

**BORANG PENGESAHAN STATUS LAPORAN AKHIR PROJEK SARJANA
MUDA**

JUDUL: NETWORK SIMULATION PERFORMANCE KOLEJ TEKNOLOGI
BESTARI (KTB)

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Saya MOHD NOR AZYADI BIN MAMAT

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(TANDATANGAN PENULIS)

Alamat tetap: No 171, Tmn Seri Intan,
Sg. Tong,
21500 Setiu, Terengganu.

Tarikh: 30/4/08



(TANDATANGAN PENYELIA)

MOHD ZAKI BIN MAS'UD

Tarikh: 30/4/2008

DECLARATION

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STUDENT : _____
(MOHD NOR AZYADI BIN MAMAT)

Date: _____

SUPERVISOR: _____
(MOHD ZAKI BIN MAS'UD)

Date: _____

DEDICATION

To my beloved Family, I love you all. To My Supervisor, Thank you so much for the assist and help. To all my friends, thanks you for you're supported.

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Throughout the completing this PSM, a lot of experience had I gained in writing this documentation. Hence, I would like to express my appreciations to everyone that have contributed towards the success my PSM. The duration of PSM I and PSMII had been taken about 4 month from January 2008 until April 20087. A lot of experience gained in the documentation.

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ABSTRACT

This project paper is about Network Simulation Performance Kolej Teknologi Bestari (KTB). This document records the process of development or simulation for network at KTB. Before this project, KTB' side do not have data network performance for network design. This project develops to get data network performance for network at KTB. Then, from the data network performance, this project improves new network design and data network performance. Comparison data network performance between current network design and enhance network design to see the good network design.

ABSTRAK

Kertas projek ini dinamakan Network Simulation Performance Kolej Teknologi Bestari (KTB). Kertas kerja ini merekodkan segala proses pembangunan atau simulasi rangkaian di KTIAM. Sebelum ini, pihak KTB tidak mempunyai data prestasi rangkaian (network performance) untuk rekabentuk rangkaian. Projek ini dibina untuk mendapatkan data prestasi rangkaian KTB. Selepas itu, daripada data prestasi rangkaian, rekabentuk rangkaian baru dibina dan data prestasi diambil. Perbandingan data prestasi rangkaian antara rekabentuk rangkaian asal dengan rekabentuk rangkain baru untuk memperlihatkan rekabentuk yang lebih bagus.

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LIST OF ABBREVIATION

KTB	-	Kolej Teknologi Bestari
FTP	-	File Transfer Protocol
HTTP	-	Hypertext Transfer Protocol
LAN	-	Local Area Network
Sec	-	Seconds

LIST OF APPENDICES

APPENDICES	TITLE
Appendices A	Gantt chart
Appendices B	Design
Appendices C	Survey (Interview)
Appendices D	Log Book

CHAPTER 1

INTRODUCTION

1.1 Project Background

In computer networks, Network performance refers to the overall effectiveness of a network at a given point. Generally performance is examined at all levels of connectivity (LAN, WAN, backbone, end-to-end, application). Measurement usually looks at the throughput, bandwidth, delay and packet lost. The bandwidth measurement is to see how much data can be transferred per unit time, delay measurement is to see how long it takes an individual piece of data to traverse the network and the packet loss is to see when a piece of data disappears in transmission affects both bandwidth and real-time applications. Different aspects of network performance can be measured, giving the information to improve application's performance.

1.2 Problem Statement

- The analyzing of network design
Kolej Teknologi Bestari (KTB) doesn't have any documentation that can be referred to analyze current network performance moreover to upgrade the network
- The simulation of the network
For 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.

Besides that, the proper parameter, analyzing and many things need to be done. If not, there will be a greater problem in the future.

1.3 Objective

- To analyze the network performance in KTB in throughput, delay, FTP (File Transfer Protocol) and HTTP (Hypertext Transfer Protocol).
- To simulate the network environment
- To suggest improvement regarding the network performance

1.4 Scope

This project is to analyze network performance in Kolej Teknologi Bestari. By performing the network in a simulation as for performance scope, the simulation will analyze parameters like network throughput and delay.

The target scope is based on user in KTB network environment. The target user is KTB staff and student, where the analyzing will be done there.

1.5 Project Significance

For this project the network performance that are going be measure are network throughput, delay, FTP (File Transfer Protocol) and HTTP (Hypertext Transfer Protocol). Throughput is the amount of digital data per time unit that is delivered over a physical or logical link or that is passing through a certain network node and the delay refers to the time taken for a packet to be transmitted across a network from source to

destination. FTP is most commonly used to download a file from a server using the Internet or to upload a file to a server. HTTP is a communications protocol for the transfer of information on intranets and the World Wide Web. HTTP is a request or response standard between a client and a server.

1.6 Expected Output

The expected output in this project is to have the data on simulation. This simulation is to check any problem that can occur on the network performance so that enhancement can be made in order to minimized or avoid the problem.

1.7 Conclusion

As a conclusion, this chapter clarifies briefly about all the process flow on the project background, objective, problem statement, and project scope. This chapter also describes the purpose of this project which is doing an analysis of an existing network a simulation by the network in order to check the performance of the network and problem that can occur.

