

BORANG PENGESAHAN STATUS TESIS[^]JUDUL: PERFORMANCE ANALYSIS ON MULTIMEDIA STREAMING OVER INTERNETSESI PENGAJIAN: 2006/2007Saya FAHMALIFI BIN MOHAMAD
(HURUF BESAR)

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**PERFORMANCE ANALYSIS ON MULTIMEDIA STREAMING OVER
INTERNET**

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Performance analysis on multimedia streaming over
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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
KOLEJ UNIVERSITI TEKNIKAL KEBANGSAAN MALAYSIA
2006**

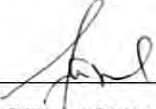
DECLARATION

I hereby declare that this project report entitled

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

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DEDICATION

To my beloved parents, family, friends and lecturers who are never give up on me and keep on supporting during the long hours of doing and writing the PSM.

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ABSTRACT

Streaming media has contributed to a significant amount of today's Internet traffic. Like conventional web objects (e.g., HTML pages and images), media streaming need fast internet connection speed to transfer their data over the Internet. This project is about to analysis the performance of Multimedia Streaming over Internet. The project is about an analysis of two popular streaming providers that involves in streaming technology. This two streaming provider is Microsoft Windows Media and Real Networks. The project are focuses on analyze the performance of both Windows Media Player and Real Player. Unique features such as huge size and high bandwidth demand for streaming over Internet is one of the problems that usually face by Internet users. Different streaming file format also be tested and analyze to shows how it impact the quality and performance of streaming media over Internet. The important part of the project is to choose the best internet connection type between broadband and dial up access in accessing the multimedia streaming file. An analysis done will shows the effectiveness, advantage and disadvantages of the streaming performance over Internet using two different internet medium that distinguished by the speed, bandwidth, and the medium.

ABSTRAK

Aliran media telah menyumbang satu jumlah yang ketara dalam lalulintas rangkaian meluas. Sebagaimana objek jaringan yang lazim (contohnya, laman HTML dan gambar), aliran media memerlukan kelajuan perhubungan rangkaian yang laju untuk memindahkan data menerusi rangkaian meluas. Projek ini adalah mengenai analisa ke atas prestasi aliran multimedia menerusi rangkaian meluas. Dua penyedia aliran media ini adalah *Microsoft Windows Media* dan *Real Networks*. Projek ini akan memfokuskan pada analisa terhadap kedua-dua *player* iaitu *Windows Media Player* dan *Real Player*. Ciri yang unik seperti saiz yang besar dan permintaan jalur lebar yang tinggi untuk aliran media menerusi rangkaian meluas adalah salah satu masalah yang lazimnya dihadapi oleh pengguna rangkaian meluas. Format fail aliran media yang berbeza juga di uji dan di analisa untuk menunjukkan bagaimana ianya mempengaruhi kualiti dan prestasi aliran media pada rangkaian meluas. Bahagian penting di dalam projek ini adalah iaitu untuk memilih jenis-jenis penghubung rangkaian meluas yang terbaik diantara jalur lebar dan dialan dalam mencapai fail media aliran. Analisis yang dilakukan akan memaparkan keberkesanan, kelebihan dan kekurangan prestasi aliran media melalui rangkaian meluas menggunakan dua perantara rangkaian meluas yang berbeza yang mana ianya dibezakan melalui kelajuan, jalur lebar, dan juga perantara.

TABLE OF CONTENTS

CHAPTER	SUBJECT	PAGE
	DECLARATION	i
	DEDICATION	ii
	ACKNOWLEDGEMENTS	iii
	ABSTRACT	iv
	ABSTRAK	v
	TABLE OF CONTENTS	vi
	LIST OF TABLES	x
	LIST OF FIGURES	xi
CHAPTER I	INTRODUCTION	
	1.1 Project Background	1
	1.2 Problem Statement(s)	2
	1.3 Objective	5
	1.4 Scopes	6
	1.5 Contributions	7
	1.6 Expected Output	7
	1.7 Conclusion	8
CHAPTER II	LITERATURE REVIEW AND PROJECT METHODOLOGY	
	2.1 Introduction	9
	2.1.1 Significant of Literature Review	9
	2.2 Fact and Finding	10

2.2.1	Overview of Multimedia Streaming Protocols	12
2.2.2	Streaming Media Format	13
2.2.2.1	RealMedia and RealAudio	14
2.2.2.2	Windows Media (Netshow)	16
2.3	Project Methodology	18
2.3.1	Analyzing and Data collecting Approach	18
2.3.2	Protocol Analysis Processing	19
2.3.3	Trace Collection and Analysis Software	19
2.3.4	Implementing the Software and Documentation	19
2.4	Project Requirement	20
2.4.1	Software Requirements	20
2.4.2	Hardware Requirements	22
2.4.3	Network Requirements	23
2.5	Project Schedule and Milestone	23
2.6	Conclusion	23

