

**SIMULATION OF ROUTING PROTOCOL ON AD HOC
NETWORKS USING OPNET SOFTWARE**

**This project is presented in partial fulfillment for the award of the
Bachelor of Electrical Engineering (Hons.)
UNIVERSITI TEKNOLOGI MARA**

EDI ISWANTO BIN ARDIANTO

**FACULTY OF ELECTRICAL ENGINEERING
UNIVERSITI TEKNOLOGI MARA
40450 SHAH ALAM
SELANGOR DARUL EHSAN**

ACKNOWLEDGEMENT

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

Alhamdulillah, in the name of God, unlimited thank to Allah the Almighty for giving me the strength, perseverance and ability to complete this project and the report as it today.

Firstly, I would like to thank my supervisor, Prof. Madya Ruhani Abdul Rahman for giving me a chance to operate this project. Secondly, I would like to thank for her initial suggestion, constructive advice, generous guidance, encouragement, support and supervision along the project. Her kindness in helping me throughout the project is deeply appreciated.

I would like to express my gratitude to my mother, _____ for the support, encouragement and understanding throughout my life especially when I have a problem. Without her I would be in difficulties.

Besides, I would also like to express my thanks to Nor Azwa Abdul Wahab for she has always given me all the support, valuable information, understanding and inspiration throughout my life. I really feel grateful.

My thanks also go to all my course mates and friends, especially Irman, Norhacida Abdullah and Zulkifli Aziz, for sharing the valuable idea and comments and advice throughout the project.

Lastly, there are still so many people that involve in this project directly or indirectly that I cannot mention their name here, thank you very much.

ABSTRACT

An ad hoc network is an instantly deployable wireless network that does not require the services of any networking infrastructure such as base stations or routers. The key feature of these networks is their ease of deployment that makes it ideally suitable for battlefield, search and rescue and disaster relief operations. These networks can operate on a single-hop or multi-hop basis where nodes in the network are able to act as intermediaries (routers) for communications of other nodes.

Routing in ad hoc networks is nontrivial due to highly dynamic environment. In recent years several routing protocols targeted at mobile ad hoc networks are being proposed and prominent among them are DSDV, AODV, TORA, and DSR.

This project focus on the comprehensive analysis of Dynamic Source Routing protocol (DSR) using OPNET (Optimum Performance Network) modeler 10 simulator. OPNET, a well-known network simulation tool, is used to implement the design and conduct performance of DSR. In simulation, the protocol considered TCP as transport protocol. Results indicate that the performance of reactive routing protocol DSR is better than remaining protocols for TCP based on number of nodes in mobile ad hoc networks. DSR which uses source routing is the best among reactive routing protocols.

TABLE OF CONTENTS	PAGE
Declaration	i
Acknowledgement	ii
Abstract	iii
List of Figures	iv
List of Tables	vi
List of Abbreviations	vii

CHAPTER

1	INTRODUCTION	
1.1	Background	1
1.2	Scope of project	2
1.3	Objective of project	3
1.4	Problem statements	3
1.5	Organization of the project report	4
2	LITERATURE REVIEW	
2.1	Ad Hoc Networks	5
2.1.1	Cellular and Ad hoc Networks	9
2.1.2	Applications of Ad Hoc networks	9
2.1.3	Issues in Ad Hoc Networks	11
2.2	Routing Protocols for Ad Hoc Networks	12
2.2.1	Table Driven routing protocol	13
2.2.2	On Demand routing protocol	14
2.2.3	Selected routing protocol - DSR versus AODV	14
2.2.4	Dynamic Source Routing (DSR)	15
2.2.5	Previous DSR Research Implementation	19
2.3	Transport Protocols	20
2.3.1	UDP	20
2.3.2	TCP	21
2.3.3	Other End-to-End Transport Protocols	23

CHAPTER 1

INTRODUCTION

1.1 Background

An Ad Hoc Network is a wireless network that does not rely on any access point to handle transaction or communication between nodes in the coverage area. Intelligent signal is passes from one node to another until it reaches the destination. Meaning that, each node has an ability to receive the intelligent signal as well as route and pass it to another node until the destination node is reach. The ability of an ad hoc's node is optimizing if the node really fulfill the requirement wireless networking, which is mobility. Thus, the name Mobile Ad Hoc Network (MANET) is really suitable in order to describe how a wireless node really adopts the mobility trend in the dynamic human life style nowadays.

A mobile ad hoc network is as shown in figure 1.1

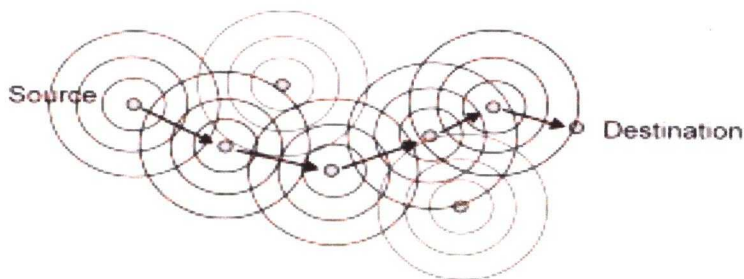


Figure 1.1 Mobile ad hoc network

In the next generation of wireless communication systems, there will be a need for the rapid deployment of independent mobile users. Significant examples include establishing survivable, efficient, dynamic communication for emergency/rescue operations, disaster relief efforts, and military networks. Such network scenarios cannot rely on centralized and organized connectivity, and can be conceived as