

# Study of Open Source Software Movement

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## ABSTRACT

The term 'software' was coined by John W. Tukey and he used it for the first time in 1958 in his article published in The American Mathematical Monthly (1958). However, the idea of software was devised by Alan Turing (1936) during his presentation on Turing Machine. Earlier, terms like 'computer program' and 'code' were in use. Cerazzi defines software as "a single entity, separate from the computer's hardware, that works with the hardware to solve a problem." The early software, the so called 'computer program' and 'code', were installed or programmed in the computer during their configuration and it was a herculean task to change, delete, uninstall, and reinstall software on computer. In fact, initially software was part of computers and were not available separately. Computer manufacturers used to sell computer and software as a single entity.

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## 1. Introduction

The term 'software' was coined by John W. Tukey and he used it for the first time in 1958 in his article published in The American Mathematical Monthly (1958). However, the idea of software was devised by Alan Turing (1936) during his presentation on Turing Machine. Earlier, terms like 'computer program' and 'code' were in use. Cerazzi (2003, p. 80) defines software as "a single entity, separate from the computer's hardware, that works with the hardware to solve a problem." The early software, the so called 'computer program' and 'code', were installed or programmed in the computer during their configuration and it was a herculean task to change, delete, uninstall, and reinstall software on computer. In fact, initially software was part of computers and were not available separately. Computer manufacturers used to sell computer and software as a single entity. But in 1968, with the intervention of the US government, computer manufacturing companies were forced to sell software as a separate unit (Cerazzi, 2003, p. 106; Kely, 2008, p. 119) and thus, emerged the computer software industry. However, the real growth of software industry was observed only after the invention of microcomputers in mid 1970s, which brought the computer on the desk of the people. 1990s observed development of Web and Windows system software that tremendously increased the use of application software with Windows. However, the history of software is very extensive and complex, this chapter would concentrate on the development of open source movement with special reference to the software in use for library and information management.

## 2. Beginning Of Open Source Movement

In the beginning, there was no existence of proprietary software or shareware/free software. Software were nothing but codes to perform a particular task on the computer and were available with computers in source code (Daffara & Gonzalez-Barahona, 2004; Chudnov, 2007). These codes were frequently used by educational institutions to study them. Customers were also able to modify them as per their needs as in the case of open source software, hence, there was no difference between the user and the programmer. At the launch of the 701, the first

commercial computer by IBM in 1952, there was no difference between hardware and software, all computers had been sold with software of one kind or the other. These softwares were free software with the code. Richard Stallman (2002) also discussed about a software sharing community which was in existence in 1970s to share and help the users who were facing problems or bugs in using operating system ITS (Incompatible Timesharing System) developed by MIT.

## 3. Open Source Movement And Libraries

### 3.1 Computer Application In Libraries

The development of computer application in libraries has been experienced since late 1950s and early 1960s to automate administrative, user and technical service functions. However the idea of an integrated library system was generated long back by Venn ever Bush (1945) in his paper 'As you may think which later realized in the form of COMIT, a programming language to retrieve a particular string of information, by Dr. Victor Yngve and others at MIT Lab in 1957 (Yngve, 1958). Another presentation by Herley E. Tillitt (1970), entitled "An experiment in information searching with the 701 calculators" at an IBM conference at Endicott, New York in 1954, also evidenced the existence of information retrieval program. Tillitt, a working professional at US Naval Ordnance Test Station (NOTS), applied library computerization that motivated the world to use computerization in libraries.

1960s witnessed the development of MARC (Machine Readable Catalogue) after the several efforts of Library of Congress. MARC is still very prominent cataloguing standard worldwide.

### 3.2 Emergence Of Open Source Library Systems

There were some free tools in existence for libraries. Most of them were developed by OCLC and Worldcat which were distributed free to its member libraries but were out of reach to non-member libraries (Clarke, 2000, p. 31). A free cataloguing utility named CDS/ISIS (Computerised Documentation Service / Integrated Set of Information Systems) and later renamed as WINISIS (Windows Integrated Set of Information Systems) was

developed by UNESCO in 1985 and distributed to libraries worldwide for free through their website.

