

# Open Source Library Management and Digital Library Software

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## ABSTRACT

In this era of transition from information age to knowledge society, the libraries have much greater challenges to face. The whole perception of library has now changed from collection of books to a single window knowledge bank. This paper discusses the definition and features of open source library management software, criteria of selection of best open source library management software, their, advantages and limitations. Open source library management software is a solution to reducing that cost. The paper describes in brief about the feature of some of the open source library management software like Greenstone Digital Library, DSpace, Koha, E-Prints, NewGenlib. PhpMyLibrary, OpenBiblio, Avanti, etc., which are useful for developing digital library and institutional repositories. The paper also highlight the initiatives taken in India to make use of open source library management software for developing their digital libraries.

**Keywords:** Open source library management software, Greenstone digital library, DSpace, Koha, E-Prints, New Genlib, openaccess initiative, digital library, GSDL

## 1. INTRODUCTION

Library automation starts with the adoption of library management software in the library. The software should have the maximum facilities to automate the library into computerised systems. Library automation is the general term for information and communication technologies that are used to replace manual systems in the library. The key functions of the library, which may be automated are acquisition, cataloguing, circulation, serials control, and reference service.

There are many commercial library software are in use in the different libraries, but open source library management software has generated lot of interest among the library professionals over the past years.

## 2. OPEN SOURCE SOFTWARE

Open source software (OSS) is computer software whose source code is available under a license for users to look at and modify freely and permits users study, change, and improve the software, and to redistribute it in modified or unmodified form<sup>1</sup>.

The OSS differs from the closed source or proprietary software. The primary difference between the two is the freedom to modify the software.

### 2.1 Advantages of OSS

The OSS offers a radically different and exponentially better software development model. OSS provides cheap alternatives to expensive commercialised solutions. Source code of the software is always open and available to the libraries which is not possible in case of traditional commercial software. Libraries can modify or develop the software according to their requirement and for this they do not have to pay license fees to anybody. The OSS provides no restrictions on how the software is used. It reduces dependence on software vendors. The OSS is more reliable than closed source traditional commercial software. The OSS also provides security and technological independence to the libraries. It also helps the library professionals to deliver low cost or free services to users. It helps converting their libraries in to digital form. Implementation cost of OSS is also more affordable to the libraries than traditional commercial software. Overall, open source is good for everyone<sup>1</sup>.

### 2.2 Limitations with OSS

For any upgradation/change in the OSS, the library needs support. In case of OSS, there is no body to solve problem, either one have to hire some expert to solve problem or library should make arrangement with some company. Open source products require technical

expertise to operate and maintain open source costs more to support because the software is typically self-supporting. Generally, a commercial software company will immediately respond on customer requests for any problem. With OSS, if one doesn't do it himself, he is at the mercy of a disjoint community of developers.

### 2.3 Problem Encountered After Taking Initiative

The main problems faced in the libraries are related to retraining end-user to get use to new paradigm shift. The library professional and user have faced initial difficulties adopting to open source technology practice due to non-availability of proper training. There are not sufficient equipments available in the library. Sometimes library authority does not agree to adopt new technology and therefore it is very difficult to adopt new systems to provide library service to the users. Major problem faced by the library is to shift data from existing software to OSS because library professionals are not well acquainted about software programming or source code.

### 2.4 Selection of Library Management Software

Selection of library management software (LMS) is not a simple task. Sometimes librarians go with either renowned software or maximum number of usage of the library. Selection of LMS may consist the following points/steps, which might help the librarians to select the right software for their housekeeping operations as well as information retrieval.

