

BORANG PENGESAHAN STATUS TESIS*

**PERFORMANCE ANALYSIS OF VIDEO CALL
APPLICATION ON TABLET USING 3G NETWORKS**

JUDUL: _____

SESI PENGAJIAN: 2012/ 2013

Saya AHMAD ASHRAF BIN RAWEE

mengaku membenarkan tesis Projek Sarjana Muda ini disimpan di Perpustakaan Fakulti Teknologi Maklumat dan Komunikasi dengan syarat-syarat kegunaan seperti berikut:

Tesis dan projek adalah hak milik Universiti Teknikal Malaysia Melaka. Perpustakaan Fakulti Teknologi Maklumat dan Komunikasi dibenarkan membuat salinan untuk tujuan pengajian sahaja.

Perpustakaan Fakulti Teknologi Maklumat dan Komunikasi dibenarkan membuat salinan tesis ini sebagai bahan pertukaran antara institusi pengajian tinggi.

** Sila tandakan (/)

<u> </u> SULIT	(Mengandungi maklumat yang berdarjah keselamatan atau kepentingan Malaysiaseperti yang termaktub di dalam AKTA RAHSIA RASMI 1972)
<u> </u> TERHAD	(Mengandungi maklumat TERHAD yang telah ditentukan oleh organisasi/badan di mana penyelidikan dijalankan)
<u> / </u> TIDAK TERHAD	

(TANDATANGAN PENULIS)

(TANDATANGAN PENYELIA)

Alamat tetap: No.46 Jalan Padi Ria 17

Mohd Najwan Mohd Khambari

Bandar Baru Uda , 81200 Johor Bahru

Nama Penyelia

Johor

Tarikh: _____

Tarikh: _____

CATATAN: * Tesis dimaksudkan sebagai Laporan Projek Sarjana Muda (PSM).

** Jika tesis ini SULIT atau TERHAD, sila lampirkan surat daripada pihak berkuasa.

**PERFORMANCE ANALYSIS OF VIDEO CALL APPLICATION
ON TABLET USING 3G NETWORK**

AHMAD ASHRAF BIN RAWEE

This report is submitted in partial fulfilment of the requirements for the
Bachelor of Computer Science (Networking)

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
UNIVERSITI TEKNIKAL MALAYSIA MELAKA
2013

DECLARATION

I hereby declare that this project report entitled
**PERFORMANCE ANALYSIS OF VIDEO CALL APPLICATION
ON TABLET USING 3G NETWORK**

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

STUDENT : _____ Date: _____
(AHMAD ASHRAF BIN RAWEE)

SUPERVISOR : _____ Date: _____
(MOHD NAJWAN BIN MD KHAMBARI)

DEDICATION

This work is dedicated to my beloved family and siblings, who passed on a love of reading and respect for education.

To my supportive friends and my supervisor, thank you so much for assist and help.

ACKNOWLEDGEMENTS

Bismillahirrahmanirrahim

Alhamdulillah, Thanks to Allah SWT, whom with His willing give me the opportunity to complete this Final Year Project which is title Performance Analysis of Video Call Application on Tablet using 3G Network. This final year project report was prepared for Faculty of Information and Communication Technology (FTMK), Universiti Teknikal Malaysia Melaka (UTeM), basically for student in final year to complete the undergraduate program that leads to the degree of Bachelor of Computer Science. This report is based on the methods given by the university.

Firstly, I would like to express my deepest thanks to, Mohd Najwan bin Md Khambari, a lecturer at FTMK, UTeM and also assign, as my supervisor who had guided be a lot of task during my project research. I also want to thanks the lecturers and technicians of FTMK for their cooperation during I complete the final year project that had given valuable information, suggestions and guidance in the compilation and preparation this final year project report.

Deepest thanks and appreciation to my parents, family, special mate of mine, and others for their cooperation, encouragement, constructive suggestion and full of support for the report completion, from the beginning till the end. Also thanks to all of my friends and everyone, that has been contributed by supporting my work and helps myself during the final year project progress until it is fully completed.

