A Simulated Secure Network Design for Quynh Nhai High School

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***Abstract*—This thesis proposes a network security design for Quynh Nhai High School in Son La and demonstrates its configuration in EVE-NG. The report surveys the school setting, reviews network and security concepts, and models a topology with virtual LANs, routing, domain services, and a FortiGate firewall. Its practical chapter documents device configuration, address assignment, DHCP, and selected connectivity checks. Screenshots show the simulated hosts receiving addresses and the firewall reaching the internet. The author concludes that the model addresses the identified school needs but also says the network is not fully complete and requires stronger security configuration. The source does not document installation in the school production environment or measured resilience against attacks. The contribution is a network design and simulation record that would require field validation before operational use.**

***Index Terms*—school network, EVE-NG, FortiGate, VLAN, network security**

I. Introduction

A school network must connect classrooms, staff, servers, and external services while limiting inappropriate access. The thesis uses Quynh Nhai High School as a case for designing such a network. It reviews network structure and potential threats and introduces security controls including a firewall. The study aims to model a practical topology and demonstrate configuration steps. Its evidence comes from a virtual environment, so real school performance and security are outside the demonstrated scope [1]. Earlier ICTU student work on related designs is included here for context [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 analyzes the school network requirements and draws a proposed topology. The implementation chapter builds a virtual model in EVE-NG with network devices, simulated hosts, virtual LANs, routing, DHCP, domain services, and a FortiGate firewall. It records configuration commands and illustrates checks for address assignment and connectivity. The exercise tests selected paths in the simulated configuration. It does not include a formal penetration test or long-term production monitoring [1].

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III. Results

The source presents a working EVE-NG model with configured segments and device roles. Screenshots show a host receiving an address from DHCP, machines joining the domain, and the FortiGate reaching the internet. These observations support that the selected simulated services and connections were configured. The report does not establish that the same results hold on the school physical network or that the design meets a quantified security target [1].

IV. Discussion

The virtual model helps explain network segmentation and the effect of configured routing and firewall rules. The author nevertheless recognizes that the design remains incomplete and needs additional security configuration. Further work proposed in the thesis includes device management and user policies suited to the school. A production deployment would require checking existing equipment, actual traffic, access requirements, and ongoing maintenance. Simulation screenshots alone cannot verify institutional security [1].

V. Conclusion

The thesis documents a proposed secure network for Quynh Nhai High School and a configuration demonstration in EVE-NG. It provides diagrams, commands, and selected connectivity evidence. The author notes unfinished aspects and the need for stronger security controls. The documented outcome is a tested virtual model, not a verified school-wide installation. The work can guide future field implementation once the requirements and security policy are confirmed with the institution [1].

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