THE CHAOTIC EXPANSION OF LOCAL NETWORKS AND THE MAIN PROBLEMS IN REGULATING THEM.

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Abstract. *This thesis analyzes the chaotic expansion of local networks and the main problems in regulating them. The study examines the causes of unplanned network expansion and its negative consequences.*

Keywords: *local network, network infrastructure, network management, information security, network architecture, optimization.*

Introduction

In the context of the rapid development of modern information and communication technologies, local networks are considered an essential part of the information infrastructure of organizations. A local area network (LAN) represents a network environment that ensures data exchange between information systems and devices located within a limited area. Currently, local networks are of strategic importance in managing information resources, supporting digital services, and automating business processes.

The increase in the volume of information in organizations, and the widespread implementation of digital technologies and remote work systems, require the continuous development of local network infrastructure. At the same time, unplanned expansion of networks leads to a decrease in network efficiency, an increase in information security risks, and the complication of management processes. This highlights the urgency of issues related to the systematic management and

development of local networks based on an optimal architecture

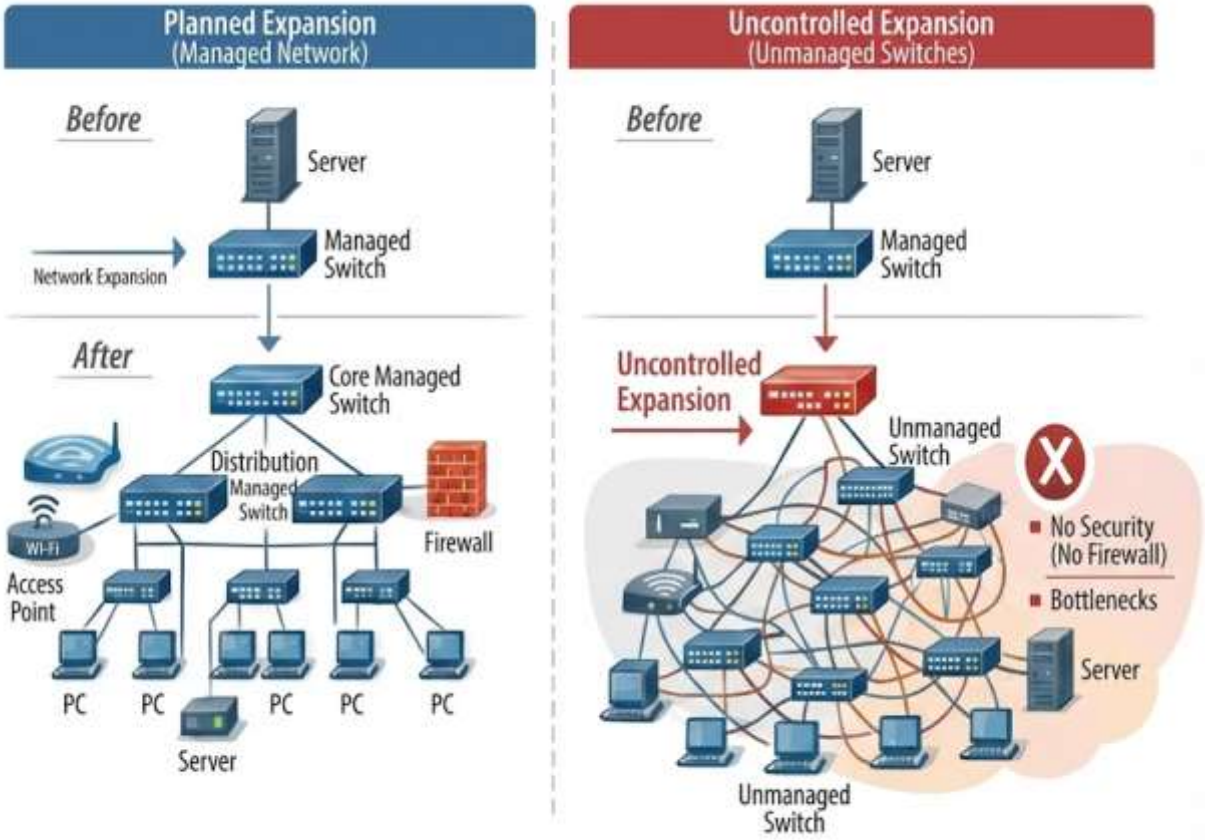

Figure 1. Expansion model of local network infrastructure.

The purpose of this work is to analyze the causes and consequences of the chaotic expansion of local networks and to develop methods for effectively regulating them. The research tasks include analyzing the local network infrastructure, identifying the main problems arising during the expansion process, and developing proposals to eliminate them. Local network systems used in modern organizations have been selected as the object of research.

The process of local network expansion is considered a natural process associated with the development of the organization's information infrastructure. Network expansion increases its functional capabilities through the addition of new devices, users, and information resources to the network. This process is explained by the development of digital technologies and the increasing demand for information resources. Figure 1. Expansion model of local network infrastructure. Local network expansion manifests in natural, planned, and uncontrolled forms. While natural expansion is associated with the growth of the organization's activity, planned expansion is carried out based on network architecture and security requirements. Uncontrolled expansion, however, can have a negative impact on network stability and information security.

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Local network expansion manifests in natural, planned, and uncontrolled forms. While planned expansion is carried out based on network architecture and security requirements, uncontrolled expansion can lead to a decrease in network stability and an increase in information security risks. Technological, organizational, and economic factors influence the growth of network infrastructure. Uncontrolled expansion is often associated with deficiencies in network management, specifically the lack of a unified architecture, the insufficiency of monitoring systems, and the incomplete formation of security policies. Therefore, strategic planning and centralized management of networks are considered important.

Practical Proposals Systematic planning of network infrastructure is considered important for effectively managing local networks and preventing chaotic expansion. To achieve this, implementing continuous network audits in organizations allows for assessing the network status and making informed decisions regarding modernization. Implementing centralized management models helps in the efficient use of network resources and the quick elimination of faults.

In order to ensure information security, it is necessary to implement network segmentation, access rights management, and continuous monitoring systems. Furthermore, improving the qualifications of network specialists, and organizing regular trainings and certification programs serves to manage the network effectively. These measures create the opportunity for the stable and secure development of local networks.

The combined use of model and formula methods in managing local networks yields high efficiency. A comparative analysis of them is presented below.

Comparison Criteria	**Model (LECM)**	Formula (E = (A + M + S + T) / R)
Main goal	Comprehensive representation of the network management system	Quantitative assessment of network efficiency
Type of analysis	Qualitative (conceptual)	Quantitative (calculation)
Area of application	Strategic planning	Efficiency assessment
Advantages	Ensures a systematic approach	Provides a clear numerical result
Disadvantages	Numerical assessment is limited	May not cover all factors

Conclusion

The results of the analysis conducted showed that the process of local network expansion is associated with the development of the organization's information infrastructure. It was determined that uncontrolled expansion leads to a decrease in network efficiency and an increase in information security risks.Systematic management of local networks, implementation of network audits, application of centralized management models, and strengthening of information security are of great importance in ensuring network stability. In the future, it is considered advisable to develop research in this field in the directions of intelligent network management, automated monitoring, and the implementation of modern network technologies.

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