Library Automation & Open Source Software

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Library Automation & Open Source Software

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ABSTRACT
The dawn of Information Technology in manifold directions altered the horizons of library services. The rising cost of technology in libraries is going day by day high. Open Source software is solution for such problem. Open Source Software are that software in which source code is available to modify and free use.Various OSS solutions are available under public licensing for download and use for libraries. Define the concept of Open Source Software. Discuses use, features and application of various automation package, content management systems, digital library software.

Keywords
Open Source Software, Library automation System, Digital Library, Content Management System

INTRODUCTION

Automation is technique to make a system automated, i.e. self-active. The act of implementing the control of equipment with advanced technology; usually involving electronic hardware; "automation replaces human workers by machines. Library automation is the application of ICTs to library operations and services.The functions that may be automated are any or all of the following: acquisition, cataloging, public access (OPAC and Web PAC) , indexing, and abstracting, circulation serials management, and reference.Library automation concerns with controlling, managing and automating library collection and services.

Thus library automation is the –

- Computerizations of the entire house -keeping operation of the library.
- Operate a computerized library management system.
- Improve & control over the work load of the library.
- Need the integrated information technology.

Need of library automation

- Information explosion
- To fulfill different approaches and needs of user
- Limitation of library like time, space & human power
- Duplication in housekeeping operation
- To well management and effective retrieval of information.
- Increasing large numbers of users.
- Impact of communication technology in present era.

- Suitability for resource sharing and networking

Advantage of library Automation:

- It is electronics based activity which is carried out by human beings. Easily working with the help of automation.
- It is user friendly system and easily searching of information.
- Availability of information
- It is helpful to providing library services and solves the user's queries.
- Library staff and patrons can view the status of the material from the OPAC or WebPAC
- Standardization in library work.
- Accuracy in work and speedily communication of information.
- Avoid duplication in the library work
- It motivate to library staff and development of human resource
- Trained staff and quality service can easily provide.
- It is helpful in stock verification and helpful in resource sharing.
- It is a time saving system.
- Networking.

Disadvantage of library automation

- It is complicated and time consuming process.
- It is a long term process.
- More expenses in initial stage.
- Continuous staff training are required for it
- Security issues
- It is totally depended on the electricity
- It maintenance cost is high.
- Untrained users

OPEN SOURCE LIBRARY AUTOMATION SOFTWARE

Open source Software refers to a program in which the source code is available to the general public for use and/or modification from its original design free of charge. It allows users to modify the program according to need and to develop new code that improves the application. This technique helps to provide better quality software's having higher reliability, flexibility with lower cost. It is available free for download on the Internet. Thus OSS bears great importance to the libraries in developing countries like India. The open source software differs from the closed source or proprietary software.

Richard Stallman first gave the idea of free software later Tim O Rally first coin the term Open Source Software and kicked off the movement Open Source Software.

An open system is a design philosophy antithetical to solutions designed to be proprietary. The idea behind it is that institutions, such as libraries, are can build a combination of components and deliver services that include several vendors' offerings. Thus, for instance, a library might use an integrated library system from one of the major vendors in combination with an open source product developed by another library or by itself in order to better meet its internal or users' requirements.

The Free Software Foundationpromotes the Four Essential Freedoms of using free software:

- The freedom to run the program, for any purpose.
- The freedom to study how the program works, and change it to make it do what you wish. Access to the source code is a precondition for this.
- The freedom to redistribute copies so you can help you neighbor
- Freedom to distribute copies of your modified.

Definition

Open source software is computer software whose source code is available under a license (or arrangement such as the public domain) that permits users to study, change, and improve the software, and to redistribute it in modified or unmodified form. It is often developed in a public, collaborative manner.

According to Open Source Initiative (http://www.opensource.org/) :

"Open source promotes software reliability and quality by supporting independent peer review and rapid evolution of source code. To be certified as open source, the license of a program must guarantee the right to read, redistribute, modify, and use it freely."

