

ABSTRACT

Explanatory note size – 92 pages, contains 14 illustrations, 32 tables, 3 applications, 26 references.

Topicality. Local computer networks are widely prevalent, with their security levels often being insufficient. In most cases, these networks possess imperfect protection systems or lack them at all. The increasing prevalence of local networks necessitates the development of easily installable and user-friendly monitoring systems. Existing monitoring systems for local computer networks are excessively complex, unreliable, and challenging to configure, use and integrate.

The aim of the study. To develop and investigate software for a multi-agent system of uninterrupted monitoring of computer networks with the aim of ensuring reliable detection of active devices, preventing unauthorized hidden access to local computer networks, and improving integration and adaptability capabilities.

The object of the research: Software for multi-agent monitoring systems of computer networks.

Предмет дослідження: Technologies and methods for detecting active devices in a computer networks using a multi-agent software system.

To achieve this goal, the **following tasks** were formulated:

- perform a review of existing methods and tools for detecting and monitoring active devices in computer networks;

- develop monitoring multi-agent software for computer networks;

- ensure that the created software has low system requirements, high performance, ease of use and installation, and an effective method for detecting active network devices;

- provide the created software with necessary methods and conditions for effective and straightforward integration as an efficient tool for detecting active

network devices into existing network monitoring systems, aiming to enhance their accuracy, speed, informativeness, and overall efficiency;

- implement communication methods among agents in the created multi-agent network monitoring software that do not disclose network locations or other agent-related information to other network participants.

The scientific novelty of the obtained results of the master's thesis lies in the presentation and implementation of an improved active network devices detection method for software of multi-agent computer network monitoring systems. This is achieved through packet interception followed by in-depth packet analysis. The method distinguishes itself from other identical existing ones by its operational principle and the absence of active network actions by agents to search for devices in the network. This, in turn, enables reliable detection of active network devices while concealing the presence of the operational network monitoring system from other network participants.

The practical value of the obtained results is the fact that the proposed active network devices detecting method for multi-agent computer network monitoring software, in combination with a concealed data exchange protocol among system's agents, simplified installation, and low system requirements of the developed software, it provides a user-friendly and efficient tool. This method offers simplicity in use and effectiveness in operation for end-users.

Relationship with working with scientific programs, plans, topics. The research was performed at the Department of Informatics and Software Engineering of the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute."

Approbation. The scientific provisions of the dissertation were tested at the V International Scientific and Practical Conference of Young Scientists and Students "Software Engineering and Advanced Information Technologies" (SoftTech-2023),

dedicated to the 125th anniversary of Igor Sikorsky Kyiv Polytechnic Institute, held in Kyiv.

Publications. The scientific provisions of the dissertation were published in:

- 1) Parkhomenko V.R., Baklan I.V. A Multi-Agent System For Continuous Computer Networks Monitoring // Proceedings of the 5th International scientific and practical conference of Young Scientists and Students «Software Engineering and Advanced Information Technologies (SoftTech-2023)» - Kyiv, National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute”, FISE, 2023y, 399 p;
- 2) Parkhomenko V.R., Baklan I.V. A Multi-Agent System For Continuous Computer Networks Monitoring // Proceedings of the 5th International scientific and practical conference “MODERN RESEARCH IN SCIENCE AND EDUCATION” - BoScience Publisher. Chicago, USA. 2024. Pp. 345-354.

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