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Open Source Software as Tools for Libraries: An Overview

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ABSTRACT

In the modern techno-savvy era, exponential growth in knowledge increased load on libraries. To cope up with the dwindling budget and vendors' closed-access attitude in dealing with proprietary software made libraries to look for open source software as an alternative. This paper focuses on the general and specific features of some of the popular software packages of integrated library management software, content management system and digital library.

Keywords: Open source software, integrated library management software, content management system, digital library software

1. INTRODUCTION

Information technology has transformed the whole world into a global village. Exponential growth of knowledge and information made human technology-dependent and libraries are not an exception to it. It is imperative to implement use of certain technology-driven software to distribute and manage vast information resources in the libraries. Budgetary provisions in the libraries do not conform to the pace of technology and knowledge output to purchase proprietary (commercial) software and to cope up with its vast data it becomes costly affair in terms of maintenance, procurement and purchase. On the other hand philosophy and cost of free/ open source software (FOSS) rightly fit with the philosophy and needs of the libraries. Therefore it is highly recommended that libraries should opt for the FOSS.

2. TYPES OF SOFTWARE

Although in the cyber age freeware, open source, and shareware are commonly used as synonyms. Actually there is difference between these terminologies and their use. Their definitions and differences between them are stated as follows:

(a) Proprietary (Commercial) Software

User has to purchase proprietary software for its use and in course of time he becomes totally dependent on the commercial developer and has to pay high cost for its purchase, maintenance, and improvement. User is unable to modify software for his own needs, makes him feel helpless at the mercy of external software.

(b) Shareware Software

Shareware can be downloaded free of cost to try as a sample, but for the ultimate use, user is supposed to pay for it. It is developed and released by someone who keeps full control of the intellectual property. The user does not have access to the source code and cannot modify it. There is also no collaboration or community around shareware.

(c) Freeware Software

Freeware is the software which can be downloaded, used and copied without restrictions. No access to the source code, no community, no development, and no improvement can be possible.

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(d) Free/Open Source Software (FOSS)[1]

The FOSS or free/libre/open-source software (FLOSS) is software that is both free software and open source. It is liberally licensed to grant users the right to use, copy, study, change, and improve its design through the availability of its source code rather than its cost. This approach has gained both momentum and acceptance as the potential benefits have been increasingly recognised by both individuals and corporations as free software. This terminology came from the ideological movement against proprietary from FSF (Free Software Foundation) in 1985 and open source from OSI (Open Source Initiative) in 1998.

The FSF defines free software as software that respects the following four freedoms to

(i) Run the program, for any purpose.

(ii) Study how the program works, and change it so it does your computing as you wish. Access to the source code is a precondition for this.

(iii) Redistribute copies so you can help your neighbour.

(iv) The freedom to distribute copies of your modified versions to others. Access to the source code is a precondition for this.

As per the the OSI, definition[2] of open source software is as follows :

(i) Free redistribution: The license shall not restrict its component to use or sell as component of an aggregate software

(ii) Source code: Must be available through a well publisised means.

(iii) Derived works: License must be redistributed under the same terms of original software.

(iv) Integrity of the author's source code: Original source code must be maintained. Modified codes can be assigned different versions and names.

(v) No discrimination against persons or groups

(vi) No discrimination against fields of endeavour: Must not restrict to use in a specific field.

(vii) Distribution of license applies to anyone receiving the program

(viii) License must not be specific to a product: Same rights as those are granted with original software distributed

(ix) License must not restrict other software: License must not restrict the other software must be open source software

(x) License must be technology-neutral

FOSS is an inclusive term that incorporates both the ideologies of free software and open source software (OSS), which despite describing similar development models, have differing in cultures and philosophies. Free software focuses on the philosophical freedoms it gives to users, whereas OSS focuses on the perceived strengths of its peer-to-peer development model. Despite these differences FOSS is a term that can be used without particular bias towards either political approach.

3. OPEN SOURCE SOFTWARE AND LIBRARIES[3]

Both libraries and open source have same philosophy i.e., 'community first'. Blake Carver's modification[4] of Ranganthan Law is: (i) Software is for use, (ii) Every computer its user, (iii) Every reader his source code, (iv) Save the time of the user, and (v) A system is a growing organism.

3.1 Need of Open Source Software in Libraries

Following benefits from open source software made it ideal to use in the libraries:

(i) Code of software is open to modify, improve, and redistribute

(ii) Mature software

(iii) Libraries outlive the any software producer or vendor

(iv) No dependence on vendor or producer

(v) It is more reliable

(vi) Perform better

(vii) More secured

(viii) Use without restriction

(ix) Reduced cost

Thus the philosophy, flexibility, freedom, cost and continuity of OSS makes this software as an ideal choice for libraries.