Open source means several things (Chudnov, 1999) :

- Open source software is typically created and maintained by developers crossing institutional and national boundaries, collaborating by using internet-based communications and development tools;
- Products are typically a certain kind of "free", often through a license that specifies that applications and source code are free to use, modify, and redistribute as long as all uses, modifications, and redistributions are similarly licensed;
- Successful applications tend to be developed more quickly and with better responsiveness to the needs of users who can readily use and evaluate open source applications because they are free;
- Quality, not profit, drives open source developers who take personal pride in seeing their working solutions adopted;
- Intellectual property rights to open source software belong to everyone who helps build it or simply uses it, not just the vendor or institution that created or sold the software.

The Ten Commandments

The Open Source Initiative (OSI) identified ten criteria for a software product to be called open source. The OSI certifies a software license as an 'OSI Certified License' on the basis of the following 'Ten Commandments.'

1. **Free Redistribution:** The license shall not restrict any party from selling or giving away the software as a component of an aggregate software distribution containing programs from several different sources. The license shall not require a royalty or other fee for such sale.
2. **Source Code:** The program must include source code, and must allow Distribution in source code as well as compiled form. Where some form of a product is not distributed with source code, there must be a well-publicized means of obtaining the source code for no more than a reasonable reproduction cost–preferably, downloading via the Internet without charge.
3. **Derived Works:** The license must allow modifications and derived works, and must allow them to be distributed under the same terms as the license of the

original software.

4. **Integrity of the Author's Source Code:** The license may restrict source code from being distributed in modified form only if the license allows the distribution of "patch files" with the source code for the purpose of modifying the program at build time. The license must explicitly permit distribution of software built from modified source code.
5. **No Discrimination against Persons or Groups :**The license must not discriminate against any person or group of persons.
6. **No Discrimination against Fields of Endeavor :**The license must not restrict anyone from making use of the program in a specific field of endeavor.
7. **Distribution of License:** The rights attached to the program must apply to all to whom the program is redistributed without the need for execution of an additional license by those parties.
8. **License Must not be Specific to a Product:** The rights attached to the program must not depend on the program's being part of a particular Software distribution.
9. **The License must not restrict Other Software:** The license must not place restrictions on other software that is distributed along with the licensed software. For example, the license must not insist that all other programs distributed on the same medium must be open-source software.
10. **The License must be Technology-Neutral:** No provision of the license may be predicated on any individual technology or style of interface.

Advantages of OSS

- It promotes creative development in present era.
- Those who can't afford proprietary software can download open source software for free of cost from internet.
- It saves time, money & efforts can be used to purchase other needed materials. This is very cost- effective project.
- Anyone can easily modify the code by adding new features and correcting errors according to their needs and patron's needs.
- Little to no upgrade costs.
- The price (free) makes it easier to change your mind when the software doesn't live up to its expectations.
- Little to no viruses!
- This software can be converted into local languages for the benefit of local people.

Limitation of OSS

- There is no guarantee develop will be happened. In other words: it is not possible to know if a project will ever reach a usable stage, and even if it reaches it, it may die later if there is not enough interest.
- There may be significant problem connected with intellectual property. This point is especially important, now that some countries are accepting software and algorithm patents
- OSS requires high maintenance. It possible structural quality issues with the source code.
- It is some difficult to know that a project exist and its current status. There is not

much advertising for open source software, especially for those projects not directly backed by a company willing to invest resources in marketing campaigns

- The main disadvantage of open-source software is not being straightforward to use. Many library system departments that require plug and play software that is well documented and supported.
- There is a shortage of applications that run both on open source and proprietary software; therefore, switching to an open-source platform involves a compatibility analysis of all the other software used that run on proprietary platforms.
- Many of the latest hardware are incompatible to the open-source platform; so you have to rely on third-party driver.

The overall process of library automation can be categorized into three on the basis of their activities: Integrated Office Automation, Digital Library and Content Management

Following are few major open source integrated office automation software:

KOHA

Koha is the first open source software library automation package. It was developed in 1999 by Katapo Communication Ltd in New Zealand for Horowhenua library trust and first implemented in January 2000. It is currently maintained by a team of software providers and library technology staffs around the world. In use worldwide, its development is steered by a growing community of users collaborating to achieve their technology goals.

