UNIT 3 LIBRARY AUTOMATION – SOFTWARE PACKAGES

Structure

- 3.0 Objectives
- 3.1 Introduction
- 3.2 History, Evolution and Generations
 - 3.2.1 Historical Foundation
 - 3.2.2 Evolution
 - 3.2.3 Generation of Packages
- 3.3 Categorisation of ILS
 - 3.3.1 Categorisation by Distribution Policy
 - 3.3.2 Categorisation by Place of Origin
- 3.4 Open Source Software Packages
 - 3.4.1 Evergreen
 - 3.4.2 Koha
 - 3.4.3 NewGenLib
 - 3.4.4 PMB
- 3.5 Commercial Software Packages
 - 3.5.1 LibSys
 - 3.5.2 SLIM
 - 3.5.3 SOUL
 - 3.5.4 Virtua ILS
- 3.6 Freeware ILS
 - 3.6.1 ABCD
 - 3.6.2 E-Granthalaya
 - 3.6.3 WEBLIS
- 3.7 Evaluation of Software Packages
 - 3.7.1 Generic Parameters of Evaluation
 - 3.7.2 Specific Parameters of Evaluation for Commercial ILSs
 - 3.7.3 Specific Parameters of Evaluation for Freeware and Open Source ILSs
- 3.8 Global Recommendations
- 3.9 Summary
- 3.10 Answers to Self Check Exercises
- 3.11 Keywords
- 3.12 References and Further Reading

3.0 OBJECTIVES

After going through this Unit, you will be able to:

- understand historical background, evolution and generation of library automation software packages;
- categorise library automation software as per origin and distribution policies;

- identify features and specialties of major commercial and open source software packages in the domain of library automation; and
- know the processes for evaluating library automation packages and understand the trends in developing library automation software packages.

3.1 INTRODUCTION

In this Unit we are going to study the library automation packages. We have already covered different aspects of library automation in Unit 1 and processes and workflows of library systems in Unit 2. This Unit aims to introduce you to the applications of library automation software for different workflows in a library system and its roles in providing information services to users and MIS services to library staff. Mukhopadhyay (2006) outlined the role of typical library automation software for two major subsystems of a library – operational subsystem and administrative subsystem (see Fig. 3.1).



Fig. 3.1: Role of library automation software in integrated setup Source: Mukhopadhyay, 2006

The above-mentioned roles of an ILS are supplemented by many other valueadded features like online acquisition, FRBRised cataloguing, RFID-enabled circulation, member card printing, bar-coding of accession number and member ID, predictive mode of serials control, interactive OPAC, federated searching, extensive reports and statistics in different formats for supporting decision making process etc. Obviously, these enhanced features added into basic core modules over the time, with the improvements in technologies particularly relational data model, web architecture, multilingual technologies, linked open data and with the development of global open standards in the domain of library automation. Presently library automation software are maturing rapidly with the advent of the above technologies.

3.2 HISTORY, EVOLUTION AND GENERATIONS

We already covered the progress of library automation for the last fifty years in Unit 1. This section is trying to associate the development of library automation software with the fundamental improvements in library automation itself.

3.2.1 Historical Foundation

Library automation began in 1930's with the use of punched card equipments in circulation and acquisitions processes in developed countries like US. But you already know from unit 1 that the computer systems applied in automating libraries in late 1960s with the use of low-cost PCs as hardware support and with the development of in-house software for managing processes related to acquisition, cataloguing and circulation. It may safely be said that right from the beginning of library automation, software played the most important role. However, software by definition is the representation of human knowledge in the forms of bits and bytes. In this sense software may be viewed as digital version of human knowledge not just as a set of related programs. Similarly, library automation software are based on knowledge and experiences acquired by library professionals over centuries. These software tools are helping in easy and effective management of housekeeping operations. Such software is also supporting dissemination of information services and helping library staff in administrative activities. Presently almost all library automation software are integrated systems, based on relational database architecture. In such systems files are interlinked so that deletion, additions and other changes in one file automatically activate appropriate changes in related files. The use of library automation software is rapidly increasing in India right from 1995. Almost all special libraries and large academic libraries in India adopted integrated library system. Recently public libraries and college libraries all over the country are either adopting automation software or planning actively to go for library automation with the advent of globally competitive open source ILSs (available free of cost and can be customised extensively). There are also supports from governments in adopting open source ILS, for example, National Library Mission (Ministry of Culture, Govt. of India) advocated to adopt Koha (an open source globally reputed ILS) for automating public libraries, Kerala State Government declared Koha as the official ILS for the public libraries in the state and almost 250 public libraries have already been automated by using Koha in West Bengal. A network of public libraries in Konkan area is automated through Koha (see granthalaya.org). Ministry of HRD, Government of India through it N-LARN project under NMEICT (see n-larn.ac.in) is helping college libraries under UGC and AICTE in adopting Koha for library

DU PLE'S SITY automation. Overall, libraries in India are moving towards a large-scale implementation of library automation in different parts of the country.

3.2.2 Evolution

You already know after covering the Unit 1 that the library automation process underwent five eras on the basis of technological improvements in computer programming, database management system, network capabilities and web integration. To respond these changes, library automation software also improved considerably through five different generations. Mukhopadhyay in 2006 reported a comparative account of four generations of ILSs. Use of cloud computing, web-scale management, linked open data and web 2.0 technologies initiated the fifth generation of ILSs. This section points out major technological features of five different generations of ILSs and next section (3.2.3) gives a comparative account of five generations of library automation software against the features earmarked by Mukhopadhyay (2006).

- The first generations ILS packages were piecemeal, non-integrated and nonportable across hardware architectures and software platforms. These packages were module-based systems with no or very little integration between modules. Circulation module and cataloguing module were the priority issues for these systems and were developed to run on specific hardware platform and proprietary operating systems;
- The most important achievements in second generation of packages were hardware and platform independence. The second generations ILSs become portable between various platforms with the introduction of UNIX and DOS based systems. The ILSs of this generation offer links between systems for specific functions and are command driven or menu driven systems;
- The most important features in third generation of packages were GUI, seamless integration of modules and relational model based client-server architecture. The third generations ILS packages are fully integrated systems based upon relational database structures and client-server architecture. They embodied a range of standards, which were a significant step towards open system interconnection. Colour and GUI features, such as windows, icons, menus and direct manipulation have become standards and norms in this generation;
- Web architecture, Unicode and digital media archiving were the major attributes of the fourth generation ILSs. The fourth generations ILSs were based on web-centric architecture and facilitate access to other servers over the Internet. These systems were Unicode complaint and allow accessing multiple sources from one multimedia graphical user interface; and
- The present of the fifth generation ILSs are adopting rapidly cutting edge technologies like web-scale management, cloud computing, web 2.0 features on the basis of AJAX (Asynchronous Java and XML) technology, Application Program Interface (API), and linked open data. Rising of open source ILSs and implementation of open standards are also remarkable features of this generation.

The progress of ILSs through five different generations improved functionalities, enhanced user access to library resources in 24X7 mode, facilitated new generation

information services, achieved interactive user interfaces, and supported multilingual data processing.

3.2.3 Generation of Packages

Library automation software are categorised into four different generations on the basis of core attributes of the packages like software architecture, programming language, internal DBMS, module integration capabilities etc. (Mukhopadhyay, 2006). This categorisation adopted by many researchers in the domain of library automation (see http://shodhganga.inflibnet.ac.in/ jspui/handle/10603/9406). Table 3.1 provides a comparative study of five different generations of ILSs in the same line with bit modifications in parameters.

Sl. No.	Features	1 st Generation	2 nd Generation	3 rd Generation	4 th Generation	5 th Generation
1	Programming Language	Low level language	COBOL, PASCAL, C	4 GL	OOPS	AJAX
2	Operating System	In house	Vendor Specific	UNIX, MSDOS	UNIX, Windows and Linux	Mainly Linux distributions
3	Data model	Non- standard	Hierarchical and Network model	Entity- Relation model	Object oriented model	Support for FRBR, FRAD and FRSAD
4	Import/Export	None	Limited	Standard	Fully integrated and seamless	Distributed across formats through XML
5	Communication	Limited	Some interface	Standard	Full connectivity across Internet	Support for Linked Open Data
6	Standards support	Limited and proprietary	Improved for bibliographic data	Bibliographic and authority data	Standards for all modules	Emphasis on open interoperability standards
7	Portability	Machine dependent and hardware specific	Machine independent but Platform dependent	Multi-vendor	Multi-vendor and Platform independent	Complete portability
8	Reports and sattistics	Fixed format, limited fields and statistics	Fixed format, unlimited fields and moderate statistics	Customised report generation and wide statistical range	Customised report generation with e mail interface and statistics in different formats	Complete control over report elements and comprehensive statistics generation
9	Media	None	None	Available in limited way	Fully available with Multimedia	All formats for digital objects

Table 3.1: Five generations of ILSs

Libial y Automation

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۱ 	10	Capacity of record holding	Limited	Improved	Unlimited	Unlimited	Unlimited
	11	Module Integration	None	Bridges	Seamless	Seamless and object oriented	Seamless with API for new modules
	12	Architecture	Stand- alone	Shared	Client- Server	Web-centric/ Distributed	Cloud and Web-scale
	13	Interface	Command driven (CUI)	Menu driven (CUI)	Icon driven (GUI)	Icon driven with Web and Multimedia (GUI)	Web 2.0- enabled interfaces
	14	User Support	Single user	Limited number of users	Unlimited number of users	Unlimited number of users	Unlimited concurrent users
	15	Multi-lingual support/ UNICODE	None	Limited (through Hardware support)	Standard	UNICODE based	UNICODE with embedded virtual keyboard for languages
	16	External resource integration	None	None	Limited	Improved	Full integration with external datasets
	17	Discovery and Federated searching	None	None	None	Limited	Support for federated search
Î	18	Distribution mode	Close and in-house	Close and proprietary	Close and proprietary	Both close and open source	Mainly open source

Self Check Exercises

2)

Note: i) Write your answers in the space given below.

- ii) Check your answers with the answers given at the end of this Unit.
- 1) Mention typical role of an ILS in library automation.

Make a comparison between 3rd and 4th generation ILSs.

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3) Enumerate features of 5^{th} generation ILS.

97

3.3 CATEGORISATION OF ILS

CDS/ISIS, a textual database management software developed by UNESCO in 1985, played an important role of forerunner for library automation in India. This package is not an ILS but provides an excellent framework for managing bibliographic databases such as library catalogue. It is specifically meant for the structured non-numerical databases, powered by a very comprehensive formatting language to control display of records and also provides many advanced level retrieval features. In India, erstwhile NISSAT (national distribution agency for CDS/ISIS) with the help of other professional bodies organised a number of training courses on application of CDS/ISIS (DOS and Windows version) in information organisation activities. As a result, a large pool of trained manpower developed all over the country. Some organisations from the experience of use of CDS/ISIS, MINISIS etc. developed their own ILSs e.g. DESIDOC developed DLMS (Deference Library Management System), INSDOC came with CATMAN (Catalogue Management) and SANJAY was developed by DESIDOC under NISSAT project by augmenting CDS/ISIS (Version 2.3) for library management activities. So we may say that first era of ILS in India dominated by ILSs developed in house such as DLMS, CATMAN and SANJAY. This trend is followed by commercial software firms in developing comprehensive full-featured ILSs in India. The era of commercial ILS is dominated by ILSs of foreign origin (such as Virtua ILS), ILSs developed in India by using foreign ILS (such as BASISPlus and TECHLIBPlus) and ILSs of purely India origin (such as LibSys, E-Granthalaya). However, the scenario of library automation in India has changed from 2001 onwards with the availability of open source ILSs which are available freely, customisable and based on global open standards in the domain of library automation. In this section we are for categorising ILSs available in India on the basis of two different train of characteristics - distribution policy (close source and open source) and place of origin (foreign origin, Indian origin and hybrid).

