

**IMPLEMENTATION OF WIRELESS LAN NETWORK AT PERBADANAN
KEMAJUAN NEGERI MELAKA**

NURUL AZLIN BINTI C ABLLAH

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

BORANG PENGESAHAN STATUS TESIS

JUDUL: IMPLEMENTATION OF WIRELESS LAN NETWORK AT PERBADANAN KEMAJUAN NEGERI MELAKA

SESI PENGAJIAN: 2008/2009

Saya NURUL AZLIN BINTI C ABLLAH

(HURUF BESAR)

Mengaku membenarkan tesis (PSM/ Sarjana/ Doktor Falsafah) ini disimpan di Perpustakaan Fakulti Teknologi Maklumat Dan Komunikasi dengan syarat-syarat kegunaan seperti berikut:

1. Tesis dan projek adalah hak milik Universiti Teknikal Malaysia Melaka.
2. Perpustakaan Fakulti Teknologi Maklumat Dan Komunikasi dibenarkan membuat salinan untuk tujuan pengajian sahaja.
3. Perpustakaan Fakulti Teknologi Maklumat Dan Komunikasi dibenarkan membuat salinan tesis ini sebagai bahan pertukaran antara institusi pengajian tinggi.
4. ** Sila tandakan (/)

SULIT

(Mengandungi maklumat berdarjah keselamatan dan kepentingan Malaysia seperti yang termaktub di dalam AKTA RAHSIA RASMI 1972)

TERHAD

(Mengandungi maklumat TERHAD yang telah ditentukan oleh organisasi/ badan di mana penyelidikan dijalankan

TIDAK TERHAD



(TANDATANGAN PENULIS)

Alamat tetap: 989 Lrg Darul Saadah Kg Pulau
Bahagia Manir 21200, K Terengganu Trg



(TANDATANGAN PENYELIA)

DR SUHAIMI BIN BASRAH

(Nama Penyelia)

Tarikh: 1/07/2009

Tarikh: 1/07/09

CATATAN: * Tesis ini dimaksudkan sebagai Laporan Akhir Projek Sarjana Muda (PSM).

** Jika tesis ini SULIT atau TERHAD, sila lampirkan surat daripada pihak berkuasa.

**IMPLEMENTATION OF WIRELESS LAN NETWORK AT PERBADANAN
KEMAJUAN NEGERI MELAKA**

NURUL AZLIN BINTI C ABLLAH

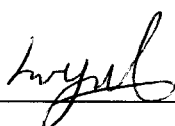
This report is submitted in partial fulfillment of the requirements for the
Bachelor of Computer Science (Computer Networking)


FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
UNIVERSITI TERNIKAL MALAYSIA MELAKA
2009

DECLARATION

I hereby declare that this project report entitled
**IMPLEMENTATION OF WIRELESS LAN NETWORK AT PERBADANAN
KEMAJUAN NEGERI MELAKA**

Is written by one and my own effort and that no part has been plagiarized without
citations.

STUDENT :  Date : 1/07/2009
(NURUL AZLIN BINTI C ABLLAH)

SUPERVISOR :  Date : 1/07/09
(DR SUHAIMI BIN BASRAH)

DEDICATION

To my beloved parents and all of person who support me to accomplish PSM project, I would like to thanks a lot. Then, especially to my Supervisor Dr Suhaimi Bin Basrah because teach me a lot to doing the project.

ACKNOWLEDGEMENT

Firstly, I would like to thanks to Universiti Teknikal Malaysia Melaka for the Projek Sarjana Muda . Special thanks to my supervisor, Dr Suhaimi Bin Basrah for his attention and supporting me to fulfill the project requirement successfully. Then, thanks a lot for all staff at Perbadanan Kemajuan Negeri Melaka because give cooperation to get the information about the network there, Especially for En Mohd Nasran Bin Hasan. Finally, to my beloved family, thanks a lot because give me opportunity to been there.

ABSTRACT

Wireless technology has helped to simplify networking by enabling multiple computer users to simultaneously share resources in office business without additional or intrusive wiring. The project are proposed to implement wireless LAN network at Perbadanan Kemajuan Negeri Melaka (PKNM) . The implementation of the project is based on simulation technique using Opnet Modeler 9.1. The design was created is mapped to Opnet Modeler 9.1 to test the performance of the network and get the result to choose the best design. All the design is simulate based on researching and interviewing technique with the staff at PKNM. Perhaps, the suggestion of wireless design will help PKNM to improve their network there.