4. OVERVIEW OF OPEN SOURCE SOFTWARE IN LIBRARIES

This paper is focusing on the software coming under FOSS license and available free to the libraries for its use, modification and distribution. The researcher has taken following category of library software under study:

(a) Integrated Library Management Software

(b) Content Management System

(c) Institutional Repository (Digital Library) Software

4.1 Integrated Library Management Software

An integrated library system (ILS)[5], also known as a library management system (LMS) is an enterprise resource planning system for a library, used to track items owned, orders made, bills paid, and patrons who have borrowed usually comprises relational database with common modules like acquisition, cataloguing, circulation, serials OPAC, etc. The study discusses in chart-form some of the widely used open source library management software in terms of their features and capabilities. The information furnished in Table 1 and 2 is taken directly from the software websites and related weblinks.

4.1.1 Special Features of Selected Integrated Library Management Software

Koha software is the first open source library management software widely used all over the world which provides additional facilities like tagging and RSS feeds. Its adaptable interface is translated in many languages. Evergreen software uses SIP2 support for Interaction. NewGenLib system and PhpMyBibli software comply with OA institutional repositories to build digital library. Besides, NewGenLib is Unicode 3.0 compliant and RFID ready.

4.2 Content Management System

Content management system (CMS)[19] is a collection of procedures used to manage work flow in a collaborative environment. A content management system is used to manage the content of a website is the fastest way to keep one's website content updated. Having a content management system saves money as a user won't need to pay a web developer every time he wants to modify the content of its website. Some of the popular CMS software packages are featured in comparison are given in Tables 3 and 4.

4.2.1 Special Features of Popular CMS

Joomla software includes features such as page caching, RSS feeds, printable versions of pages, news flashes, blogs, polls, search, and support for language internationalisation. Drupal offers a sophisticated programming interface for developers. Mambo includes advanced features such as page caching to improve performance on busy sites. WordPress software is also used for blogging. WordPress also supports the Trackback and Pingback standards for displaying links to other sites. TYPO3 is almost completely pluggable, extensible having complex framework and highly flexible.

Table 1. General information of the library management software

Software package	Developer	Licence	Site	Downloadable version
Koha[6]	Katipo Communications for Horowhenua Library Trust	GNU-GPL	http://koha-community.org/	3.6.4. February 22, 2012
NewGenLib[7]	Verus Solutions Pvt Ltd. Domain	GNU-GPL	http://www.verussolutions.biz/	NewGenLib 3.0.3 U2
EverGreen[8]	Georgia Public Library Service Public Information Network for Electronic Services (PINES)	GNU-GPL	http://evergreen-ils.org/	Evergreen 2.2 Alpha 3 was released on March 12, 2012
OpenBiblio[9]	Open Biblio Community	GNU-GPL	http://obiblio.sourceforge.net/	Release 0.7.1 Sun, March 18, 2012
OPALS-NA[10]	New York State School Library Systems	GNU-GPL	http://www.opals-na.org/	Not Given
AvantiMicroLCS[11]	Peter Schlumpf	GNU-GPL	http://www.avantilibrary	Avanti systems.com MicroLCS version 1.0, beta 3
ABCD[12]	BIREME (WHO, Brazil)	ABCD	http://fmv.jku.at/abcd/#download	abcd-0.3.tar.gz
Emilda[13]	Realnode Ltd in cooperation with SDU	GNU-GPL	www.emilda.org/Emilda	1.2.3 released 29 June 2005
WEBLIS[14]	Henryk Rybinski	Freeware	http://www.unesco.org/isis	Updated version of August
PhpMyLibrary[15]	Polerio Baboa	GNU-GPL	http://sourceforge.net/projects/phpmylibrary/	2.2.1 on June 30, 2006
Glibm (GNU Library Management System)[16]	GNU Library Management Project community	GNU-GPL	http://sourceforge.net/projects/glibs/	Glibms 0.0.7
BiblioteQ[17]	Not mentioned	BSD	http://sourceforge.net/projects/biblioteq/files/	Version 6.54, March 14, 2012
Java Book Cataloguing System[18]	Community support	LGPL	http://sourceforge.net/projects/biblioteca/files/	0.002