3.3.1 Categorisation by Distribution Policy

You know that software of any kind can be grouped into two fundamental categories – system software and application software. This grouping is based on the application levels of software. System software (such as operating system) is related with the management of resources in a computer system whereas an application software are designed to perform certain tasks such as database management (DBMS software), word processing (Word processing software), image processing (Graphic software) etc. Library automation software is an application software and manages library automation activities. On the other hand, as per the distribution policy (conditions for availability of software), software may be grouped into two broad divisions – close source software and

open source software (OSS). Close source ILSs are available against license fees (one time capital expenditure and recurring annual maintenance fees) or freely (a few close source ILS are available freely e.g. e-Granthalaya) without source codes. It means users cannot customise or modify the source code of ILS. Close source software therefore, may again be placed in two groups – commercial software and freeware. Open source software, on the other other hand, available freely with full freedom to customise the source code as per the requirements of the library. So, as per the distribution policy, the whole array of ILS may be categorised into three groups – Close source commercial ILS, Close source freely available ILS, and Open source ILS (see Table 3.2 with illustrative examples).

Types of Library					
Distribution policy	Large Library Systems	Medium Range Library Systems	Small Library System		
Close source ILSs (Commercial)	VIRTUA ILSLibSys	SLIM 21SOUL	• AUTOLIB • NIRMALS		
Close source ILSs (Freeware)	• ABCD	e-GranthalayaWEBLIS	 LAMP Librarian		
Open source ILSs (Freely available)	Evergreen ILSKoha (version 3.x)	Koha (version 2.x)NewGenLib	○ Emilda○ PHPMyLibrary		

Table 3.2: Categorisation of ILSs by distribution policy

Please remember the examples are only illustrative not comprehensive. There are several ILSs in use in Indian libraries both from commercial and open source domains. In the close source group the LibSys and SOUL are dominating ILSs, and in the open source group Koha and NewGenLib are the most popular ILSs. Some libraries in India are using WEBLIS which is based on CDS/ISIS. It has already been mentioned that the availability of open source ILSs helped in large-scale library automation in India as far as school libraries, college libraries and public libraries are concerned. Till date around fifteen open source ILSs as per the maturity level in terms of architecture, data model, core modules, support for standards, multilingual data processing ability, user services and interoperability. The Kuali ILS is an experimental open source library automation software as it is trying to implement the OLE and ILS-DI recommendations for developing the next generation automated library system.

Categorisation of Open source ILS by Maturity Level					
Fairly matured	Moderately matured Infancy		Experimental		
• Emilda	MiniSOPULI	• Avanti	Kuali ILS		
• Evergreen	• OPALS	• e-library			
• Koha (version 3.x onwards)	 OpenBiblio OtomiGenX	 PHPMyBibli PMB			
• NewGenLib	 phpMyLibrary 	• PYTHEAS			

 Table 3.3: Categorisation of open source ILSs by maturity level

3.3.2 Categorisation by Place of Origin

Mukhopadhyay (2001, 2005) grouped ILSs available in India on the basis of place of origin. This grouping later on was adopted by many researchers in the field. It includes three fundamental categories – ILSs of foreign origin, ILSs developed over ILSs (or textual database management systems) of foreign origin and ILSs of Indian origin. This grouping may again be sharpened by dividing the packages on the basis of size of library systems i.e. large library system, medium range library system and small range library system.

	Application Domain					
Origin	Large System System	Medium Range	Small System			
ILSs of foreign origin	 Alice for WINDOWS Evergreen Koha (ver 3.x) Virtua ILS 	Koha (ver 2.x)Emilda	 phpMyLibrary OpenBiblio PMB			
ILSs developed over ILS of foreign origin	 NG-TLMS.NET (over TLMS package) 	 WINSANJAY ABCD (Over CDS/ISIS) 	 LAMP WEBLIS (Over CDS/ISIS) 			
ILSs of Indian origin	 LIBSUITE LIBSYS MECSYS NEWGENLIB NEXLIB SLIM 21 SOUL SUCHIKA TULIPS ULYSIS WILISYS 	 AUTOLIB DLMS GRANTHALAYA LIBRA LIBRARIAN LISTPLUS NETLIB NIRMALS SLIM ++ 	 ARCHIVES CATMAN E-GRANTHALAYA GOLDEN LIBRA LIBMAN Library- Manager LIBRIS LIBSOFT LOAN-SOFT SALIM 			

Table 3.4: Categorisation of ILSs by place of origin

Self Check Exercises

Note: i) Write your answers in the space given below.

- ii) Check your answers with the answers given at the end of this Unit.
- 4) What is an open source ILS? List some major open source ILSs.

3.4 OPEN SOURCE SOFTWARE PACKAGES

Free/Libre Open Source (FLOSS) or simply Open source ILSs are maturing dayby-day and increasingly considered as viable alternatives to commercially available ILSs. Some of the open source ILSs are taking technological lead in cutting edge technologies, such as Koha is considered as leader in developing the model OPAC 2.0 (through integration of Web 2.0 tools like RSS, virtual shelf browsing, user-driven tagging, provision of book reviews by users, information mashp with Amason, Syndicate, LibraryThing, Open Library etc.) and in developing Z39.50 server facility for distributed cataloguing (most of the commercial ILSs only include Z39.50 client). Apart from these technological advantages, open source ILSs provide many other benefits such as –

- **Community ownership**: Users are considered as co-developers and there is no single owner of the ILS, rather user libraries are considered as stakeholders of the product;
- Vendor independence: Open source ILSs are free from vendor-lock in. It means libraries are free to hire expertise at the time of requirements;
- Smooth migration: If user library decides to switch over from one open source ILS to another ILS (commercial or open) the data migration is quite smooth and loose-less. But the migration from commercial ILS to open source ILS is not always an easy task due to problematic data transmission for obvious commercial reasons;
- Use of open standards: Open source ILSs use open standards for most of the work-flows and activities and thereby ensure transparent library operations;
- **Customisation**: No two libraries under the Sun run in the same way. Commercial ILSs provide a fit-to-all-size solution for libraries of any type or size. And these software cannot be customised as source codes are not available. Open source ILSs allow libraries to customise the source code to meet the requirements of individual libraries;
- **Fund savings**: As open source ILSs are available at no cost or at nominal cost, the library budget for software procurement and annual maintenance of the ILS may be utilised in other areas of library development;
- Freedom: Open source ILS allows librarians to operate at the system level whereas in commercial ILSs the role of librarians reduced to mere data entry operators. Apart from this benefit, open source ILSs provide freedom to use, modify and distribute the software on the basis of GPL (GNU General Public License); and

• **Fraternity**: Open source ILS supports fraternity in library community at the international level through cooperation, sharing of expertise and experiences.

A detail account of philosophies and principles of open source software is available in the next Unit i.e. Unit 4 in this block. However, in this section we are going to study the features of some matured open source ILSs that are globally reputed for their features, architecture and respectable user base (number of active users of the ILS). Presently fourteen ILSs are available against licensing agreements and these are Emilda, Evergreen. Gnuteca, InfoCid, Jayuya, Koha, NewGenLib, oBiblio. OPALS, OpenAmapthèque, OpenBiblio, PhpMyLibrary, PMB and Senayan. Müller (2011) in his study categorised the open source into two levels – i) Maturity of ILS Community; and ii) Maturity of ILS Functionality. Each of these two categories have divisions. For example, Müller divided the category ILS community into four divisions namely Inactive community, Just released community, Emerging community and Sustainable community against weight based decision matrices. The result is given below:

Category	FOSS ILS name
Sustainable	Evergreen, Koha
Emerging	PMB
Just Released	Gnuteca, InfoCID, NewGenLib, oBiblio, OPALS, Open Amaptheque, Senayan
Inactive	Emilda, EspaBiblio, Jayuya, OpenBiblio, PhpMyLibrary

Source: Müller, T. (2011). How to choose a free and open source integrated library system. OCLC Systems & Services, 27(1), 57-78.)

Similarly, rating by maturity of functionalities of open source ILSs in the above research study shows the following result:

Categories	FOSS ILS name
Mature	Koha
Improving	Evergreen, PMB

Source: Müller, T. (2011). How to choose a free and open source integrated library system. *OCLC Systems & Services*, 27(1), 57-78.)

The research study of Müller (2011) identified three matured open source ILS namely Evergreen, Koha and PMB. We are going to study these three open source ILSs along with NewGenLib as a special case as it is originated from India.

3.4.1 Evergreen

Evergreen (http://evergreen-ils.org/) is originated from public library domain in 2006 like Koha (released in 2000 as open source ILS). The Evergreen Project was started in 2006 by the Georgia Public Library System to support 275 public libraries in the state of Georgia, US. This Client-Server open source ILS is based on a robust, scalable, message-passing framework – OpenSRF, available under GNU GPL, version 2, and currently used by over 1000 libraries around the world.

Library Automation

It has modules for circulation (with sophisticated fiscal management), cataloging (with comprehensive MARC 21 based catalogue editor), Web catalog, and statistical reporting, acquisition and serials control. It also supports the SIP2 protocol for self-check The current relase is version 2.6 (released in April 2014) and the next release (version 2.7) is due in September 2014. It has comprehensive documentation (http://docs.evergreen-ils.org/), wiki (http://evergreen-ils.org/ dokuwiki/doku.php), and feature request facility.

System requirements

Evergreen is based on client-server architecture. It means that at server level we need to install server version of Evergreen and in client machines client version of Evergreen need to be installed and configured. The minimum hardware requirements of server and client machines are as follows:

Server level

- A high-end desktop or entry-level server.
- 1GB RAM, or more (if server runs a graphical desktop).
- Architecture to run Unix-like Operating System (any flavour of Linux).
- Ports 80 and 443 should be opened in for TCP/IP connections to allow OPAC and staff client connections to the Evergreen server.
- Network to establish server-client connections.

Client machines

- Low-end desktop with Windows (XP, Vista, or 7/8), Mac OS X, or Linux operating system.
- A reliable high speed Internet connection.
- 512MB of RAM.
- TCP protocol to connect Evergreeen server at ports 80 and 443.
- Barcode scanner and printer (optional).

Companion software

Apart from Evergreen server and client software, the server machine requires following companion software to run server version of Evergreen:

- 4) Unix-like Operating System.
- 5) PostGreSQl as RDBMS (version 9 or later).
- 6) Apache as Web server (version 2.x).
- 7) OpenSRF (version 2.3.0 or later).
- 8) libdbi-libdbd libraries.

Major Features

The general features of evergreen ensure stability (even under extreme server load), capability (robust handling of high volume of transactions and concurrent users), flexibility (to accommodate the varied needs of libraries), security (to protect our patrons' privacy and data) and interactivity (to facilitate patron and staff in using the system). Apart from these features, it supports all sorts of core activities like:

- System administration (privilege control, user and group management, cataloguing editor control, log records management, system parameters settings, report generation, granular access control, search enhancing, Z39.50 server and client settings, module administration, SMS gateway management, federated search control, EDI based acquisition control, theme and skin control for fine tuning user interface, data migration, backup and restoration etc.);
- Acquisitions (acquisitions settings, cancel/suspend reasons, claiming, currency types, distribution formulas, EDI (electronic data interchange), exchange rates, fund tags, funding sources, funds management, invoice menus, line item features [alerts appear in a pop-up box when the line item, or any of its copies, are marked as received], providers [vendor/supplier based profile that includes contact information for the provider, holdings information, invoices, and other information.]);
- Cataloguing (comprehensive MARC editor, authority data control, model data entry worksheet, authority lists support, multilingual data entry, integration of external resources, authority control through MARC 21 authority format, thesaurus integration (eleven number of thesauri are available and cataloguer can create new thesauri), creation of browsing categories, record display control, link checker (helps to verify the validity of URLs stored in MARC records), cross-linking of items (facility to link items to multiple bibliographic records), distributed cataloguing through Z39.50 client, bibliographic data export/import, bibliographic search enhancements supports for advanced search operators);

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Fig. 3.2: Thesaurus creation in Evergreen

- Circulation (Member management, member data migration, RFID integration, in-built support for bar-coded circulation, smooth issue/return, self-checkout facility through SIP2, circulation parameters settings, a separate facility for holds/reservation management, auto calculation of fines and overdue, SMS alert for overdue materials, facility to manage long overdue, member card generation, off-line circulation etc.);
- Serials control (MARC Format for Holdings Display (MFHD) display in the OPAC, two views of serials control – small number of issues and large number of issues (both views help to create subscriptions, add distributions, define captions, predict future issues, and receive items), loose issue management, holdings management through MFHD, special issues management, template toolkit for OPAC views for serials etc.);

- Report generation (separate report daemon, comprehensive report generation, facility to run recurring reports, reports organisation in folders, facility to select fields for report generation, sorting and filtering facilities, interface to generate report from back-end RDBMS (PostGreSQL), creation of report templates, exporting reports in different formats, report dump feature etc.); and
- OPAC (searching and browsing, availability of sophisticated search operators, separate OPAC for kids, user-driven skin control for OPAC, search results in many formats, including HTML, MARCXML, MODS and binary MARC21 format, facility to store favourite books in "My List:, third party content support (such as reader reviews) in Kids OPAC, user-driven holds/ reservation etc.).

