

Transforming Libraries into Learning Centres using Open Source Technologies

P V Konnur

Hasan Jamal Abidi

Abstract

This paper describes the list of Open Source technologies that can be implemented in an Open Library: Integrated Library Management System, Learning Management System and Document Management System.

Keywords: Open Source, Intergated Library Management System

1. Introduction

Open source is a development method for software that harnesses the power of distributed peer review and transparency of process. The promise of open source is better quality, higher reliability, more flexibility, lower cost, and an end to predatory vendor lock-in. Open Source technologies are catching up in all domains and the library domain is not left behind. One of the greatest advantages of Open Source is the freedom. The users have the following advantages.

- ◆ Free Redistribution: Software can be downloaded free and can also be further distributed to others free of cost
- ◆ Source Code: Not only the binaries but sources are also available.
- ◆ Derived Works: Source code can be modified and distributed further. But the author's ownership and license must be distributed along with the derived works
- ◆ Integrity of the Author's Source Code
- ◆ No discrimination against persons or groups
- ◆ No discrimination against fields of endeavor
- ◆ Distribution of license
- ◆ License must not be specific to a product
- ◆ License must not restrict other software
- ◆ License must be technology-neutral
- ◆ The availability of the source code and right to modify it is very important.
- ◆ The right to redistribute modified and improved code
- ◆ The right to use the software in any way
- ◆ There is no one with the power to restrict in a unilateral way how the software is used
- ◆ There is no single entity on which the future of the software depends
- ◆ No "black boxes" are possible
- ◆ There is always the possibility of "forking": If the community feels that the system is taken in a wrong direction, there is always a possibility of forking. The community can host the source code and start developing it on its own.
- ◆ No per-copy fees can be asked for modified versions



- ◆ There are fewer conflicting priorities due to marketing pressures
- ◆ It provides a new forum for democratic action

2. Integrated Library Management System

This is obviously the most important component of a library. The integrated library management system must have the following modules:

- ◆ Acquisitions
- ◆ Serials Management
- ◆ Technical Processing
- ◆ Circulation
- ◆ Online Public Access Catalogue
- ◆ MIS Reports

In the present day world, the following open source Integrated Library Management Systems are worth to be noted:

- ◆ Koha
- ◆ NewGenLib
- ◆ Avanti
- ◆ PHPMyLib
- ◆ Open Biblio

2.1. Koha : It is the oldest among the lot and used by a large user community. It was initially developed in New Zealand by Katipo Communications Ltd and first deployed in January of 2000.

2.2. NewGenLib, is the result of collaboration between specialists in library automation and software specialists. The software was developed over a 4-year joint effort between a professional charitable trust, Kesavan Institute of Information and Knowledge Management (KIIKM) and a fledgling software development company, Verus Solutions Pvt. Limited (VSPL), both in Hyderabad, India.

3. Learning Management System (LMS)

The second component that would transform a library into a Learning center is a Learning

Management System. Though there are many open source Learning Management Systems available. The best among the lot is Moodle.

3.1. Moodle

It is a Course Management System (CMS) - an open source software package designed using sound Pedagogical principles, to help educators create effective online learning communities and courses with opportunities for rich interaction. It can scale from a single-teacher site to a University with 200,000 students. The word Moodle is actually an acronym for Modular Object-Oriented Dynamic Learning Environment

3.1.1. Features

- ◆ Moodle has many features expected from an e-learning platform, plus some original innovations (e.g. its filtering system).
- ◆ Moodle promotes a social constructionist pedagogy (which includes collaboration, activity-based learning, critical reflection, etc)
- ◆ Moodle is suitable for 100% online classes as well as supplementing face-to-face learning
- ◆ Moodle has a simple, lightweight, efficient, compatible, low-tech browser interface
- ◆ Course listings show descriptions for every course on the server, including accessibility to guests.
- ◆ Courses can be categorized and searched - one Moodle site can support thousands of courses
- ◆ Most text entry areas (resources, forum postings, journal entries etc) can be edited using a capable, embedded WYSIWYG HTML editor

3.1.2. Functionality Modules

3.1.2.1. Site Management

- ◆ Site is managed by an administrator user
- ◆ Site is defined during setup. Defaults can be edited during setup or globally accepted

- ◆ Site can be modified by a robust Site administration block.
- ◆ Plug-in “themes” allow the administrator to customize the site colors, fonts, layout etc to suit local needs
- ◆ Plug-in activity modules can be added to existing Moodle installations
- ◆ Plug-in language packs allow full localization to any language. These can be edited using a built-in web-based editor. Currently there are language packs for over 70 languages.
- ◆ The code is clearly-written PHP under a GPL license - easy to modify to suit your needs

