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SOFTWARE DEVELOPMENT FOR DATA CYBER SECURITY

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Objective of paper. The essential issue of data, digital, intellectual and computer technologies is the data cybersecurity. An integrated approach to ensuring data cyber security is key importance. It requires the legal, organizational, software provider and integrated system of technical measures. As it is known, information technologies have become a global inexhaustible resource for humanity, which has stepped into the era of development up-to-date data civilization. Therefore, the main objective of the paper is to create software intended for ensuring cyber security of information and to develop a new model capable of ensuring cyber security of information using already existing technologies to use in local conditions.

Materials and methods. General scientific, mathematical modeling, mathematical statistics, calculations, comparative analysis, unified knowledge of the state of cyber security of information systems, integrated cyber security strategies, SSL/TLS, IPSec, SSH, DNSSEC, OpenID, SAML, Pfsense, suricate technologies. [1-3].

Research findings. To install the software in order to ensure data cybersecurity was selected the Linux operating system, pfsense and suricate technologies. Based on selected technologies, Pfsense blocks a set of IP addresses added to the system's drop table. Simultaneous flow backing up and analysis features have been designed and implemented so that the flow over the developed technology does not affect the timing of requests. Installation of Pfsense-based firewall, installation of Suricata IDS/IPS module layers, Pfsense + nginx reverse proxy + Suricata IDS/IPS hardware preparation technology and its installation are performed [4, 5]. pfSense is a firewall based on the FreeBSD operating system. It works with different routers, devices, and you can create your own if you need additional settings. PfSense offers routers under the Netgear name, but they also offer their own routers called Netgate with the added options and flexibility that pfSense offers.

Suricata consists of several modules (capture, collection, encoding, detection and extraction), by default, the captured traffic before decoding passes in one stream, which is optimal from the point of view of detection, but it loads the system more. After the settings in the Suricata configuration were fully implemented, one was used to split the streams, and the other was to determine how the streams would be distributed among the processors. This provides extensive opportunities to optimize traffic processing on individual devices in a given network.

Conclusion. In the first stage of software designed to ensure cyber security of information, a firewall was created to block an IP address after several consecutive calls, and an algorithm for the firewall was developed. Software designed to ensure cyber security of information has been proven in practice to ensure cyber security of servers in any system.

REFERENCES

[1]. J. Pacheco and S. Hariri, “IoT Security Framework for Smart Cyber Infrastructures,” in 2016 IEEE 1st International Workshops on Foundations and Applications of Self Systems (FAS*W), pp. 242–247, Sept. 2016

[2]. Z. A. Baig and A.-R. Amoudi, "An Analysis of Smart Grid Attacks and Countermeasures," Journal of Communications, vol. 8, no. 8, pp. 473– 479, 2013
[3]. E. B. Rice and A. AlMajali, "Mitigating the Risk of Cyber Attack on Smart Grid Systems," Procedia Computer Science, vol. 28, pp. 575–582, Jan. 2014
[4]. M. S. Al-kahtani and L. Karim, "A Survey on Attacks and Defense Mechanisms in Smart Grids," International Journal of Computer Engineering and Information Technology, vol. 11, no. 5, p. 7, 2019. GUNDUZ AND DAS: CYBER-SECURITY IN SMART GRIDS: THREATS AND POTENTIAL SOLUTIONS
[5]. R. Kaur, A. L. Sangal, and K. Kumar, "Modeling and simulation of DDoS attack using Omnet++," in 2014 International Conference on Signal Processing and Integrated Networks (SPIN), pp. 220–225, Feb. 2014