ABSTRACT

This project is about Performance Analysis of video call application on tablet using 3g network. The main purpose is to find the best application video call application based on 3 most top applications. The most user use application video call is Facetime, skype and oovoo. There are three parameter want compare and analysis video call on tablet is delay, packet loss and throughput. Duration test to compare is 1 minute (60 seconds).Laptop device was used to capture all the packet transmits from ipad. Wireshak is software to use for capture packet. Ipad Mini cellular and iphone 5 was used as a modem to get signal 3g network. The all result are combined on 1 figure to easy user know the best video call applications.

ABSTRAK

Projek ini adalah kira-kira Analisis Prestasi panggilan video pada tablet menggunakan rangkaian 3g. Tujuan utama adalah untuk mencari yang terbaik video panggilan berdasarkan 3 aplikasi yang paling atas. Para pengguna yang paling menggunakan aplikasi panggilan video adalah Facetime, Skype dan ooVoo. Terdapat tiga parameter untuk dibandingkan dan dianalisis pada tablet adalah kelewatan, kehilangan paket dan pemrosesan. Tempoh ujian untuk membandingkan ialah selama 1 minit (60 saat). Laptop peranti digunakan untuk menangkap semua paket yang dipancar oleh ipad. Wireshak adalah perisian digunakan untuk menangkap paket. Ipad Mini selular dan iphone 5 telah digunakan sebagai modem untuk mendapatkan isyarat rangkaian 3g. Hasil semua data digabungkan pada 1 gambar rajah untuk memudahkan pengguna mana yang terbaik aplikasi panggilan video.

Table of Contents

DECLARATION.....	II
DEDICATION.....	III
ACKNOWLEDGEMENTS	IV
ABSTRACT.....	V
ABSTRAK	VI
LIST OF TABLES	X
LIST OF FIGURES	1
CHAPTER I	2
INTRODUCTION.....	2
1.1 PROJECT BACKGROUND.....	2
1.2 PROBLEM STATEMENT	3
1.3 OBJECTIVES	3
1.4 SCOPE	4
1.5 PROJECT SIGNIFICANCE	5
1.6 EXPECTED OUTPUT	5
1.7 CONCLUSION	5
CHAPTER II.....	6
LITERATURE REVIEW	6
2.1 INTRODUCTION.....	6
2.2 FACTS AND FINDING	6
2.3 DOMAIN	6
2.4 PREVIOUS RESEARCH.....	7
2.4.1 JOURNAL 1.....	7
2.4.2 JOURNAL 2.....	8
2.5 PARAMETERS.....	9
2.5.1 THROUGHPUT	9
2.5.2 PACKET LOSS	9
2.5.3 DELAY	9
2.6 VIDEO CALL APPLICATION	10
2.6.1 SKYPE.....	10
2.6.2 FACETIME.....	10
2.6.3 OOVOO	11
2.7 NETWORK ANALYZER TOOLS	11

2.7.1	WIRESHARK.....	12
2.8	CONCLUSION	12
	CHAPTER III	13
	METHODOLOGY	13
3.1	INTRODUCTION.....	13
	INITIATION STAGE	15
3.1.1	PLANNING AND DESIGN STAGE.....	15
3.1.2	EXECUTION AND CONSTRUCTION STAGE.....	15
3.1.3	MONITORING AND CONTROLLING SYSTEMS	15
3.1.4	COMPLETION	15
3.2	PROJECT SCHEDULE AND MILESTONE	16
3.3	CONCLUSION	17
	CHAPTER IV.....	18
	DESIGN & IMPLEMENTATION.....	18
4.1	INTRODUCTION.....	18
4.2	NETWORK ARCHITECTURE.....	18
4.2.1	PHYSICAL DESIGN	18
4.2.2	LOGICAL DESIGN	19
4.3	REQUIREMENT ANALYSIS.....	20
4.3.1	HARDWARE REQUIREMENT	20
4.3.2	SOFTWARE REQUIREMENT.....	22
4.4	PROJECT ANALYSIS OUTPUT	23
4.5	CONCLUSION	26
	CHAPTER V	27
	TESTING & ANALYSIS	27
5.1	INTRODUCTION.....	27
5.2	TEST PLAN	28
5.2.1	TEST ORGANIZATION	28
5.2.2	TEST ENVIROMENTS	28
5.2.3	TEST SCHEDULE	30
5.3	TEST STRATEGY	31
5.4	TEST DESIGN	31
5.5	TEST DESCRIPTION.....	32
5.6	CAPTURE DATA USING WIRESHARK.....	34
5.7	PARAMETER.....	36