3.1.2.2. User Management

A. Overview

- ◆ Goals are to reduce admin involvement to a minimum, while retaining high security
- ◆ Supports a range of authentication mechanisms through plug-in authentication modules, allowing easy integration with existing systems.
- ◆ Standard email method: students can create their own login accounts. Email addresses are verified by confirmation.
- ◆ LDAP method: account logins can be checked against an LDAP server. Admin can specify which fields to use.
- ◆ IMAP, POP3, NNTP: account logins are checked against a mail or news server. SSL, certificates and TLS are supported.
- ◆ Students are encouraged to build an online profile including photos, description. Email addresses can be protected from display if required.
- ◆ Every user can specify their own timezone, and every date in Moodle is translated to that timezone (e.g. posting dates, assignment due dates etc)

- ◆ Every user can choose the language used for the Moodle interface (English, French, German, Spanish, Portuguese etc)

B. Enrollment

- ◆ Teachers can add an “enrollment key” to their courses to keep out non-students. They can give out this key face-to-face or via personal email.
- ◆ Teachers can enroll students manually if desired
- ◆ Teachers can unenroll students manually if desired, otherwise they are automatically unenrolled after a certain period of inactivity (set by the admin)
- ◆ External database: any database containing at least two fields can be used as an external authentication source.
- ◆ Each person requires only one account for the whole server - each account can have different access
- ◆ Meta courses can group together related courses so participants can interact with each other

C. Roles

- ◆ Roles for specific participants can be defined for each course
- ◆ An admin account controls the creation of courses and creates teachers by assigning users to courses
- ◆ Course creators can create courses, teach in them, and assign others to teacher roles.
- ◆ Teachers are a role in a specific course.
- ◆ Non-editing teacher roles are available for adjuncts, and part-time tutors.

3.1.2.3. Course management

A. Overview

- ◆ A full teacher has full control over all settings for a course, including restricting other teachers

- ◆ Choice of course formats such as by week, by topic or a discussion-focused social format
- ◆ Course Themes. A course can have its own theme of colors and layout.
- ◆ Flexible array of course activities - Forums, Quizzes, Glossaries, Resources, Choices, Surveys, Assignments, Chats, Workshops
- ◆ Groups - teacher(s) and students can be placed in one or more groups
- ◆ Recent changes to the course since the last login can be displayed on the course home page - helps give sense of community
- ◆ Most text entry areas (resources, forum postings etc) can be edited using an embedded WYSIWYG HTML editor
- ◆ All grades for Forums, Quizzes and Assignments can be viewed on one page (and downloaded as a spreadsheet file)
- ◆ Full user logging and tracking - activity reports for each student are available with graphs and details about each module (last access, number of times read) as well as a detailed “story” of each students involvement including postings etc on one page.
- ◆ Mail integration - copies of forum posts, teacher feedback etc can be mailed in HTML or plain text.
- ◆ Custom scales - teachers can define their own scales to be used for grading forums and assignments
- ◆ Courses can be packaged as a single zip file using the Backup function. These can be restored on any Moodle server.

3.1.3. Technical Specifications

- ◆ Moodle runs without modification on Unix, Linux, Windows, Mac OS X, NetWare and any other system that supports PHP (which includes almost every web hosting provider).

- ◆ Moodle is designed in a modular way, and allows a great deal of flexibility to add (and remove) functionality at many levels.
- ◆ Moodle upgrades very easily from one version to the next - it has an internal system to upgrade it’s own databases and repair itself over time.
- ◆ Moodle requires only one database (and can share it with other applications if necessary).
- ◆ Moodle includes comprehensive database abstraction that supports many major brands of database.
- ◆ Emphasis on strong security throughout. Forms are all checked, data validated, cookies encrypted etc

Data is stored in a single database, makes full use of database abstraction so that installers can choose from one of many types of database servers (Postgress, MySQL, Oracle and Microsoft SQL Server).

4. Content Management System

Content Management Systems help in co-operative authoring of content in an organization. The Library facilitating such an activity contributes to Knowledge Management in an organization. There are a couple of open source Content Management Systems available: Drupal, Joomla, and Word Press. The best among them or rather the best supported and biggest community is held by Drupal.

Drupal is an open source modular framework and content management system (CMS) .It allows an individual or a community of users to easily publish, manage and organize a wide variety of content on a website. Tens of thousands of people and organizations are using Drupal to power scores of different web sites, including:

- ◆ Community Web portals and discussion sites
- ◆ Corporate Web sites/intranet portals
- ◆ Personal Web sites
- ◆ Aficionado sites
- ◆ E-commerce applications
- ◆ Resource directories

4.1. Features

4.1.1. Search Engine Optimization

Drupal is probably one of the best CMS in terms of SEO, it correctly uses heading tags, has a easy to manage API for meta tag usage and uses clean URLs with only one press of a button. It's basic SEO capabilities are expanded by vast array of modules .