CHAPTER III ANALYSIS

3.1	Introduction	24
3.2	Analysis of Current Scenario	25
3.2.1	Internet Research	25
3.2.2	Library Research	26
3.2.3	Existing Thesis Research	26
3.2.4	Journal Research	26
3.3	Problem Analysis	27
3.3.1	Basic Metrics	28
3.3.2	Time Profile Metrics	29
3.3.3	Advanced Metrics	30
3.4	Requirement Analysis	31
3.4.1	Software Requirements	32
3.4.2	Hardware Requirements	37

3.4.3	Network Requirements	37
3.5	Conclusion	38

CHAPTER IV**DESIGN**

4.1	Introduction	39
4.2	Network Architecture	40
4.2.1	Video Streaming Model and Architecture	41
4.2.2	RTSP Controls Streaming Media	44
4.3	Logical Design	45
4.3.1	Continuous Media Streaming	45
4.3.2	Accessing Media Streaming File	46
4.4	Physical Design	48
4.4.1	Broadband Internet Access	48
4.4.2	Dial up Internet Access	49
4.5	Conclusion	50

CHAPTER V**IMPLEMENTATION**

5.1	Introduction	51
5.2	Setups and Configurations for Analyzer Tools	52
5.2.1	Configuration and Setups for Media Tracker	53
5.2.2	Configuration and Setups for Real Tracker	54
5.3	Converting Streaming Media File for Server	58
5.3.1	Encoding Streaming Media File to Server with Windows Media Encoder	59
5.3.2	Encoding Streaming Media File to Server with Real Producer	60
5.4	Hardware Configuration Management	61
5.5	Conclusion	61

CHAPTER VI	TESTING	
6.1	Introduction	62
6.2	Test Plan	63
	6.2.1 Test Organization	63
	6.2.2 Test Environment	63
	6.2.3 Test Schedule	64
6.3	Test Strategy	65
	6.3.1 Classes of Test	65
6.4	Test Design	66
	6.4.1 Test Description	66
	6.4.2 Test Data	68
6.5	Test Results and Analysis	69
	6.5.1 Windows Media Streaming Files Results and Analysis	70
	6.5.2 Real Media Streaming Results and Analysis	75
	6.5.3 Synthetic Streaming Media Files	78
6.6	Conclusion	79
CHAPTER VII	CONCLUSION	
7.1	Observation on Project Strengths and Weaknesses	81
	7.1.1 Project Strengths	82
	7.1.2 Project Weaknesses	82
7.2	Propositions for Improvement	84
7.3	Contribution	85
7.4	Conclusion	86

REFERENCES**BIBLIOGRAPHY****APPENDICES**

LIST OF TABLES

TABLE	TITLE	PAGE
2.1	Streaming Media Services Protocols	12
2.2	Streaming Media Architectures	13
3.1	Project Management and Drawing Software	32
3.2	Media Streaming Software Comparison	33
3.3	Media files encoding software will use in the project	34
3.4	Analyzer Software will use in the project	35
3.5	Hardware requirement will use in the project	37
3.6	Network requirement will use in the project	37
6.1	Overview of Testing Schedule	64
6.2	Test cases and expected result for classes of test	67

LIST OF FIGURES

TABLE	TITLE	PAGE
4.1	Internet Media Streaming Block Diagram	40
4.2	Unicast video streaming system models	43
4.3	Multicast video streaming system models	43
4.4	Layered Protocols use in Streaming Media versus Viewing Web page	44
4.5	Logical Views of Real-time Media Streaming	45
4.6	Logical views of the clients accessing media file from Internet	47
4.7	Last Mile internet access using broadband 1 Mbps	48
4.8	Dial up with 56 Kbps internet connection	49
5.1	Media Tracker Main Interface	53
5.2	Real Tracker Main Interface	55
5.3	Real Tracker Statistics Streaming Dialog	56
5.4	Real Data Main Interface	57
5.5	Real Data Display Log	57
5.6	Mediamax.com free Internet Server	58
5.7	Windows Media Encoder main Interface	59
5.8	Real Producer Basic main Interface	60
6.1	Islam Channel TV Bandwidth Utilization in 1Mbps Broadband	70
6.2	Islam Channel TV Bandwidth Utilization in 56Kbps Dial up	71