5.7.1	THROUGHPUT	36
5.7.2	PACKET LOSS	37
5.7.3	CALCULATE DELAY	38
5.8	OVERALL RESULT	40
5.8.1	THROUGHPUT	40
5.8.2	PACKET LOSS	41
5.8.3	DELAY	42
5.8.4	COMPARISON VIDEO CALL APPLICATION	43
5.9	CONCLUSION	44
	CHAPTER VI.....	45
	CONCLUSION	45
6.1	INTRODUCTION.....	45
6.2	PROJECT ANALYSIS SUMMARIZATION	45
6.3	LIMITATION OF PROJECT	46
6.4	CONTRIBUTION OF PROJECTS	46
6.5	FUTURE WORKS.....	46
6.6	CONCLUSION	46

REFERENCES

LIST OF TABLES

TABLE	TITLE	PAGES
1.1	Show the research problem in this project	3
1.2	Show the research questions in this project	3
1.3	Shows the research objectives.	4
2.1	Feature Comparison between Skype, Facetime, and Oovoo	11
3.1	Project Schedule and Milestone	16
4.1	MacBook Pro Specification	20
4.2	Specification Ipad Mini Cellular	21
4.3	Software Requirement	22
5.1	Test Environments	29
5.2	Test Schedule	30
5.3	Unit testing for Wireshark	32
5.4	Network testing for Ipad mini A & B	33
5.5	Comparison Parameter Throughput	40
5.6	Comparison Parameter Packet Loss	41
5.7	Comparison Parameter Delay	42
5.8	Comparison All Result Parameter	43

LIST OF FIGURES

FIGURES	TITTLE	PAGE
3.1	The Traditional Project Management Approach Step	13
4.1	Physical Design	18
4.2	Logical Design	19
4.3	Macbook Pro	20
4.4	Ipad Mini	21
4.5	Wireshark Interface	23
4.6	Create Hostpot “Connectify-me”	23
4.7	Connected to Hotspot	24
4.8	Capture Option Wireshark	24
4.9	Summary Capture Facetime	25
4.10	Summary Capture Skype	26
5.1	The packet of data that has been capture	34
5.2	Client Ipad Mini A	35
5.3	Throughput result	36
5.4	Packet result	37
5.5	Time Delta column	38
5.6	Export wireshark data to CSV file	39
5.7	Calculate Average Delay using Microsoft Excel	39
5.8	Comparison Parameter Throughput	40
5.9	Comparison Parameter Packet Loss	41
5.10	Comparison Parameter Delay	42
5.11	Comparison All Result Parameter	43

CHAPTER I

INTRODUCTION

1.1 Project Background

Videophone is a telephone that can transmit video and audio signal. Videoconferencing saw its earliest use with AT&T's picturephone service in early 1970s. In Malaysia there are 3 major mobile network operators, which is Maxis, Celcom & Digi . Before apple release their first smartphone into the market in 2007 people use video call using mobile phone with 3G mobile networks. Video calling must have 3G connections for both caller and received phone to get connectivity. Not all area in Malaysia has 3G connections. There are many video applications in the market and the best option video call application is Facetime, Skype, Oovoo, and Tango. In April 2010, Apple release first tablet in the market, which is Ipad first generation. After that, there are many tablet device have been built which is manufacturer from South Korea Samsung. These devices from Samsung are using android OS from Google. Now it's a trend people need a tablet to use as work or entertainment and games. These tablets come with Wi-Fi or 3G included.

