ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 3, Special Issue 7, October 2015

Free and Open Source Software Ideology: Case Study

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ABSTRACT: Software is one of the inevitable mechanisms for all operations in today's global scenario. Every application which was developed was customized or holding proprietary ownership. However, there prevail several issues related with proprietary software, such as licensing, agreement levels, cost, resource requirement, attacks, transparency of source code etc. Thus, software which was initially claimed proprietary and operated by organizations has now turned their scope towards becoming open and free software. This is due to moving ahead with technology and to reap the results of best practises available with latest trends in technology. This paper aims to put forth a case study carried out in one of the leading educational institutions which has adopted to use free software by replacing proprietary software. This investigation has brought out the benefits of free software and enables one to go ahead with open and free software wherever applicable in their work force in order to yield the best of technology.

KEYWORDS: Software Development; Free software; Proprietary Software; Open Source software; GLUG

I.INTRODUCTION

Evolution of mankind has led to several inventions and discoveries. Technology is one such frontier which has evolved by the intelligent creation of mankind. Software which is one of the reflections of existence of technology has become one of the vital ingredients of day to day activities of the society.

Generation of computers which is witnessed since 1945 provided platform for various types of software and hardware to get introduced into the arena of technology. Initially, the perception was towards significance of hardware in lieu with software. However, the pace in which hardware grew in comparison with software was not hand in hand. Further, cost of software was considerably low though software took its evolution in a faster mode than that of hardware. However, realization of software importance towards the benefit of human society enabled advancement of technology with emphasis on types of software either generic or bespoke.

Industrial market which was open to share their developments also kept them open to accept changes suggested by general public. This concept of incorporating changes into their products gave path towards introduction of open software system [1].

Nevertheless, software organizations which were prone to the threat of antitrust litigation directed them towardsbringing in cultural change in industry by charging separately for software and services, and ceasing to supply source code which further led to the development of proprietary software. Organizations which were in support of proprietarysoftware gave the ownership to the individual or to company which claimed the software. Thus, the source code is hidden and modification of the software is not allowed. However, proprietary software has several issues which include virus susceptibility, rigid license agreement, poor technical support, extortionist prices, additional expenses, closed source and high resource requirement. Some of these issues were addressed through development of free and open software schemes. A primary strength of free and open source software is its leverage of outside innovation. All are free to use it, evaluate it, repair it, and add new capabilities[5].

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II.RELATED WORK

The dynamic nature of software due to changing demands in the market led the researchers to work upon legacy, maintenance and development activities. Thus, various research publications took its inception.

Accordingly, author of [1] feels that mainstreaming of Free and Open Source Software (FOSS) is one of the most visible changes introduced in the domain of software since last decade. As per authors in [5], the use of open source software has become a part of accepted business strategies. Further,authors of [2] has emphasized on advantages of free and open source software among student community. In their work, they indicated that Free and Open Source Software projects provide a unique opportunity for student learning as projects are open and accessible. Also they specified that students are able to interact with established professional communities in order to contribute and thereby gain knowledge.

According to authors in [3] there are huge differences between the free and proprietary software in development, distribution, improvement and their profit model. They however expressed that restricting the freedom of software may lead to many negative effects, and advocating free software will not result in the lack of human resource, the decrease of efficiency and the reduction of quality in the development of software.

As per authors in [4] even though there is an asymmetric distribution of Information and Communication Technology resources, more specifically between developed and developing countries, the emergence of Free Open Source Software (FOSS) is a means to bridge the `digital divide'.

Author of [6] has mentioned that licenses of open source software (OSS) are quiet various but can be categorised into three namely,GNUGPL (GNU General Public License), GNU LGPL (Lesser General Public License) and MPL (Mozilla Public License). Though there are several licenses, GPL or GPL compatible licences are popularly used. The Author further has suggested that GPL is one of the most effective powers for distribution andhas economic "positive network externality".

As per authors in [7], licensing an open source software (OSS) product restricts its reuse and hence the developer of the product has to consider the impact on reuse when choosing the license. Authors in [8] provide numerous examples of popular open source software, including the Linux operating system and the market leading Apache Web server. They state that developers give away software for a number of reasons which includes developers to give away software and source code in order to get users to sample their creations or to encourage independent programmers to enhance a product.

III.A COMPARATIVE STUDY OF PROPRIETARY SOFTWARE VS FREE AND OPEN SOURCE SOFTWARE

In support to the research which is in favour of open and free software, this study directed towards a comparison between various types of software namely proprietary software, open source and free software in terms of their features. *Table 1.* provides a comparison of the features of three types of above-said software.

Table1. Comparison of Proprietary Software, Free Software and Open Source Software

SL.NO	Features	Proprietary software	Open source software	Free Software
1	Virus Susceptibility	More prone	Less prone	Less prone
2	Licence Agreement	Rigid	Restricted	Flexible
3	Transparency	Closed	Open with restrictions	Completely open
4	Technical support	Poor	Better	Better
5	Resource requirement	High	Low	Low
6	Prices	High	Medium	Low
7	Additional expenses	High	Medium	Low

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Table 1. infers that proprietary software has more drawbacks when compared to open and free software. This is justified by the following reasons.

Feature 1: Proprietary software is more prone to virus attacks than open and free software. This is because there is little to gain and little incentive for a hacker to go through the extra trouble of supporting free software when they could just target Proprietary Software and gain a lot since it has a larger market share. However, with open and free software was not peer reviewed or validated for use. But currently, with the growing importance of OSS, they are reviewed and corrected frequently which has assured less proneness towards attacks.

Feature 2: Licence agreement with proprietary software is more rigid when compared to other two types of software discussed. This is because proprietary licence contains an extensive list of activities which are restricted, such as reverse engineering, simultaneous use of the software by multiple users and publication of benchmarks or performance test. However, Free and Open Source Software's are released under copy left and permissive licenses which provides the freedom to modify and redistribute the software.

