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RESEARCH OF WIFI SYSTEMS PROTECTION EFFICIENCY

124 «System Analysis»

Abstract

diploma work for obtaining an educational degree "Master"

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The work was done at the Department of Computer Science Ternopil Ivan Puluj National Technical University Ministry of Education and Science of Ukraine

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GENERAL CHARACTERISTIC OF THE THESIS

Actuality of the thesis lies in the fact that the author has investigated the efficiency of the protection for the Wifi system.

The goal of the work: is to investigate 3G, 4G, LTE and Wi-Fi IEEE 802.11 network standards in terms of their performance, security, and cost. Moreover, an analysis of the security and vulnerability of these technologies are provided.

Object, methods and sources of research. 3G, 4G, LTE and Wi-Fi IEEE 802.11 networks.

Scientific novelty of the obtained results: The efficiency of protection for Wifi systems was investigated and recommendations for improvement of its work were issued.

Thesis tasks:

- Identify the problems in protecting the Wifi networks;
- Investigate the effectiveness of protection for Wifi systems;
- give recommendations to improving the work of the Wifi systems;
- carry out a feasibility study on the decisions taken;
- Perform additional sections on occupational safety, emergency and environmental safety.

The practical significance. The results of the work can be used to improve the security of the wifi networks.

Thesis approbation. The results of work were reported on VI scientific and technical conference "Information models, systems and technologies" Ternopil, December 12-13, 2018

The structure of the thesis. The work consists of an explanatory note and graphic part. The settlement and explanatory note consists of an introduction, 7 parts, conclusions, a list of references and appendices. Scope of work: settlement and explanatory note - 69 pages of A4 format.

MAIN CONTENT OF THE THESIS

In introduction the analysis of the relevance of the topic and research tasks was carried out.

In the first section describes the scientific and technical problem.

In the second section We did a literature study focusing on Wi Fi technology, and its comparison with other technologies. All related information is gathered from websites, e-books, online articles and journals, other internet sources and library books.

There was some difficulty about finding particular information (like frequency, upstream and downstream speed) because we have to make certain tables and comparisons of different technologies (like 3G, 4G, 5G, LTE, and WiMax) with WiFi. After carefully analyzing all gathered information, it is presented in organized form, like comparisons and tables.

In the third section the results of research on the effectiveness of protection of Wifi systems were given.

Fourth section is devoted to recommendations for improving the effectiveness of Wifi systems protection.

Fifth section the issues of organization of production were considered and calculations of technical and economic efficiency of design decisions were made..

Sixth section the issue of the safety of life during the implementation of the results of work and safety in emergency situations was worked out..

Seventh section the issues of ecology and environmental protection during the implementation of the results of work were considered.

In general conclusions about the thesis the received technical decisions are given and organizational and technical measures which provide fulfillment of the given task are offered.

CONCLUSIONS

This thesis compared the performance of Wi-Fi standards (IEEE 802.11) for industrial environments and compared it with mobile phone radio systems standards (3G, 4G and LTE/5G). Moreover the basic technical principles of IEEE 802.11 family and derivatives have been discussed in detail in this report.

Wi-Fi is an inexpensive technology and it covers the customer requirement regarding market interest. For commercial use in hotels, hotspots, and cyber cafes, 802.11n seems to be a good alternative for the future because it specifies 5 GHz frequency at a theoretical maximum speed of 300 Mbps, gives Multiple input Multiple output (MIMO), channel bonding, and payload optimization technology. It also provides uniform bandwidth over distances and covers roughly 1.5 times more distance than the earlier standards. Our investigation also shows that IEEE 802.11 is inexpensive technology as compared to other technologies available in market[40].

However, the energy consumption of in Wi-Fi technology has a significant effect on the battery of mobile smart-phones because both Wi-Fi access points and Wi-Fi smartphones are implemented with a variety of Wi-Fi power saving strategies for saving power.

Finally, we concluded that based on our assumptions, collected information, analysis, observations and results there is a possibility to offer seamless Wi-Fi internet services to the customers in the buildings, cafes, hotspots and other public places with reasonable technical performance and costs.

LIST OF PAPERS PUBLISHED BY THE AUTHOR OF THESIS

1. Opurum I. Research of wifi systems protection / K. Brima, I. Opurum, R. Zoloty // Materials of VI scientific and technical conference "Information models, systems and technologies", December 12-13, 2018. — P. 8. — (information systems and technologies).

ANNOTATION

This thesis investigates 3G, 4G, LTE and Wi-Fi IEEE 802.11 network standards in terms of their performance, security, and cost. Moreover, an analysis of the security and vulnerability of these technologies are provided.

From the analysis it can be concluded that Wi-Fi is today an inexpensive technology with high bandwidth, low direct and associated costs, and low power consumption compared to 3G, 4G, LTE and WiMax. Wi-Fi (802.11 a/b/g/n) is – due to its cost-performance ratio – an appropriate wireless technology to provide Internet services to cafes, hotspots and public places.

Key words: WIFI, PROTECTION, EFFICIENCY, RESEARCH.