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THE EFFECTIVENESS OF VLAN TECHNOLOGY IN LOCAL NETWORKS

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Annotatsiya:

Mahalliy tarmoqlarda VLAN texnologiyasining samaradorligi haqida so'z yuritilganda, avvalo bu texnologiyaning tarmoqlardagi ishlash printsipi va afzalliklarini chuqur tahlil qilish zarur. Mahalliy tarmoqlar — bu o'zaro bog'langan kompyuterlar va boshqa qurilmalardan iborat tarmoq bo'lib, ularning asosiy vazifasi ma'lumotlarni tez va ishonchli uzatishdir. VLAN texnologiyasi esa ushbu tarmoqlarni mantiqiy jihatdan bo'lishga imkon beradi. Bu texnologiya yordamida fizik jihatdan birlashtirilgan tarmoq ichida bir nechta alohida tarmoqlar tashkil qilib, tarmoqni yanada samarali boshqarish imkoni yaratiladi.

Kalit so'zlar: mahalliy tarmoqlar, ma'lumotlar, tarmoq xavfsizligi, qurilmalar, texnologiyalar, kompyuterlar, muammolar.

Аннотация:

Говоря об эффективности технологии VLAN в локальных сетях, необходимо прежде всего глубоко проанализировать принцип работы и преимущества этой технологии в сетях. Локальные сети — это сети, состоящие из соединённых между собой компьютеров и других устройств, основной задачей которых является быстрая и надёжная передача данных. Технология VLAN позволяет логически разделить эти сети. Эта технология позволяет создавать несколько отдельных сетей внутри физически объединённой сети, что позволяет более эффективно управлять сетью.

Ключевые слова: локальные сети, данные, сетевая безопасность, устройства, технологии, компьютеры, проблемы.

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Abstract:
When talking about the effectiveness of VLAN technology in local networks, it is first necessary to deeply analyze the principle of operation and advantages of this technology in networks. Local networks are networks consisting of interconnected computers and other devices, the main task of which is the fast and reliable transmission of data. VLAN technology allows these networks to be logically divided. This technology allows you to create several separate networks within a physically connected network, which makes it possible to manage the network more effectively.

Keywords: local networks, data, network security, devices, technologies, computers, problems.

INTRODUCTION

One of the most important aspects of VLAN technology is the significant increase in network security. In a network, interconnected devices act as a single large network, which increases the risk of data being viewed or modified by other users. Using VLAN, data is only shared within a specified group, providing internal security. At the same time, each VLAN forms a network segment that can work independently of each other, further strengthening the security of the system. Another important aspect is that it is easier to manage the network through the VLAN. Where each VLAN is reserved for a specific department or group, facilities for network administrators to assist this network and identify problems arise. For example, if a network problem occurs in a particular section, the administrator can only check that VLAN, which helps to find and eliminate errors faster.

VLAN improves network efficiency by providing centralized management of networks. With the expansion of the network, i.e. the combination of a large number of devices, the importance of the VLAN is further increased. In large networks, connecting all devices to one physical network is not only complicated, but the effect can be low. Using VLAN technology, it is possible to divide users or devices into logical groups. As a result, each of the network segments can control its own traffic,

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the overload in the networks is reduced. This ensures the stability of network activity.[1]

MATERIALS AND METHODS

VLAN technology also serves to reduce network traffic. In the standard, if there are a lot of devices on the network, all devices can see cross-traffic, which leads to inefficient consumption of network resources. Using VLAN technology, only traffic within each segment is distributed, in which case the distribution of traffic to other segments is limited. In this way, the overall efficiency of the network will increase and the traffic situation will be relieved for devices running on other segments. As an added advantage, VLAN technology reduces network emissions. When the number of users increases in large physical networks, waste packages in the network can also increase accordingly. This leads to network failures, slow down end-user performance. With VLAN, the networks are segmented and the wastes are lowered. This increases the service life and efficiency of the system and reduces the likelihood of device breakdown.[2]