Nowadays all town in Malaysia have a 3G coverage networks but connections speed are different. It depends on that area or how many people in that area. This project will discuss the capabilities 3 video call applications, which are Facetime, Skype and Oovoo that are using 3G Network. This project will show prove of result after we capture data packet and analyze from that data and we can know which the best video call application using 3G network.

1.2 Problem Statement

Table 1.1 Show the research problem in this project

RP	Research Problem
RP 1	Don't know which the best performance video call applications.
RP 2	Don't know which are video call application can run smoothly using 3G connections.
RP 3	Don't know how to monitor data traffic and capture packet during video calling.

Table 1.2 Show the research questions in this project

RP	RQ	Research Question
1	1	How to choose the better performance video call application on tablet
2	2	How to choose the video call application that can run smoothly using 3G connections.
3	3	How to monitor the data traffic during video calling

1.3 Objectives

The main objectives of this project are:

- To analyze and evaluate the performance video call application on tablet.
- To choose the best video call application on tablet.
- To monitor 3G packets traffic using wireshark for each application on tablet during video call.

From the research problem and research question, the research objectives have been create to overcome the problem and question as shown in Table 1.3.

Table 1.3 shows the research objectives.

RP	RQ	RO	Research Objective
1	1	1	To analyze and evaluate the performance video call application on tablet.
2	2	2	To choose the best video call application on tablet.
3	3	3	To monitor 3G packets traffic using wireshark for each application on tablet during video call.

1.4 Scope

Scope of this project will be involved data packet capturing at place that have strong signal 3G by using Digi Mobile Network for calling and received call using Maxis Mobile Network. The operating system for capture packet is Windows 7. The software used is Wire shark 1.8.6 for Windows to capture data packet that are used by video call application on tablet. Ipad 3G will act as modem to be connected to laptop and this laptop will act as Hotspot. IPad Mini Wifi will use that Hotspot to connect to play video call application. Iphone5 will connect to 2nd laptop and this 2nd laptop will acts ast a hotspot. Another ipad mini will connect to this 2nd laptop. Data will capture on both laptop using wireshark and capturing data at Taman Muzafar Syah (Home). The duration video call will take 1 minute (60 seconds). Speedtest for digi and Maxis is around 3 – 4 mbps during video call. Wireshark will start first then video call run and after 1 minute wireshark will stop automatically. The all result show on chapter testing.

1.5 Project Significance

Describe the capabilities of video call application on tablet using 3G networks. This research may benefit user especially the user have limited Internet connection. User can easily choose the best video call application.

1.6 Expected Output

Performance of Video call application on tablet using 3G Networks will be analyzed in this project and a report will be generated to show which the best video call application using tablet on this project.

1.7 Conclusion

There are many application video call have built and there are some application need strong signal Internet to play that application. As a tablet user with 3G connections, users don't know which is the best video call application that can call without lag or delay. With this research we can make the right choice in choosing the best video call apps. We choose the best app not depends by human eyes but we capture the data packet all application from that we do analyze which is the best applications for tablet.

CHAPTER II

LITERATURE REVIEW

2.1 Introduction

A literature review will discuss published paper or journal in particular subject area within a certain time period. It can be just a simple summary of the resource but usually its a combine both summary and synthesis. A summary have a important imformation of the source of paper or journal. The purpose of this chapter is will research about the performance video call application on tablet, and what parameter will use to compare between all video call application. This chapter also will disccuss about meaning of that parameter .

2.2 Facts and finding

Previous journal and paper will be use as a reference for collect data and gather information so that this project will successful. This is to ensure that selection of methodology is a correct on previous documentation. All fact and finding will be discussed in this chapter.

2.3 Domain

Basically every project has it own domain. For this project, the domain is collecting the data and analysis the data that we get. From the data we can compare which the best application video call application.

2.4 Previous Research

2.4.1 Journal 1

There are previous journal that I used for this project. In the previous journal "*Video Calling Over Wireless Networks*"(2012) by David Urban . In this journal there are lot of issue that we get from user that are use video call application on device.