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Fig. 3.3: OPAC in Evergreen

Special features

The Evergreen open source ILS originated as ILS for library consortia and has the credit of many special or unique features such as:

- Use of Open SRF (a message routing network that offers scalability and failover support for individual services and entire servers with minimal development and deployment overhead);
- TPAC support to associate a web page with a library (useful to link library information page, library rules, journal portals etc.);
- Auto-suggest option during OPAC searching (the facility may be enabled/ disabled by users);
- OPAC is Web Content Accessibility Guidelines (WCAG) 2.0 compatible to support access by physically challenged users;
- Meta-record search facility to access group formats and editions and for listing multiple constituent records;

- Support for MARC format for holdings display and its integration with OPAC for journal holdings;
- EDI support for acquisition of library materials and SIP2 support for self checkout; and
- Support for template creation by administrator and skin selection by users.

Important URLs

- Downloading (http://evergreen-ils.org/egdownloads/);
- Documentation (http://evergreen-ils.org/eg-documentation/);
- Users list (http://evergreen-ils.org/dokuwiki/doku.php?id=evergreen_libraries);
- Wiki (http://wiki.evergreen-ils.org/doku.php);
- Mailing list (http://evergreen-ils.org/communicate/mailing-lists/);
- Blog (http://evergreen-ils.org/communicate/blog/);
- IRC (http://evergreen-ils.org/communicate/irc/); and
- Book (http://en.flossmanuals.net/_booki/evergreen-in-action/evergreen-in-action.pdf).

Remark

Evergreen open source ILS has improved a lot in recent years and presently considered as the model ILS for managing library consortia and library networks. However, the above mentioned features of Evergreen suggest that the ILS can be deployed in any type or size of individual library to support core automation workflow as well as many value-added features.

3.4.2 Koha

As you know already, there are now almost fourteen open source ILS in the domain of library automation. But Koha is the first open source ILS (released in 2000 as open source) and possibly it is now the most feature rich open source ILS. Koha changed the rule of game in the ILS market and set trends in many ongoing changes in the area of library automation. Koha was originated in public library system of New Zealand. In Maori language Koha means an unconditional gift. The first version (1.0) of Koha made available for downloading as open source software in July 2000. The current stable version is 3.14.06 (released in April 30, 2014). The Koha ILS community is very active and in every month the developer community provides a bugfix release. Koha versions with new features are released in every six months (for example the next stable version 3.16 is expected to be released in June 2014). Koha is an integrated library management system that was originally developed by Katipo Communications Limited of Wellington, New Zealand for the Horowhenua Library Trust (HLT), a regional library system located in Levin near Wellington. In 1999, Katipo proposed developing a new system for HLT using open source tools (PERL, MySQL, and Apache) that would run under Linux and use Telnet to communicate with the branches. The software was in production on 3rd January 2000, and released under the GPL for other people to use in July 2000. Koha 1.01 was released on August 9, 2000. Koha is essentially based on LAMP architecture. Here L is Unix-like OS (different flavours of Linux); A is Apache Web server; M is MySQL

RDBMS and P is PERL programming environment. Koha is pioneer in a number of technological achievements such as use of Web 2.0 tools, integration of authority format and bibliographic data format, availability of OPAC interface in 25 different languages, implementation of Z39.50 server and OAI/PMH compatibility, in built support for social networking tools, independent branch management, Web-based self issue, use of open standards for different modules and granular system administration facilities.

System requirements

Koha is based on Web architecture. Both staff interface for professional activities and public access interface for retrieval are available through Web browser. This Web-enabled open source ILS supports 24×7 mode of access for both for staff and users. Another important advantage of the Web architecture is no requirement of installation of client software in the end-user terminals. A web browser (like Firefox, Chrome etc.) may act as client software at end user terminal. This feature of Koha reduces maintenance works to a great extent in a large campus library (for example we need to install, configure and maintenance Koha only at the server; at client level no Koha specific maintenance is required as client machines access Koha through a preloaded Web browser). In short, at server level we need to install Koha and client machines can access Koha server through Web browser (most of desktops and laptops are preloaded with web browser). The minimum hardware requirements of server and client machines are as follows:

Server level

- A high-end desktop or entry-level server
- 1GB RAM, or more (if server runs a graphical desktop)
- Architecture to run Unix-like Operating System (any flavour of Linux but Debian and its derivatives like Ubuntu are mostly in use)
- Ports 80 and 8080 should be opened in for TCP/IP connections to allow OPAC and staff client connections to the Koha server. These two ports are default ports for OPAC and staff interfaces respectively but the ports can be changed as per the network settings of the library
- Network to establish TCP/IP connections.

Client machines

- Low-end desktop with Windows (XP, Vista, or 7/8), Mac OS X, or Linux operating system
- A reliable high speed Internet connection (optional)
- 512 MB of RAM
- TCP/IP protocol to connect Koha server at ports 80 and 8080 (or other ports as desired)
- Barcode scanner and printer (optional).

Companion software

Apart from Koha, the server machine requires following companion software to run server version of Evergreen:

9) Unix-like Operating System (Koha users prefer Debian, Ubuntu and CentOS)

- 10) MySQL as RDBMS (version 5.5 or later)
- 11) Apache as Web server (version 2.x)
- 12) YAS toolkit
- 13) PERL programming environment (version 5.10 or later) and PERL modules (version 3.14 of Koha requires a total of 139 PERL modules).

Major Features

Koha is considered as the first and the best ILS from open source domain. It is a global The Koha developer team explored many emerging possibilities to redefine the scope of ILS such as OAI/PMH server, Z39.50 server, OPAC in 25 languages (the list is growing everyday), options for two text retrieval engines (Sebra and Apache-Solr), and options for two cataloguing interfaces (default cataloguing template and Biblios template). However, the major features are as follows:

System administration (global parameters settings for each module, basic parameters settings for library, enhanced contents for integrating cataloguing data with global resources through information mashup, comprehensive report generation, granular access control, independent branch management option, log records supervision, fine tuning of privilege control MARC bibliographic framework set, Z39.50 client settings etc.);

Koha administration

Global system preferences Manage global system preferences like MARC flavor, date format, administrator email, and templates. Search **Basic parameters** Hint Libraries and groups Define libraries and groups. Item tv Define item types used for circulation rules. Authorized values Define categories and authorized values for them. Patrons and circulation Define patron categories Circulation and fines rules Define circulation and fines rules for combinations of libraries, patron categories, and item types Patron attribute type Define extended attributes (identifiers and statistical categories) for patron records Library transfer limits Limit the ability to transfer items between libraries based on the library sending, the library receiving, and the item type involved. These rules only go into effect if the preference UseBranchTransferLimits is set to ON. Transport cost matrix Define transport costs between branches Item circulation alerts Define rules for check-in and checkout notifications for combinations of libraries, patron categories, and item types Cities and town Define cities and towns that your patrons live in. Road typ Define road types (street, avenue, way, etc.). Road types display as authorized values when adding/editing patrons and can he used in geographic statistics.

g-rules.pl

Catalog

MARC b

Create and manage Bibliographic frameworks that define the characteristics of your MARC Records (field and subfield definitions) as well as templates for the MARC editor Koha to MARC mapp

Define the mapping between the Koha transactional database (SQL) and the MARC Bibliographic records. Note that the mapping can be defined through MARC Bibliographic Framework. This tool is just a shortcut to speed up linkage. Keywords to MARC may

Define the mapping between keywords and MARC fields. those keywords are used to find some datas independently of the framework

MARC Biblio phic framework test

Checks the MARC structure. If you change your MARC Bibliographic framework it's recommended that you run this tool to test for errors in your definition.

Authority type Create and manage Authorities frameworks that define the characteristics of your MARC Records (field and subfield definitions).

Classification s

Define classification sources (i.e., call number schemes) used by your collection. Also define filing rules used for sorting call numbers.

Record matching rules

Manage rules for automatically matching MARC records during record imports.

- OAI sets configurati
- Manage OAI Sets

Acquisition parameters

Currencies and exchange rate

- Define currencies and exchange rates used for acquisitions.
- Budgets Define your budgets
- Define funds within your budgets

Additional parameters

Z39.50 client targets

Define which servers to query for MARC data in the integrated Z39 50 client. Did you n

Fig. 3.4: Koha administration

- Acquisitions (basic parameters for acquisition, budget head and fund allocation, real time fund accounting, vendor management, different types of order handling, order through Z39.50 searching, exclusive data entry framework in acquisition module, provision for item related information etc.);
- Cataloguing (comprehensive MARC editor, inclusion and integration of MARC 21 bibliographic and authority framework, integration of thesaurus and authority lists, multilingual data entry, sub module for authority data management, Z39.50 client search for both bibliographic and authority data, implementation of FRBR model in providing item related information, integration of catalogue data with global related resources through title-ISBN matching rule, help to manage leader, control (00X) and number and code fields (0XX) in MARC 21 etc.);

Circulation Patrons	Search 🕷 Cart More 👻	kohaadmin NO LIBRARY SET + Help
AL. 1.	Enter authorized heading:	
Э копа	Default : contains :	Heading A-Z : Submit
-	Search main heading Search all headings Keyw	ord search
iome > Authorities		
+ New a	authority • Q. New from Z39.50	

Fig. 3.5: Authority cataloguing in Koha

- Circulation (all required activities support, off-line circulation, granular circulation rules, fine calculation through cron job, RFID integration facility, member photo management, fast cataloguing in circulation module, renew, holds management, user-driven reservation etc.);
- Serials control (predictive mode of serials control, easy management of Kardex of loose issues of journals, holdings management, separate display for back volumes and current issues, provision for routing, easy renewals, creation of frequency master and numbering patterns, vendor-wise claim management, links with cataloguing module and budget head under acquisition module etc.);
- Report generation (predefined reports, custom report format, provision for pick-and-choose fields, auto scheduling of reports, sorting and filtering provision, statistical reports, top lists, format exchange provision); and
- OPAC (searching and browsing, enhanced content integration through information mashup, simple and advanced search interfaces, OPAC language change option, user login for personal information environment, authority searching, tag cloud, subject cloud, purchase suggestion, filter by language, item types and library, different sorting options title, author, relevance, dates, popularity, call number, range search and sophisticated search operators, cart for listing favourite documents, private and public lists, filtering by subtype by audience, by content type, by format, and by content type, by availability, purchase suggestions etc.).