6.3	Radio Ikim Bandwidth Utilization in 1Mbps Broadband	72
6.4	Radio Ikim Bandwidth Utilization in 56Kbps Dial up	73
6.5	Radio Era Bandwidth Utilization in 1Mbps Broadband	74
6.6	Radio Era Bandwidth Utilization in 56Kbps Dial up	75
6.7	BBC01 TV Streaming Bandwidth Comparison in 1Mbps Broadband	76
6.8	6.8: Alalam TV Streaming Bandwidth Comparison in 56Kbps Dial up	78
6.9	Bandwidth Utilization for Synthetic Data in 1Mbps Broadband	79

CHAPTER I

INTRODUCTION

1.1 Project Background

Today's Internet is increasingly used for transfer of continuous-media data, such as video from news, sports, and entertainment Web sites and audio from Internet broadcast radio. Streaming-media content presents a number of new challenges to network engineers. The use of streaming media on the Internet is growing at exceptional rates, and will continue to accelerate as last mile bandwidth improves. Streaming media is not only popular for entertainment sites, but is becoming an important tool for businesses. Due to the continuously increasing capabilities and power of nowadays end-systems, the vast majority of personal computers are multimedia-enabled. This fact, in combination with the tremendous growth of the Internet, raises in both the research and industrial communities, the aspect of transmitting multimedia content across the Internet.

This project of analyzing the performance on multimedia streaming over the internet done to analyzing the streaming performances over the internet medium between broadband and dial-up access. The project research has explored the effectiveness of performance optimizations on streaming-media workloads by

different streaming provider like Windows Media, and Real Networks. Once again, this project is about to analysis the web TV (online streaming TVs channel) and online radio streaming performance over the internet medium specified. Besides that the project also explains the differences and effectiveness of streaming encoding technology between Windows Media and Real Networks. The streaming protocols used in different architecture also focuses on this project.

1.2 Problem statements

Due to the large data rates required, a number of audio and video streaming for the Internet will continue to be utilized to address the wide range of platforms, pipe speeds (Internet medium), and user preferences. The problems statements are included in this project soon will be achieve so that the objective of this research and the project significant will be implemented.

i. Different categories of streaming technology involves a user to choose several type of Media Player

Practically streaming technology used today by content providers is using different type of streaming technology architecture to support the streaming multimedia content. This categories can be divided by protocols (i.e.: TCP or UDP e.g. RTP) that there are used and the architecture of streaming whether they using on-demand streaming or real-time streaming architecture. The problems are because each of the streaming architecture is different and the media player needs to play the files are also must be different. Usually, no streaming media player today has full supported for the different streaming files e.g. Media Player usually used (.asx and .asf) where Real Player are using (.rm besides .ram) as their major files format.

ii. There are many streaming provider that provide their streaming services for Internet Users

The administrator to those in this field always face the problems when choosing what is the best streaming provider for their streaming services such as internet radio or web TV. This because there are three major streaming providers that offer the technology and all of them has the pro and contra in their services. Still others may not have the proper plug-in or sufficient bandwidth for the richer media. In these situations, a major component of the streaming media experience is missing.

iii. Internet medium are distinguished by their bandwidths limitations

The leased line, broadband (i.e.: x DSL), wireless hot spot, and also dial-up access distinguished by their bandwidth limitations. Media streaming servers over the internet will reflect with this by encoding the data with different method and send back to the user in their way. The different method of encoding will make a complex computation when data being encoded and this cause major problems that server may not responds to client.

iv. Streaming Multimedia Content is not reliable

This problem is in form of availability, Time to fill buffer, and also Time to refill the buffer that streaming multimedia contents provided. For availability the stream may be unavailable for several reasons such as the server is down, the server does not have support more capacity (limit users audience), the network connection is down or something else. In Time to fill the buffer most users can be tolerate with respect to waiting while the initial buffer fills up. Although some users maybe not happy if the fills is much more waiting

than looking their streaming contents. Time to refill buffer is refer to the streaming contents that are stopping the display to refill the buffer, this will frustrate their audience.

Objective

The objective of this research and analyzing are;

- i. To compare and analyze streaming performance over the internet by testing the multimedia streaming data in broadband and dial-up access.
- ii. To choose the best streaming provider available is today's such as Windows Media and Real Networks.
- iii. To measure the bandwidth performance and utilization, and also data encoding in different internet medium.
- iv. To test and analyze the performance of specific streaming Web TV and online radio in different streaming protocols.

