the design phase. In these cases, designers can use the means of simulation, with the help of which models are being developed, recreating information processes occurring in networks.

There are special software-oriented software systems, in which the process of creating a model as such does not exist at all. Such software systems generate the network model on the basis of initial data on its topology and used protocols, the intensity of the requests flows between the computers of the network of the length of the communication lines, the types of equipment and applications used. Software modeling systems can be narrowly specialized and sufficiently universal, allowing to simulate networks of the most diverse types. The quality of the results of modeling depends to a large extent on the accuracy of the initial data on the network transferred to the simulation system.

Software network modeling systems are tools, that can be useful to any administrator of a corporate network, especially when designing a new network or making drastic changes to an existing one. Products in this category allow you to check the consequences of implementing certain solutions before you purchase the equipment. Of course, most of these software packages are quite expensive, but the possible savings can also be quite appreciable.

Simulation programs of the network use in their work information on the spatial arrangement of the network, the number of nodes, communication configurations, data rates, the protocols used and the type of equipment, as well as the applications running on the network.

Computer network organization refers to distributed computer systems that perform automated processing of information. The problem of ensuring information security is central to such computer systems. The provision of CSR security implies the organization of counteraction to any unauthorized intrusion into the CSR operation process, as well as attempts to modify, steal, disable or destroy its components, that is, protect all CSR components - hardware, software, data and personnel.

Methods of solving security tasks are very closely related to the level of development of science and technology and, especially, to the level of technological support. A typical trend in the development of modern technologies is the process of total integration. This trend includes microelectronics and communication technology, signals and channels, systems and networks. Examples include super-large integrated circuits, integrated data transmission networks, multifunctional communication devices, and so on.

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