L F L OPAC koha Search Library catalog : **अ •** Go E Cart Lists + by hierarchy | Authority search | Tag cloud | Subject roud | No. More resources here Useful links Welcome N-LARN Project Site Demonstration Koha OPAC Access: Library Address Welcome to the OPAC of the Koha You are welcome to search This demonstration library **MY University** our catalogue without Demonstration Library by LFL. has no physical address. logging in. Z 39.50 server developed by us Koha available as a service to current and prospective Koha users. This is the To access additional **Opening Hours** public catalogue only. You can also services you must log in. In access the Staff Client at n-lam.ac.in this demonstration, access The demonstration library Koha Comm is available to everyone: is available 24 hours per If you have any questions about Koha or day about N-LARN' services, please contact More resources here. US. Changes to the demonstration data base are erased nightly Powered by Linux 4 Librarians

Fig. 3.6: OPAC in Koha

Special features

The Koha open source ILS originated as ILS has many special or unique features. Some of the important special features are:

Enhanced features

- Can be integrated with free bibliographic data services (XISBN, Amazon, ThingISBN)
- Full authority control
- Compliant fully with Unicode 5.1
- Can be used as CMS (Integration of ILS and CMS)
- Easy control of contents/news/running text
- Can easily be integrated with wiki, blogs etc.
- Supports emerging standards like NCIP, MARC-XML, DCMES, METS
- Supports sophisticated search features Boolean, Relational and Positional operators
- Any report generation.

Standard supports

- SRU/W, Z39.50, UnAPI (http://unapi.info/), COinS/OpenURL
- OpenSearch (http://opensearch.a9.com/)
- Records are stored internally in an SGML-like format and can be retrieved in MARCXML, Dublin Core, MODS, RSS, Atom, RDF-DC, SRW-DC, OAI-DC, and EndNote;
- OPAC can be used by citation tools such as Zotero
- Koha 3.x includes support for 3M's Standard Interchange Protocol (SIP2), using the OpenNCIP libraries (http://openncip.org)

Library Automation

- Cross-platform, multi-RDBMS architecture
- News writer, label creator, calendar, OPAC comments, MARC staging and overlay, notices, transaction logs, guided reports with a data dictionary and task scheduler, classification sources/filing rules etc.

Web 2.0 features

- Can generate RSS (including ATOM) feed for search query
- Supports information mashup (OPAC can be linked with book jacket service, book rating/review from Amazon, Google books, Syndicate LibraryThing, Open Library etc.)
- Users can submit comments/rating/tags for any item from any device (mobile OPAC)
- Can be integrated easily with many Web 2.0 tools like zoreto, delicious, etc.

Important URLs

- Downloading (http://koha-community.org/download-koha/);
- Documentation (http://koha-community.org/documentation/);
- Users list (http://wiki.koha-community.org/wiki/Category:Koha_Users)
- Wiki (http://wiki.koha-community.org);
- Mailing list (http://koha-community.org/support/koha-mailing-lists/);
- Free support (http://koha-community.org/support/free-support/);
- IRC (http://koha-community.org/get-involved/irc/); and
- Calendar of events (http://koha-community.org/calendar/).

Remark

Koha has already established itself as a global trend setter in the domain of ILS. Many libraries in India are using Koha ILS such as Delhi Public Library system, Konkan Public Library system etc. There are almost 2500 installations of Koha. The inspiring examples are the National Library of Venesuela (7.5 million volumes), Delhi Public Library (1.4 million volumes), and the United Nations Food and Agriculture Library (1 million volumes). Koha provides mature support for all major library standards including MARC21 (a family of five standards), UNIMARC, Z39.50 (server and client), SRU/SRW, SIP2, OAI/PMH, Unicode etc. Koha presently serves the needs of a wide range of libraries from academic to public and from special and research libraries to corporate libraries.

3.4.3 NewGenLib

NewGenLib or NGL started as commercial ILS in 2005 and made available as open source ILS under GNU GPL in 2008. NewGenLib is the result of collaboration between a charitable trust called Kesavan Institute of Information and Knowledge Management (KIIKM), Hyderabad and Verus Solutions Pvt. Ltd. It is a platform independent ILS that can be installed in both Windows and Unix-like OS. NGL has five functional modules – technical Processing (Cataloging), circulation, acquisitions, serials management and web OPAC including administration for parameters settings and report generation. The features of the ILS are:

- Architectute (completely web based and adheres to International standards, supports web services and allows networking of unlimited number of libraries, database and operating system independent and uses open-source, n-tier, and Java based technologies for scalability, reliability and efficiency);
- Companion software requirements (JAVA SDK as programming environment, PostGreSQl as RDBMS, Apache Ant as Java installer, Lucene and Solr text retrieval engine, Apace Tomcat as web server);
- Standards support (NGL adheres to international standards like MARC21 (bibliographic, authority and holdings formats), ISO 2709, and AACR-2R. Cataloguing database design is based on well proven database design to adhere to MARC and also supports Unicode 4,0 and UTF-16 encoding format, by which it can support all the possible languages);
- Enhanced services (Import of MARC data from sources such as OCLC and freely available web-based resources, Extensive use of setup parameters in configuring the software to suit specific needs, e.g., in management of fines, Multi-user and multiple security levels, Automated email facility integrated into different functions of the software to ensure efficient communication between library and users, vendors, Module-specific querying in all modules);
- Acquisition (Online requests by users, Firm orders, On-approval purchases, Standing orders, Solicited gifts, Unsolicited gifts, Exchange-triggered acquisitions, Web service interfaces to supply sources such as *amazon.com*, Management information reporting to enable better decisions in acquisitions management;
- Cataloguing (supports data-entry using MARC tags, fields, sub-fields, etc., or Simple, label and form based data-entry, Import of MARC records from sources such as OCLC or from free MARC download sites on the web, Access to authority files during data entry and catalogue database searching, Catalogue record attachments enabling access to related data, e.g., multimedia, web-based resources, scanned images, and full text digital documents, Provision of a search engine to search full text documents, Plugins for specialised thesauri, Automatic validation etc.);
- Additional utilities (Network functionalities supports sharing of hardware, server and application software between the host and one or more associate libraries. It helps users of branch libraries - To download metadata or the full text of records, where records are available, into their desktops, In acquisition of new publications from the host library, To access their circulation records, To access electronic journals across all the libraries in the network, To improve services to both the end user and the library staff);
- Circulation (apart from traditional functions supports Setting of a wide range of circulation options, fines, user privileges, etc., needed in different library environments, Rapid charging, discharging, renewal and reservation operations, Built-in traps for delinquent users, reservations, etc., On-the-fly circulation, Interlibrary transactions, Binding management, Management Information Reporting for better management of collection and Assistance in stock verification);

- Serials control (includes facilities like Integrated management of serials subscriptions, registration, cataloguing and binding, Rapid registration of incoming serials using a kardex-like interface, Batch and on-demand claiming for missing issues, Support for Union catalogues, ?MIS reporting for better serials management); and
- OPAC (supports Browser-based access to the library's catalogue database, Extensive search, retrieval, display, print, download and formatting options for patrons (Customised, text format (brief), Text format (Full), MARC tagging, ISO 2709, MARC-XML, Dublin core), Patrons can request new additions, access their circulation data, make reservations and go to the web via the OPAC, Patrons can trigger interlibrary loans, interact with library staff via instant messages/email).

Special features

Functional modules are completely web based. Uses Java Web Start[™] Technology

- Compliant with international metadata and interoperability standards: MARC-21, MARC-XML, Z39.50, SRU/W, OAI-PMH
- Runs on open source components like Java SE, PostGreSQL
- A high degree of scalability
- OS independent Windows and Linux flavours available
- Z39.50 Client for distributed searching
- Multilingual supports (Unicode 4.0 complaint, easily extensible to support Indic scripts, storage, processing and retrieval of multilingual data)
- Provision for RFID integration
- Alerting and messaging services integrated into different modules of the ILS
- Templates for generation of form letters and applies XML-based OpenOffice templates
- Scope for extensive cutomisation like other open source ILS
- Supports digital media archiving and Android compatible.

Important URLs

- Downloading (http://www.verussolutions.bis/web/content/download);
- Documentation (http://www.verussolutions.bis/web/content/documentation);
- Users list (http://wiki.koha-community.org/wiki/Category:Koha_Users);
- Help from experts (http://www.verussolutions.bis/web/content/do-you-needurgent-help-newgenlib-get-expert-help-free-cost);
- Forum (http://www.verussolutions.bis/web/content/forum); and
- Free support (http://www.verussolutions.bis/web/content/get-help-librariansmy-region).

Remark

NGL is the first open source ILS released from India. It is now a matured open source ILS and many libraries are using NGL. It is under continuous development,

for example recently NGL Touch developed as a library kiosk application. The features of NGL ILS are quite suitable for Indian libraries for obvious reasons. Both free and paid supports are vailable for this ILS along side discussion forum, blog and documentation services.

3.4.4 PMB

Müller (2011) reported that PMB (PhpMyBibli) is improving rapidly and coming up as a fully featured open source integrated library system. The PMB ILS project was started by François Lemarchand in October 2002, the then Director of the Public Library of Agneaux, France. Presently it is managed by PMB Services, an initiative to support open source software. PMB is Web-enabled ILS and is using XAMP architecture (X – any OS; Apache as Web server, PHP as programming environment and MySQL as RDBMS). It is also using AJAX to support interactive and collaborative framework. This software is easy to install in comapre with other ILSs from open source domain. It supports both Windows and Linux platform with XAMP architecture. This open source ILS is available in four languages interfaces (English, French, Spanish, Italian). The first version was released in the year 2003 and the current version is 4.1 (released in March 2014). PMB, as open source ILS was initially available through GNU GPL licensing but presently it is available against CeCILL free software license. This platform independent open source ILS supports all basic library automation workflow alongside some advanced features like OPAC 2.0 and electronic SDI service.

System requirements

PMB is based on Web architecture. It means that only server version is required to be installed and in client machines Web browsers (like Firefox, Google Chrome, IE etc) may act as client software to access PMB server. The minimum hardware requirements of server and client machines are as follows:

Server level

- A high-end desktop or entry-level server
- 1GB RAM
- Architecture to run Windows or Unix-like Operating System
- Ports 80 should be opened in firewall for TCP/IP connections to access OPAC and staff client of PMB ILS
- Network to establish TCP/IP connections.

Client machines

- Low-end desktop with any operating system
- A reliable high speed Internet connection for enabling AJAX based services
- 256 MB of RAM
- TCP/IP protocol to connect PMB server at ports 80.

Companion software

Apart from Evergreen server and client software, the server machine requires following companion software to run server version of Evergreen:

- 15) MySQl as RDBMS (version 9 or later)
- 16) Apache as Web server (version 2.x)
- 17) PHP programming environment (version 5.x or later).

Major Features

Apart from supporting basic activities and automation operations, PMB is supporting authority file management, linking of subject headings with UNESCO thesaurus in cataloguing interface, Web 2.0 features (such as RSS feed, user tagging), SDI service module, facility to search formula (mathematical and chemical formulae), links to search external sources (Amazon, US books etc), shelf management, basic cataloguing of different document forms, on-line help etc. The regular features are as follows:

- System administration (configuration, parameters settings, security, thesaurus linking, SDI setup, external resource management etc.);
- Acquisitions (purchase management invoice, order, delivery, invoice, payment, accounting etc, budget control, suggestions management, vendor management, budget control etc.);
- Cataloguing (comprehensive UNIMARC editor, authority data control, Z39.50 client search, in built support of UNESCO thesaurus for subject access fields and authority search, predefined data entry format for different document forms, analytical entry etc.);

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IDR Server	Opening Hours	public catalogue only. You can also	services you must log in. In this demonstration, process	
Koha Community	The demonstration library is available 24 hours per day.	If you have any questions about Koha or about NLARN services, please contact	is available to everyone:	
are resources here	Changes to the demonstration data base are erased nichtly.	<u>us.</u>		

Fig. 3.7: Cataloguing in PMB

- Circulation (Member management, easy issue/return, calculation of fines and overdue, facility to manage overdue, hold/reservation management etc.);
- Serials control (new serials management, renewals, loose issue management, holdings management, bindings of back volumes etc.);
- Report generation (basic reports, statistical reports, report groups borrower related, document related loan related); and

• OPAC (Web OPAC, basic and advanced searching, linking of UNESCO thesaurus in OPAC, search filter by document types, search filter by fields, all field search option, search for external resources, search help, basic content management utility in OPAC, language selection facility in OPAC etc.).

