An IPv6 Multi-Area OSPF Network Design for TIN Company

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***Abstract*—This thesis designs network infrastructure and a multi-area OSPF routing scheme over IPv6 for Northern Telecommunications Infrastructure Company (TIN). The report reviews IPv6 addressing, routing, and the organizational network, then presents topology and configuration material for the proposed areas. The author discusses expected benefits such as easier expansion, fault isolation, and more flexible routing. Those benefits are design expectations in the conclusion; the source does not establish measured reductions in delay, congestion, or operating cost. The manuscript documents the configuration and selected checks, but it does not show a long-term production trial across the company network. The contribution is a technical design and demonstration that can be evaluated against actual traffic and equipment before implementation.**

***Index Terms*—IPv6, OSPF, multi-area routing, network design, TIN**

I. Introduction

A growing telecommunications network needs addressing and routing plans that can support additional segments and services. The thesis uses TIN Company as a case for an IPv6 network divided into OSPF areas. It explains why topology, address allocation, and routing relationships must be considered together. The project aims to produce and test a configuration model. Its stated operational advantages are not treated as measured outcomes without a company field evaluation [1]. Earlier ICTU student work on related designs is included here for context [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 surveys the stated company requirements, draws a network topology, allocates IPv6 addresses, and defines multiple OSPF areas. The practical chapters provide routing configuration and selected checks of network behavior. The report also explains how routers exchange routes across areas and how the design separates parts of the network. Its method is configuration and demonstration; the source does not describe a controlled traffic benchmark or a sustained production monitoring period [1].

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III. Results

The manuscript presents the proposed infrastructure, addressing scheme, and multi-area OSPF configuration. Configuration outputs and diagrams support that the planned routing relationships were represented and inspected. The conclusion argues that the design could improve connectivity, resilience, and bandwidth use. It does not supply measurements demonstrating those improvements at TIN. Accordingly, the observed result is a documented network design and configuration exercise, not a quantified performance gain [1].

IV. Discussion

Separating OSPF areas can make a network architecture more manageable, but benefits depend on topology, traffic, device capability, and operational practices. The thesis does not measure fault recovery, end-to-end latency, or security under production conditions. Its claims about cost savings and better customer experience are forward-looking. A later implementation should test convergence, failover, access control, and capacity with the company actual infrastructure [1].

V. Conclusion

The thesis documents an IPv6 multi-area OSPF design for TIN and describes its configuration. The source supports the existence of network diagrams and selected routing checks. It does not establish production deployment or measured improvements in throughput, delay, resilience, or cost. The work can serve as a design basis for a carefully instrumented company trial, with the reported benefits remaining hypotheses until that evaluation is done [1].

References

[1] Bùi Đức Hoàn, ”An IPv6 Multi-Area OSPF Network Design for TIN Company,” internal undergraduate thesis (original in Vietnamese), Thai Nguyen University of Information and Communication Technology, 2024.
[2] TGS, Bài giảng Mạng máy tính, Thái Nguyên: Trường ĐH CNTT&TT, 2016
[3] L. H. Hiệp, Bài giảng Thiết kế mạng, Thái Nguyên: Trường ĐH CNTT&TT, 2022
[4] C. Systems, “IPv6 Routing: OSPFv3,” 13 11 2018. [Online]. Available: https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/iproute_ospf/configuration/15- s/iro-15-s-book/ip6-route-ospfv3.pdf

[5] Lê Hoàng Hiệp, Trần Thị Yến, Lương Thị Minh Huế, Dương Thị Quy, “NGHIÊN CỨU ĐÁNH GIÁ HIỆU NĂNG GIAO THỨC ĐỊNH TUYẾN OPEN SHORTEST PATH FIRST TRÊN NỀN IPV4 VỚI IPV6,” 31 August 2020. [Trực tuyến]. Available: https://jst.tnu.edu.vn/jst/article/view/3427

[6] Megaport, “A Forrester Consulting Thought Leadership Paper Spotlight commissioned,” 4 2022. [Online]. Available: https://www.megaport.com/blog/five- features-your-enterprise-network-needs-in-2023/. [Accessed 12 12 2022]. 82

[7] 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.

[8] ICTU Student 215, ”Building a WAN Network for Thai Hung Corporation,” internal undergraduate thesis, Thai Nguyen University of Information and Communication Technology, 2010.

[9] 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.

[10] 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.