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Challenges in Open Source Software: Implementation in Government Sector

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Abstract: Open-source software (OSS) is an approach in which software is made available with its source code and an open-source license. Here the owner supplies definite rights to alter and distribute the software free of cost to anyone and for any purpose. Need for the use or implementation of open source software in government sector is increasing. The use of open source software posses' different angles & multi views to understand. Understanding of different terms related to open source or having same meaning but used in different context is essential to describe Open Source Software. This study focuses on issues related to its licensing, need of open source software, open source software in Government and its challenges along with recommendations will be explored; finally study will concluded.

Keywords: Open Source, Open Source Software, Challenges in Government.

1. INTRODUCTION

The term free software and open source software (OSS) are used interchangeably serving the same purpose, liberty to run, copy, distribute, alter/modify or improve the software. Free software foundation is the owner of the term "free software" while open source software are managed by Open Source Initiative (OSI). Open source or free software does not mean zero (0) cost or free of cost but it's all about freedom to use, such as (Free Software Foundation, 2013)

- Freedom to copy the software / source code.
- Freedom to distribute the software / source code.
- Freedom to study the software / source code.
- Freedom to bring changes to the software / source code.
- Freedom to improve the software / source code.

To qualify software in free category, it must provide one or all of the above mentioned freedoms; otherwise software will not be qualified in free category. One other important scenario does exits, which is application of this free software. If program B is written based on program A, which is free in nature; then do we need to consider program B as free or not? We have to understand the market strategies in order to understand program B is free or not; for instance we have to assume that program B is not. As program B has freedom to bring changes in source code along with freedom to improve source code.

The discussion of different licensing schemes used in open source world will help in selecting proper software for the organization use. Why open source software should be used? it is a value added and read worthy discussion. Going through issues or concerns and their perspective solutions related to open source software will lead towards improved confidence and trust over open source software. Section 2 will discuss licensing issues; section 3 will explore the need of open source; section 4 will introduce open source in Government; section 5 will discuss challenges of open source software in Government sector; section 6 will suggest recommendations; and finally conclusion and future work.(Phil, 2006) Developer Guide to Open Source Licensing).

2. SOFTWARE LICENSING

In a broad view, the licensing scheme could be divided into two main categories (Phil, 2006) Developer Guide To Open Source Licensing).

- Closed source or propriety software: Software come under this category does not allow the user to copy or distribute the software. The software may have its source visible, but not allowed for distribution.
- Open source or free source software: Open source and free software are same while serving the purpose but hold a slight difference in terms of licensing. In case of free software, any software that makes use of free software code must be free also but in case of open source it is not necessary. So we can say that free software is an open source but open source is not necessary to be free software.

The open source licensing could be further expanded to "Copyleft license" and "Permissive" or "Non Copyleft" license. "Copyleft" refers to licenses that allow copied works and require this work to use the same license as the original work. Most commonly used

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copyleft license is GNU GPL (General Public License). The example of permissive license is BSD (Berkley Software Distribution) license (Open Source Initiative, 2013).

3. NEED OF OPEN SOURCE

To understand the importance of using open source software we must need to know the issues with closed source (propriety) software. Following are the major issues find with closed source software (Abrar and Andy 2008)

- Dependency on proprietor: Propriety software is controlled by owning company and there is no way out other than waiting for their scheduled updates or bug fixes.
- Do not meet all the needs or requirements: There are a lot of service specific features and required flows that vary from organization to organization and cannot be standardized to be made the part of standard propriety software.
- Unwanted features: Propriety software comes with standard features, which are not the requirement of all the organizations and make the system complicated for use e.g. United Arab Emirates (UAE) is a tax free country but all the accounting software or known ERPs come with this feature.
- Required features cannot be added: The nature of business and services offered changes from organization to organization and so are their way and kinds of reporting but in closed source one will stick to all that is provided by the proprietor and one cannot mold the software according to one's business needs.
- Contractual support: The support for all the propriety software are contract based for a certain period of time and the levels of support are defined through service level agreement.
- Forceful up gradation to new version: By stopping the support for older versions one will always be forced to upgrade to a newer version even if users are happy with older version.
- Security threats: Several updates will be pushed on to the system without providing the complete or exact details of the updates or some time the data will be collected and pushed back from its system without bothering to inform user(s).
- Cannot be translated to local language: Closed source software cannot be translated to local language other than provided by them.