Table 2. Special features of library management software

Software package	Written in languages	Requirements	Platform	Useful for	Standards	Functional modules
Koha	Perl	Apache web server, MySql database, Perl, KohaW32 install	Unix, Linux, Windows	Small and big libraries	Z39.50, SRU, and SIP2, MARC, AGRIS,OAI-PMH	OPAC, Full Catalogue, Circulation, Serials, Acquisition, Patron Management, Branch Management, Reservations.
NewGenLib	Perl	J2SE kit, PostgreSQL, JBoss Application Server, Java Runtime Environment, Newgenlib files, backup in plain SQL, newgenlib.ear	Windows, Linux,	Small to big libraries	MARC-21, MARC-XML, AGRIS,z39.50, SRU/W, OAI-PMH	Acquisitions Cataloguing Serials management Circulation Administration, MIS Reports, End of Day Process
EverGreen	C, Perl, XUL, JS	PostgreSQL,OpenSRF, Evergreen	Windows, Mac, Linux	Small and big libraries like consortium	Z39.50, SRU server,	Acquisitions Cataloguing, Circulation Administration, Inter-library Loan, OPAC
OpenBiblio	PHP	PostgreSQL or MySQL, Apache, XAMPP	Windows, Linux,	Small and medium size	Z39, MARC	Cataloguing, OPAC, Circulation, Report
OPALS-NS	Perl, Zebra, MySql	MySQL	Linux,Window, Macintosh	School library	MARC, Z39	OPAC, Cataloguing, Circulation, Inventory, Admin, Reports, Union Catalogue, Intern-library Loan Preferences.
Avanti MicroLCS	Java	Not given	Platform independent	Small libraries	MARC, Z39.50	Circulation, Catalogue, OPAC
ABCD	Java	ISIS database	Windows	Small to big	Z39.50,MARC, CEPAL and AGRIS, OAI-PMH	Administration, Cataloguing, Acquisition, Loan, OPAC, ABCD site, Serial Control
Emilda	MYSQL and Zebra	Apache, MySQL, PHP, Pearl, Zebra Server from Indexdata as backend server	LINUX	Small to m-edium size library	Z39.50, MARC,	OPAC, Circulation, Administration
WEBLIS	Xitami, Apache, IIS	CDS/ISIS, Libcat database	Window, Unix	Small to medium size	AGRIS	Cataloguing system • OPAC (search) • LOAN module • Statistical module
PhpMy Library	PHP, PL/SQL, Python	MySQL, Apache, PHP, PhpMyAdmin	Linux, Windows	Medium	USMARC	Acquisition, Cataloguing, Circulation, WebOPAC
GNU Library Management System (Glibms)	PHP	PostgreSQL	Linux, Mac, Windows, Solaris	Small libraries	MARC	Cataloguing, Circulation, OPAC
BiblioteQ	C++	PostgreSQL or SQlite, QT, YAZ	FreeBSD, Linux, OS X, Solaris and Windows	Small libraries	Z39.50 MARC	Cataloguing
Java Book Catologing System	Java	RDMS backend database	Windows, Linux, Mac OS, BSD, Solaris	Small libraries	MARC	Cataloguing

4.3 Institutional Repository Software

An institutional repository (IR)[26] is an online locus for collecting, preserving, and disseminating - in digital form - the intellectual output of an institution, particularly a research institution. It preserves digital asset of an institution by self-archiving research output and gives open access and global visibility from a single location.

The number of digital repositories currently in existence shows that there is both a high demand for digital library software as well as a need for a new software package to meet these demands. Most of the digital library software are based on OAI-PMH model for sharing of metadata between digital libraries by means of metadata harvesting. Some of the popular IR software along with

Table 3. General features of the content management system

Criteria	Joomla	Drupal	Wordpress	DotNetNuke	Mambo	TYPO3
Developer	Joomla Project Team	Dries Buytaert	WordPress Foundation	DotNetNuke Corporation	Mambo Foundation Inc.	TYPO3 Association
Website	http://www .joomla.org/	http://drupal.org/	http://word press.org/	http://www.dot netnuke.com/	http://mambo-foundation.org/	http://typo3.org/ http://typo3.org
Download website	http://www.jooml a.org/download.	http://drupal.org/ htmproject/drupal	http://wordpress. org/download/	http://www.dotnet .com/Resources/ Download-Dot NetNuke/Regis tration.aspx	http://mambo-code. org/gf/projec t/mambo/	/download/
Stable version	Joomla 2.5.4	Drupal 7.12	Wordpress 3.3.1	06.01.02	4.6.5	4.6.6

