PERFORMANCE STUDY OF ROUTE REDISTRIBUTION IN HYBRID MESH-STAR NETWORK TOPOLOGIES

By

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DECLARATION

I hereby declare that the work in this project paper is my own except for quotation summaries which have been duly acknowledged.

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APPROVAL

We have examined this manuscript and verify that it meets the programme and university requirement for the degree of Master of Information Technology in the Faculty of Creative Media and Innovative Technology.

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ABSTRACT

Undoubtedly, route redistribution is a crucial process of IP network design and it becomes critically important in certain incidents where there is a growing demand to share packet data between various networks configured using distinct routing protocols. In this research work, different routing protocols, network topologies and route redistribution will be studied. The expected outcomes of this project are designs that cater for various hybrid mesh-star network topologies configured in different routing protocols. Several forms of route redistribution scenarios will be studied and modelled using industrial simulation software, Optimized Network Engineering tool, and OPNET Modeler. To evaluate the hybrid topology performance, various metrics have been used including convergence rime, end-to-end-delay, end-to-end-delay variation and queuing delay have been used. In this thesis, single and multi-point route redistribution with different network topologies have been studied and analysed. The network topologies considered in this proposal are Gateway Routing Protocol (EIGRP), Open Shortest Path First (OSPF) and Route Information Protocol (RIP). The simulations results show that routing protocol performance is very much influenced by the type of hybrid network topology. For instance, it has been found that the convergence time of multiple point redistribution is increased by 16.4% as compared to single point redistribution. EIGRP/IGRP has the best performance in single point redistribution from analysis of convergence time whereas EIGRP/OSPF and EIGRP/RIP have the best and equal performance in single and multi-point redistribution from the analysis of end-to-end delay and end-to-end delay variation.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Nowadays, routers are commonly used to route data packets across different networks by making use of the so-called routing or forwarding table which assists these routers to make decisions and forward packets to their destination addresses. Regularly, the router makes utilization of the forwarding table to decide on the best way to send the data to its destination (Computer Networks, 2015). Routing protocols execution varies from each other with respect to their jitter and end-to-end delay (Mohammad, N. Nazrul, Ashique, 2015). For routers to broadcast across various routing domains; router industry has come out with a new paradigm rout redistribution. In fact, it is definitely simpler to deal with a system designed with a single protocol. Routing protocols of distinct standards in a group of networked routers are absolutely unpredictable and hard to oversee. Thus, there is a demanding requirement to dessiminate routing data over various boundaries of protocols, in particular, between networks that include different protocols (Le, F. Xie, G. Zhang, 2015).

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