The free software movement or open source movement was already in the lime light in 1980s nonetheless, libraries were still away from the concept of free software. During this decade UNIX was already installed on computers while Linux was about to be born. During late 1980s concept of free software was taking momentum and commercial vendors were looking towards free software as an opportunity to accomplish their commercial goals. This resulted into establishment of Cygnus Solutions, the world's first open source software company by Michael Tiemann with the help of David Henkel-Wallace and John Gilmore. Tiemann found business opportunities in open source as he states:

"Open Source would unify the efforts of programmers around the world, and companies that provided commercial services (customizations, enhancements, bug fixes, support) based on that software could capitalize on the economies of scale and broad appeal of this new kind of software." (Tiemann, 1999)

By late 1980s and early 1990s the whole world had been looking at FOSS as an approach to save their money to be invested on commercial software or FOSS as a business strategy itself. However, libraries did not turn towards it before late 1990s; instead, there were some proprietary software which were using open source software as a component of their ILS.

### 3.3 Advocacy of Daniel Chudnov to Open Source Software in Libraries

In most of the possibilities, Daniel Chudnov, the most well-known advocate of the open source software in libraries, drew the attention of library professionals towards open source software through his historical writing 'Open Source library system: getting started' in February 1999 on a website (<http://www.oss41ib.org>) created by him to provide open source software to library professionals (Morgan, 2012; Clarke, 2000). In August, 1999 he republished it in 'Library Journal' with modified title 'Open source software: the future of library system', that had done enough to bring the term to the attention of library community (Chudnov, 1999a).

Daniel Chudnov (1999b), in his writing encouraged the library professionals to draw their attention towards open source software by elaborating the benefits of open source software and equalizing the philosophy of librarianship and OSS. He suggested that using open source software the libraries can cut the costs involved in development and management of proprietary software in library as well as the libraries could modify the codes as per the requirement of the library. He says "We are an educational institution, and we are here for people to learn about computers. That should include learning how the software on this computer works.... Libraries should actively discourage the concealment of generally useful knowledge, and that includes proprietary software." (Chudnov, 1999b).

### 3.4 Dissenting Voices to Open Source Software in Libraries

This writing of Chudnov led to several reactions towards use of open source software in libraries, some of them supported OSS while a few perceived OSS as "still only a distant possibility" (Breeding, 2002). Marshall Breeding (2002) produced his arguments why OSS in libraries could not be a reality soon:

- A movement of libraries, including Library of Congress, from self-developed ILS to proprietary software ensured that they do not have resources to develop and maintain library automation system. Then how one can expect development of an OSS.
- Proprietary ILS developed by commercial vendors are result of research of more than five years and their software are having program codes of millions line. They have great teams of computer programmers and development of an OSS is a million dollar project. It is hard to see that even a large library would have all these facilities to develop a large scale ILS.
- Technology is developing so fast that even commercial ILS developers with their great teams find it difficult to cope with the demands of libraries. Hence how a team of open source developers with their limited resources could meet the ever rising expectations of library professionals.
- A number of OSS enthusiasts are present but very few library administrators are ready to take risk of strategic reliance on OSS. Libraries lack the ability to fund the programming staff for their commercially-supplied system, and much less towards the development of OSS.

### 3.5 OSS as an essential aspect for the development of library services

Draft Report (Digital Library Federation, 2001) of Digital Library Federation (USA) did observe OSS as an essential aspect for the development of Library services. The report puts their findings as under:

- OSS is an economical alternative to libraries' reliance upon commercially supplied software.
- OSS is essential if libraries are to develop software and systems that meet their patrons' needs.
- OSS ensures that library systems and online services will be more functional for libraries and their patrons and as such be good for library patrons.

Roy Tennant (2000) saw the opportunities in OSS but he felt that "unless the OSS application is a well-developed and stand-alone application such as the Apache web server, use of OSS will mostly occur in large libraries (of all types) that are more likely to have staff who can install and maintain the software". Similarly, Muir (2005) accepted that OSS is beneficial for libraries from the financial point of view and it gives opportunities to the libraries to modify them according to the need of the library but at the same time he raises doubts as to the availability of technical expertise and support in the long run to contain any bug or error. This turns out to be its single most drawback.

There are software which are developed purely on free and open source platform and the users need not spend even a single penny for these. Using free and open source software, one can easily provide high level technical facilities to the users and make the library automated.