The next chapter consists of literature review, fact and finding, project requirement, milestone and methodology that will be used on this project.

CHAPTER II

LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

This chapter explains about the literature review and project methodology for the project. The discussion will be more on finding the fact, journal or article that related to the project. The lively project methodology is important as a guideline of activities for developers to follow and obey. There are a lot of methodology exists and depend on developer to choose the suitable one. Usually, it will be choosed according to project or system.

Moreover, this chapter also discuss in depth on the proper project methodology in carrying out the project successfully. The project methodology is an important procedure describes that the process to collect, analyses, and distribute responsibility and estimates outcomes. The project methodology will also encompass development methodology and technique chosen along with hardware, software and network requirement.

2.2 Literature Review

2.2.1 Domain

Every project has its own domain. In this project, the domain for the project is networking concept and simulation. To be specific, these projects focus on wired network simulation. This project will cover the problem that can occur in implementing network and can be references to implementing the network.

2.2.1.1 Network performance

Network performance refers to the level of quality of service of a telecommunications product as seen by the customer.

Functional description of network performance encompasses a description of speed, capacity, latency and distortion of transactions that are carried across the network. This informal description of what constitutes network performance certainly feels to be on the correct path, given that if one knew the latency, available bandwidth, loss and jitter profile and packet reorder probability as a profile of network performance between two network end points, as well as the characteristics of the network transaction, it is possible to make a reasonable prediction relating to the performance of the transaction. Measuring these quantities and then map them back to an overall picture of network capability and performance is very difficult. Service providers and customers often find themselves with entirely different motivations in service performance measurement.

The following list provides definitions for network performance goals that can use when analyzing precise requirements:

- **Capacity (bandwidth).**

The data-carrying capability of a circuit or network, usually measured in bits per second (bps)

- **Utilization.**

"Utilization" is the ratio of time a system is busy (i.e. working for us), divided by the time it is available. The percent of total available capacity in use.

- **Optimum utilization**

Maximum average utilization before the network is considered saturated.

- **Throughput**

Quantity of error-free data successfully transferred between nodes per unit of time, usually seconds.

- **Offered load**

Sum of all the data all network nodes have ready to send at a particular time.

- **Accuracy**

The amount of useful traffic that is correctly transmitted, relative to total traffic.

- **Efficiency**

A measurement of how much effort is required to produce a certain amount of data throughput.

- **Delay (latency)**

Time between a frame being ready for transmission from a node and delivery of the frame elsewhere in the network.

- **Delay variation**

The amount of time average delay varies.

- **Response time**

The amount of time between a request for some network service and a response to the request.

The basic Internet architecture is one of end-to-end data flows, where the network's task is one of simple packet switching. The Internet architecture does not manage the network resource by trying to 'protect' one application's use of the network from any other.

2.2.1.2 Simulation

In computer network research, network simulation is a technique for a program simulates the behavior of a network. This simulation is performance by the program using mathematical formulas, actually capturing or playing back network parameters from a production network. The network behavior, the various applications and services it supports can be observed in a test. Also, various attributes of the environment can also be modified. When a simulation program is running in network with live applications and services in order to control end-to-end performance to the user desktop, this technique is also referred to as network emulation.

The averages of the simulators are GUI drive, while some network simulator requires input scripts or network parameters. Important outputs of simulations are the trace files. The network parameters describe the state of the network such as node placement, existing links and the events such as data transmissions, link failures, etc. Trace files every event that occurred in the simulation and is used for analysis. Network simulators can also capture of data directly from network simulation environment. This data capture may be done at various times of the day, week, and month.

Most network simulators use discrete event simulation. Some network simulation problems is important those relying on queuing theory suited to Markov chain simulations, in no list of future events is maintained and the simulation consists of transiting between different system in a memory less fashion. Markov chain simulation is typically faster but less accurate and flexible than detailed discrete event simulation.

2.2.2 Previous Research

Network performance is the qualitative level at which a network fulfills its function by the [ATIS. *network performance*. Retrieve on May 2007 from <http://www.atis.org/>]. Based on National Laboratory for Applied Network Research(NLANR), network performance refers to the overall effectiveness of a network at a given point. Generally performance is examined at all levels of connectivity (LAN, WAN, backbone, end-to-end, application). Difference aspects of network performance can be measured, giving you information you can use to improve your application's performance by the [National Laboratory for Applied Network Research (2001). *Getting Started Guide Network Performance*. Retrieve on May 2007 from <http://dast.nlanr.net>]. Due to this, in order to implement this project the target parameter must best set of and the target parameter is to measure the packet lost and end to end delay at Kolej Teknologi Bestari.

Network traffic analysis and modeling play a major role in characterizing network performance. Models that accurately capture the salient characteristics of traffic are useful for analysis and simulation, and they further our understanding of network dynamics and so aid design and control from Shriram Sarvotham, Rudolf Riedi and Richard Baraniuk (2001a). There many things as we know to be consider before the analyzing is to be done. Measuring and analyzing network traffic dynamics between end hosts has provided the foundation for the development of many different network protocols and systems (Shriram Sarvotham, Rudolf Riedi and Richard Baraniuk, 2001a). Joel Sommers, et al. (2002).The importance is to understand the packet loss behavior since loss can have a significant impact on the performance of both TCP- and UDP-