Studying the Cisco ASA 5506-K9 Firewall and Simulating Its Deployment for Hana Pharma's Network

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***Abstract*—This undergraduate thesis studies the Cisco ASA 5506-K9 firewall and designs a protected network for Hana Pharma. The implementation is simulated in Cisco Packet Tracer rather than documented as an installation on the company's live network. The proposed topology separates public services in a DMZ from inside and outside network zones, configures the firewall and core switches, and examines redundancy with HSRP. The report shows configuration and simulation checks, including a core-switch failover scenario. It argues that the architecture can improve security, but provides no measured before-and-after security outcome from a real deployment. Further operational security work is discussed as a future direction.**

***Index Terms*—Cisco ASA 5506-K9, firewall, network security, HSRP, FTP**

I. Introduction

The thesis provides an overview of network security and various network security protocols, including SSL/TLS, IPsec, and SSH. It then delves into the deployment of the Cisco ASA 5506-K9 firewall to improve the security of Hana Pharma's network system, focusing on the DMZ, outside, and inside zones. The author discusses the importance of continuous hardware and software upgrades, as well as the integration of Intrusion Prevention System (IPS) and email security features. However, the study does not provide specific details on the implementation or evaluation of these features [1]. Earlier ICTU student work on related designs is included here for context [2], [3], [4], [5], [6], [7], [8], [9], [10]. These contextual works were selected for this English summary; they are not asserted to appear in the original thesis bibliography.

II. Methods

The author reviews network-security principles and Cisco firewall functions, then analyses the requirements of Hana Pharma's network. A revised topology is modelled in Cisco Packet Tracer. The simulation configures a Cisco ASA 5506-K9, core switches, service servers, and separated DMZ, outside, and inside zones. HSRP is used to examine a redundant path, including a scenario in which one core switch is disabled. These steps document a network-design and simulation exercise, not a measured field installation [1].

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III. Results

The Packet Tracer model demonstrates the proposed firewall zoning and core-network configuration for Hana Pharma. The report shows a DMZ for public services, inside and outside network segmentation, and configured service hosts. Its HSRP check illustrates continuity of the web-server path after the first core switch is turned off in the simulation. These are functional results within the simulated topology. The thesis does not report a real-company deployment or quantified improvement in attack resistance [1].

IV. Discussion

Segmenting public services from internal systems and adding redundancy address two stated design concerns in the report. The Packet Tracer checks support the proposed configuration at a functional level, but cannot establish how the design would perform under actual network traffic or attacks. The source recommends additional intrusion prevention, email security, monitoring, staff practice, and later analytics. Those suggestions are future measures, not results already implemented in the simulated model [1].

V. Conclusion

The thesis produces a simulated network-security design for Hana Pharma centred on a Cisco ASA 5506-K9 firewall. It models DMZ isolation, inside and outside zones, core-switch configuration, and an HSRP failover scenario in Cisco Packet Tracer. The reported checks demonstrate the intended network functions in simulation. They do not prove improved security or availability in the company's operational network. The work therefore provides a configuration and design basis for later implementation, testing, and security improvement [1].

References

[1] Ngô Quang Vũ, "Studying the Cisco ASA 5506-K9 Firewall and Simulating Its Deployment for Hana Pharma's Network," internal undergraduate thesis (original in Vietnamese), Thai Nguyen University of Information and Communication Technology, 2024.

[2] ICTU Student 120, "Development of a Simulation Program for Static Packet Filtering Firewall Technology," internal undergraduate thesis, Thai Nguyen University of Information and Communication Technology, 2009.

[3] ICTU Student 105, ”Design of a Secure Network Using Cisco PIX Firewall for a Technical College,” internal undergraduate thesis, Thai Nguyen University of Information and Communication Technology, 2009.
[4] ICTU Student 129, ”Construction of a Network Security System for the Commercial Bank of Vietnam Hanoi Branch,” internal undergraduate thesis, Thai Nguyen University of Information and Communication Technology, 2009.
[5] ICTU Student 142, ”Construction of a Remote Access VPN System on PIX/ASA Devices for Âu Lạc Joint Stock Company,” internal undergraduate thesis, Thai Nguyen University of Information and Communication Technology, 2009.
[6] ICTU Student 130, ”Construction of a Network Security System for a College of Education in Thai Nguyen,” internal undergraduate thesis, Thai Nguyen University of Information and Communication Technology, 2009.
[7] ICTU Student 189, ”Application of Routing and Access Control Lists in Designing a Hierarchical Network Model for the Department of Information Technology - Thai Nguyen University,” internal undergraduate thesis, Thai Nguyen University of Information and Communication Technology, 2010.
[8] ICTU Student 106, ”Design and Security of Wi-Fi Networks for the Tai Nguyen Software Technology Center,” internal undergraduate thesis, Thai Nguyen University of Information and Communication Technology, 2009.
[9] ICTU Student 54, ”Design of LAN and WAN Systems for the Information and Communication Department of Phu Tho,” internal undergraduate thesis, Thai Nguyen University of Information and Communication Technology, 2008.
[10] Lê Văn Long, ”Design and Simulation of a Local Area Network for Tien Phong Secondary School in Me Linh, Hanoi,” internal undergraduate thesis, Thai Nguyen University of Information and Communication Technology, 2023.