Special features

The Evergreen open source ILS originated as ILS for library consortia and has the credit of many special or unique features such as:

- OPAC and Staff interfaces in four different languages and facilities to switch over language by selecting target language;
- A module to manage alerting service in SDI mode;
- UNIMARC bibliographic format for different document forms;
- Web-OPAC with Web 2.0 features like RSS, user tagging, book review linking etc.;
- Support for OAI/PMH, FRBR, RDF and RDA;
- E-book management options for different formats including e-Pub;
- RFID integration option; and
- XML based export/import.

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votre disposition pour	5 Information and communication					

Fig. 3.8: OPAC of PMB

Important URLs

- Downloading (http://forge.sigb.net/redmine/projects/pmb/files);
- Documentation (http://www.sigb.net/index.php?lvl=cmspage&pageid=20);
- User community (http://www.sigb.net/index.php?lvl=cmspage&pageid=18); and

Technical support (http://www.sigb.net/index.php?lvl=cmspage& pageid=17).

Remark

7)

PMB is quite suitable for small and medium scale libraries. The ease of installation and configuration makes it a suitable candidate for public libraries in India. It can be customised to a great extent to incorporate Indian languages. The only problem of this open source ILS is that the PMB portal is available in French language only and this ILS supports only UNIMARC format.

Self Check Exercises

Note: i) Write your answers in the space given below.

- ii) Check your answers with the answers given at the end of this Unit.
- 6) Point out the salient features of any one open source ILS known to you.

Make a comparison between any two open source ILSs of your choice.

3.5 COMMERCIAL SOFTWARE PACKAGES

Most of the large Indian libraries including elite institutes like IITs, IIMs, NITs, IISc, Universities and big college libraries, corporate libraries have adopted commercial ILSs for automating workflows of the libraries. There are two reasons for it - i) most of these institutes started library automation projects in early 1990s when open source ILSs were not available (remember that Koha, the first open source ILS released in July 2000); and ii) the institutes which started automation projects in early 2000 could not rely on open source ILSs because of the lack of on call support. However, situation in India is changing quickly. Many newly established institutes (such as West Bengal University of Technology, Kolkata, MG University, Kerala) are adopting open source ILSs (mainly Koha and NewGenLib) because of the availability/inclusion of features on regular basis, fund savings opportunities, active discussion forum/mailing list/software wiki etc and growing user base of open source ILSs. Some of the large scale libraries like British Council libraries (all centres in India) Indian Statistical Institute, Kolkata switched over from commercial ILS (LibSys) to open source ILS (Koha). This unit already categorised and listed commercial ILSs in sub-section 3.3.1

(see Table 2). There are many commercial ILSs in India that are in use. There is a pattern in adopting ILSs in India. The software LibSys, one of the early initiatives in library automation in India, is utilised by most of the large-scale academic libraries all over India but other commercial ILSs are region specific. For example, SLIM ILS (SLIM 21 and SLIM++) is popular in West India (Maharastra, Gujrat), AutoLib and NIRMALS are popular in South India. As it is not possible to cover all of the commercial ILSs listed in table 2 because of the space limitation, this section discusses only four commercial ILSs on the basis of their huge user base. These are LibSys, SLIM, SOUL and Virtua ILS.

3.5.1 LIBSYS

LibSys (http://www.libsys.co.in/) is an indigenous ILS designed and developed by LibSys Corporation, New Delhi in 1984. LibSys is presently available in six different editions/versions to suite requirements of different types of libraries. These are:

LIBSYS 7: This version of LibSys has features like Unicode Support, Federated Searching, Customisable look and feel, User notification through E-mail and SMS, RSS feeds and integration with Google Books, BookFinder, etc. and interactive features like online reviews, ratings, renewals, reservations etc. The modules are – Acquisition, Cataloguing, Circulation, Serials, Article Indexing, Web OPAC, Customisable Reports. LibSys 7 supports following standards – MARC21, Unicode, SRU/SRW, Z39.50, NCIP (NISO), SICI Barcode.

LSEase: The basic features of this version of LibSys are – independent of Operating System, support for digital media archiving, user-friendly workflow, user-defined security, may be extended to Web architecture.

LSAcademia: It is an ERP Solution to integrate administration of academic institutions and ILS. Apart from library management, it supports Admissions, Student Management, Academic Administration, Examination/ Results, Fee Management, Learning Triggers, Time Table, Student/ Parent Portal, Faculty/ Director Portal, Bus Use, Hostel, Staff Management, Payroll, Alumni etc.

LSmart: It integrates RFID and EM hardware from world renowned manufacturers with LIBSYS and thereby offers following add-on services - RFID Tags on Books/Documents and CD/DVDs, Multiple item processing simultaneously, Self-use Kiosk for check-out/check-in, Book Drops for quick check-in of items, Hand held RFID readers for Shelf Management, EAS Security Gates, Books Sorters to reduce items replacement times on shelves.

LSNet: This version of LibSys evolves around a virtual library that includes the collection of books, CD/DVDs, reference material, etc through a single Webenabled search interface. It may be integrated with LIBSYS 7 to provide platform for sharing e-content, promotion of library materials, value added services like book updates, reviews, upcoming titles etc.

LSDigital: It is a complete Digital Resource Management System (DRMS) which can be integrated with LIBSYS 7 for value-added digital contents dissemination. The integration provides Implicit interaction with LIBSYS database, Full-text and bibliographic searching through LIBSYS OPAC, Converts different data into format of choice (PDF, Doc, etc.), Define & organises library data structure / flow according to needs and Supports various image manipulations

Library Automation – Software Packages

3.5.2 SLIM

SLIM (System for Library Information Management) a client-server architecture based ILS developed by Algorhythms consultants Pvt. Ltd., Pune (http://slimpp.com). It is a module-based LMS that offers wide range of functionality for library management. Presently there are two versions of SLIM – SLIM 21 and SLIM++.

SLIM 21: The are three levels of SLIM 21 version – Basic Level (Acquisition, Cataloguing, Serials control, Circulation and OPAC); Enterprise Level (Basic Level integrated with Web based OPAC, Selective Dissemination Information (SDI), Inter Library Loan (ILL), Current Awareness Service (CAS), Web Proposals, Statistical Analysis); and L2L Level (Basic level + Enterprise level integrated with Z39.50 client, Z39.50 server, MARC-XML). All of these three levels are supported by additional utilities like Colon classification shelving order, Touch Chip Interface (Biometrics), Newspaper monthly billing, Smart Card / RFID interface, Library Map and News clipping publishing, Multilingual data processing and retrieval, Support for standards like NCIP, SIP2, ISO-2709 etc.



Fig 3.9: SLIM 21 control panel

SLIM ++ is a stripped down version of SLIM 21. It supports export/import through MARC/CCF/ISO-2709 standards and downloading of bibliographic data from online databases through DB Bridge module and Z39.50, generates customised reports on screen/printers/RTF or as text/PDF/HTML files with auto e-mailing facility, supports unicode based LMS that supports multi-script sequencing for Indian scripts, generates shelving order for documents as per colon classification, supports smart card/ RFID based circulation and touch chip (biometric) interface for user authenticity, creates library map for easy location of items and provides user-friendly online help and reference manual.

3.5.3 SOUL

SOUL (http://www.inflibnet.ac.in/soul/) is one of the oldest ILS initiative in India. The story of SOUL (Software for University Libraries) started with the development of ILMS (Integrated Library Management Software) by INFLIBNET in collaboration with DESIDOC. INFLIBNET later decided to develop a state-of-the art, user friendly, Window based system which will contain all the features/

facilities available with other ILSs in the market. As a result, the first version (version 1.0) of SOUL (Software for University Library) released in February 1999 during CALIBER-99 at Nagpur. SOUL uses RDBMS on Windows NT operating system as backend to store & retrieve data. The SOUL has six modules - Acquisition; Cataloguing; Circulation; Serials Control; OPAC and Administration. The modules have further been divided into sub-modules to take care of various functions normally handled by the university libraries. The features of SOUL version 1.0 are: Window based user friendly system with extensive help messages at affordable cost, Client-server architecture based system allowing scalability to users, Uses RDBMS MSSQL to organise data, Multiuser software with no limitation for simultaneous access, User friendly OPAC with web access facility, Supports bibliographic standards like CCF & AACR II and ISO 2709 for export & import facility, Provides facility to create, view & print records in regional languages, Supports LAN & WAN environment and Available in two versions – university library version and college library version. The second version of SOUL, named as SOUL 2.0 was released in January 2009.



Fig 3.10: SOUL 2.0 OPAC

SOUL 2.0 provides two options for back end DBMS - MS-SQL and MySQL. SOUL 2.0 is compliant to international standards such as MARC 21 bibliographic format, Unicode based Universal Character Sets for multilingual bibliographic records and NCIP 2.0 and SIP 2 based protocols for electronic surveillance and control. MARC-XML as standard for export/import, Supports cataloguing of electronic resources such as e-journals, e-books, virtually any type of material, Supports requirements of digital library and facilitate link to full-text articles and other digital objects, Supports ground-level practical requirements of the libraries such as stock verification, book bank, vigorous maintenance functions, transaction level enhanced security, etc.

3.5.4 Virtua ILS

Virtua ILS (http://www.vtls.com/products/virtua) is a globally reputed ILS product that offers the full spectrum of library activities. This ILS is designed and

Library Automation – Software Packages

developed by VTLS Inc., Virginia, US. It uses off-the-Shelf UNIX hardware and the Oracle RDBMS to guarantee continued availability and support. Apart from providing facilities to manage circulation, cataloguing, serials, acquisitions, it also ensures integration with course reserves and managed information environment (integration with student database, institutional repository and so on). All functions are fully integrated, allowing any staff user to access any function at any time according to their library-assigned permissions. The important features of this world-class software are enumerated here in the form of a list.

- System administration (It is fully parameterised software i.e. libraries can configure the setting to achieve maximum flexibility, Basic system includes modules for OPAC, circulation, reserves, cataloguing, acquisition, serials control and reporting,); Provides support for excellent security options at different levels of access, Provides comprehensive customisation parameters (over 1000) for global settings and each subsystem (OPAC, cataloguing, circulation, acquisition, serials control etc, Provides extensive and precise control over user activities and helps creation of rich and customised web interface for various collection components for each patron class;
- Ensures management of multiple libraries or branches across a library);
- Cataloguing (Supports national and international standards for data interchange, Full support for FRBR, FRAD and RDA, Basic system may be supplemented by companion products like RFID, MARC data processing suite, ILL manager and patron self cheek system, Supports multilingual authority control, and networked multimedia database management and seamless access to multiple databases through Z39.50 client, Supports UNICODE and thereby enables the input and display of different languages in their native scripts. In fact Virtua ILS ensures true multi-lingual catalogue database);
- Acquisition (Comprehensive support for all acquisition activities, Integration with institutional financial system, EDI support);
- Additional utilities (Syndetics content enrichment, OverDrive e-books, Comprise PC reservation and print management, iTiva automated telephone notification as well as most self-check and RFID circulation solutions, Allows data exchange with your student information system or financial management system);
- User interface (Helps designing web-enabled digital media archiving and supports development of digital library database (delivery options include CDROM, DLT, DVD and DAT), Provides 'security bit' enabled RFID solution to serve both inventory and theft deterrence functions.

Self Check Exercises

Note: i) Write your answers in the space given below.

- ii) Check your answers with the answers given at the end of this Unit.
- 8) Point the advantages and disadvantages of using commercial ILSs.

9) Discuss the features of any commercial ILS known to you.

121

3.6 FREEWARE ILSS

Freeware by definition are software that are available free of cost but without the availability of source code. There are some ILSs which are available for downloading and use freely but either they are using companion software which are not open source products (e.g. e-Granthalaya is based on Microsoft products like Windows OS, MSSQL RDBMS and ASP.NET programming environment) or based on non-open source textual database management system (e.g. ABCD and WEBLIS are based on CDS/ISIS). These ILSs are generally used by small-scale libraries like school libraries and rural public libraries. A total of three ILSs are most visible in the freeeware ILS domain. e-Granthalaya in India is developed and supported by a reputed government institute National Informatics Centre (NIC), WEBLIS is now supported by UNESCO and ABCD is the product of BIREME (an organisation based in Brazil that develops and maintains information resources for health science in Latin America and the Caribbean).

