PORTABLE WIRELESS CLOUD STORAGE

UMAR ARRASYID BIN AHMAD ZABIDI

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

BORANG PENGESAHAN STATUS TESIS*

JUDUL: Portable Wireless Cloud Storage

SESI PENGAJIAN: 2014/2015

SAYA UMAR ARRASYID BIN AHMAD ZABIDI

mengaku membenarkan tesis (PSM) ini disimpan di Perpustakaan Fakulti Teknologi Maklumat dan Komunikasi dengan syarat-syarat kegunaan seperti berikut:

1. Tesis dan projek adalah hakmilik Universiti Teknikal Malaysia Melaka.
2. Perpustakaan Fakulti Teknologi Maklumat dan Komunikasi dibenarkan membuat salinan untuk tujuan pengajian sahaja.
3. Perpustakaan Fakulti Teknologi Maklumat dan Komunikasi dibenarkan membuat salinan tesis ini sebagai bahan pertukaran antara institusi pengajian tinggi.
4. **Sila tandakan (/)

_______ SULIT	(Mengandungi maklumat yang berdarjah keselamatan atau kepentingan Malaysia seperti yang termaktub di dalam AKTA RAHSIA RASMI 1972)
_______ TERHAD	(Mengandungi maklumat TERHAD yang telah ditentukan oleh organisasi/badan di mana penyelidikan dijalankan)
________ TIDAK TERHAD	

(TANGDATANGAN PENULIS)	(TANDATANGAN PENYELIA)
Alamat tetap:_________________	
	Nama Penyelia
Tarikh:________________________	Tarikh:_______________________

Catatan: *Tesis bermaksud sebagai Laporan Akhir Projek Sarjana Muda (PSM)

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

PORTABLE WIRELESS CLOUD STORAGE

UMAR ARRASYID BIN AHMAD ZABIDI

A project report submitted in partial fulfillment of the requirements for the award of Bachelor of Computer Science (Computer Networking) with Honour

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2015

DECLARATION

I hereby declare that the project report entitled

PORTABLE WIRELESS CLOUD STORAGE

I hereby certify that this report is my own work and are based on law under the rules set forth Universiti Teknikal Malaysia Melaka (UTeM). It is based from the original project was done by me and it is my own work without copying any source except some of the parts each of which had me explain the source.

STUDENT : ______________________ Date: ______________

(UMAR ARRASYID BIN AHMAD ZABIDI)

SUPERVISOR : ______________________ Date: ______________

(DR. NORHARYATI BINTI HARUM)

DEDICATION

Millions thanks to dear father and mother for the support and strong encouragement and motivation throughout this project. They have always loved me unconditionally and whose good examples have taught me to work hard for the things that I aspire to achieve. This project is far complete without them. This project is also dedicated to my family, my siblings, who has been a constant source of support and encouragement during the challenges of graduate university and life. I am truly thankful for having friend in my life. They are the unsung heroes guiding me very step at a time in the time of need and really play a big role for my project who are directly or indirectly in providing ideas and suggestions. All the guidance, advice and guide I will never forget. Hopefully, this project was conducted to get the blessing from God.

ACKNOWLEGDEMENT

A million thanks to **Dr. Norharyati Binti Harum** for helping and guidance me through endless obstacles, Alhamdulillah for one it seem an impossible task of developing an Raspberry Pi based hardware and software even though I never learned to make one, but now it just a small matter. The true success of beating the odds really pushes my knowledge boundary even further. Nothing is impossible.

I would like to express my deepest appreciation to all those who provided me the possibility to complete this report. A special gratitude I give to our final year supervisor, Dr. Norharyati, whose contribution in stimulating suggestions and encouragement, helped me to coordinate my project especially in writing this report.

ABSTRACT

Portable Wireless Cloud Storage is cheap, physically small, power efficient and wireless oriented cloud storage aim at delivering the best possible cloud service to Personal Area Network (PAN) environment. It’s a raspberry pi based project which utilize a small form factor, lightweight and high mobility of a microcomputer compared to ordinary computer. User within the small network coverage can upload and download files and shared the files between each other. There are three cloud storage software in the raspberry pi, two of the raspberry pi are third party software which is ownCloud and Seafile and third one is custom build for this project. The third party software are accessible via web browser on wireless device such as laptop, smartphone and tablet. The custom build cloud software is accessible wirelessly via laptop or computer, it’s a java application which open up a direct TCP connection to raspberry pi making it the fastest cloud storage in term of accessibility, download and upload. Portable Wireless Cloud Storage also include a Kodi Media Center aim for consumer need for media center and cloud integration. User can upload a videos within the network coverage and stream it directly onto the big screen. This project is aim to deliver the best possible cloud storage and media center integration under small package.