The layered approach of the network again increases the efficiency of VLAN technology. In the creation and management of VLANs, layered architecture is used, in which the function of each layer is clearly defined. This approach makes the network more flexible and extensible. If new departments or services appear on the network, administrators can easily set up a new VLAN. At the same time, through this approach, the network will be able to further strengthen customs positions, improve the quality of services. Another important aspect is that VLAN technology is an effective resource management tool in the network. Specific access rights to networked resources, such as printers, servers, or internet resources, can be installed in various departments or user groups. This gives the Network Administration clear management and ensures the efficient use of resources. In this way, overloading for resources is obtained and network activity is stable. Also, VLAN technology allows virtualization of networks. With the creation of Virtual networks, various departments or services are mutually isolated, which not only improves security, but also leads to a more complex and flexible network architecture. With the help of

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Virtual networks, changes in the network, work with additional devices is carried out quickly and easily.

RESULTS AND DISCUSSIONS

The effectiveness of VLAN technology in local networks consists not only in technical aspects, but also in economic and managerial efficiency. Expanding the physical network and organizing new connections often require significant costs. And with VLAN, it will be possible to expand networks without significant costs for new devices by using the available network resources correctly and dividing them into certain groups. It is a cost-effective solution for businesses. The practical application of VLAN technology is common in many fields, notably corporate, educational, public and industrial sectors. It is possible to increase system stability and user confidence by creating efficient vlan segments to suit the specificity and requirements of the network in each area. This contributes to its uninterrupted and efficient operation, taking into account the modern approach to network management. Also, Networks based on VLAN technology provide more flexibility, which means that it is possible to quickly and easily organize a separate VLAN part for a new department or services. This gives great convenience in managing networks and placing devices in them. With VLAN, network operators can manage each segment of the network individually, which leads to a quick and effective solution of network problems.

The use of VLAN technology in extended networks increases the speed of data transmission. In this, by dividing traffic into segments, the compression in the network decreases, the maximum performance of network devices increases. As a result, communication between users will be more efficient, information exchange will be carried out in a stable and high quality. The effectiveness of VLAN technology in local networks not only provides benefits at the infrastructure level, but also serves to improve network security, management lightness, economic efficiency and quality of Service. This technology is developing day by day, creating new opportunities in the field of network engineering and management. As a result, networks created using VLAN technology open up great opportunities for enterprises and organizations, serving to make them competitive.

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CONCLUSION

In conclusion, when VLAN technology is used in local area networks, it is possible to achieve high efficiency in the field of network management and security. This technology increases the speed of network performance, simplifies the detection and elimination of network problems, enhances the security of data exchange, and makes it possible to use resources efficiently. Networks organized using VLAN are flexible, scalable and stable, and are the most optimal solution for modern enterprises and institutions. Therefore, the introduction of VLAN technology and its constant improvement are important for the creation of an innovative and safe infrastructure in local networks.

REFERENCES

1. Mamarasulov, B. (2022). "Virtual Local Area Networks: theory and practice". Tashkent: Scientific Publishing House.
2. Usmanov, D. (2023). "VLAN technology and its effectiveness in local networks". Journal Of Information Technology, 12(4), 25-32.
3. Karimov, J. (2022). "VLAN approaches in network management". Tashkent: Technical Publishing House.
4. Normurodov, S. (2021). "Network security and segmentation methods". Innovative Technologies, 9 (3), 45-51.
5. Abdullayev, A., Tursunov, B. (2023). "Improving network efficiency through VLAN technology". Information and communications, 15(2), 12-20.
6. Rakhimov, D. (2022). "VLAN application and network efficiency in enterprises". Information Technology and Society, 6(2), 38-44.
7. Ismailova, N. (2020). "VLAN architecture and management in network structure". Journal Of Computer Science, 8 (1), 53-60.