The Koha ILS includes catalogue, OPAC, circulation, member management, and acquisitions package. Koha is used by public libraries, private collectors, not-profit organizations, churches, schools, and corporate. To install koha for use following configuration is required. It requires a Linux server, apache, MySQL, Perl, Root on the server, a reasonable level of command with command line and database administration skill.

Paul Poulain had begun adding multiple language support to koha in 2001.Koha is available in several language viz. English, French, Chinese, and Arabic etc. An Ohio based company LibLime was established in 2005 to support koha. It supports the international bibliography records and cataloguing standards MARC21, UNIMARC, Copy Cataloguing and Z39.50. It runs on different platform like Linux, MacOSx, FreeBSD, Solaris, and Windows. Originally developed on the Linux OS, is written in Perl, uses Apache web server, has better support for multi-RDBMS like MySQL, PostgreSQL. OPAC interface is in CSS with XHTML. Koha-3.x supports Zebra full text search engine as backend, in addition to MySQL / PostgreSQL.

Main Features:

- A full acquisitions module complete with budgets, book funds, suppliers and exchange rates. Simple acquisitions for the smaller library.
- Circulation: a fully featured circulation with circulation rules customizable to needs of your library.
- An OPAC: the public side of Koha. This has all the features you would expect, plus enhanced content from sources like Amazon, Google Books, etc.
- Flexible reporting: you have access to all the data in the database and a reporting

engine is provided to help you query it.

- Customizable item types: you can choose exactly how you want to catalogue your items. This flexibility also allows Koha to be used to manage inventory such as cameras or computers. Able to catalogue websites as items, or have them as links to existing records.
- Barcode scanning: Koha works in a web browser, so any scanner that works with your PCs can be used with Koha.
- Barcode printing: Koha can be used to print barcodes and spine labels.
- User management: Koha manages your users, including integration with systems like LDAP, Radius, Active Directory and SAML, to allow single sign-on.
- Koha uses a full text indexing engine to allow for fast and powerful searching of all of your metadata.
- Mature support for all major library standards including MARC21, UNIMARC, Z39.50, SRU/SW, SIP2 and many more.
- Automated overdue notices either by email or SMS. Koha can also send advance notices to warn a borrower that an item is nearly due. Koha can email issue slips instead of printing them at point of circulation.
- Koha can work in consortia, multi-branch or single-branch mode.
- Koha has been translated into many languages including Te Reo Māori.
- Koha has an offline circulation module.
- Self Check: Koha can be used with any SIP2 compliant self-check machines.
- Faceted search: Search results are classified for easier drilling down.

NEWGENLIB

NewGenLib is library automation software. It was developed by over a 4 year joint effort between professional charitable trusts, Kesavan Institute of Information and Knowledge Management (KIIKM) and a software development company Verus Solutions Pvt Ltd (VSPL) , both in Hyderabad in India. It was developed in March 2005. It was totally proprietary library software but 9th Jan.2008, it was declared as open source software under GNU GPL v3 License. It has abilities a library manage its housekeeping operation, viz., acquisition of book and other materials creation and maintenance of its catalog database, circulation of its holdings, etc. NewGenLib allow library to define its own network of libraries. One library in the network called Host library install the software on its public domain server and then configures other libraries as Associate libraries on its network.NewGenLib can be installed on Linux and Window operating system. It has Compatibility - Complies with international metadata and interoperability standards: MARC-21, MARC-XML, z39.50, SRU/W, OAI-PMH

Main Features

- Functional modules are completely web based. Uses Java Web Start Technology.
- Compatibility - Complies with international metadata and interoperability standards: MARC-21, MARC-XML, z39.50, SRU/W, OAI-PMH.
- OS independent - Windows and Linux flavors' available and Uses chiefly open source components.
- Easily extensible to support other languages and Data entry, storage, retrieval in any (Unicode 3.0) language.
- z39.50 Client for federated searching

- Supports multi-user and multiple security levels and Allows digital attachments to metadata.
- Networking – Hierarchical and Distributed networks
- Scalable, manageable and efficient
- RFID integration
- Automated email/instant messaging integrated into different functions of the software
- Form letters are configurable and use XML-based Open Office templates
- Extensive use of set up parameters enabling easy configuration of the software to suit specific needs, e.g., in defining patron privileges

EVERGREEN

The Evergreen Project develops an open source consortia quality ILS (integrated library system) used by over 1000 libraries around the world. The software, also called Evergreen, is used by libraries to provide their public catalog interface as well as to manage back-of-house operations such as circulation (checkouts and checking) , acquisition of library materials, and (particularly in the case of Evergreen) sharing resources among groups of libraries.