ABCD

ABCD (Automation of Libraries and Documentation Centers) is a comprehensive Web-enabled integrated library automation system developed by BIREME, Brazil. It is based on CDS/ISIS as back end databases and WWWISIS as middle-ware. The web interface of CDS/ISIS, called WWWISIS was developed by BIREME in 2005. BIRME in 2010 developed ABCD by using CDS/ISIS as database and WWWISIS as CGI script for designing Web-enabled ILS. It includes all major activities generally expected from a third-generation ILS. Core modules are -Cataloging, Circulation, Acquisitions, Statistics and Reports and OPAC. It also includes a facility called "Adds a Site". This facility is a built-in feature in ABCD to support content management system (CMS). It allows easy production of a library website with integrated meta-search option. In ABCD, cataloguers may use predefined bibliographic formats (like MARC21, UNIMARC, CEPAL) or they may create custom format by using FDT (Field Definition Table) utility of CDS/ISIS. As a whole, ABCD is a very flexible and versatile ILS for use in libraries and information centres where non-standard database-structure create non-bibliographical applications like experts databases, data bank and technology directory. ABCD (present version is 1.0) includes two circulation interfaces -i) standard loans-module; and ii) advanced loans module. The advanced circulation module provides external links with SQL-databases. The upcoming version 2.0 of ABCD will include digital media archiving module. This module will provide facility to handle textual objects and multimedia objects with full-text indexing facilities. The problem of ABCD is that it is not Unicode-compliant (the problem is inherited from CDS/ISIS) and therefore, cannot handle Indic scripts based documents. ABCD is available under GPL (version 3) and independent of

Operating System (bowser based cross-platform system) with standards support like MARC 21, MODS, OAI, XSLT. The programming environments are open source components like Java, JavaScript and PHP. As a whole ABCD is based on an array of technologies like ISIS database, ISIS formatting language, CISIS, ISIS Script, ISIS NBP, Java Script, Groovy and Jetty, PHP, MySQL, Apache and YAS

Resources:

- Technological features (http://reddes.bvsaude.org/projects/abcd/wiki/ Features);
- Wiki (http://wiki.bireme.org/en/index.php/ABCD);
- Download (http://bvsmodelo.bvsalud.org/download/abcd/ABCD_1.0_wis_full.exe);
- Project homepage (http://reddes.bvsaude.org/projects/abcd).

e-Granthalaya

e-Granthalaya has improved a lot recently through continuous up-gradation. The current release (version 3.0) supports almost all core activities of an ILS alongside advanced features like e-book management, Web-OPAC, predictive serials control, Unicode-compliant multilingual support, easy data migration and MARC 21 support for both bibliographic and authority data. This ILS is a product of National Informatics Centre (NIC), Department of Electronics & Information Technology, Ministry of Communications and Information Technology, Government of India. The only problem of e-Granthalayas is its dependency on Microsoft products (commercial close source software) like VB.NET or ASP.NET and MSSQL server 2005. The software can be implemented either in standalone or in client-server mode. In client-server mode database and WebOPAC are installed on the server PC while the data entry program is installed on client PCs. The version 3.0 of e-Granthalaya supports union catalog output. The major features of this freeware ILS are as follows:

- Technological features (runs on Windows Platform Only (Win XP/vista/7/ 8/Server 2003/2008) on LAN/WAN environment, UNICODE Compliant, supports data entry in local language);
- Administration (Module Wise Permission to the software Users, Workflow as per Indian Libraries and Retro-Conversion as well as Full Cataloguing Modes of Data Entry, Library Statistics Reports);
- Cataloguing (Authority Files/ Master tables for Authors, Publishers, Subjects, etc, Multi-Vol, Multi-Copy and Child-Parent Relationship pattern, Z39.50 Client Search Built-in, Export Records in CSV/Text File/MARC 21/MARC XML/ISO:2709/MS ACCESS/EXCEL formats, Centralised Database for member libraries, Import Data from any structured Source (MARC21/ EXCEL), Generate Bibliography in AACR2, Data Entry Statistics Built-In, e-Books management with digital files in pdf or other formats);
- Acquisition (Main/Branch Libraries Acquisition/Cataloguing, Print Accession Register, Bulk accessioning in single click, Budget and account control, Budget Modules with Bill Register Generation, Manages multibudget heads, Exchange rates, Report generation, Printing accession register etc.);

- Circulation (Issue/return, Membership module, Bar-coding support, comprehensive circulation reports);
- Serials control (Subscription/renewal with auto-generate schedule, CAS/ SDI Services and Documentation Bulletin, Micro-Documents Manger (Articles/Chapter Indexing));
- OPAC and Utilities (Search Module built-in with basic/advance/boolean parameters, Full Text News Clipping Services, Digital media integration with uploading / downloading of pdf/html, etc documents, Web Based OPAC Interface, Photo Gallery available for uploading photo and pictures of the organisations published on the Library Web site).

Resources

- Portal (http://egranthalaya.nic.in/);
- Forum (https://lsmgr.nic.in/mailman/listinfo/egranthalaya_forum);
- Software request (http://egranthalaya.nic.in/Request%20Form.pdf);
- Documentation (http://egranthalaya.nic.in/eG3_UserManual.pdf).

WEBLIS

WEBLIS stands for Web based Library and Information System. This Web based ILS is based on CDS/ISIS. It has been developed by the Institute for Computer and Information Engineering (ICIE), Poland by combining CDS/ISIS and WWW-ISIS engine (also developed by ICIE). It is freeware ILS and provides basic library workflow support through four modules – Cataloguing system, OPAC (search), LOAN module, Statistical module. WEBLIS is presently supported by UNESCO. The features of these four components of WEBLIS are:

- 1) Cataloguing system (module is supported by WWW-ISIS data entry facilities and allows management of different document types with support for powerful validation tools, Provision of integrated on-line thesaurus, Availability of model data entry worksheet etc.);
- 2) Circulation (Issue/return, Hold/reserve management, Auto generation of claiming (by e-mail or a traditional mail in word form), Task schedule, Authorised circulation (through password authentication), Member management, Member management, Loan statistics etc.);
- OPAC (Simple and advanced search, Search history, Saving queries function, and ISIS Query language facilities, Thesaurus based search support, ISO-2709 based export/import);
- 4) Statistics (Generate statistical data aggregated from the CDS/ISIS databases, Statistical analysis may be defined in a spreadsheet, Statistical data can be stored in given database).

Resources

- UNESCO Portal (http://portal.unesco.org/ci/en/ev.php-URL_ID=16841& URL_DO=DO_TOPIC&URL_SECTION=201.html);
- Download (http://www.unesco.org/webworld/weblis/Weblis070826.sip);
- Documentation (http://www.unesco.org/webworld/weblis/WEBLIS-DOC.sip);

Library Automation – Software Packages



Self Check Exercises

- Note: i) Write your answers in the space given below.
 - ii) Check your answers with the answers given at the end of this Unit.
- 10) What is freeware ILS? List major freeware ILSs.

11) Discuss the features of e-Granthalaya. What are the problems associated with this ILS?

3.7 EVALUATION OF SOFTWARE PACKAGES

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Evaluation of ILS is an important task for library professional in selecting an ILS for procurement and for migration from one ILS to another. Evaluation criteria must be framed on the basis of factors like: i) type and size of the library system; ii) nature of library services; iii) requirement of technical skills to handle the ILS; iv) use of ILS in neighbouring libraries; v) time needed to perform migration as well as regular maintenance; vi) compliance of ILS with global standards in the domain of library services and interoperability; and vii) fund requirements for capital and recurring expenditure (remember procurement of ILS is not one time capital expenditure, it also involves recurring cost for annual maintenance and regular updation). This section discusses the issues related with ILS evaluation in three heads – generic parameters, specific parameters for commercial ILS and parameters for open source and freeware ILS.

3.7.1 Generic Parameters of Evaluation

Experts differ in clustering the factors or parameters for ILS evaluation. This section attempts to group evaluation parameters into three broad groups – generic parameters, specific parameters for evaluation of commercial ILSs and parameters applicable for open source and freeware ILS. The generic parameters of evaluation for an ILS are applicable to all sorts of ILS irrespective of the origin of these products. The generic parameters (as devised by Mukhopadhyay in 2006) that should be taken into consideration are as follows:

Services availability checklist: An ILS is ranked by the services it provides. Evaluation of a typical third generation ILS should be based on the following core, enhanced and value-added services (Mukhopadhyay, 2006)–

- *Core services*: Acquisition, Cataloguing, Circulation, OPAC, Serials control, Bibliographic format support, Data exchange format support, Article indexing, Retro conversion, Standard report and System administration.
- *Enhanced services*: Customised report generation, GUI based user interface, Reservation facility, Interlibrary loan module, Multi-lingual support, Union catalogue, Authority file support and controlled vocabulary, Online help, Online tutorial, Power search facility, Internet support, Intranet support, Web access OPAC, Multimedia interface, Barcode support and Backup utility.
- *Value-added services*: Patron self service through RFID & Smart card (self circulation, self reservation etc.), Online user training/orientation, Stock verification facility, Members photo ID card generation, Barcode generation, Fine calculation & receipt generation, Gate pass generation, Bulletin board services & e-mail reports, Electronic SDI, CAS support, Digital media archiving support.

Functional checklist: The following general features are part of software module testing, and each functional activity must be tested or conducted during the evaluation process:

- Searching Capabilities (All modules)
- Data Entry and Editing (All modules)
- Bibliographic/item File and Maintenance
- Cataloguing editor (Cataloguing)
- Authority Control (Cataloguing)
- Inventory (Circulation)
- Check-out (Circulation)
- Renewal (Circulation)
- Circulation/Management Reports (Circulation)
- Check-in (Circulation)
- Fines and Fees (Circulation)
- Notice Production (Circulation)
- Holds (Circulation)
- Recalls (Circulation)
- Patron File (Circulation)
- Reserves (Circulation)
- Portable Back-up Units
- Report Writer
- Acquisitions
- Serials
- Electronic Databases
- Gateways
- Network Operations
- Z39.50 Client and Server

Library Automation

- Inter-Library Loan
- Web Accessibility
- Integrated Archiving
- Self Registration
- Statistics Generation
- Export and Import
- Fund Accounting
- Digital media archiving.

Data conversion and backup utility: The ability of the ILS in terms of support for data conversion from other library systems and adherence to the international bibliographic data standards and protocols should be checked extensively. In this age of shared cataloguing systems and web integration, the ILS should also support metadata schemas and interoperability issues like XML, RDF and OAI/ PMH. Backup facility in suitable media is also to be checked in view of data recovery at the time of need.

Standards compliance: In Unit 1 (sub-section 1.4.1) of this block, we already discussed the standards that need to be supported by a typical ILS. The minimum essential standards are – ISO–2709 for bibliographic data interoperability; Standard bibliographic formats compliant with ISO - 2709 (e.g. MARC 21, UNIMARC, CCF/B); Z39.50 protocol standard for distributed cataloguing;

Z39.71 standard for holdings statements; BS ISO 9735-9:2002 Electronic data interchange for administration, commerce and transport (EDIFACT); Z39.83-1 (NISO Circulation Interchange Part 1: Protocol (NCIP)); Z39.83-2 (NISO Circulation Interchange Part 2: Protocol (NCIP)); ISO/CD 28560-1(Information and documentation — Data model for use of radio frequency; identifier (RFID) in libraries — Part 1: General requirements and data elements); ISO/CD 28560-2 (Information and documentation — Data model for use of radio frequency; identifier (RFID) in libraries — Part 2: Encoding based on ISO/IEC 15962); ISO/CD 28560-3 (Information and documentation — Data model for use of radio frequency identifier (RFID) in libraries — Part 3: Fixed length encoding); and ISO/IEC 10646: 2003 (Universal Multiple-Octet Character Set or UCS).

