

**THE PERFORMANCE MEASUREMENT OF MEDIA STREAMING ON  
VIRTUAL MACHINE NETWORK ENVIRONMENT**

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**THE PERFORMANCE MEASUREMENT OF MEDIA STREAMING ON  
VIRTUAL MACHINE NETWORK ENVIRONMENT**

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**This report is submitted in partial fulfillment of the requirements for the  
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**DEDICATION**

*To my beloved family, your prayers and love gives me hope and blessing.*

*To my lecturer, for the guidance and challenge to develop myself.*

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## ABSTRACT

The technological bloom particularly in Information Technology (IT) has a great impact on business environment nowadays. The increasing use of Internet in day to day life transformed users into consumers. New services, essentially multimedia oriented ones, are high bandwidth consumers and usually require low delay between end-to-end users. However, these bandwidth consuming services are just keep emerging, and are often not well suited for hardware now used, such as routers. Multimedia oriented traffic is the new trend, and there is a real need for people developing products in this domain to measure what Internet is really capable of in terms of bandwidth and delays. Plus, this project is aim to implementing the media server in LAN using virtual machine environment. The result gained from this project is expected to give the clear overview of the streaming performance happen in the internet traffic. Therefore, some elements carry out from this project on the traffic management is important to have effective and conductive network system.

## ABSTRAK

Pembangunan pesat dalam bidang Teknologi Maklumat pada masa kini telah memberikan impak yang besar khususnya dalam bidang perniagaan. Peningkatan penggunaan Internet dari semasa ke semasa telah menjadikan pengguna sebagai satu keperluan asas pada masa kini. Pelbagai perkhidmatan yang baru, terutamanya yang berasaskan multimedia adalah sangat memerlukan kadar perkhidmatan jalurlebar yang tinggi dan seharusnya menghasilkan penundaan yang kecil di antara pengguna. Walaubagaimanapun, kadar penggunaan perkhidmatan jalurlebar semakin meningkat dan malah terdapat juga kelengkapan barangan yang masih tidak dapat menampungnya seperti routers. Trafik berorientasikan multimedia adalah satu trend yang baru, jadi ini memerlukan pengeluaran produk baru untuk memastikan penggunaan Internet adalah selari dengan kualiti jalurlebar dan penangguhan. Tambahan lagi, projek ini adalah bertujuan untuk menghasilkan konfigurasi server media di dalam mesin maya. Hasil daripada ujikaji ke atas rangkaian ini juga di harapkan supaya dapat memberikan gambaran yang jelas mengenai penangguhan dan keberkesanan yang berlaku di dalam trafik Internet. Jadi, elemen-elemen tertentu adalah penting untuk menjayakan projek ini dalam konteks pengurusan rangkaian Internet yang efektif dan kondusif.



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## CHAPTER I

### INTRODUCTION

#### 1.1 Project Background

Currently, various applications provide very useful services in the Internet. As these applications are widely used nowadays, it is important that quality of these services such as responses time and throughput. The Performance Measurement of Media Streaming on Virtual Machine Network Environment is the measurement of throughput and delay over the local area network (LAN) architecture and emerged to facilitate the massive and timely distribution of continuous media such as audio and video. The simulation process is basically using controlled environment in which the continuous media delivery has gradually integrated with the dynamic composition of media services in order to various result and observations.

In order to manage the system performance, it is important the administrator to be aware of the system usability such as data transfer throughput, processing time and also access time delay. Therefore in this project the performance of the network systems is going to be evaluated using several ways. It is difficult to provide a certain level of quality of service (QoS) in internet. In line with the delay and throughput happen in the network systems, this project used service composition methodologies of dynamically coordinating the service and resource such as hardware, memory, bandwidth, packet size/packet load from server to client components. Therefore, we need a evaluation for the end point applications performance. The main goal of this project is to gain all possible performance results of network

system. In this approach, the performance is measure in controlled client-server architecture.

## 1.2 Problem Statements

The internet has been used to transport data in the form of packet from sender to receiver. Most of the multimedia such as voice and video is being sent using the internet. In the past few years, the used of internet has increased and the internet did not support any kind of sophisticated quality of service (QoS) mechanism. The internet protocol (IP) header has been present used in differentiated of packets, it was never thought of being used on a large-scale. The IP applications have been used on carrying tremendous type of media through network so far.

Moreover, the IP is designed in a way that it runs across almost every transmission media and also network system platform. Almost all services include voice and data and multimedia applications demand high bandwidth. There is also wireless access to the internet at a reliable fast rate. The internet we are using nowadays provides best effort service in which the reliable delivery of packets is important than the amount of time needed for the delivery.

Therefore, this project is aim to produce an output and understand regarding the problem in networking system and what actually happen in background structure. In order to find the optimum solution in network system planning, understanding the correlation between physical quantitative parameters of network quality subjective judgement for services on the network is important.

### 1.3 Objective

Based on the numerous factors identified, the objectives of the project are:

- i. To design a LAN network inside and outside virtual machine environment.
- ii. To compare the performance of multimedia traffic in normal and virtual machine environment.
- iii. To compare the performance of network with traffic background.

### 1.4 Scope

The scope for this project is mainly focusing on proof-of-concept to find the result show how network behavior when carry multimedia data across the network IP traffic in terms of packet loss and throughput and also packet delay. The network architecture that is use to create the controlled environment network system are Local Area Network (LAN) in which all the size of packet and load of data are control by single entity call packet generator. The concept of creating the controlled environment network system is important to determine the robust and efficient use of available load in a network and also the capacity provisioning or streaming can be made in end-to-end delay measurement.