4. OPEN SOURCE SOFTWARE IN GOVERNMENT

The factor of great concern & interest in the "future of open source" survey 2013 is that a number of people who responded believed that open source software will more impact on public sector than other sectors. **(Fig.1)** below shows the survey results (David 2013),

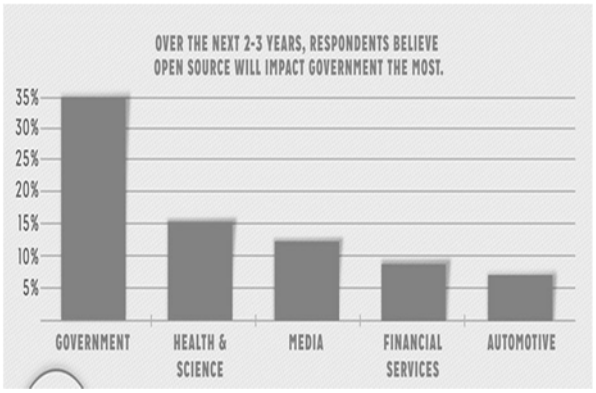

Fig. 1: Future of Open Source Survey 2013 (Result)

Recently effective from April 2013, a beta version of new "Government Service Design Manual" was released, describing the standards that must to be followed by all new digital public services developed across Whitehall (Bryan 2013). On the one end the Dutch government is going to adopt open source software as a solution for the development e-ID card system (Gijs 2013), and on the other hand Extremadura, a self-governing region, in the government of Spain has started switching their desktop computers applications to open source (Gijs, 2013). Besides these efforts, the Swiss government is conducting studies on the possibilities of obtaining the open source services resembling the approach followed by Sweden's public administrations. The translation of open source procurement into German language is funded by FITSU (Federal IT Steering Unit) of Swiss government (Gijs 2013), The White House's update in their website and adding the resources section for developer is an up-to-date approach for citizen developers to link with the tools they required to get access to government data. The developer resources section is more than a simple technical reference post, the White House stated that "*We believe in using and contributing back to open source software as a way of making it easier for the government to share data, improve tools and services, and return value to taxpayers*" (Mark, 2013).

5. CHALLENGES OF OPEN SOURCE SOFTWARE IN GOVERNMENT

Following are identified as challenges of Open Source in Government sectors (Jeremy and Neil (2013) Familiarity with open source solutions: Because of no or very less marketing of open source software the majority of the Management including IT management are not familiar with open source solutions, their features, usage and availability.

- Legal concern with licensing: Selecting a licensing scheme of open source software is of more concern and need a little more technical understanding of different types of licenses. One should know their rights for the source code they are using. Software license is not necessary to be a contract but still we have copyright to protect our work.
- Deployment Complexities: Platform incompatibility and non-availability of support for new technology and hardware can lead deployment complexities.
- Versioning control: Different programmers participate from different parts of the world to develop open source software or add features to existing software which make it complex to control the versioning of the software.
- Quality control: Un-availability of a dedicated quality assurance team leads to compromise on quality of the software.
- Interoperability: The main strength & most challenging part of open source software is interoperability. Integration of an open source software into current system is a major concern, either the open source software will be integrate-able into the existing system or not and up to which level it is interoperable? are the main concern.

6. RECOMMENDATIONS

Following are identified as recommendations to overcome above mentioned challenges of Open Source in Government sector (Patrice-Emmanuel Schmitz, Unisys Belgium, 2001), (Kevin 2011), Steve Parks, Open Source Security For Government, 2013).

- Training: To develop in-house technical skills an important part of working on open source policy and for this proper training is required. If the numbers of technical staff are less, their training is not a big deal but a bigger number is a point of concern to be addressed. Once organizations have enough trained engineers, then educating everybody about the policies and making sure they're following the process become increasingly difficult. This is highly recommended point of concern.
- Awareness: Popularity of Open Source Software is increasing with the passage of time but plenty space for its growth and ambiguities are still exists. Sincere efforts are needed to be made and sound step must be taken to increase awareness among higher management and technical staff. The public sector of Singapore is a good example in this regards.
- IT Security and Audit: Bad things will happen or one must expect it to happen but can minimize the risk by proper management. Software is big and complex, it is difficult to evaluate all the software but security enforcing function must be evaluated properly. In open Source Software lack of development and common infrastructure standards can be a cause of security vulnerability but implementing IT Security standards and proper audit can assure the maximum security required.

7. CONCLUSION

To play an important role in public sector open source approach requires growing and getting mature. Meanwhile open source experts and consultants can fill the gap of large public organizations requirements, by providing ad hoc and/or hybrid solutions. The limited capabilities of the mostly public sector organization towards open source approach in a few countries looking well organized and well represented, they are trying to organizing themselves, but it is fact that they are still growing and getting mature. It is clearly understood that there is still a lot of work to be done in the public sector open source market and this situation appears to be heading towards right direction. Open source markets in most of the countries are still deficient, but the good news is that the infrastructure is now in place. Flexible rules and policies are bringing up. Implementation, however, still needs a lot of efforts and a change in attitude towards adopting open source is most important.

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