The global de facto standards for interoperability that should be supported by an ILS are – MARCXML - MARC 21 data in an XML structure (developed by Library of Congress - http://www.loc.gov/standards/marcxml/) acting as base standard for bibliographic data export/import in place of ISO-2709; MODS (Metadata Object Description Standard) - XML markup for selected metadata from existing MARC 21 records as well as original resource description (developed by Library of Congress – http://www.loc.gov/standards/mods/); MADS (Metadata Authority Description Standard) - XML markup for selected authority data from MARC21 records as well as original authority data (developed by Library of Congress – http://www.loc.gov/standards/mads/); METS (Metadata Encoding & Transmission Standard) - Structure for encoding descriptive, administrative, and structural metadata (developed by Library of Congress - http://www.loc.gov/mets/); PREMIS (Preservation Metadata) - A data dictionary and supporting XML schemas for core preservation metadata needed to support the long-term preservation of digital materials (developed by Library of Congress –

http://www.loc.gov/standards/premis); SRU/SRW (Search and Retrieve URL/ Web Service) - Web services for search and retrieval based on Z39.50 (developed by Library of Congress - semantics http://www.loc.gov/standards/sru/); and OAI/ PMH Version 2.0 - Open Archive Initiative/Protocol for Metadata Harvesting (developed by Open Archive Initiative).

Hardware and third party software requirements: The ILS should provide a complete list of hardware requirements (processor type and RAM) for server and client machines, operating system requirements and back end RDBMS (with version) requirements. Evaluation should be based on total cost for minimum hardware and third party software requirements of the package.

Performance testing: Any ILS should be evaluated by checking some performance testing like transaction throughput capacity and response time, hardware functionality, module functionality, conversion testing, database loading, index building etc.

3.7.2 Specific Parameters of Evaluation for Commercial ILSs

Vendor validity: The reputation of software development group or the vendor is extremely valuable. The following questions should be raised to judge the validity –

- Is the vendor also the software developer, or is the vendor a distributor or agent for the software developer?
- Is there an international presence or is the company localised?
- How long has the software developer been in the library systems industry?
- How long has the library system you are interested in been on the market?
- Who use their products? (Look for someone in close proximity and contact him or her with questions. If possible, make an on-site visit to see the product in action.)

Training, Documentation and Customer support: The vendor must provide:

- Adequate training facilities without fees for supervisor and operators
 - To manage and operate the system on a day-to-day basic
 - To run file backup operations, software utilities and cataloguing utilities
 - To troubleshoot and solve simple problems and load software enhancement received from the vendor.
- Complete documentation (in hard copy and machine-readable form) must be available with the package along with regular documentation updates and release notes available for local printing or downloading via www including online help for modules and OPAC search.
- The package must have support from the software vendor for hardware and software maintenance, data conversion, emergency and on-call support and disaster management.

Library Automation – Software Packages

3.7.3 Specific Parameters of Evaluation for Freeware and Open Source ILSs

Public Library Association (PLA) working under ALA recommended a set of criteria in selecting open source ILS for library (see http://www.ala.org/pla/tools/ technotes/opensourceils). These criteria apart from the general criteria discussed above must be kept in mind in selecting open source ILS. The minimum essential criteria specifically meant for open source ILSs are as follows –

- **Currency and regular releases**: The open source ILS under consideration must have at least two substantial releases a year along with a road map for future development activities.
- **Core modules**: All core activities of a library like acquisition, cataloging, circulation, serials control, systems administration and patron access catalog modules must be available. Value-added services that require to run library operations smoothly (like barcode generation, fine calculation, gate pass printing, member card printing, web-OPAC etc.) must be included in road map of development.
- Standard Data Formats: MARC 21 family of standards (at least MARC 21 bibliographic format and Authority format) should be supported alongside export/import facilities (based on ISO-2709/MARC-XML). Availability of UNIMARC format in addition to MARC 21 standards is an added advantage.
- **IPR and Licensing**: Current source code and technical documentation are available for downloading under the GNU General Public License.
- User base: The product is currently in use in a significant number of libraries.
- **Scalability**: Scalability should not be an issue; it means there should be no risk of database size or activity levels exceeding the capacity of the software.
- **Developer group**: A dedicated group of developers ensures the progress of open source ILS under consideration such as adopting cutting edge technologies in developing new features and facilities.

Of course, the main OSS ILS in the U.S., Evergreen and Koha, meet all of these criteria. Libraries that have already decided to choose one of these systems will need to consider other factors. The Massachusetts Library Network Cooperative has released a useful list of points comparing these systems (http://masslnc. cwmars.org/node/1892).

Self Check Exercises

Note: i) Write your answers in the space given below.

- ii) Check your answers with the answers given at the end of this Unit.
- 12) Why do we need a framework for ILS evaluation? Enumerate the factors to be considered in selecting ILS.

 13) What are specific factors to be considered in selecting open source ILS?

3.8 GLOBAL RECOMMENDATIONS

ILSs are changing fundamentally to meet the challenges of network era and as a direct result of this transformation the difference between automated library system and digital library system is blurring day-by-day. We already covered the role of global recommendations in shaping ILSs and basic recommendations as proposed by ILS-DI and OLE in sub-sections 1.5.1 and 1.5.2 of Unit 1(block 1 of course 9) respectively. Here we are going to study major technical recommendations advocated by these two global agencies.

DLF ILS Discovery Internet Task Group (**ILS-DI**) Technical Recommendations are acting as pathfinders for advancement of ILSs or Library Management Systems (LMSs) globally. These recommendations were developed in 2008 by Digital Library Federation (DLF) to guide inter-operation between integrated library systems and external discovery applications (DLF, 2008). These recommendations are under continuous revision. The major ILS-DI recommendations may be grouped as follows:

General

- Improve discovery and use of library resources via an open-ended variety of external applications that build on the data and services of the ILS;
- Articulate a clear set of expectations;
- Make recommendations applicable to both existing and future systems and technologies;
- Support interoperation and cooperation with applications outside the traditional library domain;
- Ensure that the recommendations will be feasible to implement; and
- Be responsive to the user and developer community.

Interoperability, Functionality and Standard Compatibility

- Basic Discovery Interface (BDI) should support applications that provide discovery outside the ILS;
- BDI should include a broad range of practical discovery tools that operate in tandem with the OPAC;
- BDI may be linked with domain-specific discovery platforms (e.g. courseware repository in case of academic libraries and community information resources in case of public libraries);

- BDI should facilitate metadata harvesting, availability checking for resources (within and outside of library system) and bibliographic request functionality;
- Data aggregation, Real Time search, Patron functionality, and OPAC interaction;
- Compatibility with the established and emerging standards like OAI/PMH, SRU/SRW, METS, MODS, DCMES, MARC-XML, NCIP etc.;
- Facilities to expose bibliographic records to different external discovery tools (such as SOPAC, Vufind, etc.).

Data aggregation

- Many external discovery applications need to maintain external copies of ILS data and thereby supports should be provided for extracting, or harvesting, ILS data (bibliographic, authority, holdings, and other item metadata (such as circulation information) in bulk;
- Facilities must be provided for selective harvesting for external metadata transformation, cleanup, relationship (FRBRising), vocabulary mapping and other processing services;
- Bibliographic records should be in a well-specified format and each record should have a unique persistent identifier;
- Bibliographic records must be available in interchangeable native format (for example, a MARC record stored as relational table elements could be returned as native marc21, or as MARC-XML schema, or DCMES or MODS and METS; and
- Support for compatibility with different text retrieval engines (for example, a Lucene index of bibliographic records that can be searched with facets using Solr).

Search and retrieval

- Integration of ILS with digital library system or other application requires the capacity to perform rich, real time searches as a mission-critical feature;
- ILS should provide XML-based protocol like SRU/W (SRU and SRW) for distributed search apart from traditional library-centric search protocol like Z39.50;
- Enabling the ILS as a target for meta-searching via a standard federated search product or other discovery tool (with inclusion of features like result paging, sorting, and query filtering);
- Search system should display real time availability of results (both at the bibliographic level and at the item level), rather than availability data;
- Search system should be able to storing, processing and retrieving of Unicodecompliant multilingual documents;
- Full authority records should be available for Real Time Search. Like bibliographic and holdings information, authority information can be expressed using the MARC 21 authority format (http://www.loc.gov/marc/authority/).

Patron Functionality

- Library system should note that patrons use the OPAC for more than just discovery they also use it to manage their account and request delivery of discovered materials;
- System should ensure patron authentication, patron account retrieval, and circulation/delivery transactions;
- System should support standard protocols like NCIP and SIP2;
- Patrons must be able to retrieve all the personal information (like fine information, hold request information, loan information, messages etc.);
- System must support privilege control facilities to provide selective functionalities to patrons.

User Interaction

- Interface should have provision for adding links to external resources from within the OPAC;
- Availability of federated search mechanism is desirable;
- System should support standard protocols openURL;
- System must support interactive user interface for user-driven tags, comments, reviews and ratings.

The abstract reference model of **OLE project** centres on seven fundamental functions of library systems. The major recommendations are as follows –

Select Entity

This function describes the processes of acquisition of an entity and includes workflow like Obtain Metadata and Create Metadata. The resources may be gifts, approval plan items, firm orders, interlibrary loan requests, reserve requests, remote location requests, publication references, trial databases. Metadata can be obtained (if available) or created for descriptive, holdings (e.g. what is available and being considered for acquisition), authority, financial, or other types. The metadata may be harvested from or deposited by another system.

Acquire Entity

Associated license/registry terms are managed and documented within the system through this function. The workflow includes – selection of entity, assigning supplier/vendor, fund management, determine claiming cycle etc. The invoice process and payment activity may be executed manually or electronically (by using protocols such as: EDIFACT; ANSI X12, XML EDI.).

Describe Entity

This function is associated with description of physical or digital entities (resources, collections, people, organisations, services, events, courses, facilities, finances, relationships, etc.). It includes process to obtain, create, modify, delete, or expose metadata for an entity.

Deliver Entity

This function describes the process where a user submits a request for a service or resource and entity supplied to him/her to satisfy information demand. Entities cover a wide range like physical/digital, returnable/consumable, free/fee based, local/trans-local, and ownership/external.

Manage Entity

This function covers processes that track the life-cycle of an entity including preservation, conservation, evaluation, retention, relocation, duplication, version preference, rights management, binding, repair, reformat, replacement, and withdraw. The workflow includes Preserve/Conserve Resource, Manage Inventory, Configure Metadata, Manage Rights, and Reformat Resource.

OLE recommendations are very promising in developing futuristic ILSs. One example of such application is Kuali ILS, an extensible service-driven library management system. Kuali is an enterprise-ready, community-source software package developed on the basis of OLE recommendations. It manages and provides access not only to items in library collection but also to licensed and local digital contents. Kuali ILS has four major OLE components –

Select and Acquire Module

• This module of Kuali developed on the basis of Open Library Environment (OLE) recommendations and includes Financial, Selection, Acquisitions, Receiving, Payment/Invoicing, Licensing, and Electronic Resource Management (ERM), a component that supports operational processes for demand-driven acquisitions of library resources.

Describe and Manage Module

• This module is based on OLE's user-friendly interface that allows library staff to create and manage core metadata relating to library resources such as bibliographic data, localised holdings, and electronic resources access information.

Deliver Module

• This module covers the interactions between the library, its collection, patrons and discovery systems and provides the basic features/functions to manage patron records, item records, circulation tasks, holds management, fine calculation, NCIP standards compliance with local parameters e.g., patron-related blocks, item-related blocks, loan periods, notice types and notice frequency, etc.

System Integration

• Systems Integration is the link between the three modules: Select and Acquire, Describe & Manage, and Deliver. Kuali uses a common middleware suite called Kuali Rice to achieve service oriented architecture (SOA). The SOA supports interoperability related with identity management, acquisitions/ financial accounting, course and learning management, and student information systems.