Feature 3: Proprietary software is opaque in terms of code transparencysince only user interfaces are provided to work with it. User cannot know the internal processing and other details. While availability of source code enables the user to study, review, share and modify the software in open source which is however distributed in free software.

Feature 4: Proprietary software is providing less technical support than above mentioned software. This is because any technical support required for development of any application demands fulfilment of policy bound restrictions which is left free in other two cases of software.

Feature 5: Resource requirement for proprietary software is high when compared to open and free source software. Rationale is that pre requisites for optimal functioning of an application are generally not included in the proprietary software installation package and need to be installed separately.

Feature 6: Cost to develop applications using proprietary software is high depending on complexity due to inclusion of base fee cost, integration cost, services cost and annual licensing/support fees.

Feature 7: Additional expenses for applications developed using proprietary software is more since it includes upgrade investment and additional package investment which is less seen in open source and almost negligible in free software since these are left open for the general public to develop than porting of components and packages.

IV. CASE STUDY

The knowledge thus obtained from the above sections has motivated to carry out investigation of impact of open and free software over proprietary software. Thus, this paper put forth a case study which is carried out in one of the leading educational institution where proprietary software is replaced with free software to carry out specific applications.

The education institution which is under investigation is having a legacy of more than 50 years and providing educational opportunities to all the sectors of education in Karnataka, India. The institution is running with maximum intake for all fields of educational domains and comprising of student community across the globe. Due to the above said reasons, this institution march towards pace with technology and hence initially several educational oriented applications were run using proprietary software. However, due to emergence of open and free software, this institution further restructured some of their applications using free software.

One such case where proprietary software is replaced with free software is the operation of applications through GNU/Linux Users Group (GLUG). GLUG is an organisation, which was started to promote the Free Software Movement and its ideology under the guidance of Free Software Movement Karnataka (FSMK).FSMK is a non-profit organisation working towards the Free Software Movement started by Richard Stallman through the GNU project initiated under Free Software Foundation (FSF).

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This investigation took its inception during 2014 where a comparative study is made between free software and proprietary software. In order to carry out this task, a series of interviews were conducted with staff, students and administration section which were operating their functionalities using traditional software. Further, template was generated to ask questions and answers were collected as a data store for inference to this investigation. Having obtained the data set, analysis was carried out to draw the inferences.

It was noted that since 2014 all educational associated applications such as learning to install or download or even to customize operating systems were a challenge and issue to student community. However, ever since the institution moved towards using of free software through GLUG, it was found that either to download, or install or customize applications, operating systems, learning of tools etc were made possible and an easy task.

Table 2. provides a template used for data collection which is sampled of such cases which were studied during this investigation purpose to prove the advantages of free software over proprietary software that was conventionally used before to 2014.

Table 2. Sample Template to Compare the Impact of Proprietary Software Usage Verses Free Software Usage

SL.NO	Application	Windows	Ubuntu	End-user choice
1	Image editor	Photoshop	GIMP	GIMP
2	Server	WAMP	LAMP	LAMP
3	Database	Oracle	MySQL	MySQL
4	Text Editor	Notepad	Gedit	Gedit
5	Office tools	Microsoft office	Libre office	Microsoft office
6	Media player	Windows media player	VLC	VLC
7	Graphics	Maya	Blender	Blender

Table 2. infers that the institution has operated using Photoshop for image editing purpose through Windows operating system. However, this was replaced with GIMP by using Ubuntu operating system. The reason for replacement is that GIMP is freely available. Further, it was found to be easy and simple for all sections of end users to operate upon image editing purposes.

Additionally, *Table 2.* indicates that the institution moved ahead with use of LAMP in place of use of WAMP for Content Management System (CMS). This is because LAMP was cost effective and easy to configure as per the end users requirements.

Table 2. Also infers that the institution adopted MySQL database in place of Oracle database. This changeover was due to low cost and high performance for developing educational applications. MySQL was found to be easy and simple to install and configure.

The institution operated Notepad as the primary text editor which was replaced withGedit which provides a better interface and supports multiple programming languages.

In addition, the institution used VLC as a substitution to Windows Media Player. This is because VLC supports multiple file formats, provides more options to manipulate sound and also supports media broadcasting.

Table 2. Alsoinfers that the institution earlier developed graphic applications using Maya. Since, the modelling workflow in Blender is easy to understand and it also provides a better platform for rendering process compared to Maya, Blender was adopted by the institution for the development of Graphic applications.

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This case study does not provide a judgement on the free and open source approach but exposes the fact that a project which is free and open source does not provide a precise description of the approach used to support the project. This comparison purely proposes the ideology of Free and Open Source Software.

V. CONCLUSION

Software has undergone a remarkable evolution since its inception.One such instance where evolution has occurred is with type of software in terms of ownership and licensing actions. Initially, proprietary software which was the only option for the stakeholders were later replaced by open and free software. This is due to the issues regarding proprietary software which created a need for more flexible software which led to the development of free and open source software.A comparative study reflects the benefits of free and open source software over proprietary in terms of virus susceptibility, licence agreement, transparency, technical support, resource requirement, prices and additional expenses. With these pre-requisites, an investigation was carried out in one of the leading educational institution in order to explore the strengths of open and free software verses proprietary software. Theinvestigation results indicate flexibility and easiness in developing applications with free software in lieu of proprietary software.

ACKNOWLEDGMENTS

Authors would sincerely like to acknowledge the educational institution that has enabled us to carry out this research over a period of one year as per the Non Disclosure Agreement. Authors would further thank each and every personnel who have helped during this span of research endeavour.

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BIOGRAPHY

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