

**BORANG PENGESAHAN STATUS TESIS**

JUDUL: ANALYZING NETWORK PERFORMANCE IN VOIP AT MAJLIS BANDARAYA MELAKA BERSEJARAH

SESI PENGAJIAN: SEMESTER 2 (2007/2008)

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**ANALYZING NETWORK PERFORMANCE IN VOIP AT  
MAJLIS BANDARAYA MELAKA BERSEJARAH**

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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 TEKNIKAL MALAYSIA MELAKA  
2008**


## DECLARATION

I hereby declare that this project report entitled

### **ANALYZING NETWORK PERFORMANCE IN VOIP AT MAJLIS BANDARAYA MELAKA BERSEJARAH**

is written by me and is my own effort and that no part has been plagiarized without citations.

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## DEDICATION

*My dedication goes to both my beloved parents because without them, I couldn't archive at this level. Also to lectures of University Technical Malaysia Malacca, especially my supervisor En Ariff Bin Idris and all my friends who help me a lot to finish this project.*

## ACKNOWLEDGEMENTS

Bismillahirrahmannirahim.

First, Alhamdulillah and Thank You Allah S.W.T that finally I had been finished my PSM II. The duration of PSM II had been taken about 5 month from December 2007 until April 2008. A lot of experience gained in the documentation.

I would like to extend my gratitude to all those who have helped in making my Projek Sarjana Muda (PSM) such a rewarding and enriching experience. All the research really teaches me to be more independent, reliable, organize and many more. My deepest thanks to all the staff of Majlis Bandaraya Melaka Bersejarah for the help, support and helped that they have given to me throughout the duration of my research doing this project. All of them had given me an opportunity to learn and gain more experience on how to do a research in a real-time environment. I really appreciate the trust that they give to me. In addition, I am very grateful for the guidance of my lecturer-in-charge, En Ariff Bin Idris which has provided me everything that I needed throughout my PSM period. All the support and the advice that you give have and it's really help me.

Last but not least, I would like to thank my parents for giving me their blessings to do my PSM documentation here even though they are far.

Thank you.

## ABSTRACT

This project is about analyzing network performance in VoIP at Majlis Bandaraya Melaka Bersejarah and creates a network simulation due to this scenario. I will analysis and do simulation on the network performance of MBMB current network and the analysis will cover on the VoIP delay, LAN Delay and LAN Through Traffic, FTP download response time and Email download response time. This document describe about all the stages taken during the project development. The first chapter briefly explains about the introduction, problem statements, objective and scope of the analysis, and also the project significance of this project to the users. Chapter two is the part of this documentation where the literature review and Project Methodology of the analysis is done. This chapter will explain about network performance based on current situation in Majlis Bandaraya Melaka Bersejarah. The next chapter is the analysis part which is chapter three. In this chapter all the requirement regarding this project need to be collected and analyze to make sure the next chapter can be proceeded. Next chapter is chapter four where the design phase begins. Here all the design regarding the project must be shown. As for this project the network architecture, logical design, physical design and security requirement are shown. The last chapter of this document is the conclusion of the project. Here the advantages, disadvantages and propositions for improvement of the project. are state.

## ABSTRAK

Projek yang dilaksanakan ini merupakan satu analisa mengenai perestasi rangkaian mengenai protocol suara melalui internet di Majlis Bandaraya Melaka Bersejarah. Kajian dan simulasi akan dijalankan untuk mengkaji output sebenar didalam rangkaian. Di dalam dokumen ini menerangkan perjalanan pembangunan projek dengan secara terperinci. Pengenalan akan menerangkan pengenalan projek secara ringkas. Di dalam bahagian ini terdapat pernyataan masalah, objektif sistem ini dibangunkan, skop sistem dan kepentingan projek ini dibangunkan. Bahagian kajian *literature* dan perancangan pembangunan pula menerangkan perancangan pembangunan di mana keperluan-keperluan sistem ini dari segi perkakasan dan perisian di jelaskan dengan terperinci. Di dalam bahagian ini juga menerangkan pendekatan pembangunan projek yang saya gunakan dalam membangunkan projek ini. Terdapat juga perancangan dan *milestone* bagi projek saya di dalam bab ini. Bahagian berikutnya adalah Analisa yang menerangkan mengenai analisa rangkaian lama atau semasa dan analisa rangkaian yang sedia ada. Dalam bahagian Rekabentuk Sistem pula menerangkan reka bentuk sistem yang akan dibangunkan. Disini semua rekabentuk rangkaian, rekabentuk fizikal, rekabentuk logical dan keperluan keselamatan di ditunjukkan. Kesimpulan Projek merupakan bab yang terakhir di dalam dokumen ini, berkenaan adalah kesimpulan projek. Rumusan mengenai projek, kekuatan dan kelemahan projek dan cadangan pembaikan diterangkan di bab ini. Bahagian terakhir bab ini ialah kesimpulan projek yang menerangkan projek ini mencapai objektifnya ataupun tidak.

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## LIST OF ABBREVIATIONS

MBMB	-	Majlis Bandaraya Melaka Bersejarah
PSM	-	Projek Sarjana Muda
HTTP	-	Hypertext Transfer Protocol
UDP	-	User Datagram Protocol
PPS	-	Packet per second
LAN	-	Local Area Network
WAN	-	Wide Area Network
IP	-	Internet Protocol
TTL	-	Time to Live
PDF	-	Portable Document Format
WBS	-	Work breakdown structure
PRINCE	-	Projects In Controlled Environments
SDLC	-	System Development Life Cycle
WEP	-	Wireless Equivalent Privacy
WPA	-	Wi-Fi Protected Access
HTTP	-	Hyper Text Transfer Protocol
FTP	-	File Transfer Protocol
WLAN	-	Wireless Local Area Network
AD	-	Access Date

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## CHAPTER I

### INTRODUCTION

#### 1.1 Project Background

Now day, technology's growing very fast especially in the field of information technology and communication. One of technology is a Voice over Internet Protocol (VoIP), VoIP is a technology that allows you to make telephone calls using a broadband Internet connection instead of a regular (or analog) phone line. Some services using VoIP may only allow you to call other people using the same service, but others may allow you to call anyone who has a telephone number - including local, long distance, mobile, and international numbers. Also, while some services only work over your computer or a special VoIP phone, other services allow you to use a traditional phone through an adaptor.