### 3.6 OSS4Lib AND CODE4Lib

Development of OSS in LIS was started for tiny LIS tools by distributed efforts of libraries spread over different corners of the world but today it has integrated as a crusade at International level and approach of the library professionals toward open

source software can be considered as a movement in the field of Library and Information Services. Today for almost every function, an open source application exists. OSS4Lib and Code4Lib are two major websites and communities that are dedicated for the development and distribution of OSS for the use of libraries. OSS4Lib was developed by Daniel Chudnov in 1999 with the mission to “build better and free system for the use of libraries” (Chudnov, 2005). This site maintains the list of the, programming languages, and protocols and standards for libraries and keep track of the news of OSS in libraries. OSS4Lib has listed over 500 library specific application under more than 15 categories for various functions of libraries. These applications are (as on 23rd May 2013) listed under following categories:

- ADA (1)
- Bibliography (63)
- ILL-DD (19)
- ILS (67)
- Image Processing (15)
- Information Retrieval (47)
- Library Administration (12)
- Metadata (56)
- OPAC (92)
  
- Readers' Advisory (30)
- Reference (13)
- Repositories (39)
- Reserves (7)
- Resolvers (5)
- Text Processing (19)
- Training (4)
- User Access Management (12)
- Workstation Management (5)

(OSS4Lib, n.d.).

Code4Lib was initiated by a group of library programmers in 2003 with an objective “to providing a harassment-free community experience for everyone regardless of gender, sexual orientation, disability, physical appearance, body size, race, or religion” (Code4Lib, n.d.). Code4Lib also organises annual conferences on OSS since 2006 and continues it till now.

## 4. OSS Projects For Libraries

### 4.1 Open Source Library Management Systems

#### 4.1.1 Koha (Open Source ILS)

Koha, claimed to be the first open source library management system, traces its origin to the 1999 in New Zealand. Koha is a result of the frustration of the library professional with the commercial library management system. A group of public libraries of Horowhenua Library Trust (HLT) in New Zealand felt the need to change their commercial ILS, Catalyst, as it was not complemented with Y2K6 issues. The library was not able to do anything with the software as it was a

closed source software and they were forced to replace their ILS with a new ILS. The other problem with Catalyst was that it depended on modems to maintain their network which was increasing their telephone line cost (Ancil & Beheshti, 2004).

Initial release of Koha was enough for HLT libraries though it did not have several features such as Z39.50 and MARC. After publishing its release on Koha’s mailing list, people around the world started showing their interest in it. Some school libraries in Coast Mountains School District of British Columbia in Canada started using Koha with the help of Steve Tonneson, the network engineer of the district. The worldwide interest in Koha rose only after its adoption by Nelsonville Public Library (NPL) in Ohio, USA. NPL also funded to develop Z39.50 and MARC feature in Koha to make it more advanced and viable. Slowly and gradually a number of libraries moved to Koha from closed source software. The constant move of libraries towards Koha also generated the opportunities for commercial vendors to establish themselves as Koha technical supporter. Some of the commercial vendors are Koha Water Solutions, Liblime, and Equinox. Presently Koha is running in its 3.10.6 version.

#### 4.1.2 Avanti

Avanti10 is the earliest started project on an open source ILS by Peter Schlumpf in 1998. Nonetheless the project had very small success until the end of 2004. This is what gave chance to Koha to be acclaimed the world’s first open source ILS. Avanti is dependent on a single man’s effort as it does not have any supporting community of developers. By the end of 2008 it could have only a cataloguing and patron accessible catalogue module. Its capacity is limited and it is configured to catalogue and search up to 16,000 titles and 32,000 items (Schlumpf, 2008). The programming language of the software is java and it is compatible to run on Linux and Windows. However it failed to fascinate library community and no library has reported using Avanti MicroLCS (Ancil & Beheshti, 2004).

#### 4.1.3 Evergreen

Evergreen, another promising open source ILS project, took its way in 2006 at Georgia, USA. Georgia Public Library Service (GPLS), is a unit established by University System of Georgia with the objective to “empowering libraries to improve the life of Georgians” (Georgia Public Library Service, 2013) through dissemination of information and encouraging reading, learning and education with their continuing support and improvement of Georgia’s public libraries. They provide excellent information services to people and support the libraries through various programs. One of those is PINES (Public Information Network for Electronic Services). PINES provides automation support to the libraries all over the State. As on 15th January 2013, PINES has been providing its services to 281 public libraries in Georgia. The main feature of PINES is that a user registered at any library may borrow items from any public library in PINES Network (Georgia Public Library Service, 2013).