Table 4. Content management system: support, requirements and features

Criteria/Software	Joomla	Drupal	Wordpress	DotNetNuke	Mambo	TYPO3
Written in	PHP	PHP	VB.net	PHP		PHP
Tested D/B support	MySQL	MySQL, Maria DB, PostgreSQL, SQLite, Mongo, DB or Microsoft, SQL Server	MySQL	SQL Server	MySQL	MySQL, Oracle, PostgreSQL, DBAL
Operating system	Cross platform	Cross platform	Cross platform	Windows only	Cross platform	Cross platform
Licence	GNU General public license	GNU General public license	GNU General public license	Community MIT and professional proprietary	GNU General public license	GNU General public license
FTP support	Yes	Limited	Free Add On	Yes	Yes	Yes
Search engine	Yes	Yes	Yes	Yes	Yes	Yes
Architecture	Extension layer, application layer, framework layer	Template, user permissions, blocks and menus, modules, data (Nodes, etc.)	Plug-in architecture, template system	Presentation layer, business layer, data layer	Template system	Visitor-visible frontend and administrative access layer backend
User friendliness	All friendly	More developer friendly and less user-friendly	Less developer friendly and more user-friendly	More user friendly and less developer friendly	Less developer friendly and more user-friendly friendly	More user- and less devel-oper-friendly
Server	Apache, IIS	Apache, IIS, Lighttpad, Hiawatha, Cherokee or Nginx	Apache, IIS	IIS	Apache, IIS	Apache, IIS
Multilingual	No. additional plug-in require	Yes	No additional plug in require	Yes	Yes	Yes

their URL, licences, etc., are shown in Table 5. Table 6 shows the languages, operating system requirements, object formats, etc., of IR software.

4.3.1 Special Features of Selected Institutional Repository Software

Fedora and DSpace are most popular IR software in the world community. VuDL includes a built-in METS metadata editor, service image generation tools, an XML database repository, and an OAI server and easy to use. XTF offers robust optimisation for large documents and RSS feeds. Both, Fedora and DSpace are able to export digital objects as METS XML files.

5. CONCLUSIONS

Open source software has placed the right to make changes to the software in the hands of the public, rather than a company. Its immediate effect is the shift from

Table 5. General features of selected institutional repository software

Software	URL	Latest versions	Developed by	License
GSDL[1]	http://www.greenstone.org	2.62 in 2005	New Zealand Digital Library Project with UNESCO and the Human Info NGO	GNU (General Public License)
DSpace[2]	http://www.dspace.org/	1.6.0 in 2010	Massachusetts Institute of Technology (MIT) Libraries and Hewlett-Packard	BSD License
Ganesha[3]	http://kmrg.itb.ac.id/ (Registration for download)	4.2 in 2004	Indonesian Digital Library Network	GNU (General Public License)
Fedora Commons[4]	http://www.fedora-commons .org	3.4.2 in 2011	Cornell University Information Science and the University of Virginia Library	ECL (Apache derived)
EPrint[5]	http://software.eprints.org	3.3.1 in 2011	University of Southampton	GPL
CDS Invenio[6]	http://invenio-software.org/	v1.0.0-rc0in 2010	CERN Document Server Software Consortium	GPL
Dienst[7]	http://www.cs.cornell.edu/ cdlrg/dienst/DienstOverview.htm	3.0 protocol2007	CS-TR Project (Corporation for National Research Initiatives)	Cornell University (CU) licence
VuDL[8]	http://vudl.org/	0.4.1 Alpha in 2011	Villanova University's Falvey Memorial Library	GPL open source license
XTF[9]	http://xtf.cdlib.org/	3.0 in 2011	California Digital Library (CDL)	BSD license

Table 6. Requirements, features, and support for IR software

Software/ criteria	Language written	OS	User interface language	Object format	Requirements
GSDL	Perl	Windows, Unix	English, Spanish, French and Russian	HTML files, email messages, PDF documents, JPEG and GIF images, Word documents, plain text files	Apache webserver, Pearl (already included), GCC compiler, GDBM, Java Runtime Environment, Java Compiler (Java Developer Kit)
DSpace	Java	Windows Linux	English French German Italian Russian	Text, images, audio, and video	Apache Maven, Apache Ant, Apache Tomcat, PostgreSQL or Oracle, (Java Development Kit) or Oracle Java 6
Ganesha	Java	Windows, Linux, Unix	English, Indonesian	Text, image, audio, video, software	Apache, PHP, SQL
Fedora Commons	Java	Linux	International Language support and translate	Images and video or audio clips, text of letters	Sun Java Development Kit (JDK), MySQL database server, Apache Tomcat server
E-Print	Perl	Unix, Linux	Phrase can be converted in any language	Text, images, audio, and video	Apache, MySQL, Perl, Perl module, indexing and thumbnailing tools. GDOME
CDS Invenio	Python	Cross platform Mac, Unix, Linux	26 native languages	Vector formats (EPS, SVG, PDF) and Bitmap format (PNG, TIFF, gif)	Python, MySQL server, Apache 2 server
Dienst	Perl	Unix, Windows, Mac	Multilingual extension	PostScript or TIFF, gif, HTML, text	Imagemagic, Perlmagick, FreeWAI SSF, Additional Pearl Module, Apache or Microsoft IIS
VuDL	Perl	Windows, MAC and Linux	Multilingual Extension	Books, Transcriptions, Images, Audio, Video	JDK kit, eXist-db, Apache Tomcat, ImageMagick, Tesseract
XTF	Java and XSLT 2.0 code	Unix, Linux, Mac, Windows	English, French, Spanish, German, and Italian	Microsoft Word, PDF, Web pages (html/htm), XML encoded, plain text, Scanned books from Internet Archive and HathiTrust	J2SE, Apache Tomcat or Caucho Resin

