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JUDUL: NETWORK ANALYSIS AND DESIGN AT WISMA NEGERI

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NETWORK ANALYSIS AND DESIGN AT WISMA NEGERI

MOHD EZWAN BIN MD SAID

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 entitled

NETWORK ANALYSIS AND DESIGN AT WISMA NEGERI

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

STUDENT : _____ Date: 2.5.2008
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SUPERVISOR: _____ Date: _____
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DEDICATION

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

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ABSTRACT

This project paper is a about Network Analysis and Design at Wisma Negeri. This document records the process of development or simulation for network performances at Wisma Negeri. The current network is all wired network and it make the staff easy to access the network and the internet. The problem with this network is inconvenience. This can be seen went the staff wants to access the internet in the peak hour. The staff also had the same problem if their want to access the network outside their office. Also the current network is difficult to expand as the current network used more cost to expand. The propose solution for this project is to simulate and analyzing the network at Wisma Negeri to see whether it can be implement with the new network. After that, an enhancement to the current design will be added and then simulate it so see whether the new design can support the wireless network without any major disturbing to the current network. The expected output in this project is to have the data on simulation been made.. The software requirement on this project is OPNET Modeler, Wireshark and NetStumbler. This software use for the simulation and analyzing. As the hardware, access points are needed and the existing network diagram was used for analysis before any implementation can be made. This project will benefit both parties as it make accessing internet at Wisma Negeri much easier.

ABSTRAK

Kertas projek ini dinamakan Network Analysis and Design di Wisma Negeri. Kertas kerja ini merekodkan segala proses pembangunan atau simulasi dalam rangkaian di Wisma Negeri. Rangkaian yang sedia ada merupakan rangkaian berwayar dan masalah yang pertama adalah ia tidak memudahkan penguna. Ini ketara ketika pekerja mahu mengakses internet pada waktu kemuncak kerja. Para pekerja juga menghadapi masalah ini terutama apabila mahu mengakses diluar kawasan tempat kerja. Salah satu masalah adalah tidak mudah untuk dikembangkan, dimana rangkaian sedia ada memerlukan kos yang tinggi untuk dikembangkan. Penyelesaian untuk projek ini adalah menganalisis rangkaian sekarang dengan mengunakan cara simulasi. Ini akan menghasilkan satu keputusan yang akan guna pakai untuk menjalankan sebarang penambahan terhadap rangkaian sedia ada. Selepas itu, rekabentuk rangkaian sekarang akan ditambah dan dinaik taraf serta akan melalui proses simulasi utk melihat samada penambahan ini boleh diimplementasikan tanpa ganguan besar terhadap rekabentuk rangkaian asal. Maka keputusan yang dijangkakan adalah data yang diperolehi dari simulasi.. Perisian yang digunakan untuk menjalankan simulasi dan analisis ialah OPNET Modeler, Wireshark and NetStumbler. Projek ini akan menguntungkan kedua-dua belah pihak di mana akses internet di Wisma Negeri akan lebih memudahkan.

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IP	-	Internet Protocol
LAN	-	Local area network
WAN	-	Wide area network
HTTP	-	Hyper Text Transfer Protocol
WWW	-	World Wide Web

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CHAPTER I

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 usually is to see how much how much data can be transferred per unit time, while 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. Difference aspects of network performance can be measured, giving you information you can use to improve your application's performance.

This study case will be analyzing the network traffic in Wisma Negeri where by using a simulation that will be developed using OPNET. Using the OPNET Modeler to experiment with different aspects of user- or session-behaviors and network configurations and focusing on LAN delay, Email parameters and HTTP parameters .

The research is more focus on analyzing on network performance to how the LAN delay, Email and HTTP parameters. This depends upon whether to analyze traffic for a particular network segment or the entire network. It also depends upon the network size and structure.

As result of this research is the collection of data at regular intervals. If the data want to be able to determine anomalies on the network, data over a sufficiently long period of time have to gather. This will allow us to distinguish normal network activity from abnormal one. The data must be gathered at different times of the day to see the various traffic patterns.

1.2 Problem Statement

- The analyzing of network design

  Wisma Negeri do not have any documentation that can be referred to analyze current network performance moreover to upgrade the network Before any enhancement on network performance can be done, the existing network need to be analyzed as we do not want any problem occur in the future. This is one of the challenges as the existing network can be design properly or not. If the design is not proper, then there will be a problem and a challenge to make it better with the enhancement of the network performance.

- The internet connection is slow

  The network connection at Wisma Negeri is very slow during peak hour. User has to take a much longer time to access the internet connection. This may be because the bottleneck on Wisma Negeri network.

1.3 Objective

The objective of this system is to make sure that this analysis will reach the goals and the objectives are stated as below:

- To analyze the network performance in Wisma Negeri
  Analyze the network performance in Wisma Negeri from measuring the LAN delay, Email parameters and HTTP parameters.

- To simulate the network environment
  All the current data of the current network will be gathered in order to compare to the new data, to see what the outcome of this project are. The actual network simulation will be created using OPNET.

- To suggest improvement regarding the network performance
  After the getting the entire outcome needed from the analysis, a suggestion in term of a purpose network will be forwarded to the organization for reference in order to enhance their network performance.

1.4 Scope

This project is a simulation that will be used to analyze network performance in Wisma Negeri. As for performance scope, the simulation will analyze parameters like LAN delay, Email and HTTP.

The target scope is based on Wisma Negeri network environment where the user of there network there is about 600 user. The target user is Wisma Negeri staff it's self where the analyzing will be done there. Other than that the scope is to measure and manage network like network delay.

By using the OPNET Modeler, the network topology will be created and it consists of a collection of nodes and links. Traces and monitors will be primary monitoring capabilities to be able to calculate the results from the simulations.

1.5 Project Significance

As we know a functional description of network performance encompasses a description of speed, capacity, latency and distortion of transactions that are carried across the network. This 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.

For this project the network performance that are going be measure are network delay. The analyzing of network performance will allow the network administrator there to enhance their network performance more efficiently and much faster. Basically the analysis will give many benefit to the Wisma Negeri staff because it will enhance the network capability their. The network will be more manageable and the traffic condition will be much better.

1.6 Expected Output

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

Also the output of this project is the network a Wisma Negeri will be much more stable and the delay or packet drop will be reducing.

Other expected output is the data on analysis of the existing network. The data actually will be used to enhance network performance.

1.7 Conclusion

As a conclusion, the introduction on this chapter clarifies briefly about all the flow process based on project background, objective product, problem statement, and project scope. Other than that this chapter the purpose of this project which is to do an analysis of the existing network performance, to make a simulation to check any the performance of the network and problem probability that can occur.

CHAPTER II

LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

In continuing the report for project "Network Analysis and Design for Wisma Negeri", literature review is important in order to study the basic about the subject of the project. Literature review is a process to search, collect, analyse and concluded all debates and issues raised in the work that been done in the past. It also provide the examples, case studies and other relevant work that be done by other people in the past, it gives the chance to investigate areas and read the subject that user may not have thought about before. The literature review focuses on the various theory and basic network knowledge used in the project. Project methodology will discuss detail about type of methodology, techniques, hardware or software requirements and project planning to develop the project, so that the planning for the project proposed to meet project objectives, scopes and requirements.

2.2 Fact and Findings

2.2.1 Domain

Every project has it own domain. In this project, the domain for the project is networking concept and simulation. To be specific, these project 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

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.**

  The percent of total available capacity in use