1.2 Scopes

What should be the scopes of this research are like follow;

- i. Project are focus on the analyzing streaming performance over the internet medium by capturing the audio and video data, measure and testing it, do some comparison of their results, and conclude with what is the best.
- ii. Bandwidth utilization, session characteristic, response time (e.g. delay), streaming technology overview used by different streaming provider today will be covered one by one during this project. What will be tested is the RTSP session; this is an RTSP response and an RTSP request that will involves when user play, download, and close the streaming.
- iii. The free online web servers are used to simulate the testing data so that the comparison to major streaming contents provider can be done.
- iv. Internet medium such as broadband (ADSL and DSL and dial-up access are used in this project. The data of this different type of medium are capturing using appropriate tools.
- v. Two streaming tools and two analyzer tools will be used to capturing media streaming data and analyze streaming performance. The analysis includes of the measurement and testing streaming delay, buffer, packet, and also network utilization. These tools will use to works on windows based platform. Besides that two streaming encoding software are used to encoding the media files before the file can be upload to server.
- vi. This project is not to develop any tools for testing, analyzing the performance, measurement and capturing the data of the media streaming over the internet.

1.3 Contributions

This project will help the network administrator and to those it may concern in this fields when choosing what the best streaming provider available is today. Due to streaming-media content presents a number of new challenges to systems designers. Compared to traditional Internet applications such as email and Web browsing, multimedia streams can require high data rates and consume significant bandwidth. This project also will help normal internet users to get some knowledge in media streaming so that they don't waste the bandwidth of the internet medium whether they are at home, schools, office and where else.

1.4 Expected output

Finally, the result of this research project is to study, implement, analyzing, capturing, comparing, testing and measuring every aspect of streaming technology that involved over the internet. From this research will bring the findings that can be documented as a reference to users and industrial communities. This research should end up with measuring and analyzing the performance of multimedia streaming over internet in terms of the quality output such as bandwidth utilization while the media data is streaming. The output also will include result of testing streaming delay, buffer, packet receive/loss, and also network utilization. A few tools for streaming and analyzing the data will used in order to get the reliable result.

1.5 Conclusion

Performance Analysis on Multimedia Streaming over Internet is one of the study and research/project that brings comprehensive of understanding the need of streaming over Internet so that it will benefit peoples whose those in this technology either they are normal users or industrial communities. This project shows the comparison technology, technique, methodology between major players in streaming provider such as Windows Media and Real Network. Every data are useful for this research because it captured on different medium such as broadband (i.e. ADSL and DSL) and dial-up access. These differences shows how complex the streaming network that were working over the internet medium. Through the findings found on this project prepare the suggestion for what is the best streaming provider exist today.

The next chapter will be carried out according to the literature researches that have been conducted. It also discuss about the fact and findings.

CHAPTER II

LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

The literature review will help for research and fact finding. It's also to present the method of finding, collecting, identify, investigating the characteristics of project and provides consistency. The research mostly done based upon the facts and findings on the internet resources and other existing research. This information is very important to determine a Multimedia Streaming technologies and functional requirement for this project. In the following sections a range of areas related to this project will be reviewed. Current media streaming approaches and applications are reviewed in this section.

2.1.1 Significant of Literature Review

Due to the significant of literature review it is done from the books, existing research, papers, and so on that can related with the project goals.

2.2 Fact and Finding

Focus in this paper is to performance analysis the general problem of assessing the quality of streaming media in the Internet medium. In this context, “streaming media” refers to a combination of audio and/or video content that is accessed on-demand, at scheduled times, or live. On-demand and scheduled content is pre-encoded and stored at one or more media servers, while live content is created, encoded, and distributed in real time. In research project assume a client-server type system in which multimedia is delivered over uni cast using UDP. The system prototype will uses Windows Media Server; thus the streamed media is delivered via Microsoft’s Microsoft Media Server (MMS) protocol over UDP. This project presents two main contributions. First, to specify a new measurement and assessment architecture that can flexibly support the needs of different classes of assessment consumers while supporting both new and existing measurements that can be correlated with user perceptions of media stream quality. Second, to demonstrate that a analysis of this implementation can be used to assess a user’s perceived quality of a media stream, by judicious choice and assessment of objective stated early.

It’s clear to see that we have been “streaming” media, according to industry expert Steven M. Blumenfeld, “...since the dawn of the media age... Streaming media is not new; it has been around since the inception of the radio (Guglielmo Marconi 1897 - inventor of the radio). We just called it broadcast.” (Blumenfeld, 2000). Broadcast, however, as we currently know it in the form of radio and television, does not yet provide the rich media experience that the Internet and the World Wide Web enable.

Download time seemed to be the major concern associated with audio and video presentation, but quality was a close second. For example, to facilitate faster and easier retrieval times of video clips over the Internet, the number of frames per second is usually reduced. However, with reduced frame size poor quality of motion and sound becomes a distinct possibility rendering video clips intending to display