#### 4.1.4 NewGenLib

NewGenLib, perhaps is the first effort to develop an ILS from a developing nation like India. NewGenLib (New Generation Library) first came into existence in 2005 with the joint efforts of Kesavan Institute of Information and Knowledge Management (KIIM) and Verus Solutions Pvt. Ltd., both based

in Hyderabad. The initial releases of NGL (NewGenLib) was commercial and was not available free of cost until 2008. On 9th January 2008, both the partners decided to make NewGenLib as an open source software under GNU's General Public Licence. KIIKM is the primary source of finance for the development of NGL while Verus Solution took the responsibility to develop and promote it by engaging professional programmers. Verus Solutions provides technical support to install and make the software active at libraries willing to adopt NGL through online community and using desktop sharing systems. If the library wishes to have onsite support, NGL also has a provision for commercial onsite service. A number of libraries in India are using NGL. Verus Solutions is actively working on the development of NGL. The current version of NGL is 3.0.4 R2 that can be downloaded through their website.

#### 4.1.5 Others

A number of other open source ILS projects were in existence but many of them either could not be successful or could not be completed at all. Some of these projects are Openbiblio, OPALS, PhpMyBibli(PMB), Emilda, Invenio, Learning Access ILS (LA ILS), iVia, BiblioteQ, and ABCD. Openbiblio originated in 2002 in Spain with efforts of Dave Stevens and it is still under active development. Openbiblio has all modules required in a general ILS such as OPAC, cataloguing, circulation, patron, and reports. It is very much popular in small and rural libraries of Spain, Chile and surrounding areas. Openbiblio is recommended for those libraries which do not have possibilities to reach beyond a collection of 50000 volumes and those which do not require much advanced features. This software can be installed either on Linux or on Windows.

## 4.2 Open Source Digital Library Software

### 4.2.1 Greenstone

Greenstone is world's first open source digital library software developed in New Zealand at University of Waikato. The roots of Greenstone development were traced to the establishment of New Zealand Digital Library Project in 1995 with an initial collection of 50,000 documents. This project was supported and funded by the New Zealand Lotteries Board and operating funding from the New Zealand Foundation for Research, Science and Technology (Witten & Bainbridge, 2007). With New Zealand Digital Library Software, a fully searchable CD ROM Database could be produced. After production of CD ROM database for an NGO, The Zealand Digital Library Project team also produced a CD ROM Database for UNESCO. By the end of 1997, the software was renamed as 'Greenstone' which is valued more highly than gold in Maori language. In addition to that, it was released as an open source software under GNU GPL licence. The initial open source release was distributed in 1998 at greenstone.org (Witten & Bainbridge, 2007). Greenstone is a full-fledged Digital library software with the capacity to create a digital library on Internet, Intranet and produce a CD ROM based database. The development of Greenstone is undertaken by University of Waikato, New Zealand and it is promoted by UNESCO. The current version of Greenstone is version 3.0.

### 4.2.2 Dspace

Dspace is another open source digital library project. Dspace is designed to capture, store, index, preserve, and redistribute the digital literature. The idea of Dspace was born in MIT libraries in 1997 when the need for a digital library software was noticed. This need raised conversations among MIT librarians and finally in a meeting with Hewlett Packard Labs in 2000, a contract was signed for software development plan. The 1st version of Dspace was released after the signing of this contract in 2002. It was released as an open source digital library software under BSD licence. Dspace is a very simple and effective digital library software which even a non-technical person can manage effectively. It follows all major international standards such as OAI-PMH, Dublin Core, and CNRI etc. In less than one decade, Dspace became very popular among libraries throughout the world. As on 15th June 2013, 1450 users have been registered on dspace.org (DSpace, 2013) while according to OPENDOAR it is mostly used by open source digital library software in the world (OpenDOAR, 2013). Current version of DSpace is version 3.1.

### 4.2.3 Eprints

Eprints is another enthusiastic open source digital library project started by Steven Hamad. Eprint came into existence in 2000 as an outcome of Santa Fe meeting in 1999. Eprints is developed by University of Southampton, UK and released under GPL Licence. Similar to DSpace it also supports OAI-PMH and other international standards. Presently it is ranked among the most widely used open source software.