ABSTRACT

Portable Wireless Cloud Storage adalah murah, fizikalnya kecil, tenaga efisien dan storan awan berorientasikan tanpa wayar yang bermatlamat untuk menyampaikan servis awan terbaik dalam persekitaran Rangkaian Kawasan Peribadi atau *Personal Area Network (PAN).* Ia adalah satu projek berasaskan raspberry pi yang menggunakan faktor reka bentuk kecil, ringan dan mudah alih sebuah mikrokomputer berbanding dengan komputer biasa. Pengguna dalam liputan rangkaian yang kecil boleh memuat naik dan memuat turun fail dan berkongsi fail antara satu sama lain. Terdapat tiga perisian storan awan didalam Rapsberry Pi, dua daripada perisian tersebut adalah perisian komersial dan pihak ketiga iaitu Seafile dan ownCloud manakala perisian ketiga adalah perisian yang dibina khas untuk projek ini. Perisian pihak ketiga boleh diakses melalui pelayar web pada peranti tanpa wayar seperti komputer riba, telefon pintar dan tablet. Perisian yang dibina khas boleh diakses secara tanpa wayar melalui komputer riba dan komputer biasa, perisian ini menggunakan aplikasi Java yang membuka sambungan terus kepada Raspberry Pi menggunakan protokol TCP sekaligus menjadikannya perisian storan awan yang paling laju dari segi kemudahan akses, muat turun dan muat naik. *Portable Wireless Cloud Storage* turut juga meyertakan sekali pusat media Kodi bagi keperluan pengguna untuk pusat media dan integrasi awan. Pengguna boleh memuat naik video dalam liputan rangkaian dan terus menonton pada skrin besar. Projek ini bermatlamat untuk menyampaikan storan awan sebaik mungkin dan integrasi pusat media dibawah satu pakej.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

SoC	-	System on Chip
USB	-	Universal Serial Bus
HDMI	-	High-Definition Multimedia Interface
OS	-	Operating System
iOS	-	Iphone Operating System
IT	-	Information Technology
NAS	-	Network Attach Storage
SDLC	-	System Development Life Cycle
SD	-	Secure Digital
RAM	-	Random Access Memory
AMD	-	Advance Micro Device
MB	-	Megabit
GB	-	Gigabit
TB	-	Terabit
OTG	-	On The Go
VGA	-	Video Graphic Array
mAH	-	milli Ampere Hour
SATA	-	Serial Advanced Technology Attachment
RPM	-	Round Per Minute
SSH	-	Secured Socket Shell
NMS	-	Network Monitoring Software
PAN	-	Personal Area Network
LAN	-	Local Area Network
WAN	-	Wide Area Network
IP	-	Internet Protocol

HDTV	-	High Definition Television
WiFi	-	Wireless Fidelity
NTFS	-	New Technology File System (Windows NT)
HDD	-	Hard Disk Drive
CPU	-	Central Processing Unit
APT	-	Advanced Packaging Tool
TCP	-	Transfer Control Protocol
SDK	-	Software Development Kit
MBPS	-	Megabit Per Second
KBPS	-	Kilobit Per Second
DTR	-	Data Transfer Rate
HTTP	-	HyperText Transfer Protocol
MS	-	Millisecond
WLAN	-	Wireless Local Area Network

CHAPTER I

INTRODUCTION

1.1 Project Background

A cheap alternative, ultra-low power consumption and portability of a flexible cloud storage is one of the main requirement for this project. A wireless cloud storage that free from constraint by having a wired all around it and the ability to be carry anywhere and anytime. Raspberry Pi is the suitable hardware to develop a small, power independent, portable and lightweight cloud storage solution. Having a hard disk, Solid State Disk or even flash drive with atrocious electric usage and third party hardware might be the thing in the past. Portable Wireless Cloud Storage is the penultimate solution for home streaming, data storage and much more to come.