Therefore, this project does not use internet as one of the testing pad. The platform selected for this project is Windows operating system. In this project, we are going to compare the delay and throughput operating systems in virtual machine. The result gain from the file streaming will be compare using graph plotting method. Multiple tools also will be used in this system which includes the software, hardware and documentation tools.

## 1.5 Project Significance

Based on the objectives stated, many benefits are gained from this project finding. This includes the capabilities of this project to carry out various results and understanding on what is exactly running on the background the network system architecture in the way of data streaming between server and client.

This project carry out some methods in order to measure the delay in the controlled environment by monitoring result in accurate measurement, but it may cause data overload competition between streaming yet, we still can examined the network performance behavior. Thus, this would be a benefit for network planning or management to introduce the basic ground of network quality.

Besides that, we can observe the partial file accesses limit the amount of server and network bandwidth that can be conserved by using multicast delivery on end-to-end communication. Series of data transfers have been performed for measuring the delay, jitter and packet loss in various real time multimedia and non-real time applications are collected and plotted into graphical approach to get the better understanding.

## 1.6 Expected Output

The expected output of this project is to get all possible result of delay and throughput on communication between client server network systems. This is because of the important for the network administrator to know what is happen in the background view of their network architecture. It is hoped that the system would gives some contribution for the network design and provides some basic controls.

Based on the use of internet nowadays, it is important for us to have knowledge of the delay and internet throughput. Prior work includes various established test benches, methods and platforms for network delay measurements is expected to achieve in the end of this project. When they have made the pre-selection

of the house they desire, they can approach the staff to make further buying process. Besides that, obtaining accurate measurements is important for (Internet Service providers) ISP's and their customers.

## **1.7 Conclusion**

In this chapter, the project background, problem statement, objectives and scopes has been discussed. Hence, the project can be seen as one of the option to solving the network system nowadays. The use of internet at the client side can be optimized. By having correct view of how data streaming is done, it will be easier for us to indentify the problem and make maintenance of our network system in future.

In order to optimizing the use of internet in today's network needs, a better solution with the more effective approach is needed. Hence, in the measurements undertaken in the proposed approaches, few samples were used considering that delay monitoring in an operational network offers unique difficulties and challenges. The work in this regard offers a practical guideline through detailed analysis of the obtained delay measurements in future.

Next, the following chapter will elaborate more about the literature review and the project methodology for the system in detail.

## **CHAPTER II**

### **LITERATURE REVIEW AND PROJECT METHODOLOGY**

#### **2.1 Introduction**

Literature review is defined as a body of text that aims to review the critical points of current knowledge on a particular topic. Hence, this chapter discusses about the literature review and methodology that related to develop the Performance Measurement of Media Streaming on Virtual Machine Network Environment project. Besides that, the project methodologies are also further explained in this chapter. Details about related research, findings and other related materials to develop the system are elaborated in the next subchapters.

#### **2.2 Literature Review**

This section describe about facts and findings in details. There are divided into three sub-chapters which are the existing network architecture and current network issues.

##### **2.2.1 Domain**

The purpose of this project is to do the testing on The Performance Measurement of Media Streaming Based on Virtual Machine Network Environment

using LAN architecture. Therefore, the domain of this project is Networking and Distributed Computing whereas we concentrate more delay measurement and internet throughput on virtual machine environment using LAN topology as a testing-bed for the testing process.

### **2.2.2 Keyword**

The keywords that used in this project are Virtual Machine Environment, Client-Server Connection and Multimedia Oriented.

#### **2.2.2.1 File Transfer Protocol (FTP)**

FTP is a network protocol that used to transfer data between two computers over a network. The transfer is completed only when the request from the requesting node (client) is granted by the responding node (server). In this project, the client will become the FTP (data streaming) client as well as a media server while server will become the FTP (media storage) server. The client makes a TCP connection to the server's port 21. This connection is also called control connection and remains open for the duration of the session.

#### **2.2.2.2 Client-server**

Client-server is a system architecture that shows two computers are being connected through LAN. The client usually become the user interface which running the operating system platform such as Windows or Linux. On the other hand, server opens its listening port to give respond to client's request. Server will process the request and return the result to client.

Client computer and server computer are two separate devices that follow their designed purpose. For example, the web client works on a large screen display while at the same time the server is not using any screen display. But in some cases,

client and server may run on same device where a server may act as client to other server in the particular network. For this project, the architecture of client and server is as separate devices.

### 2.2.3 Previous Research

In this part, discussion is focusing on protocols and services, techniques and exist network system.

#### 2.2.3.1 Protocols and Services

##### i. Delay Measurement

Delay in networking is an important design and performance characteristic of a network devices or telecommunications network. The delay of a network indicates how long it takes for a bit stream of data to travel across the network from one node to another. It is specific measured in multiples or fractions of seconds. The delay may differ slightly, depending on the location of the specific pair of communicating nodes and the size of the data being sent across the network.

Delay measurements are the important aspect of internet tomography and play an important role for the estimation of internal characteristics of the network. The measurements must follow the dynamics of the network parameters which should be computed. It is important to implement the measurements in a right way and to find a trade-off between the accuracy and complexity.

The delays are divided into several parts;

- *Processing delay* - time taken by the routers to process the packet header.
- *Queuing delay* - time the packet spends in routing queues.
- *Transmission delay* - time it takes to push the packet's bits onto the link.
- *Propagation delay* - time for a signal to reach its destination.