These are the list of issue:-

- I. Disconnects
- II. Long reconnections
- III. Poor video quality
- IV. Long delays
- V. Lack of video and audio synchronzationnn
- VI. Freezing of the video
- VII. Brief distortions of the video display

There are 2 type test was performed by this author which is 720p and 1080p video call using WIFI and also using 3G network. This aurther also say that a succesfull video calling need a good network connection on both user, good processing power in the CPU that are running the application, good camera and display for both users , low packet loss, low latency, low jitter, and also a good video calling application.

2.4.2 Journal 2

For this journal “*Video Telephony for End-Consumers: Measurement Study Of Google+, iChat and Skype*” (2012) by Yang Xu, Chengguang Yu, Jingjiang Li and Yong Liu. These are issue that they focus:-

i. System Architecture

A Natural conferencing architecture is Peer-to-peer (P2P), where users send their voice and video to each other directly.

ii. Video Generation and Adaptation

A source can generate single video version at a rate downloadable by the weakest receiver. One-version design unnecessarily limits the receiver video quality on other stronger receiver.

iii. Packet Loss Recovery

The conventional wisdom is to use Forward Error Correction (FEC) coding instead of retransmission. In video conferencing video has to be encoded and decoded in realtime.

iv. User Quality-of-Experience

The performance of a video conferencing system is evaluated by the delivered user conferencing experiences which are highly sensitive to various voice and video quality metrics such as end-to-end voice and video delay, synchronization between voice and video, video resolution, frame-rate and quantization.

2.5 Parameters

They are key parameters to get successful video call which is data rate, throughput, packet loss, jitter, delay and relays. For this project 3 parameters will use to compare the video call application tablet using 3G network.

2.5.1 Throughput

Typically the throughputs are measured in kbps, Mbps and Gbps. The file sizes measured in bytes which are 1 bytes equal eight bits. To calculate the throughput divide the file size by the time. Throughput are the average rate of successful message delivery over a communication channel. Analog limitations, i.e hardware considerations and multi-user consideration are the factor effecting throughput.

2.5.2 Packet loss

Packet loss is the failure of one or more that transmitted packet to next destination. Packet loss can be caused by signal degradation over the network medium, channel congestion, corrupted packet rejected in transit, faulty networking hardware, faulty network driver and overburdened network nodes. Packet loss Concealment(PLC) is a technology that are to minimize the effect of lost packet in digital communications. Voip used this technology.

2.5.3 Delay

Delay is a how long it can takes for a bit data to travel across the network from one node or endpoint to another node and endpoint. Basically measure in multiples or fractions of seconds.

2.6 Video Call Application

There are many video-calling app in the market. All video call application basically can call using different hardware or operating system. The best option video call is Skype, Facetime, Oovoo, Tango, And Google Video (The best option video calling, 2011) by Mark W.Smith

2.6.1 Skype

Janus Friis from Denmark and Niklas Zennstorm from Sweden founded Skype in 2003. Skype service allows all users to communicate each other around the world by using different hardware. The list of hardware can use is Computer, Mobile, Tablet, Home Phone, TV and PS Vita. At the end 2010, 663 million users around the world are using Skype. In 2011, Microsoft has bought Skype for 8.5 billion USD and the April 2013 Microsoft has shut down the Windows Live Messenger. Now Skype can Video call on Facebook. Skype also has group video call. It also can message and share file of any size. Skype can call to mobile line worldwide at low rate. Skype can install all different OS like Mac, Windows and Linux.

2.6.2 Facetime

Apple CEO Steve Job announced Facetime on keynote speech at Worldwide Developers Conference on June 2010 This application is for iPhone 4. Apple purchased the name of Facetime. On October 2010 Apple has announced Facetime for Mac OS X. This application only works for apple product that runs IOS or Mac OS X. This application only work on Wifi but the newer operating system for iPhone IOS 6 can works on 3G networks. If the smartphone apple has jailbreak there are have app that Facetime can use the network 3G. This app cannot call android or Linux computer. This app also doesn't have a group video call and cannot call mobile phone.

