IMPLEMENTING A MOBILE AD-HOC NETWORK UNICAST ROUTING PROTOCOL IN NS-2

A project submitted to Dean of Postgraduate Studies and Research in partial fulfillment of the requirement for the degree

Master of Science of Information Technology

Universiti Utara Malaysia

By

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ABSTRACT

The emerging of wireless network deemed to be a solution to overstep problems associate with wired networks, since wireless networks have better services and facilities rather than those provided with wired networks, and as a consequence, it considered as an advanced mechanism of network communication to keep pace with the growth of Internet technologies. The problem of routing is the essential challenge in the reconfigurable wireless environments. Designing and developing a routing protocol in simulated environment make it easier to understand the behaviour of the protocol, and might lead to further improvement, before deploying the protocol in real network. The lack of suitable guideline for implementing a routing protocol is considered an important issue for researchers in terms of time and efforts.

This project provides a guideline of step by step approach to implement a MANet point-to-point routing protocol. The project includes both system development process and the necessity to invoke a simulation; therefore we combined two methodologies to produce a new methodology that is applied to conduct this project. The project uses Network Simulator 2 (ns-2) to achieve its objectives. It is worthwhile to mention that the protocol implemented in this project is in general enough to have several common points with other routing protocols, and it is a tool that make researchers familiar with the steps and files required to implement or develop a MANet unicast routing protocol. This project can be a useful guideline to other network researchers and programmers to study the process of implementing or developing any MANet unicast routing protocol in ns-2.

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First and foremost, I would like to thank our GOD "Allah", the most gracious and the most merciful, for having made everything possible by giving me strength, confidence, and courage to accomplish this work.

There is an old Arabic legend. Once upon a time, a young man met a modest wizard, who could convert soil to gold. The wizard used his magic to make gold and gave it to the young man. However, the young man did not accept the gold because he wanted to learn the magic that could make gold out of soil. I think in the period of preparing this project, my supervisor Prof. Madya Dr. Suhaidi B Hassan taught me how to do the research. In other words, he taught me how to make gold out of soil. Thus, I would like to thank my supervisor for his guidance and direction for this project, for the many interesting, valuable, and sincere feedbacks he gave for me through his supervision. I greatly benefited from his detailed comments and insights that helped me clarify ideas.

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LIST OF ABBREVIATIONS

Synopses	***StandFor***
MANet	Mobile Ad-Hoc Network
NS-2	Network Simulator
DSL	Digital Subscriber Line
WLAN	Wireless Local Area Network
P2P	Peer to Peer
IP	Internet Protocol
RFC	Request For Comment
IETF	Internet Engineering Task Force
VANet	Vehicular Ad-Hoc Network
GPS	Global Positioning System
BER	Bit Error Rate
OTcl	Object-oriented Tool command language
UUM	Universiti Utara Malaysia
PDR	Packet Delivery Ratio
TTL	Time to Live
TCP	Transmission Control Protocol
UDP	User Datagram Protocol
FTP	File Transfer Protocol
AODV	Ad-hoc On-Demand Distance Vector
FQ	Fair Queuing
SFQ	Stochastic Fair Queuing
DRR	Deficit Round Robin Scheduling
RED	Random Early Detect
CBQ	or Class Based Queuing
ACK	Acknowledgment

CHAPTER ONE

INTRODUCTION

1.0 Introduction

As the exponential growth of Internet continued, network engineers' needs to maintain, and intervene (troubleshoot) to solve the problems that are associated with the growth of network components have significantly increased as well. The infrastructure of a wire line connection, which can be deployed through the use of the base connection with cable modem or DSL, is limited to the connection of Internet. Besides, this type of infrastructure is cost effective and time consuming infrastructure as compare to the wireless network infrastructure. Moreover, most of the Internet providers in the advanced countries do not prefer to install some important equipment, like optical fiber in the rural areas. Hence, the emerging of wireless network was considered like a solution to overstep this crisis, where this type of network has better services and facilities rather than those provided with wired networks, such as the cost factor and interoperability.

No detailed information for mobile ad-hoc network (MANet) will be provided in this introduction; as we assume that the audience is familiar with the basic aspects. So, we will concentrate in this introduction on the question: why do we need to implement a mobile ad-hoc network unicast routing protocol?

The contents of the thesis is for internal user only

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