The Evergreen Project was initiated by the Georgia Public Library System (GPLS) in September 2006 to support Public Information network for Electronic services (PINES) . Equinox Software is the company that provides support, development, migration service and other service for library using evergreen.

Main features:

- Evergreen is a metadata search engine
- Evergreen is a transaction processing engine
- Evergreen is just another web application
- Evergreen is based on a robust, scalable, message-passing framework – Open SRF
- Search the collection
- See the details of the records as well as their availability
- Reserve items
- Request for check-out
- View their transaction history
- View their current check outs and also renew them
- View their current reservations and also cancel them
- View their current requests for check-out and also cancel them
- List of new arrivals
- Login using their Library card number/Email id

Digital Library Software

The term "Digital Library" has a variety of potential meanings, ranging from a digitized collection of material that one might find in a traditional library through to the collection of all digital information. However, it is not merely equivalent to a digitized collection with information management tools. It is also a series of activities that brings together collections, services, and people in support of the full life cycle of creation, dissemination, use, and preservation of data, information, and knowledge.

The creation and maintenance of digital libraries is imperative with growing amount

of information available in the digital format. Building digital libraries needs a fair amount of knowledge of information management tools such as databases, web technology, information retrieval, user interface, etc. The usability of hosted resources is as important as the quality of information presented. The Digital Library toolkits discussed below are fairly integrated set of solutions to build digital libraries with born digital resources. However, converting existing hard copy documents into digital format would require few more tools like scanner, optical character recognition (OCR) software, word processing software, image editing tools, etc.

Following are few major open source digital library software:

GREENSTONE

Greenstone is a suite of software for building and distributing digital library collections. It provides a new way of organizing information and publishing it on the Internet or on CD-ROM.Greenstone is produced by the New Zealand Digital Library Project at the University of Waikato, and developed and distributed in cooperation with UNESCO and the Human Info NGO. It is OPEN-SOURCE, multilingual software, issued under the terms of the GNU General Public License. The aim of the Greenstone software is to empower users, particularly in universities, libraries, and other public service institutions, to build their own digital libraries. The complete Greenstone interface, and all documentation, is available in ENGLISH, FRENCH, SPANISH, RUSSIAN and KAZAKH. Greenstone also has interfaces in many other languages.

Main Features:

- Structured Metadata in XML using DC
- Support for image, video, and text collection
- Hierarchy Structure
- Concurrent & Dynamic Content Development
- Support for multilingual collection building
- Z39.50 client available on Linux and Windows systems
- Highly portable collection, can easily be distributed even on a CD-ROM

D-SPACE

D-Space is a specialized type of digital asset management or content management system. It manages and distributes digital items, made up of digital files and allows for the creation, indexing, and searching of associated metadata to locate and retrieve the items. It is designed to support the long-term preservation of the digital material stored in the repository. D-space is also intended as a platform for digital preservation activities. Since its release in 2002, as a product of the HP-MIT Alliance, it has been installed and is in production at over 1528 institutions around the globe, from large universities to small higher education colleges, cultural organizations and research centers. It is shared under a BSD licence, which enables users to customize or extend the software as needed.

Main Features:

- **Institutional Repository:** D-Space is organized to accommodate the multidisciplinary and organizational needs of a large institution.
- **Document Formats:** Support for a Variety of Digital Formats and Content Types including text, images, audio, and video

- **Access Control:** D-Space allows contributors to limit access to items in D-Space - at the collection and the individual item level.
- **Digital Preservation:** D-Space provides long-term physical storage and management of digital items in a secure, professionally managed repository including standard operating procedures such as backup, mirroring, refreshing media, and disaster recovery.
- **Search and Retrieval:** The D-Space submission process allows for the description of each item using a qualified version of the Dublin Core metadata schema.