ABSTRAK

Rangkaian Komunikasi tanpa wayar adalah untuk computer memudahkan dalam rangkaian membahagikan sumber di pejabat tanpa memerlukan sebarang kabel. Projek ini telah memilih Perbadanan Kemajuan Negeri Melaka (PKNM) untuk mencadangkan rangkaian tanpa wayar (LAN) di sana. Projek ini menggunakan Perisian Opnet Modeler 9.1 untuk merekabentuk rangkaian. Rekabentuk rangkaian yang dibina dan memilih rangkaian yang paling bagus. Rekabentuk rangkaian adalah disimulasi berdasarkan penyelidikan dan temuramah dengan PKNM. Adalah diharapkan, rekabentuk rangkaian tanpa wayar yang di cadangkan ini akan dapat menolong PKNM untuk memperbaiki rangkaian di sana.

TABLE OF CONTENTS

CHAPTER	SUBJECT	PAGE
	DECLARATION	ii
	DEDICATION	iii
	ACKNOWLEDGEMENTS	iv
	ABSTRACT	v
	ABSTRAK	vi
	TABLE OF CONTENTS	vii
	LIST OF TABLES	xiii
	LIST OF FIGURES	xv
CHAPTER I	INTRODUCTION	
	1.1 Project Background	1
	1.2 Problem Statement	2
	1.3 Objective	2
	1.4 Scope	3
	1.5 Project Significance	3
	1.6 Expected Output	3
	1.7 Conclusion	4
CHAPTER II	LITERATURE REVIEW AND PROJECT METHODOLOGY	

2.1	Introduction	5
2.2	Literature Review	6
2.2.1	Domain	6
2.2.1.1	Wireless LAN	6
2.2.1.2	Wireless Network Design	6
2.2.1.3	Wireless Network Simulation	7
2.2.2	Keyword	8
2.2.3	Previous Research	9
2.2.3.1	Case Study	9
2.2.3.1.1	CPAR and NUSAF (Lira Telecentre)	9
2.2.3.1.2	Western Michigan University	12
2.2.3.1.3	Indiana University	13
2.2.3.1.4	Salt Lake Community College	14
2.2.3.1.5	Comparison	15
2.2.3.2	Technique	15
2.2.3.2.1	Opnet Modeler 9.1	16
2.2.3.3	Project Requirement	
2.2.3.3.1	Software Requirement	17
2.2.3.3.2	Hardware Requirement	17
2.2.3.3.3	Other Requirement	17
2.3	Propose Solution	18
2.3.1	Project Methodology	18
2.3.1.1	Analyze Requirement of the network	19
2.3.1.2	Develop Logical Design	19

2.3.1.3	Develop Physical Design	19
2.3.1.4	Test, optimized and document the design	20
2.4	Project Schedule and Milestones	21
2.5	Conclusion	23
CHAPTER III	ANALYSIS	
3.1	Introduction	24
3.2	Problem Analysis	25
3.2.1	Network Architecture	26
3.2.2	Logical Design	26
3.3.3	Physical Design	28
3.3	Requirement Analysis	32
3.3.1	Quality of data	32
3.3.1.1	Interview	32
3.4	Conclusion	33
CHAPTER IV	DESIGN	
4.1	Introduction	34
4.2	Possible Scenario	34
4.2.1	Current Design	34
4.2.2	New Implementation of Wireless LAN Network Design.	40
4.2.2.1	First Possible Scenario Design	42
4.2.2.2	Second Possible Scenario Design	47
4.3	Security Requirement	52
4.4	Conclusion	52
CHAPTER V	IMPLEMENTATION	

5.1	Introduction	53
5.2	Network Configuration Management	54
5.2.1	Configuration Environment Setup	54
5.2.1.1	Statistic For Measure Network Design	54
5.2.1.2	Application Configuration	57
5.2.1.3	Profile Configuration	58
5.2.2	Version Control Procedure	61
5.3	Hardware Configuration Management	62
5.3.1	Hardware Setup	62
5.3.1.1	Server	62
5.3.1.2	Users Workstations	65
5.3.1.3	Links	66
5.3.1.4	Switches	66
5.3.1.5	Access Points	68
5.4	Security	68
5.4.1	Security Policies And Plan	68
5.5	Development Status	69
5.6	Conclusion	69
CHAPTER VI	TESTING	
6.1	Introduction	70
6.2	Test Plan	71
6.2.1	Test Organization	71
6.2.2	Test Environment	71
6.2.3	Test Schedule	72
6.3	Test Strategy	73
6.3.1	Classes of Test	73
6.4	Test Designs	73
6.4.1	Test Description	73