4.1.2. Content Creation

Content creation is where Drupal excels both in creation but also in how it handles and displays content, again due to the modular nature of Drupal can create multiple types of content, its basic content types are story, page, blog, book each has a different use and purpose, new content type's can be created with various fields through the use of CCK.

Content can be displayed in many forms and Drupal has a powerful taxonomy system for creating categories this is one of its most versatile features but is not very newbie friendly requiring a firm understand of the terminology used.

4.1.3. User Interaction

Drupal does have a commenting system out of the box which can be set to work with any content type, so for example users and visitors can comment on a story or page with little or no effort, like any other aspect of Drupal this is expanded by a wealth of modules. Drupal can be used as a blogging platform, though, this was not it's intended purpose and requires additional modules to handle trackbacks.

4.1.4. Security

- ◆ Security from hackers – Drupal has few problems with security and the Drupal team not only monitor security of Drupal but also provide security information for contributed modules, however, it is worth subscribing to the security mailing lists.
- ◆ Access control – Drupal has a powerful permission based system, allowing users to be assigned very granular permissions as well as a role based system which makes Drupal based systems one of the most flexible systems when it comes to assigning users access rights.
- ◆ Drupal also contains many built-in features and is easily extensible with a vibrant community supporting and adding to the portfolio of additional features. The basic features include:
 - ◆ Friendly URLs using Apache's mod_rewrite capability
 - ◆ Easily extensible using Drupal's module framework (The community has developed many useful modules that provide functions such as taxonomy display, jabber authentication, private messages, bookmarks, and so on.)
 - ◆ A personalization environment for individualized content and presentation based on user preferences
 - ◆ Role-based permission system to define access to the viewing and editing of content
 - ◆ Content is fully indexed to support search
 - ◆ Drupal is written on top of a database abstraction layer, so the framework can be easily extended to other database back ends
 - ◆ Support for other content forms such as polls, threaded comments, and discussions and content syndication
 - ◆ Separation of content from styling in a templating system that uses HTML, CSS, and PHP

- ◆ Administrative support for logging, analysis, and Web-based administration
- ◆ The extended features include:
 - ◆ Creating an extranet environment — a closed access site that requires authentication before seeing any information
 - ◆ Session expiration based on user interaction with the Web site
 - ◆ A terms and conditions policy implementation
 - ◆ An extension of the existing content editing interface to provide “in place” editing (For example, show an authorized user what they can edit in the context of the Web page and allow them to elect to edit that content there and then.)
- ◆ Management of announcements to publicize general information that all members should see
- ◆ Management of working groups mission, current status, action items, and so on
- ◆ Management of the creation of conference sessions and agendas using Ajax to help the administrative interface
- ◆ An extended view and administrative interface for member information and the search of this information
- ◆ Additional blocks of information displayed as a sidebar to display contextual data based on the members role and data they own or create
- ◆ A weekly digest of information e-mailed to members interested in specific areas of content

4.2. Functionality Modules

4.2.1. Core modules

Drupal core also includes “core modules” which can be enabled by the administrator to extend the stock functionality of the core Web site.

The core Drupal distribution provides a number of features, including:

- ◆ Access statistics and logging
- ◆ Advanced search functions
- ◆ Caching and feature throttling for improved performance under load
- ◆ Comments, forums, and polls
- ◆ Descriptive URLs (for example, “www.example.com/products” rather than “www.example.com/?q=node/432”)
- ◆ Multi-level menu system
- ◆ Multi-user content creation and editing
- ◆ OpenID support
- ◆ RSS Feed and Feed Aggregator
- ◆ Security/new release update notification
- ◆ User profiles
- ◆ Various access control restrictions (user roles, IP addresses, email)
- ◆ Workflow tools (Triggers and Actions)

4.2.2. Technical Specifications

- ◆ Drupal will work on Apache 1.3 or Apache 2.x hosted on Unix/Linux or Windows. The majority of Drupal development is done using Apache so there is more community experience and testing performed.
- ◆ You can use the Apache ‘mod_rewrite’ extension to allow for clean urls.
- ◆ MySQL 5.0 or PostgreSQL 7.4 or higher can be used as database
- ◆ Developed in PHP

5. Conclusion

Open source technologies libraries offer a greater freedom in using the software without any restrictions on “How it has to be used?” They also have the liberty to migrate, upgrade and update

without any hassles. The Open Source is used synonymous with Free, which is absolutely wrong. At times the initial implementations cost of Open Source technologies is costlier than proprietary ones, but their running costs are usually very low compared to proprietary software. Open Source may synonymously used with the word Freedom.

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About Author

Dr. P V Konnur, University Librarian, Bangalore
University Library, Jananabharati, Bangalore-560056
E-mail : konnur@bub.ernet.in

Dr. Hasan Jamal Abidi, Deputy Librarian,
Dr Zakir Husain Library, Jamia Millia Islamia,
Jamia Nagar, New Delhi