FEDORA

Flexible Extensible Digital Object and Repository Architecture (Fedora) is software to build a digital object repository management system. Fedora was originally developed by researchers at Cornell University as architecture for storing, managing, and accessing digital content in the form of DIGITAL OBJECTS inspired by the Kahn and Wilensky Framework. Fedora defines a set of abstractions for expressing digital objects, asserting relationships among digital objects, and linking "behaviors" to digital objects. Fedora provides a core repository service (exposed as web-based services with well-defined APIs) . In addition, Fedora provides an array of supporting services and applications including search, OAI-PMH, messaging, administrative clients, and more. Fedora provides RDF support and the repository software is integrated with semantic triple store technology, including the Mulgara RDF database. Fedora helps ensure that digital content is durable by providing features that support digital preservation. The FEDORA COMMONS refers to the community surrounding the Fedora Repository Project. This community joins together with common needs, use cases, and projects. The Fedora Commons community is very active in producing additional tools, applications, and utilities that augment the Fedora repository. Many of these creations are available to the entire community as open source.

Main Features:

- **Web Services:** The interface to the Fedora repository system consists of three open APIs that are exposed as web services: Management API known as API-M, Access API known as API-A, and Access-Lite API known as API-A-Lite.
- **Datastreams:** Objects in a repository may consist of content and metadata (datastreams) that physically reside inside the repository or outside the repository. The Fedora repository system supports content of any MIME type.
- **XML Submission and Storage:** Digital objects are stored as XMLencoded files that conform to an extension of the Metadata Encoding and Transmission Standard (METS) schema. The schema for the extended version of METS used by Fedora can be found at http://www.fedora.info/definitions/1/0/mets-fedora-ext.xsd**.**
- **OAI Metadata Harvesting Provider:** The Fedora metadata is accessible using the OAI Protocol for Metadata Harvesting, v2.0.
- **Parameterized Behaviors:** Behaviors defined for an object support user supplied options that are handled at dissemination time.
- **Versioning:** Although not fully implemented in release 1.1, the Fedora repository system includes the infrastructure to support versioning of digital objects and their components.
- **Access Control and Authentication:** Release 1.1 includes a simple form of access

control to provide access restrictions based on IP address. IP range restriction is supported in both the Management and Access APIs.

Content Management Software

Content Management System (CMS) is the set of processes and technologies that support the collection, managing and publishing of information over internet. While early CMS software was used to manage documents and local computer files, most CMS systems are now designed exclusively to manage content on the Web. With the use of CMS many types of content can be organized and published, and the layout, appearance and structure of the site can be changed easily and quickly, as it is based on templates and therefore content is separate from presentation - unlike a normal hard-coded site. If you want to change your content, it can be edited online and goes live immediately. Plug-ins can be used to add Functions and features as and when you need. Different content can be served to different visitors, according to their language or location. Visitor interaction can be increased compare to static or HTML site.

The greatest advantage of using CMS for content management lies in the fact that the users are not required to have any knowledge of Hypertext Markup Language (HTML) to create websites or post content on the website

Advantage of using CMS in libraries

Content Management System (CMS) provide a new dimension to the way services can be provided by the libraries. CMS can be used in libraries to:

- Develop library websites
- Manage digital content in various formats like Text, Image, Audio, Video Scientific data etc.
- Provide library users with an interactive interface
- Increase user participation in library activities/ Services
- Allow development of shared content for the library
- Allow user participation in content development
- Aid in easy storage and retrieval of data
- Reduce repetitive duplicate inputs

Some major open source Content Management softwareare as following:

JOOMLA

Joomla is one of the most powerful Open Source Content Management Systems. It is a free open source and content publishing system designed for creating highly interactive Multilanguage Web sites in short time like online communities, media, portals, blogs and E-commerce applications. Joomla is a universal free open source content management system. Universality means you can customize it as you wish. In many cases Bloggers used WordPress blogging platform. This is a natural choice, but you can also blog with Joomla. You can set page by selecting appropriate template. You can choose from thousands of free templates or select paid one for professional design. You can add additional functionality using add-ons. There are lots of extensions available at Joomla for free and for some you have to pay. And if for any reason you cannot find appropriate you can build it from scratch according to your requirements. As Joomla is open source you can also change code of the page layout according to your need by hiring web

developer and enjoy the freedom.