Raspberry Pi is a small microcomputer created by the head of Raspberry Pi foundation. Eben Upton[1] of the Raspberry Pi Foundation has spent the past eight years trying to produce a $39 (approximately RM170) computer specifically designed to show young people what's inside and to inspire them to write programs to, say, control a microwave oven, manipulate a thermostat, or even create their own video a game. The Raspberry Pi Model B+ [2] is powered by Broadcom SoC running at 700MHz, 512MB soldered on top of the Broadcom chip, 4 USB ports, HDMI port, network port and 3.5mm audio jack. Basically it's a small fully equipped and ready to use small form factor personal computer. Raspberry Pi is also OS independent which mean it can be used on any Linux operating system such Raspbian Wheezy, Debian OS, Turnkey Linux and etc. A small customizable microcomputer combine with open source capability make this electronic a widely known among tech enthusiastic.

Cloud Storage [3] is a service where data is remotely maintained, managed, and backed up. The service is available to users over a network, which is usually the internet. It allows the user to store files online so that the user can access them from any location via the internet which in this case, a physical device that stored a local data via some sort of Personal Area Network (PAN) made entirely from Raspberry Pi microcomputer. The files can be read and stream to devices capable of receiving a wireless signal from the Raspberry Pi. User can browse, read and write the files, audio, video in real-time environment without having the need to connect to internet 24 hours a day, it's basically is an offline solution of Do-It-Yourself alternative to Dropbox, Google Drive and vice versa.

Cloud storage [4] deploy a model of data storage where the digital data is stored in logical pools, the physical storage spans multiple servers (which in this case a single physical hard disk server). Personal Cloud Storage [5] Also known as mobile cloud storage, personal cloud storage is a subset of public cloud storage that applies to storing an individual's data in the cloud and providing the individual with access to the data from anywhere. It also provides data syncing and sharing capabilities across multiple devices. Personal Cloud Storage are type of cloud storage architecture in used for this project, it reflect the suitable need for Personal Area Network (PAN).

1.2 Problem Statement

Table 1.1 show the summary of the problem statement.

Table 1.1: Summary of Problem Statement

PS	Problem Statement
PS1	The commercial cloud storage requires internet connection to remote server to work.
PS2	Commercial cloud storage need to be access from computer which lack of portability and flexibility.
PS3	Subscription model, internet plan and hardware for commercial cloud storage can have a burden to user affordability.

1.3 Project Question

Research Question (PQ1, PQ2 and PQ3) are found based on Problem Statement (PS1, PS2 and PS3). Project question are constructed to identify the problem statement as described in Table 1.2.

Table 1.2: Summary of Project Question

PS	PQ	Project Question
PS1	PQ1	How the offline portable wireless cloud storage can affect the user's commitment to self-sustain cloud storage?

PS2	PQ2	How to develop a portable wireless cloud storage using raspberry pi microcomputer?
PS3	PQ3	Can free, open source and cheap alternative raspberry pi cloud storage solve user's affordability in long run?

1.4 Project Objective

There are three project objective identified for this project which are listed as below and Table 1.4 summarize the objective that can be achieve at the end of this project.

PO1: To study the differences of online cloud storage versus offline portable wireless cloud storage using raspberry pi microcomputer.

This particular study is to shown the fundamental differences between online cloud storage and offline portable wireless cloud storage using raspberry pi microcomputer in term of user's need.

PO2: To develop a portable, ultra-low power consumption and fully wireless capability of a raspberry pi based cloud storage.

This analysis is to develop a portable wireless cloud storage that can be carry around anywhere and access anytime while maintaining a portable form factor and low energy consumption will suffice the user's need for offline Portable Wireless Cloud Storage.

PO3: To validate that the developed raspberry pi cloud storage can perform better than commercial cloud software.

This study is to validate the custom build cloud software against the third party cloud software in term of performance. The performance metric will be measured in term of data transfer rate and response time. Comparison will be made after all the data have been gathered.

Table 1.3: Summary of Project Objective

PS	PQ	PO	Project Objective
PS1	PQ1	PO1	To study the differences of online cloud storage versus offline portable wireless cloud storage using raspberry pi microcomputer.
PS2	PQ2	PO2	To develop a portable, ultra-low power consumption and fully wireless capability of a raspberry pi cloud storage.
PS3	PQ3	PO3	To validate that the developed raspberry pi cloud storage can perform better than commercial cloud software.

1.5 Scope

The scope of this research for this project are focus on:

1. This project will make use of Raspberry Pi microcomputer advantage of physically small, lightweight and form factor to able to use as portable cloud storage.
2. For this project, the raspberry pi must be able to be access, stream and stored data wirelessly across multiple devices.
3. The raspberry pi can be built by anyone with minimal cost and computing skill. Fulfilling the need for Personal Area Network (PAN).