There are many LMS, which are very popular and being used by number of libraries. Librarians may have the comprehensive study about them before taking decision in this regard. While examining the software, librarian must have the followings information about the software which might help to select the right software for housekeeping operations as well as information retrieval<sup>2</sup>:

- How it matches the library's requirements
- Product quality
- Features and functions
- Staff training and support service
- Operating system
- Hardware and software requirements
- Functionality: What modules are available, value addition to existing functions
- User interface: Navigation, error alerts, intuitive, customisation
- Design: Flexibility, switching from one module to

another, multifunction modules, does it enhance the productivity

- Conforming to standards: MARC, Z39.50, ISO-2709, etc.
- Scalability: Single user-multi use network. Can it be used in client server LAN architecture or fully web-browsing architecture
- User-controlled customisation
- Reports that help take decisions
- Security levels
- Migration of data or data transfer

## 3. OPEN SOURCE LIBRARY MANAGEMENT SOFTWARE

Open source LMS is a valuable catalyst for change in terms of exploring possibilities and pushing boundaries for the community. There are many open source LMS being used in the libraries. In India also, some libraries like, Delhi Public Library, British Council Library, Mysore University Library, etc., are using OSS. Some of open source LMS are:

### 3.1 Koha

Koha is a promising full featured open source integrated library system (ILS) created in 1999 by Katipo Communications for the Horowhenua Library Trust in New Zealand, and currently being used by thousands of libraries all over the world. It includes modules for circulation, cataloging, acquisitions, serials, reserves, patron management, branch relationships, and more. Koha has web-based Interfaces. Koha is built using library ILS standards and uses the OPAC (online public access catalog) interface. In addition, Koha has no vendor-lock in, so libraries can receive technical support from any party from they want. It is distributed under the free open source general public license (GPL). It supports MARC 21 and UNIMARC support, Z39.50. It also has a provision for online reservations and renewals,

### 3.2 NewGenlib

NewGenLib, an integrated LMS is open source under the most widely used free software license, GNU GPL. NewGenLib is the result of collaboration between specialists in library automation and software specialists. The software was developed over a four-year joint effort between a professional charitable trust, Kesavan Institute of Information and Knowledge Management (KIIKM) and a fledgling software development company. Libraries in India still do not generally use international metadata and interoperability standards (e.g., MARC-21, Dublin Core, OAI-PMH) and it is believed that this puts them at a great

disadvantage when it comes to sharing metadata and building union catalogues and networking. The fact that libraries are not networked and hence are handicapped in sharing costly bibliographic and full-text resources among themselves, the importance of providing a software that would allow both library management and the creation of institutional open access repositories increases.

### 3.3 PhpMyLibrary

PhpMyLibrary is a PHP/MySQL web-based library automation application meant for smaller libraries. The software has the facilities of cataloguing, circulation, and OPAC module. The software also has an import export feature. It strictly follows the USMARC standard for adding materials. This software is compatible with the content management system and have as facility of Online reservation system for library and also supports import from ISIS database with an ISIS2MARC program.

### 3.4 OpenBiblio

OpenBiblio is an easy to use, open source, automated library software written in PHP. This software has facilities of OPAC, circulation, cataloging, and other administrative work. OpenBiblio is well documented, easy to install with minimal expertise and designed with common library feature.

### 3.5 Avanti

Avanti MicroLCS Software is developed by Avanti Library Systems in Java language. This is a small, simple, and easy to install and use open source software. it is a platform independent, and can run on any system that supports a Java runtime environment. This software is useful for small libraries, it has a powerful and very flexible architecture that allows it to be adapted for use in libraries of any type. This software incorporate standards such as MARC and Z39.50 as modules and interfaces.