Fig. 3.10: SOA of Kuali ILS based on OLE recommendations

Source: http://www.kuali.org/sites/default/files/ole/system_integration.png

Self Check Exercises

Note: i) Write your answers in the space given below.

- ii) Check your answers with the answers given at the end of this Unit.
- 14) Draw a summary of OLE recommendations.

15) Discuss how Kuali ILS is applying OLE recommendations.

3.9 SUMMARY

This Unit covered ILS available in India in depth. It provided a historical and theoretical foundation of library automation software development spanning last sixty years and under five different generations. Five generations of ILSs against a set of parameters framed in view of the technologies in use and services expected to be available have been compared. After discussing features of different generations of ILS, comparison of ILSs available in India on the basis two trains of characteristics – distribution policy (commercially available ILS, open source ILS and freeware ILS) and place of origin (foreign, Indian and originated in

foreign and developed in India) has been done. This Unit discussed features of four most promising open source ILSs, four commercial ILSs (selected on the basis of their user base in India) and three visible freeware ILSs. As evaluating exercise is considered as one of the most important tasks in library automation process, this Unit discussed evaluation parameters under three heads – generic (applicable to all kinds of ILS irrespective of distribution policy and place or origin), specific parameters to be considered for evaluating commercial ILSs and parameters important for evaluating open source ILSs. This Unit ends with a brief discussion on two sets of global recommendations in the domain of library automation namely ILS-DI recommendations and OLE recommendations. It also throws light on the impact of these recommendations in future development of ILS.

3.10 ANSWERS TO SELF CHECK EXERCISES

- 1) The role of typical library automation software is to manage two major subsystems of a library operational subsystem and administrative subsystem. Apart from the core activities like acquisition, cataloguing, serials control, circulation and public access interface, an ILS provides many value-added services like online acquisition, FRBRised cataloguing, RFID-enabled circulation, member card printing, bar-coding of accession number and member ID, predictive mode of serials control, interactive OPAC, federated searching, extensive reports and statistics in different formats for supporting decision making process etc.
- 2) Third and fourth generation ILSs mainly differ in the context of i) architecture (client-server vs. Web-enabled); ii) database technology (entity-relationship vs. object-oriented); iii) standardisation (bibliographic vs. all round); media support (limited support vs. extensive support); and distribution mode (mainly commercial vs. both commercial and open source).
- 3) The major features of the fifth generation ILSs are AJAX support, Support for FRBR, FRAD and FRSAD. Support for Linked Open Data, Use of open interoperability standards, provision of Cloud and Web-scale resource discovery, and Support for federated search.
- 4) Open source ILSs are available freely under GNU GPL license, extensively customisable (as source codes are available) and based on global open standards in the domain of library automation. The major open source ILSs are Koha, Evergreen, PMB, Avanti, NewGenLib and so on.
- 5) ILSs available in India may be grouped on the basis of two trains of characteristics distribution policy (close source and open source) and place of origin (foreign origin, Indian origin and hybrid). as per the distribution policy (conditions for availability of software), software may be grouped into two broad divisions close source software and open source software (OSS). Close source software therefore, may again be placed in two groups commercial software and freeware. As per the place of origin, ILSs may be grouped under three fundamental categories ILSs of foreign origin, ILSs developed over ILSs (or textual database management systems) of foreign origin and ILSs of Indian origin. This grouping may again be sharpened by dividing the packages on the basis of size of library systems

i.e. large library system, medium range library system and small range library system.

- 6) There are many open source ILSs of which Koha appeared first in the year 2000. It is now considered as the most feature rich open source ILS in the world. The user base of Koha is increasing rapidly all over the world. Many libraries are switching from commercial ILS to Koha because of the following features i) Web-centric architecture; ii) compliant with all major standards in the domain of library automation; iii) OPAC 2.0; iv) use of open source companion software; v) multi-lingual and Unicode-compliant; vi) supports all core and value-added features expected from fourth generation ILS packages; and vii) OPAC available in 25 languages.
- 7) A comparative study of Koha and Evergreen may be represented as below:

Koha	Evergreen
Web-centric architecture	Client-server architecture
Meant for individual library but may be extended to manage library network or library consortia	Meant for library network or library consortia but may be deployed in individual library
Uses MySQL as back end RDBMS	Uses PostGreSQL as back end RDBMS
Applies PERL modules	Applies OpenSRF

8) The advantages of using a commercial ILS are – i) less responsibility on the part of thelibrarian; ii) on call support service; iii) arrangement of training by vendor; iv) up gradation is responsibility of vendor; v) customisation is fee based vendor activity; and vi) light learning curve.

The disadvantages are -i) no customisation of workflow; ii) non transparent use of standards; iii) huge capital and recurring expenditure; iv) problem in data transfer and migration; v) vendor dependency in every step; and vi) slow release cycle.

- 9) Virtua ILS, a product of VTLS Inc, US, is one of the most comprehensive ILSs at the global scale. The real advantages of this ILS are – i) compliance with all global standards of library automation, ii) full support for bibliographic data models like FRBD, FRAD, FRASD; iii) provision for RDA based cataloguing along side MARC 21 and AACR 2; v) full support for Web 2.0 architecture to generate interactive user interface; vi) very sophisticated search mechanims; viii) facility to create customise workflow for library and many more such facilities. Virtua ILS is used by many national libraries including National Library of India.
- 10) Freeware ILSs are available for downloading and use freely but either they are using companion software which are not open source products (e.g. e-Granthalaya is based on Microsoft products like Windows OS, MSSQL RDBMS and ASP.NET programming environment) or based on non-open source textual database management system (e.g. ABCD and WEBLIS are based on CDS/ISIS). The visible freeware ILSs are e-Granthalaya, ABCD and WEBLIS.

Library Automation

- 11) The current version of e-Granthalaya (version 3.0) is client-server mode integrated library automation package that supports almost all core activities of an ILS along side some value-added services like news clippings, CAS/ SDI, article indexing, digital media archiving etc. It also supports many library standards like MARC 21, MARC-XML, ISO-2709 and S39.50 protocol. The main disadvantage of this ILS lies on it's heavy dependency on Microsoft products (Windows OS, MSSQL, VB.NET/ASP.NET) which are not open source software product. As a result a library is getting this freeware ILS at no cost but companion software procurement places huge financial burden on the library budget.
- 12) A framework for evaluation of ILS is required for three major purposes i) selection of an ILS for procurement from a short-listed group of ILS; and ii) selection of an ILS for migration from one ILS to another; and iii) development of RFP for seeking expression of interest (EOI). The parameters of selection must be based on following factors –) service availability checklist and standards support checklist; ii) functional features; iii) companion software requirement; iv) hardware support required; v) vendor reputation (in case of commercial ILS), vi) project duration and release cycle (in case of open source ILS); vii) data conversion and transfer support; viii) software architecture; ix) support for cutting edge technologies (like AJAX, Web 2.0, Linked Open Data) and x) support for training, documentation, on-call service (availability of forum, wiki and mailing list in case of open source ILS).
- 13) The following specific parameters, apart from the generic parameters should be cheeked in selecting an open source ILS – Currency and regular releases, Core modules support, Standard Data Formats, IPR and Licensing, User base, Scalability, and reputaion and duration of Developer group.
- 14) Open Library Environment project (OLE project http://oleproject.org) or the OLE project, funded by Andrew W. Mellon Foundation has started in early 2000. As a whole, the OLE project report for future ILSs may be summarised under following heads -1) Flexibility (Supports for wide range of resources; accessed by a wide range of customers in a variety of contexts); 2) Community ownership (Advocates systems that are designed, built, owned, and governed by and for the library community on an open source licensing basis); 3) Service Orientation (Prescribes technology-neutral service-oriented framework that ensures the interoperability of library systems); 4) Enterprise-Level Integration (Facilitates integration with other enterprise systems such as research support, student information, human resources, identity management, fiscal control, and repository and content management); 5) Efficiency (Provides a modular application infrastructure that integrates with new and existing academic and research technologies); and 6) Sustainability (Creates a reliable and robust framework to identify, document, innovate, develop, maintain, and review the software necessary to further the operation and mission of libraries).
- 15) Kuali Open Library Environment or simply Kuali-OLE is an experimental ILS, developed by Kuali Foundation Inc and funded by Andrew W. Mellon Foundation right from January 2010, to achieve the goals of OLE project. The final product is due in late 2014. It is based on six fundamental criteria

Library Automation – Software Packages

as set by OLE project for future ILSs. It is trying to implement following OLE features in the ILS product – Built, owned, governed by the academic and research library community; Supports a wide range of resources and formats of scholarly information; Interoperates and integrates with other enterprise and network-based systems, Supports federation across projects, partners, consortia, and institutions, Provides workflow design and management capabilities and Offers information management capabilities to non- library efforts.

3.11 KEYWORDS

Bibliographic metadata:		Information about a resource that serves the purpose of discovery, identification and selection of the resource. Includes elements such as title, author, subjects, etc.
EDI	:	Electronic Data Interchange (EDI) is a standard method for exchanging structured data, such as purchase orders and invoices, between computers to enable automated transactions.
EDIFACT	:	EDI For Administrations, Commerce and Transport The concept of utilising a single set of specifications for bibliographic records regardless of the type of material they represent.
ERMS		Electronic Resources Management System is used to manage a library's electronic resources, primarily e-journals and databases. Systems can include features to track trials, license terms and conditions, usage, cost, and access.
Evergreen	:	The first open source ILS designed to handle the processing of geographically dispersed, resource-sharing library networks and library consortia.
GPL	:	The GNU General Public License is an open source license that is used by Evergreen and Koha.
ILS	:	An automated library system that utilises shared data and files to provide interoperability of multiple library functions, e.g. cataloging, acquisition, circulation, serials, etc.
Interoperability	:	The ability for two different computer systems to communicate and exchange information in a useful and meaningful manner.
MARCXML	:	A metadata scheme for working with MARC data in a XML environment.
Metadata	:	Structured information that describes an information resource. "Data about data" for an information bearing object for purposes of description, administration, legal requirements,

NCIP

SIP2

SOA

SRU

SRW

technical functionality, use and usage, and preservation.

- **Metadata harvesting** : A technique for extraction of metadata from individual repositories for collection into a central catalog.
- **Module of ILS** : Functions specific to a particular system capability such as the online public access catalog, cataloging, acquisitions, serials, circulation, etc.
 - : NISO Circulation Interchange Protocol (NCIP) is a standard which defines a protocol for the exchange of messages between and among computer-based application to enable them to perform functions necessary to lend and borrow items, to provide controlled access to electronic resources, and to facilitate co-operative management of these functions.
- **Open Source** : A concept through which programming code is made available through a license that supports the users freely copying the code, making changes it, and sharing the results. Changes are typically submitted to a group managing the open source product for possible incorporation into the official version. Development and support is handled cooperatively by a group of distributed programmers, usually on a volunteer basis.
- **OpenSRF** : Open Service Request Framework is developed by Evergreen ILS team to achieve load balancing and service availability.
 - : Standard Interface Protocol Version 2 is a standard for the exchange of circulation data and transactions between different systems.
 - : Service-Oriented Architecture (SOA) is a software framework for managing loosely-coupled, distributed services which communicate and interoperate via agreed standards.
 - : Search/Retrieve via URL is a standard search protocol for Internet search queries, utilising CQL (Common Query Language), standard query syntax for representing queries.
 - : Search/Retrieve Webservice is web services implementation of the Z39.50 protocol that specifies a client/server-based protocol for searching and retrieving information from remote databases.

Unicode	:	A universal character-encoding standard used for representation of text for computer processing. Unicode provides a unique numeric code (a code point) for every character, no matter what the platform, no matter what the program, no matter what the language. The standard was developed by the Unicode Consortium in 1999.
Z39.50	:	A NISO and ISO standard protocol that specifies a client/server-based protocol for cross-system searching and retrieving information from remote databases. It specifies procedures and structures for a client system to search a database provided by a server.
Zebra	:	A high performance open source text retrieval engine for indexing and retrieval, used by Koha as its primary search system for bibliographic and authority data.

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