Main Features:

- User Management
- Media Manager
- Banner Management
- Contact Management
- Polls
- Search
- Web Link Management
- Content Management
- Syndication and Newsfeed Management
- Template Management
- Integrated Help System
- System Features
- Web Services
- Powerful Extensibility

Apart from above Joomla has nice Community. The most active members provide you faster response to your queries. You canask anything about your problem and be sure that you will get an answer in short time. The community is strong and helpful.

Joomla also have strong Developers that worked to make Joomla better and better every time. Always ready to find out the problem and its solutions. Add-ons make Joomla more efficient, you can find lots of free add-ons, components, modules, templates on the new developers' site on Joomla.org. You can also find commercial or ask for custom add-ons, modules, components or templates. Joomla is very easy to use and update. Even a novice can work with Joomla. It's simple to use, but has a lots of features if you need. Installing Joomla is on single click. You can configure in a few minutes. There are lots of extensions available in Joomla like Shopping Carts, Forums, Calendars & Events, Ad serving tools, Search, Google Maps, Business & People, Directories, Classified Ads, Community Portal Tools, Reservations, Automated Backup, Newsletters, Polls Quizzes, Blogs & News, Image Galleries & Portfolio Tools, and Project Management & Groupware & Many More.

DRUPAL

Drupal is an open source platform for building robust, flexible websites. It is used by all over the world here are some of thereasons why it is best. Drupal is a CMS which allows user to update their web pages without technical knowledge and ensurethat it fits your organization's workflow. Unlike printed materials, web site should be dynamic. Drupal is a dynamic platform that will grow as your need expands. By adding features like advanced search, auto-tagging, and internationalization, you'll allow users to explore your web content in different ways. Drupal can be installed in multiple languages, allowing both administrators and users to view a site in their own language. You can customize Drupal according to your content, user and features of organization that make shine in front of others. You do not have to relying on vendors, Drupal have large developer community which provides support, security, testing, documentation for your web site. Whenever you hear about next big enhancement in web design, Drupal is always there.

Drupal community member makes Drupal better and better.

Main Features:
- Administer
- Build
- Collaborate
- Connect
- Create
- Design & Display
- Extend
- Organize & Find

WORDPRESS

WordPress is initially designed as a blogging platform, in the last several years WordPress has changed itself as a useful content management system. One of the main advantages of WordPress is the large number of plug-ins released by independent developers. In fact, every aspect of web site regarding the creation, organization and search engine optimization can be now handled with the use of WordPress plug-ins. Actually these plug-ins are add-ons and improve the functionality of the user interface. With lots of WordPress plugins available it becomes popular in the public. Lots of people confused in selecting plug-ins to simplify a particular task. For them, there is a large WordPress community ready to advice how to use them with WordPress content management system.

Main Features:
- Full standards compliance
- No rebuilding
- WordPress Pages
- WordPress Themes
- Cross-blog communication tools
- Spam protection
- Full user registration
- Password Protected Posts
- Easy Importing
- XML-RPC interface
- Workflow
- Intelligent text formatting
- Multiple authors

Conclusion

There are number of positive impact of OSS in the field of Libraries.When it is applied at operational level in libraries it can boost the services in libraries. OSS has also provided a new ways and means to the libraries in the era of information explosion to organize and manage their library database, collections, services and facilities without too much expenditure on infrastructure development in the libraries. The small and unaided libraries are using the OSS freely to automate their library house-keeping operations to fulfill the informational need of their users. OSS has also provided opportunity to users to

modify the software by using the source for the better service. No doubt the hardware costs have to be borne by libraries but the availability of efficient OSS has considerably cut down the software costs.As the cost of reading materials and software for library automation are increasing in the leaps and bound, OSS is the right and ultimate solution to automate the services in the libraries to serve maximum users at the minimum cost.

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