6.4.2	Test Data	74
6.5	Test Result and Analysis	76
6.5.1	Ethernet Delay (seconds)	76
6.5.2	Email Download Response Time (seconds)	78
6.5.3	Email Upload Response Time (seconds)	79
6.5.4	Email Traffic Sent (packets/second)	80
6.5.5	Email Traffic Receive (packets/second)	82
6.5.6	FTP Download Response Time (seconds)	83
6.5.7	FTP Upload Response Time (seconds)	85
6.5.8	FTP Traffic Sent (packets/seconds)	87
6.5.9	FTP Traffic Receive (packets/seconds)	88
6.5.10	Http Traffic Sent (packets/seconds)	90
6.5.11	Http Traffic Receive (packets/seconds)	92
6.5.12	Print Traffic Sent (packets/seconds)	93
6.5.13	Print Traffic Receive (packets/seconds)	94
6.5.14	Database Response Time (seconds)	96
6.5.15	Database Traffic Sent (packets/seconds)	97
6.5.16	Database Traffic Receive (packet/seconds)	99
6.5.17	Wireless LAN Load (bits/seconds)	101
6.5.18	Conclusion Based On Test Results And Analysis	102
6.6	Conclusion	105
CHAPTER VII	PROJECT CONCLUSION	
7.1	Observation on Weakness and Strength	106
7.1.1	Weakness	107
7.1.2	Strengths	107
7.2	Propositions For Improvement	108
7.3	Contribution	108

7.4	Conclusion	109
	REFERENCES	110
	BIBLIOGRAPHY	112
	APPENDICES	113

LIST OF TABLES

TABLE	TITLE	PAGE
2.1	List of Project Schedule and Milestones	22
3.1	Hardware use at PKNM	31
3.2	Example of question	33
4.1	Specification Wireless AP	41
5.1	Statistic For Measure Network Design	54
5.2	Version Control Procedure	61
6.1	Unit Testing Schedule	72
6.2	Ethernet Delay (seconds)	77
6.3	Email Download Response Time (seconds)	78
6.4	Email Upload Response Time (seconds)	80
6.5	Email Traffic Sent (packets/second)	81
6.6	Email Traffic Receive (packets/second)	83
6.7	FTP Download Response Time (seconds)	84
6.8	FTP Upload Response Time (seconds)	86
6.9	FTP Traffic Sent (packets/second)	88
6.10	FTP Traffic Receive (packets/second)	89
6.11	Http Traffic Sent (packets/second)	91
6.12	Http Traffic Receive (packets/second)	92
6.13	Print Traffic Sent (packets/second)	94

6.14	Print Traffic Receive (packet /second)	95
6.15	Database Response Time (seconds)	97
6.16	Database Traffic Sent (packets/seconds)	98
6.17	Database Traffic Receive (packets/seconds)	100
6.18	Wireless LAN Load (bits/seconds)	102
6.19	Comparison of newdesign1 and newdesign2	104

LIST OF FIGURES

DIAGRAM	TITLE	PAGE
2.1	The Previous Network Architecture	10
2.2	The Current Network Architecture At CPAR	11
2.3	Network Architecture at NUSAF Site	12
2.4	Basic Network Architecture at Indiana University's Bloomington Campus	13
2.5	The development cycle	16
2.6	Top Down Network Design	20
3.1	Flow Implementation Of Network Design	26
3.2	Logical Diagram at PKNM	27
3.3	Flow implementation of network design	28
3.4	Physical design for each department except 9 th and 11 th floor	29
3.5	Physical design for 9 th floor	29
3.6	Physical design for 11 th floor	30
4.1	Opnet Modeler workflow	35
4.2	Current Network Design at PKNM	36
4.3	Network connection between each floor in PKNM	37
4.4	7 th Floor at PKNM	38
4.5	Specific network connection with each floor except 9 th floor	38
4.6	Specific network connection with 9 th floor	39