### 4.2.4. Others

Besides the above widely used open source digital library software there are several other projects available for digital library creation. These are CDS- Invenio, DoKS, Fedora, MyCoRe, and SOPS (SciX Publishing Services). CDS-Invenio20 (CERN Document Server - Invenio) earlier known as CDSware is a project of CERN laboratory released under GNU General Public License in 2002 to run CERN Database Server. DoKS21 (Document and Knowledge Sharing application) is another open source digital library software project initiated by Katholieke Hogeschool Kempen (KHK) with an objective to develop an application to organise electronic thesis and curricula vitae of students of Flemish University Colleges, Belgium. The project took its way in 2002 and funded by Institute for the Promotion of Innovation by Science and Technology in Flanders, private industry partners and non-profit organizations (Baccame, 2007). The current version of DoKS is 1.4.1. Another project on open source digital library software is Fedora22 developed at Cornell University with the financial help of DARPA and NSF. The first version of Fedora was released in May 2003. Fedora is repository type digital library software that is capable to store and disseminate several types of electronic documents to the user. Similarly, MyCore23 was released in 2004 at Essen University, Germany and SOPS24 was also released in 2004 with the financial help of European Commission (EU). However, the open source digital library software which are used comprehensively all over the world are DSpace, Greenstone and Eprints.

## 5. Conclusions

OSS has become an inevitable reality not just in library but any type of organization and even in daily lives of people. The widely used open source software is GNU/Linux operating system which is used by almost every individual who uses Internet because all major applications used by people today use Linux as operating system of their servers such as Facebook, Google, Amazon, etc. Apache Web Server has been used by maximum number of websites in the world and has beaten all commercial web servers. Its nearest competitor is Microsoft Web Server. Among Web Browsers also, open source software is leading with Firefox and Chrome.

OSS have proved efficient in every aspect such as price and support. Every open source software is supported through more than one community and through their developers as well. Most of the time the participants of the community are users of the software who are experiencing the software, hence, the bug finding and offering solutions are quicker than a commercial vendor. The new users get support from the community and soon get ready to support other new users. However, without good supporting communities it is difficult for OSS to develop. A

few examples of such software are Avanti, PhpMyLibrary, Openbiblio, Emilda, etc.

Another benefit of open source software is that it is continuously under development; thus users can avail the latest features. Yet another very important benefit of using open source software is that it does not bind anyone to continuously use it. It gives freedom to migrate to any other software any time which is not an easy task in case of commercial software.

Continuous involvement of library professionals in open source software installation and its use helps them in becoming aware of the complexities of information technology and in comprehending the intricacies of software used in library automation. Some information professionals gain considerable expertise of software by using open source software that they themselves could develop or support the development of an open source software by way of providing programming help, bug finder or through helping other installations. Open source software is a philosophy and it joins the people around the world in a chain where each one is connected and supported by others. Lastly, it could be said that in open source world each one is a user, developer and programmer who supports this movement to the best of his/her capabilities.

## References

1. Chudnov, D. (1999a, February 01). *Open Source Library Systems. 'Getting Started*. Retrieved May 09, 2009, from oss4lib: <http://oss4lib.org/readings/oss4lib-getting-started.php>
2. Chudnov, D. (1999b). Open Source software: the future of library systems? *Library Journal*, 124(13), pp 40-43.
3. Chudnov, D. (2005, November 1). *about oss4lib*. Retrieved May 20, 2013, from oss4lib: open source systems for libraries: <http://www.oss4lib.org/about>
4. Chudnov, D. (2007). The future of FLOSS in libraries. In R. S. Gordon (Ed.), *Information tomorrow : rejections on technology and the future of public and academic libraries* (p. 19). Medford: Information Today, Inc.
5. Daffara, C., & Gonzalez-Barahona, J. M. (2004). *Free software / open source. 'information society opportunities for Europe? Italy: Working group on Libre Software*.
6. Grosch, A. N. (1995). *Library information technology and networks*. New York: Marcel Dekker, Inc.
7. Harnad, S. (2004b). *The affordable-access (AA) problem and the open-access (OA) problem are not the same. Re. 'The green road to open access. 'A leveraged transition, January 23*. Retrieved June 23, 2013, from American-Scientist-Open-Access-Forum: <http://www.ecs.soton.ac.uk/harnad/Hypermail/Amsci/3483.html>
8. Harris, S. (2007, May). *Encouraging innovation*. Retrieved September 12, 2012, from Research Information: [http://www.researchinformation.info/features/feature.php?feature\\_id=132](http://www.researchinformation.info/features/feature.php?feature_id=132)
9. Keltly, C. M. (2008). *Two bits. 'the cultural significance of free software*. London: Duke University Press.
10. Koha Community. (n.d.). *History*. Retrieved May 18, 2013, from Official Website of Koha Library Software: <http://koha-community.org/about/history/>
11. Koha. (2013, April). *Koha history*. Retrieved May 18, 2013, from Koha: <http://koha-community.org/about/history/>