The Impact of Open Source Software on Smartphones Industry

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INTRODUCTION

Recent advancement of information and communication technology on mobile communication has changed the way people communicate, interact, and perform their daily activities. The new era of wireless multimedia communication with smartphones has born replacing the old cell phones. Major players in cell phone industry such as Nokia has lost their market shares and new players such as Apple (iPhones) and Samsung (Android phones) dominate the market.

Smartphones are very handy. Although they cannot replace all desktop or laptop's functionalities, they can be carried around conveniently as multipurpose devices. There are myriad of applications (apps) that can run on smartphones and thousands of new apps are created everyday. The main advantage of smartphones is the ability to connect to the Internet from anywhere, enable their users to have a complete Internet experience, stay in touch with their families, friends and colleagues, checking emails, making reservations, checking the traffic condition and so forth. Travelling with a smartphone is very helpful. With a digital map app, finding a place is much simpler in comparison to using conventional methods. The map can also enlighten us to the location of ATM machines, restaurants, gas stations and others. While traveling, a person with a smartphone can easily navigate his/her way through unfamiliar routes and keep in touch with family and friends through social networking such as sharing photos with *Instagram* or video chatting with *Skype*.

The heart of a cell phone or smartphone is an operating system (OS) as this system controls and manages all resources. Most OSs for cell phones are proprietaries and an attempted to introduce open source OS in cell phones such as mobile Linux was not very successful. However, open source OS for smartphones such as Android have been widely accepted and in fact is a dominant OS for smartphones nowadays. Interestingly, some smartphones vendors that used proprietary OS developed and intent to use open source OS such as *Maemoo* and *MeeGo* (Nokia), and *webOS* (Palm). *Tize*n, an alternative open source OS, has been developed by Samsung, Intel and Linux Foundation. Some old OSS players has released open source OS for smartphones such *Firefox OS* from Mozilla and *Ubuntu Touch* from Canonical.

OSS is free software that provides user a freedom to use, replicate, modify, and distribute for any purpose. Unlike proprietary software where the executable code commercially distributed under a copyright law, the source code of OSS is available and a user has a freedom to modify the source code, creating another version or an extended version of the software.

This article discusses the impact of OSS on smartphone industry. The development OSS and it usage in smartphone will be presented. The competition between proprietary and OSS operating systems for smartphones will be discussed as platforms or operation systems shape the smartphone industry. Future direction will be presented in the last part of this article. The next section will present background followed by a discussion on the development OSS and smartphone platforms in in Section 3. Section 4 discusses the impact of OSS on smartphone industry. Section 5 is the future direction and the last section is the conclusion.

BACKGROUND

OSS is free software that provides user a freedom to use, replicate, modify, and distribute for any purpose. Unlike proprietary software where the executable code commercially distributed under a copyright law, the source code of OSS is available and a user has a freedom to modify the source code, creating another version or an extended version of the software.

Interestingly, though the benefits of OSS are obvious but OSS is still not widely used and accepted in the PC world. Despite some of the hindrance factors mentioned above, some OSS gained wider acceptance, such as Linux, Apache, Sendmail, PHP, MySQL, and Firefox. Linux for example is a very reliable and powerful operating system that can run on less powerful PCs. Remarkably a well-known website, Google, has used Linux servers since its inception. According to Sergey Brin, who was one of the Google founders, said that they decided to use Linux, because it is the most cost effective solution (Schumaker, 2000). The other widely used OSS is Apache, which is a number one web server since 1996. In a survey (October 2012) conducted by Netcraft (2012), Apache still dominates web server over the Internet with market share 58.00%, followed by its main competitor, Microsoft Internet Information Server (IIS) with market share 16.52%. Another OSS is Sendmail, which is the leader in email server. PHP on the other hand is the most popular server-side scripting language. MySQL is a prevailing database management system is a popular OSS database management system. Some software package provide some OSS that normally used together to create powerful application. For example, XAMPP, a bundle of personal web server package consists of Apache, PHP, Perl, and MySQL. Nowadays, XAMPP is available in many platforms, including Linux, Windows, Max OS X, and Solaris.

OSS is always strong in the platform level. This strength prevails in the smartphone world. Smartphones are integration of cell phones and personal digital assistance (PDA) technologies. Cell phones with some features of smartphones were introduced by end of 90s or early 2000 such as Nokia 9000 Communicator and BlackBerry. In fact, Ericson used the word smartphone for its GS88 in 1997 (Yousuf, 2013). However, the major breakthrough was the introduction of iPhone by Apple in 2007 with its proprietary OS, iOS. The mobile phone market was shaken by the introduction of iPhone. By 2008, iPhone with iOS dominated the smartphone market with market share close to 80%. The success of iPhone was followed by the introduction of Android by Google in 2008. The domination of iOS was challenged by Android after one year of its introduction as within few years, smartphone operation system is now dominated by Android, an open source OS, with market share was 79.3% in second quarter of 2013, while iOS is losing its market share, which was 13.2% in second quarter of 2013 (Clover, 2013).

LITERATURE REVIEWS ON OSS AND SMARTPHONES

The history of open source can be traced during early development of large-scale commercial computer in 1950s and 1960s where software was free and came with source code. The source code can be modified and recompiled to improve the software. At this time the software was not considered as a revenue generator, instead software was just a necessary ingredient to make hardware work and provide useful functionalities or solutions so that people are encouraged to buy expensive hardware or mainframes.

The term Free Software (FS) has been introduced by Richard Stallman (Stallman, 2010). He is the one who established GNU Project and Free Software Foundation. GNU General Public License (GNU GPL) has been introduced. This license guarantees that software under this license is free. The term open source software used instead of free software to embrace business world (Perens, 1999).

The open source movement shares the basic principles of Stallman's free software movement. As Stallman (2010) said, "free software" and "open source" describe the same category of software, more or less, but say different things about the software, and about values. He further said, "The Free Software Movement and Open Source Movement are two political parties in the same community."

Open Source Movement has taken different path from Free Software Movement to promote the idea of free software. Notable persons in Open Source Movement such as Eric Raymond, Bruce Preens, Tim O'Reilly and others concerned about an anti-business message from Free Software Foundation (DiBona, Ockman, & Stone, 1999). They agreed that to promote the idea; however, the business world should be embraced. The term "free software" is not business friendly, so

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