4.7	Infrastructure Mode	41
4.8	Wireless LAN First Logical Design	42
4.9	Network Connection For 4 th , 5 th , 6 th , 7 th , 8 th and 9 th floor	43
4.10	Network Connection For 11 th Floor	43
4.11	Network Connection Between Each Floor in PKNM	44
4.12	New Design At 7 th Floor (Server)	45
4.13	New Design for 4 th , 5 th , 6 th , 8 th , 9 th and 11 th Floor at PKNM	46
4.14	Logical Design For Second Possible Scenario	47
4.15	Network Connection For Each Floor except 11 th Floor	48
4.16	Network Connection For 11 th Floor	48
4.17	Network Connection Between Each floor At PKNM	49
4.18	7 th Floor At PKNM(Server)	50
4.17	New Design for 4 th , 5 th , 6 th , 8 th , 9 th and 11 th Floor at PKNM	51
5.1	Application Configuration	57
5.2	Application Definition Table	58
5.3	Profile Configuration	59
5.4	Profile Configuration Table	59
5.5	Staff group 1 application	60
5.6	Staff group 2 application	60
5.7	Server Attribute	62
5.8	Application Supported Services (Email) Table	63
5.9	Application Supported Services (FTP) Table	63
5.10	Application Supported Services (Http) Table	64
5.11	Application Supported Services (Print) Table	64
5.12	Application Supported Services (Database) Table	65
5.13	Office_LAN Attribute for 4 th , 5 th , 6 th , 8 th and 9 th Floor	65
5.14	Office_LAN Attribute for 11 th Floor	66
5.15	Core Switch	67
5.16	Access Switch	67

5.17	Wireless AP Attribute	68
6.1	Ethernet Delay (seconds)	76
6.2	Email Download Response Time (seconds)	78
6.3	Email Upload Response Time (seconds)	79
6.4	Email Traffic Sent (packets/second)	80
6.5	Email Traffic Receive (packets/second)	82
6.6	FTP Download Response Time (seconds)	83
6.7	FTP Upload Response Time (seconds)	85
6.8	FTP Traffic Sent (packets/second)	87
6.9	FTP Traffic Receive (packets/second)	88
6.10	Http Traffic Sent (packets/second)	90
6.11	Http Traffic Receive (packets/second)	92
6.12	Print Traffic Sent (packets/second)	93
6.13	Print Traffic Receive (packets/second)	94
6.14	Database Response Time (seconds)	96
6.15	Database Traffic Sent (packets/seconds)	97
6.16	Database Traffic Receive (packets/seconds)	99
6.17	Wireless LAN Load (bits/seconds)	101

CHAPTER 1

INTRODUCTION

1.1 Project Background

The project will be work on for PSM is to analyze and implement wireless at Perbadanan Kemajuan Negeri Melaka. . In this chapter is about to state a objective, scope and collect more information to accomplish the PSM project. The project consists of to create new network design using wireless LAN for the place that merge with the existing network. The testing and implementation will cover either all around campus include simulation for data and performance. The current network that use in that place is wired network so the project can give more benefit to student and staff because can access internet easily. It is available to use wireless LAN because Perbadanan Kemajuan Negeri Melaka is not a big organization.

1.2 Problem Statement

The current network at PKNM only has wireless access at 9th floor. Only staff at this floor can use wireless. Another staff at another floor cannot use it. Wired network offers an environment where staffs are tied to their desk and cannot budge around to access the network.

Wireless networks can offer more convenient device and computers for all staffs. The target of the new wireless design is to ensure network environment at PKNM support mobility features and also will ensure overall services increase productivity.

1.3 Objective

1. Analyzing of existing network design. The analyzing is to know the environment of the existing network to merge with the new network design.
2. To design two wireless network at PKNM..
3. Analyze performance of the implementation wireless at PKNM.
Simulation current and new network is to compare the result. This is the way to implement new network design.
4. To give better mobility for staff to use the network.

Scope

1. User target are for staff in PKNM. They will use new network as alternative to use the network.
2. Added new features and device to provide wireless access such as access point can locate at several places.

1.5 Project Significance

1. The implementation of wireless also will include in analyzing the network performance of the implementation of wireless LAN network at PKNM.
2. Staffs can access to network wirelessly.

Expected Output

1. The wireless LAN implementation can connect the network either inside or outside the room.
2. Analyze network performance of the designs.
3. Proposed the best network on simulation technique.

4.7 Conclusion

The wireless network is standardized with respect to protocol definitions. Analyze various type of parameter analysis such as check and compare latency means a time delay between the moment something is initiated, and the moment one of its effects begins or becomes detectable. Then packet loss occurs when one or more packets of data traveling across a computer fail to reach their destination. The analysis is include check the speed of the network and the cost by using wired and wireless LAN and the distance at which a particular through can be achieve.

CHAPTER II

LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

Literature review is the part of the Implementation of wireless LAN project that include the step to develop a part of the project. Literature review for the project include domain, Keyword that introduce about the project and do previous research as a reference. The project methodology use is Top Down Network Design. Project methodology is a formalized approach that applies systematic way of project development. All needed information can gather from many resource such as books, journal, internet and study from ongoing research. The implementation of the wireless LAN network is as a backup for the current network. Current network is still to be use.