

UNIVERSITI TEKNOLOGI MARA

PERFORMANCE ANALYSIS OF
ALOHA PROTOCOL IN RFID
NETWORK

NURHAFENAH BINTI ABDUL JALIL

MSc

JULY 2014

UNIVERSITI TEKNOLOGI MARA

**PERFORMANCE ANALYSIS OF
ALOHA PROTOCOL IN RFID
NETWORK**

NURHAFENAH BINTI ABDUL JALIL

**Thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Science**

Faculty of Electrical Engineering

July 2014

ABSTRACT

Radio Frequency Identification (RFID) technologies have evolved in recent years and attract the attentions of profitable and research community. Hence, number of applications of the system has been established and it keeps on increasing tremendously over the years. However, when the number of applications is getting bigger, it will introduce collisions which could cause headaches to user. In view of that, model of anti-collision Aloha protocol is been introduced. This research presents the Aloha anti-collisions analysis between a pure Aloha and a slotted Aloha. OPNET Modeler 16.0 is the simulation tool that has been used to aid the analysis of this research paper. Based on the analysis done on the simulation results, it's showed that the performance of RFID with slotted Aloha is better than the performance of RFID with pure Aloha in terms of throughput and end-to-end delay. With the content and results presented in this paper, it is hope that it will provide insights on the Aloha anti-collisions protocol and will give contributions in RFID's studies and further increase the performance of RFID technology as a whole.

ACKNOWLEDGEMENTS

In the name of Allah, The Most Gracious and The Most Merciful. Praise is only to ALLAH S.W.T. I thanked him for giving me the strength, confidence and patience to finish this thesis.

I would like to express my sincere gratitude to my supervisor, Dr. Darmawaty Mohd Ali for his endless support, ideas, motivation, encouragement and constant guidance throughout the period of completing this project. She kept me focused on my thesis, help me to improve the quality of the thesis by giving prompt feedback.

Finally, I am grateful to my beloved family, especially to my husband, Azril Hafiz B Ab Rahim, my mother, Mahyon Mohd Noor and my beloved daughter, Amira Fatin Hanina for their understanding and tireless effort in building myself stream.

TABLE OF CONTENTS

APPROVAL	i
AUTHOR'S DECLARATION	ii
ABSTRACT	iii
ACKNOWLEDGEMENT	iv
TABLE OF CONTENTS	v
LIST OF TABLES	vii
LIST OF FIGURES	viii
LIST OF ABBREVIATIONS	x
CHAPTER ONE: INTRODUCTION	1
1.1 Project Background	1
1.2 Problem Statement	3
1.3 Objectives of the Study	3
1.4 Scope of Study	3
1.5 Structure of the Thesis	4
CHAPTER TWO: LITERATURE REVIEW	5
2.1 Introduction	5
2.2 Anti Collision in RFID System	5
2.2.1 Pure Aloha	5
2.2.2 Slotted Aloha	6
2.3 Review of the Anti-Collision Algorithm	7
CHAPTER THREE: RESEARCH METHODOLOGY	13
3.1 Introduction	13
3.2 Designing in OPNET	14
3.2.1 Transmitter Process Model	17
3.2.2 Transmitter Node Model	20
3.2.3 Receiver Process Model	21