2.6.3 Oovoo

Oovoo was founded by the entrepreneur Claython L. Mathile in 2006. In June 2007 Oovoo for Microsoft has launched. Oovoo for Mac was launched on May 2008. For group video call was introduced on July 2009. Oovoo can run on Microsoft, Mac OS X, Android and IOS. Oovoo allow registered user to communicate around the world. Oovoo also have free user and premium user. For free user oovoo offer video call, web video call, video messaging, and instant messaging and file sharing. For premium user oovoo offer video conferencing, phone call, Desktop Sharing, Video call recording and also file sharing.

Table 2.1 Feature Comparison between Skype, Facetime, and Oovoo.

	Skype	Facetime	Oovoo
Videochat from Windows/Mac OS X	Yes	No(Mac Only)	Yes
Videochat from tablet and smartphone	Yes	No (IOS only)	Yes
Group Video Call	Yes(Premium User)	No	Yes (free up 12 user at once)
Send files	Yes	No	Yes

2.7 Network Analyzer Tools

There are many network analyzer tool in the market. The are 5 free which is Wireshark, Nast, Zenmap, Angry IP scanner, and JDSU network analyzer Fast Ethernet.

2.7.1 Wireshark

Wireshark are the Most Powerful network protocol analyzer on the market. The feature wireshark live capture and offline analysis , standard three-pane packet browser. It Support on multi-platform which is Windows, linux , OS x, Solaris , FreeBSD, NetBSD and many other. It also can capture the network data by using browsed GUI or TTY-mode Tshark utility. Other feature are powerful display filters , VOIP analysis, read/write different capture format, live data can be read from IEEE 802.11 , PPP/HDLC , ATM , Bluetooth , USB , Token Ring, Frame Relay, FDDI and others.

2.8 Conclusion

This chapter basically explains about Literature Review. Literature review can be described about knowledge and ideas to find strengths and weaknesses of the current project. The next chapter methodology will describes briefly about the entire step to run this project.

CHAPTER III

METHODOLOGY

3.1 Introduction

In this chapter it will discuss about Project Methodology for this project. Project methodology is one of important part that is design and develop project. It will show what the methodology and method use in network design to build up the project. Before choose what the methodology for the project, we must do a research that related with the project. These topics also briefly explain about project schedule and milestone and conclusion.

After doing several researches I found that the method that I will use for this project that is traditional project management approach. Project Management are defined as “the application of knowledge, skill, tools and techniques to a broad in order to meet the requirement of a particular project. The process of this techniques and skill are divided into 5 basic stages. The figures below show the 5 basic stages in traditional project management.

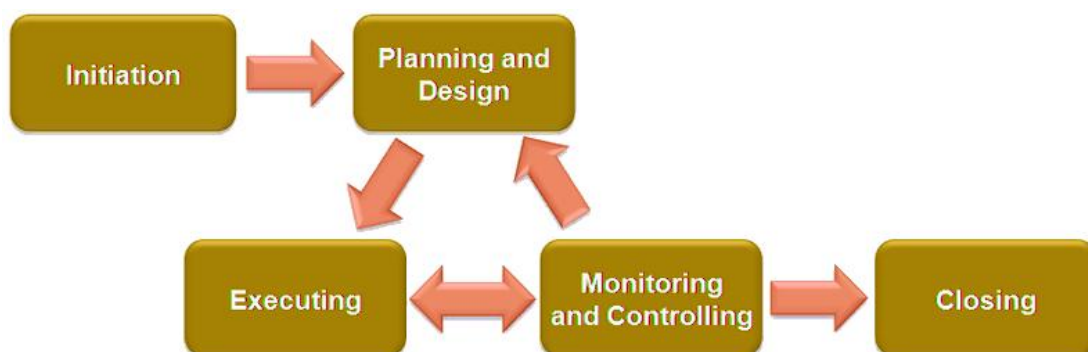


Figure 3.1: The Traditional Project Management Approach Step