### 3.6 Greenstone Digital Library

The Greenstone digital library software is an open source system for the construction and presentation of information collections. Greenstone is a suite of software for building digital library collections. It is not a digital library but a tool for building digital libraries. It provides a new way of organising information and publishing it on the internet in the form of a fully-searchable, metadata-driven digital library. It has been developed and distributed in cooperation with UNESCO and the Human Info NGO in Belgium. It is multilingual software, issued under the terms of the GNU GPL Greenstone runs on all versions of Windows, and Unix/Linux, and Mac OS-X and is very easy to install. It has two separate interactive interfaces, the Reader interface and the Librarian interface. End

users access the digital library through the Reader interface, which operates within a web browser. The reader's interface is available in the following languages: Arabic, Armenian, Bengali, Catalan, Croatian, Czech, Chinese (both simplified and traditional), Dutch, English, Farsi, Finnish, French, Galician, Georgian, German, Greek, Hebrew, Hindi, Indonesian, Italian, Japanese, Kannada, Kazakh, Kyrgyz, Latvian, Maori, Mongolian, Portuguese (BR and PT versions), Russian, Serbian, Spanish, Thai, Turkish, Ukrainian, and Vietnamese.

### 3.7 DSpace

DSpace was developed by Massachusetts Institute of Technology (MIT) libraries and Hewlett-Packard (HP), as an open source application that institutions and organisations could run with relatively few resources. It is to support the long-term preservation of the digital material stored in the repository. DSpace accepts all manner of digital formats, such as articles, preprints, working papers, technical reports, conference papers, books, theses, data sets, computer programs, visualisations, simulations, and other models, multimedia publications, administrative records, published books, journals, bibliographic datasets, images, audio files, video files, reformatted digital library collections, learning objects, web pages, etc.

### 3.8 E-Prints

E-Prints has been developed at the University of Southampton School of Electronics and Computer Science in 2000 and released under a GPL license for building open access repositories that are compliant with the Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH). It shares many of the features commonly seen in document management systems, but is primarily used for institutional repositories and scientific journals.

### 3.9 Fedora

Fedora software gives organisations a flexible service-oriented architecture for managing and delivering their digital content. Digital objects exist within a repository architecture that supports a variety of management functions. All functions of Fedora, both at the object and repository level, are exposed as web services. These functions can be protected with fine-grained access control policies. This unique combination of features makes Fedora an attractive solution in a variety of domains. Some examples of applications that are built upon Fedora include library collections management, multimedia authoring systems, archival repositories, institutional repositories, and digital libraries for education.

#### 4. Open Source Software Initiative in India

In India there are a number of university and institute libraries, which are in the process of conversion into DLs. The advantage of having a DL is now well understood by librarians, technologists, management and users. The situation in India regarding DLs is very peculiar. Generally, the use of information technology (IT) and information and communication technology (ICT) in libraries in India is concentrated in universities, Indian Institutes of Technology (IITs), Indian Institutes of Management (IIMs), Indian Institute of Science (IISc), ICMR, CSIR, ICAR and their research institutes and some special libraries. Some government agencies, as well as public-sector institutions, are also engaged in digitisation of libraries. But the initiatives taken by the Government of India in this direction indicate that the potential of ICTs for developing DLs has not been fully realised. While one government agency is providing support for one particular aspect, the other is focusing elsewhere without any coordinated effort by a nodal agency<sup>3,4</sup>.

In agriculture sector, the beginning of digitisation of Indian information was initiated by ICAR<sup>5</sup>, when, Govt. of India took decision to participate in AGRIS database of Food and Agricultural Organisation. The ICAR has digitized approximately 1.5 lakh bibliographic records of research information published in various Indian Journals and made available to world agricultural community using CDS/ISIS software. Under the National Agricultural Innovative Project (NAIP), emphasis would be on strengthening of the ICAR-Net, creation of digitised content and knowledge management, using open source management software and CMS and strengthening of 42 libraries of the SAUs and ICAR Institutes into fully electronic libraries, formation of an ICAR e-journals Consortium. Recently, it is decided at UAS, Bangalore in September 2011 to Implement Koha LMS in 12 partner libraries under (e-Granth) project of NAIP.