Usually a VoIP service is using wired connection for medium to works. VoIP converts the voice signal from your telephone into a digital signal that travels over the Internet. If you are calling a regular phone number, the signal is then converted back at the other end. VoIP can allow you to make a call directly from a computer, a special VoIP phone, or a traditional phone using an adapter.

In addition, new wireless "hot spots" in public locations such as airports, parks, and cafes, allow you to connect to the Internet, and may enable you to use VoIP service wirelessly. If you make a call using a phone with an adapter, you'll be able to dial just as you always have, and the service provider may also provide a dial tone. If your service assigns you a regular phone number, then a person can call you from his or her regular phone without using special equipment.

Companies providing VoIP service are commonly referred to as providers, and protocols which are used to carry voice signals over the IP network are commonly referred to as Voice over IP or VoIP protocols. They may be viewed as commercial realizations of the experimental Network Voice Protocol (1973) invented for the ARPANET providers. Some cost savings are due to utilizing a single network - see attached image - to carry voice and data, especially where users have existing underutilized network capacity that can carry VoIP at no additional cost. VoIP to VoIP phone calls are sometimes free, while VoIP to public switched telephone networks, PSTN, may have a cost that's borne by the VoIP user.

OPNET modular will be use to simulate all of data and information about network performance for VoIP over Wired and to integrate all of research in simulate program

## 1.2 Problem Statements

- The analyzing of network design

One Number Call Center provides by Melaka ICT Holding (MITCH) to Majlis Bandaraya Melaka Bersejarah (MBMB). It is a common sense that network performance is a most important issue when it comes to wired medium for voice signal transaction. Some of problem is a network delay and packet loss. Network delay is inversely proportional to the speed of the link and is also affected by the processing time required as the packet traverses the network. Packet loss occurs when a packet fails to reach its destination and is dropped, a concern in highly congested or high error rate networks. Packet loss can detrimental effect on real-time applications such as voice traffic if packets are dropped and conversations become unintelligible. In addition to capacity planning, quality of service management can alleviate the impact of packet loss by establishing priority preferences for voice traffic.

- The lack of expertise on network performance

MBMB more prefer the staff to reconstruct the network infrastructure and this became a problem because the staff do not have the expertise in the networking field. There is no expert staff MBMB to manage and monitor the network performance especially in VoIP due to other job that they have to give their commitment. Therefore, analysis of current network performance and solutions for the network problems must have highest merit in terms of best efficiency and easiest to implement and enhance the network performance

- The simulation of the network

Before getting any result, the design and the data collected need to be in simulation as to know any problem can occur if the new network performance is to be implemented. This is not an easy task because the proper calculation, analyzing and many things need to be done. If not, there will be a greater problem in the future.

## 1.2 Objective

This is a network simulation about performance in VoIP over wired based on research and data collection. Study on the performance voice inside wireless conversation about speed, quality of data, security, noise, and network latency. Below is an objective:-

- a) To make a detail research for network performance based on VoIP services in a real situation..
- b) To develop simulation about network performance based on research and collection data using network simulator.
- c) To suggest improvement regarding the network performance and design based on result from simulation program

### 1.3 Scope

The main tasks for this project are to analysis network performance for VoIP and develop a network simulation using OPNET software. This simulation can determine network performance for Network delay, LAN Traffic/Delay and Response time for network application.

- a) Using network simulator (opnet modulator) software to develop a simulation. This simulator can compile and run a VoIP services
- b) Determine network performance for voice signaling and calculate packet per second in data transmission form sender to receiver.
- d) Collect data of network delay, Response time and LAN Traffic/Delay to determine status of network performance.

### 1.4 Project Significance

In implementing project, there will be need commitment and sacrifice of time and energy. On the project, from doing research or study case of analyze network performance for VoIP must work hard in achieving the objective. So, there are many benefits that can be archived from implementing this project and know how to analyze the network design and performance of the network area. Through a support from MBMB staff, there are comparison between the existing and enhanced designs with analyze the parameter which can see the result of network traffic. Other than that, do simulation and using new simulator software like OPNET Modular is a new experience because it is a network simulator and popularly used in the simulation that involved protocols over wired and wireless. On parameter, there are many parameters that can be analyzed but in this project, it will analyze dual parameter that is throughput and delay.

The duration of the simulation will be set in 24 hours and there will be different scenarios to test for analyzing the network performance.

## **1.5 Expected Output**

The main purpose of this project is to study, understand, analyze and make a simulation for VoIP. The output for this project is a developer using modulator software. The simulation will produce a result for network performance in network delay and packet loss to determine how far performance in VoIP.

## **1.7 Conclusion**

In VoIP, the carrying voice signal will through the wired technology path protocol for conversation to the ending point like a server or client receiver. This project is all about network performance take a point into much obstruction like a delay/network latency, packet loss, jitter, echo, security, reliability and so on to adaptation to output result in simulation program.

The literature review and project methodology of chapter 2 will be discussing the concept behind the simulation program. Make a research and data collecting from existing system to develop a new simulation program, discuss the existing problem and making an good simulation. Research will make acquainted with the basic concepts and technologies used in the literature review and project methodology