proprietary software to FOSS which has resulted in cost saving of libraries. Not only developing but also well-developed countries are supporting FOSS for electronic access, digital libraries, and resource sharing, thereby, making a valuable contribution to the greater good.

REFERENCES

1. Free and open source software. http://en.wikipedia.org/wiki/Free_and_open_source_software (accessed on 3 April 2012).
2. The open source initiative. http://www.opensource.org/docs/osd (accessed on 3 April 2012).
3. Singh, Sukhdev. http://www.slideshare.net/sukhi/open-source-software-in-libraries (accessed on 3 April 2012).
4. Sherikar, Amrut & Jange, Suresh. Open source software development: Historical and current perspectives for academic librarianship. http://ir.inflibnet.ac.in/dxml/bitstream/handle/1944/1219/196-201.pdf? (accessed on 5 April 2012).
5. Integrated library system. http://en.wikipedia.org/wiki/Integrated_library_system (accessed on 4 April 2012).
6. Koha. http://koha-community.org/ (accessed on 3 April 2012).
7. NewGenLib. http://www.verussolutions.biz/ (accessed on 4 April 2012).
8. Evergreen. http://evergreen-ils.org/ (accessed on 4 April 2012).
9. OpenBiblio. http://obiblio.sourceforge.net/ (accessed on 3 April 2012).
10. OPALS. http://www.opals-na.org/ (accessed on 03/04/2012).
11. Avanti MicroLS. http://www.avantilibrarysystems.com (accessed on 3 April 2012).
12. ABCD. http://fmv.jku.at/abcd/ (accessed on 3 April 2012).
13. Emilda. www.emilda.org/ (accessed on 5 April 2012).
14. WEBLIS. http://www.unesco.org/isis (accessed on 5 April 2012).
15. PhpMyLibrary.http://sourceforge.net/projectsmylibrary/ (accessed on 6 April 2012).
16. GNU library management system. http://sourceforge.net/projects/glibs (accessed on 4 April 2012).
17. Biblioteq. http://sourceforge.net/projects/biblioteq/files/ (accessed on 5 April 2012).
18. Java book cataloguing system. http://sourceforge.net/projects/jbiblioteca/files// (accessed on 5 April 2012).
19. Content management system. http://www.ralant.com/cms.php (accessed on 7 April 2012).
20. Joomla content management system. http://www.joomla.org/ (accessed on 7 April 2012).
21. Drupal content management system. http://drupal.org/ (accessed on 8 April 2012).
22. WordPress content management system. http://wordpress.org/ (accessed on 7 April 2012).
23. Microsoft's DotNetNuk CMS. http://www.dotnetnuke.com/ (accessed on 8 April 2012).
24. Mambo. http://mambo-foundation.org/ (accessed on 8 April 2012).
25. TYPO3 CMS. http://typo3.org/ (accessed on 8 April 2012).
26. Institutional repository. http://en.wikipedia.org/wiki/Institutional_repository (accessed on 7 April 2012).
27. Greenstone digital library system (GSDL). http://www.greenstone.org (accessed on 7 April 2012).
28. DSpace. http://www.dspace.org/ (accessed on 7 April 2012).
29. Ganesha digital library (GDL). http://www.dspace.org/ (accessed on 5 April 2012).
30. Fedora Commons. http://www.fedora-commons.org (accessed on 3 April 2012).
31. Eprints digital library software. http://software.eprints.org (accessed on 7 April 2012).
32. CDS Invenio. http://invenio-software.org/ (accessed on 7 April 2012)
33. Dienst. http://www.cs.cornell.edu/cdlrg/dienst/DienstOverview.htm (accessed on 5 April 2012).
34. VuDL. http://vudl.org/ (accessed on 7 April 2012).
35. STF digital library software. http://xtf.cdlib.org/ (accessed on 7 April 2012).