The ICAR also developed its website using an open source content management system called Drupal. The website is a unique platform for sharing and dissemination of information to a wide range of users and stakeholders. The ICAR research journals (*The Indian Journal of Agricultural Sciences* and *The Indian Journal of Animal Sciences*) are available in open-access mode and have been downloaded in 158 countries<sup>6</sup>. *Journal of Medicinal and Aromatic Plants* and *Fishery Technology* of Society of Fisheries Technologists (India) are also published as open access journals on ebooks platform of ICAR.

The CMFRI has developed open access institutional repository, using E-print software. The institute's repository can be accessed from the Institute website and users anywhere in the world can download the research outputs. This repository was created using OSS developed by the University of Southampton at UK.

Kerala Agricultural University (KAU) had launched its journal, '*Journal of Tropical Agriculture*' and University of Agricultural Sciences, Dharwad made available its journal, '*Karnataka Journal of Agricultural Sciences*' using Open Journal Systems (OJS), a free open source software (FOSS).

Central Marine Fisheries Research Institute (CMFRI), Indian Agricultural Research Institute (IARI), Indian Institute of Spice Research (IISR) and Indian Institute of Horticultural Research (IIHR) have established open access repositories using Eprint, DSpace and other OSS. The Sugarcane Breeding Institute (SBI) with the support of Department of Scientific and Industrial Research (DSIR) had established 'CanelInfo' a sugarcane knowledge repository. Under the NAIP sub-project 'Strengthening of digital library and information management' (e-Granth), 12 institutions in NARS are in the process of establishing their institutional repositories which would have a digital collection of rare books and old journals available in their libraries.

The Indian Academy of Sciences is one of three science academies in India. Apart from various other activities, it publishes 11 science journals reporting research work both in India and outside. These journals, mainly in print, are freely accessible on the web. The E-Print archives of the Indian Institute of Science is an online digital repository of research papers, both reprints and post prints, technical reports, unpublished findings, and journal articles of the faculty. It was set up using E-Print, and is registered in the e-prints registry.

Eprints@iisc is now part of the worldwide institutional e-print archives. The E-prints archives allow the faculty and students to submit their publications electronically to the campus network. The eprints@iisc website also supports metadata for browsing and searching. It is also integrated with the Greenstone Digital Library software, which enables full-text searching of the e-prints.

The Raman Research Institute has developed digital repository in DSpace which allows research community to deposit preprints, post prints, and other publications and organises these publications for retrieval. It also contains the annual reports of Institute and newspaper clippings from its archives. The repository uses DSpace. National Chemical Laboratory has also developed the institute repository using DSpace. Indian Institute of Technology, New Delhi also develop digital libraries. Online courseware has been developed and older volumes of journals have been digitised, among other projects.

More than 500 dissertations are available in the repository. The Central Library, IIT Kharagpur and Bombay, has also created institutional repository. The repository at IIT Bombay has bibliographic information and abstract for dissertations beginning in 1965. More

than 3,000 full-text theses and dissertations are available in the ETD database.

The repository uses Greenstone. The NISCAIR has also developed National Science Digital Library by providing Internet access to digital resources related to science and technology<sup>7</sup>.

## 5. CONCLUSIONS

Digitisation needs a huge amount of money for creation and maintenance. Libraries have a growing role in managing the output of their institution due in part of the open access movement. The OSS have been found very useful in various library operations. The OSS are a solution to reduce the cost. Libraries can make use of open source software for managing digital contents effectively.

In India automation and networking of library are still in their formative stages. Recently, ICAR and its institutes/SAUs taken a decision to implement Koha open source software initially in 12 Libraries from National Agricultural Research System (NARS)<sup>8</sup>.

The LIS professionals should keep eyes on development and to choose appropriate technology depending upon needs. Since numbers of libraries worldwide are using OSS for managing their library systems more economically and effectively. Librarians and programmers may worked together to implement open source integrated library systems and at the same time, library professional are required to acquire new skills for developing and managing the digital library by using open source LMS. For taking benefit from OSS additional technology, education, and training are essentially required.

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